HP 3PAR Recovery Manager 4.3.0 Software for Microsoft Exchange 2007 and 2010 User Guide

Abstract

This document is designed for System Administrators and Microsoft Exchange Administrators who are experienced in using Microsoft Exchange 2007 and 2010 and responsible for backing up Microsoft Exchange mailbox or public store databases.



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Documentation

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1 Overview of Recovery Manager

System Requirements

General Requirements for Recovery Manager

- Microsoft Windows Server 2008 or 2008 R2
- Single processor with either 1.4 GHz (x64) or 1.3GHz (Dual Core)
- 512 MB RAM
- 32 GB hard drive space
- Virtual copy (snapshot) space must be available on HP 3PAR Virtual Volumes.

  To create virtual copies on the base volume, you must allocate virtual copy space to the volume itself when you create the base volume. For information on creating a base volume with virtual copy capability, or assigning virtual copy space after the base volume is created, see the HP 3PAR InForm OS Command Line Reference.

NOTE: For complete details on system configurations, see "Recovery Manager Layout" (page 12).

Components Required on the Exchange Server (Production Server)

- HP 3PAR InForm OS Command Line Interface (CLI)
- 3PAR VSS Provider Software for Microsoft Windows 2.1.1 or higher
- Recovery Manager Agent component

Components Required on the Backup Server

- Microsoft Exchange Management Tools component
- HP 3PAR InForm OS Command Line Interface (CLI)
- 3PAR VSS Provider Software for Microsoft Windows 2.1.1 or higher
- Recovery Manager Backup Server component

Licenses Required on the HP 3PAR Storage System

Licenses are required for the following software components:

- HP 3PAR Virtual Copy Software
- 3PAR VSS Provider Software for Microsoft Windows
- HP 3PAR Recovery Manager Software for Microsoft Exchange
- HP 3PAR Remote Copy Software (Optional)
- HP 3PAR Virtual Lock Software (Optional)

NOTE: For platform-specific release levels, refer to "Related Documents" (page 114).

Recovery Manager Requirements

- The mailbox databases (or storage groups for Exchange 2007) for which you are creating virtual copies must be online.
- The same level of software updates is required on all mailbox servers.

- Microsoft .Net Framework V3.5 or higher is required by VSS Provider as well as HP 3PAR Recovery Manager Software for Exchange. You can install this automatically by running the Setup.exe program provided with Recovery Manager Software for Exchange.
- Visual C++ (2008 Redistributable) Runtime libraries (x64 or x86). You can install this automatically by running the `Setup.exe` program provided with Recovery Manager for Exchange.
- (For Exchange 2010) For DAG configurations on multiple HP 3PAR Storage Systems that are separated by a long distance, two Recovery Manager for Exchange backup servers for each HP 3PAR Storage System are required.
- (For Exchange 2007) For CCR configurations on two HP 3PAR Storage Systems, where both nodes are separated by a long distance, two Recovery Manager for Exchange backup servers are required.
- Database and transaction log files must reside on the HP 3PAR Storage System before HP 3PAR Recovery Manager Software for Microsoft Exchange can be used to take snapshots.

NOTE: You must follow the instructions in the *Windows Server 2008 Implementation Guide* to set up the Windows Server.

NOTE: (For Exchange 2007) If you are running a Single Copy Cluster (SCC) or a CCR (Cluster Continuous Replication) on Windows 2008, the backup server needs to have the "Failover Clustering" feature enabled to function properly.

(For Exchange 2010) The backup server needs to have the "Failover Clustering" feature enabled to function properly.

NOTE: For platform-specific release levels, refer to "Related Documents" (page 114).

Running Recovery Manager on a Japanese OS

△ **CAUTION:** To be fully compatible with Recovery Manager, you must use English-language naming conventions in your Exchange setup (for example, for domain names, database names, path names, and so on).

Recovery Manager does not function correctly when any language other than English is used, even for areas in which Exchange itself supports Japanese characters.

- Exchange OS: Windows Server 2008 R2, Japanese OS
- 3PAR VSS Provider 2.1.1 Software or higher
- HP 3PAR Recovery Manager Software for Microsoft Exchange 4.3 or higher
- HP 3PAR Storage System 2.3.1 or higher

NOTE: The Japanese OS does support scheduling virtual copies using Task Scheduler. For more details, see "Automating Tasks" (page 44).

Features Supported

- Exchange online virtual copy creation using Volume Shadow Copy Service
- Volume Shadow Copy Service "Full" backup type
- Virtual copy creation of local and remote Windows domain mailbox servers (or Exchange Servers for 2007)
- Centralized virtual copy management with multiple mailbox servers (or Exchange Servers for 2007)

- (For Exchange 2010) Virtual copy creation of Database Availability Group (DAG) databases where the active and passive mailbox database copies reside on one or more HP 3PAR Storage Systems.
- (For Exchange 2007) Virtual copy creation of CCR databases, where active and passive copies reside on a single or dual HP 3PAR Storage System with single or dual Recovery Manager backup servers, where the second backup server connects to a secondary HP 3PAR Storage System at the remote site
- Virtual Lock of DAG mailbox database (or CCR storage groups for Exchange 2007) and DAG/CCR virtual copies
- Scheduling and management of automated tasks
- Mount virtual copies on Windows hosts on which Recovery Manager is installed
- Mount virtual copies with read/write permissions
- Unmount virtual copies
- Delete virtual copies
- Backup using HP Data Protector or Symantec NetBackup
- Restore from backup using HP Data Protector or Symantec NetBackup
- Public folders
- Coexistence with autonomic groups (domain sets, volume sets, and host sets)
- Automatic Recovery for File Copy and Volume restores
- Recovery Manager GUI
- Recovery Manager CLI
- Cross–Windows-domain support
- HP 3PAR Remote Copy Software (in both synchronous and asynchronous periodic mode)
- Queueing of virtual copy creation and backup for different mailbox databases/storage groups from the same backup server
- (For Exchange 2007) Single Copy Cluster
- (For Exchange 2007) Host sets for Single Copy Cluster
- Hyper-V support
- Peer motion support

Features Not Supported

- VSS backup types “Incremental,” “Differential,” “Copy,” and “Log”
- A single Exchange server spanning different HP 3PAR Storage Systems
- All backup tools, except for HP Data Protector and Symantec NetBackup
- Access to the HP 3PAR Storage System via SSH
- Creation of virtual copy on System Boot Volume
- Windows automount feature
- Date customizing: Recovery Manager always displays dates in month/day/year format
- (For Exchange 2007) Exchange CCR volumes in a Remote Copy volume group
- (For Exchange 2007) Cross HP 3PAR Storage System mounts (includes CCR dual HP 3PAR Storage System configurations)
- (For Exchange 2007) VSS snapshot backup for SCR node

Microsoft Volume Shadow Copy Service

Microsoft includes VSS (Volume Shadow Copy Service) in Windows to simplify the enterprise's storage environment. It provides a framework for creating a point-in-time copy of either a single volume or multiple volumes.

Microsoft Windows Server VSS works with the VSS-aware applications that are in use to determine when a volume shadow copy (snapshot) can be made. (A snapshot is a virtual copy: a copy of some data set, for example, a disk volume, at a point in time.) VSS then communicates with the operating system and applications and freezes I/O to the storage system to allow snapshot creation (without the freeze function, data could become corrupted when the snapshot is taken because the system might be in the middle of a task). Meanwhile, applications continue to run uninterrupted. The original volume continues to change as the process continues, but the shadow copy of the volume remains constant. VSS also gives permission to the backup application to access the volume and back it up in its frozen state. The shadow copy volume is then used for the actual backup. After VSS saves the shadow copy volume on the backup device, it deletes the shadow copy.

VSS coordinates between Requestors (backup applications such as Recovery Manager), Writers, and Providers (components that create the shadow copies).

Table 1 VSS Components

VSS Component	VSS Component Description
Requestor	The requestor is backup software that initiates the creation of the shadow copy.
Writer	The writer is any application software that participates in the shadow copy process and whose files and data are included in the process.
Provider	The provider is the storage technology that does the actual shadow copy.

Supported VSS Components

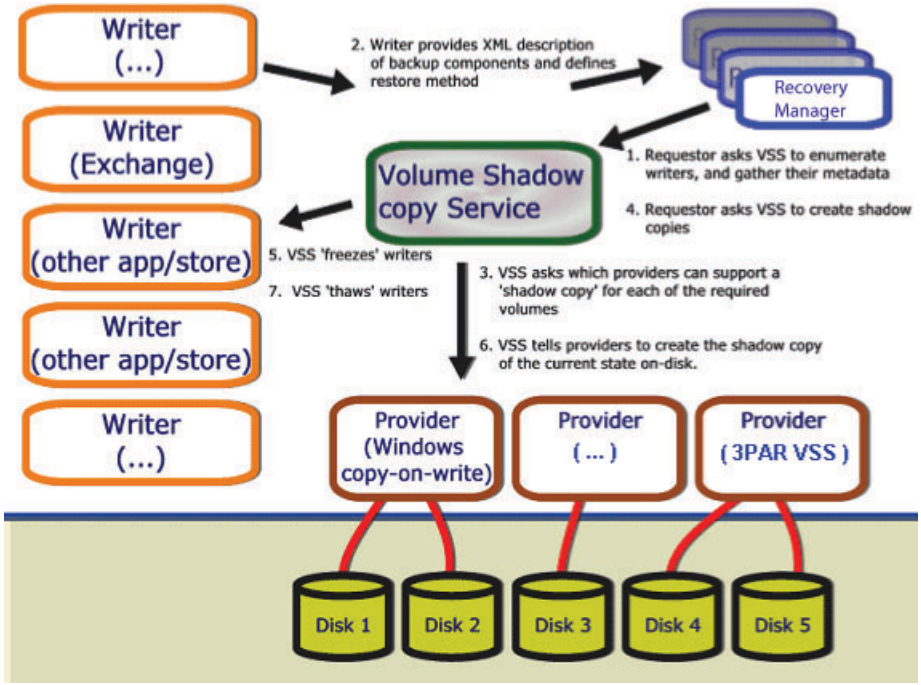
VSS components currently supported by 3PAR VSS Provider for Microsoft Windows include:

- Requestor
  - Recovery Manager
  - Symantec NetBackup for Microsoft Windows
  - HP Data Protector for Microsoft Windows
- Writer - Microsoft Exchange 2007 and 2010

NOTE: For platform-specific release levels, refer to the latest HP 3PAR InForm OS Configuration Matrix. To obtain a copy of this documentation, go to http://www.hp.com/go/3par/, navigate to your product page, click **Support for your product**, and then click **Manuals**.

How 3PAR VSS Works with Microsoft Exchange

Figure 1 HP 3PAR VSS Provider Software for Microsoft Windows Operation Overview



1. The requestor (Recovery Manager) sends a command to the Volume Shadow Copy service to take a shadow copy of the selected mailbox database (or Exchange storage group for Exchange 2007).

   If a previous request is still in process, Recovery Manager adds the new request to the request queue.
2. The Volume Shadow Copy service communicates with the Exchange writer or public folder database to flush the current log file generation to disk and suspend any writes to the log files and to the `.edb` file. The `.stm` file is not allowed to grow; however, read-only access is still allowed. Therefore, anything that is already there can still be accessed from the client.
3. Volume Shadow Copy service communicates with the provider to initiate the shadow copy process for the disk volumes that contain Exchange data. VSS talks to the writers and providers to fix a point in time for the shadow copy to take place; it is the provider that actually does the shadow copy.
4. The shadow copy typically takes less than a minute. Clients that use Microsoft Outlook in cached mode do not notice any disruption. Clients of earlier versions of Outlook might see an hourglass icon for several moments during the shadow copy process.
5. After the shadow copy is created, Volume Shadow Copy service communicates with the Exchange writer to indicate that it can resume writing to disk.
6. The queues of the email transactions are written to the logs.

The shadow copy is now available to the requestor for backing up.

Recovery Manager Layout

Recovery Manager allows for many types of configurations, depending on your setup.

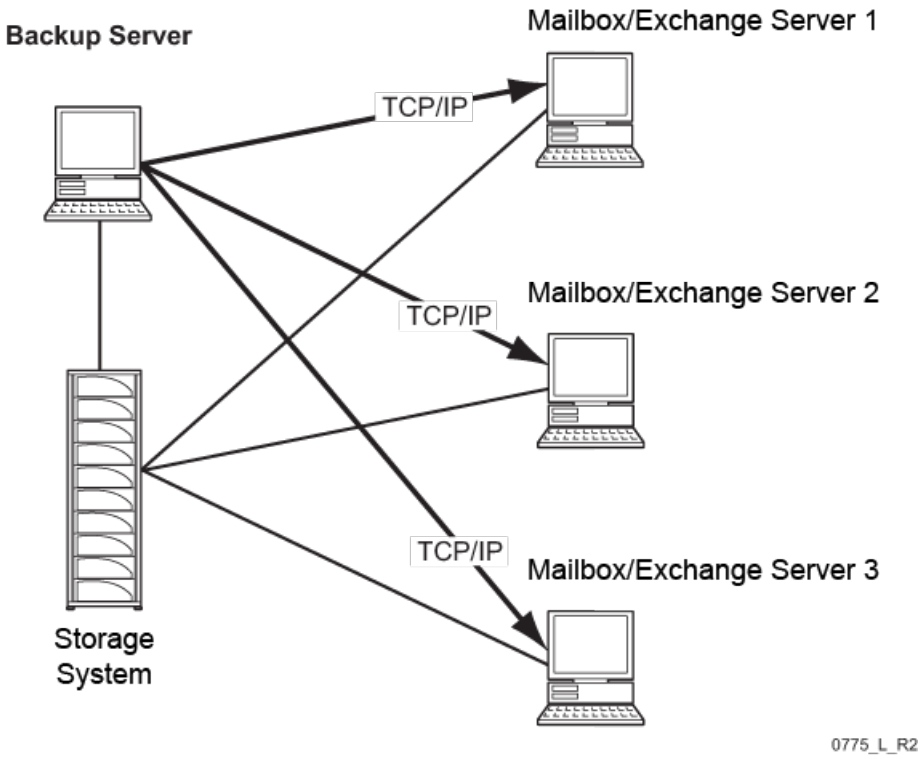
Centralized Backup Configuration

A centralized backup configuration, shown in Figure 2 (page 13), allows you to maximize the resources and performance of the mailbox servers (or Exchange servers for Exchange 2007) through off-host central control management capabilities. A single Recovery Manager Backup

Server installation can remotely create virtual copies on multiple mailbox servers (with a Recovery Manager Agent installation) and manage all virtual copies on the backup server.

This type of configuration is recommended if you need to manage multiple mailbox servers or are in a clustered environment.

Figure 2 Centralized Backup Configuration



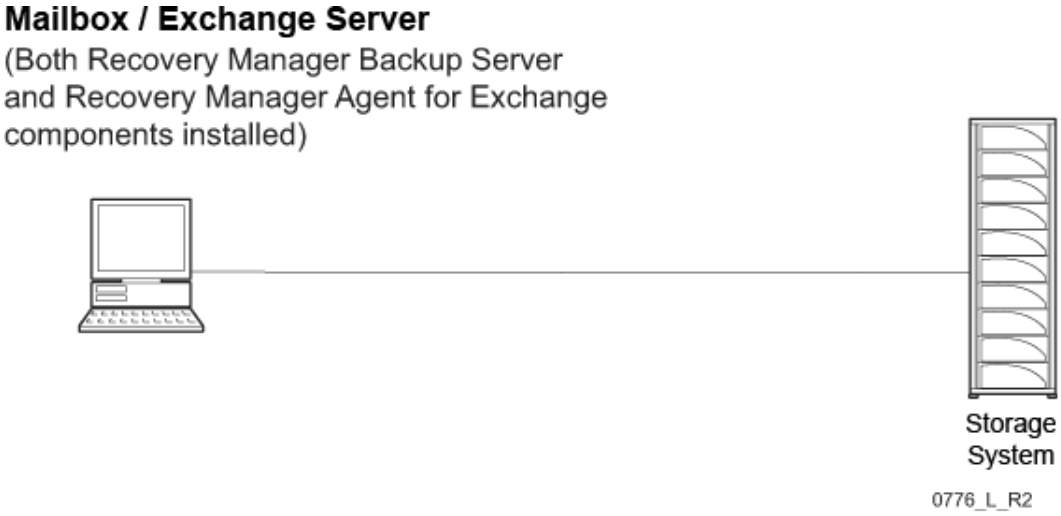
NOTE: The Exchange System Management Tools is required on the Recovery Manager backup server for validation purposes. In addition, the mailbox servers (Exchange Servers for Exchange 2007) and the Management Tools must be the exact same version.

NOTE: All mailbox servers (or Exchange Servers for Exchange 2007), including the Recovery Manager backup server, must be in the same Windows domain (unless you have configured Recovery Manager to use multiple Active Directory domains).

Single Host Backup Configuration

A single host backup configuration, shown in Figure 3 (page 14), allows you to manage virtual copies locally on the Mailbox/Exchange Server.

Figure 3 Single Host Backup Configuration



Multiple Host Backup Configuration (For Exchange 2010)

HP recommends that you use a separate Recovery Manager for Exchange backup server for the mailbox databases/storage groups on each HP 3PAR Storage System and that you execute commands from each Recovery Manager backup server for each HP 3PAR Storage System. For example, if your Exchange configuration involves two systems, System1 and System2, you should use two backup servers and execute Recovery Manager commands for System1 from Backup Server 1, and execute commands for System2 from Backup Server 2. If you have one HP 3PAR Storage System, you need just one Recovery Manager backup server, and the `-vs` parameter is the Recovery Manager server used for verification.

Backup Configurations

(For Exchange 2010) If your Exchange 2010 configuration uses Database Availability Groups (DAG), which replicates mailbox database(s) across multiple HP 3PAR Storage Systems, HP recommends that you use a master Recovery Manager backup server and use the other Recovery Manager backup servers as verification servers (designated with the `-vs` parameter). Under this configuration, the Recovery Manager for Exchange repository is centralized, and managed from one server. Keep in mind that under this configuration, each verification server must have Recovery Manager Backup Server installed in order to perform backups to media.

(For Exchange 2007) CCR configurations can be implemented at a single site or span multiple sites. When implemented at a single site, a single backup server is utilized. For implementations that span multiple sites, two backup servers are required. The command `RMExch peer` is used to specify the name of the peer backup server for multiple sites. This command must be run in CCR configurations using two backup servers and is not required for CCR configurations using only one backup server. See “Configuring Recovery Manager” (page 22).

When implemented at a single site, you can use a single backup server, as shown in Figure 4 (page 15) and Figure 5 (page 15). For implementations that span multiple sites, you must use one backup server per site, as shown in Figure 6 (page 16).

Figure 4 Single HP 3PAR Storage System, Single Site

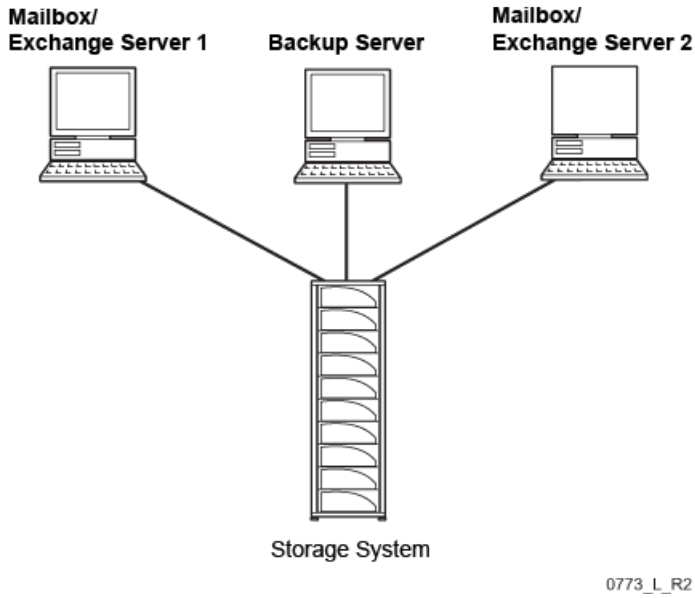


Figure 5 Two HP 3PAR Storage Systems, One Site

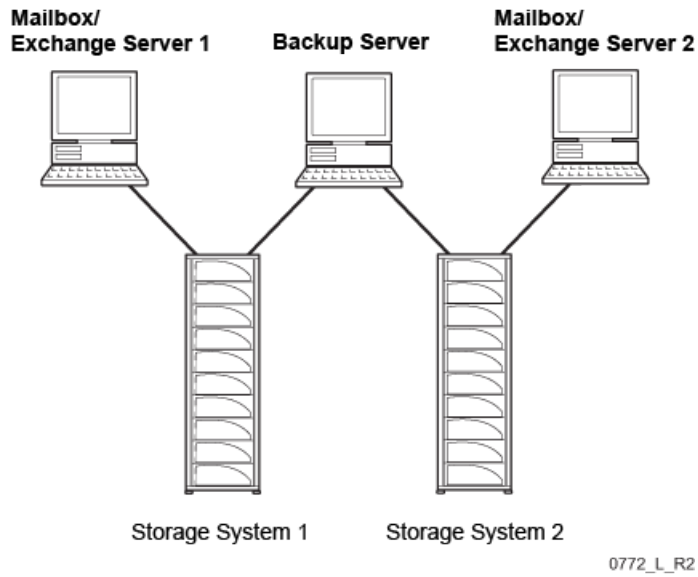
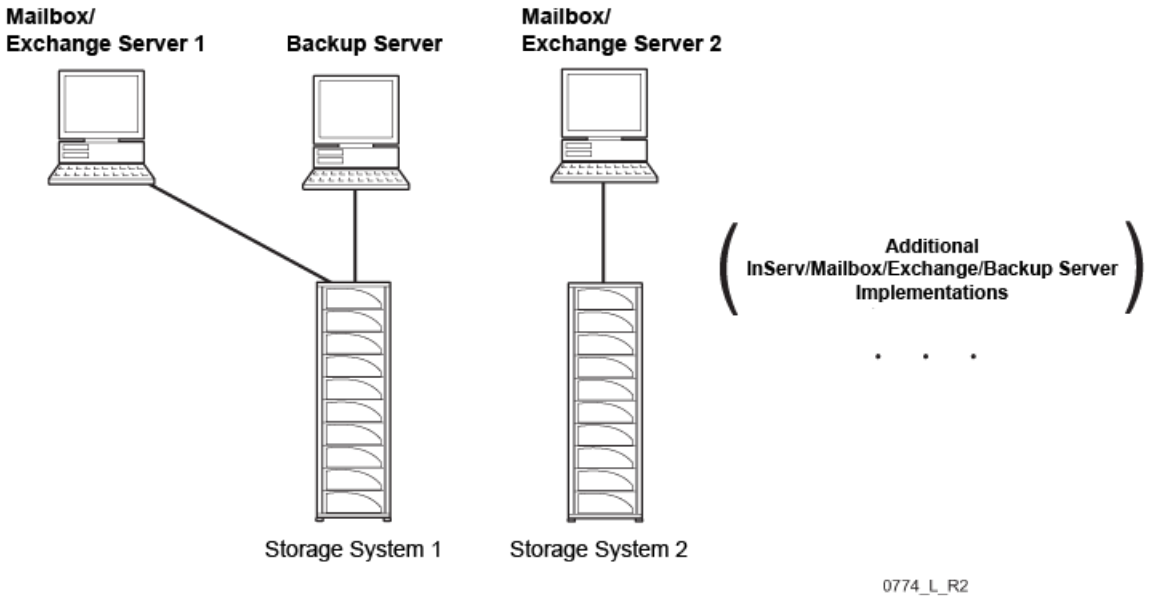


Figure 6 Multiple HP 3PAR Storage Systems, Multiple Sites



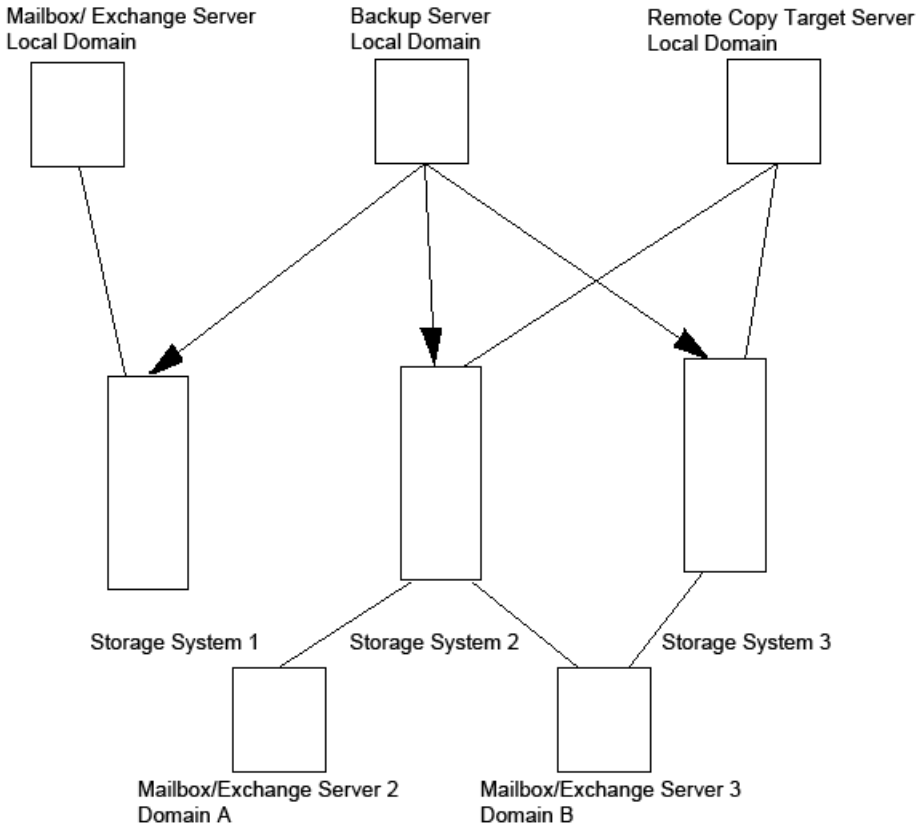
Multiple Domain Backup Configurations

Multiple domain backup configurations, shown in Figure 7 (page 17), allow you to use one backup server for multiple Active Directory domains. Keep in mind:

- All backup components (for example, the backup server, backup software client, and Remote Copy target server) must be in the local domain.
- The production servers and the Windows hosts enabled for mounting virtual copies can be in domains other than the local domain.
- (For Exchange 2010) You must install the Client Access server role on each Recovery Manager for Exchange 2010 machine.

For more information about configuring multiple domain setups, see "Configuring Multiple Domains" (page 28).

Figure 7 Multiple Domains



Server Relationships

The following defines the roles, relationships, and restrictions between the server types:

Backup Server

The backup server plays a central control point for the Recovery Manager that controls and manages the backup and restore on different mailbox/Exchange servers. Keep in mind:

- If you are using third-party software (such as NetBackup or Data Protector) in the backup environment, you must install the backup client or master on the backup server.
- When specifying the verification server with the `-vs` option (see "`RMExch backup`" (page 59)) for backups, you must install the Recovery Manager Backup Server component on the server.

Remote Copy Backup Server

Depending on the configuration, the Remote Copy backup server(s) manage synchronous and asynchronous periodic Remote Copy virtual copies.

Mailbox Servers (for Exchange 2010)

Mailbox servers can be standalone servers, or they can be configured as a member of a DAG.

Exchange Servers (For Exchange 2007)

The Exchange Servers can be standalone servers or cluster virtual servers.

Connectivity

- Both the backup server and the mailbox/Exchange servers must be connected to the same HP 3PAR Storage System.
- To manage a DAG-enabled configuration (or a CCR enabled configuration for Exchange 2007) from a single backup server for DAG/CCR nodes that connect to two HP 3PAR Storage Systems within the same site, the backup server must connect to two HP 3PAR Storage Systems with separate Fibre Channel or iSCSI connections. The HP 3PAR Storage Systems also need to be in the same Active Directory domain unless you have registered multiple Active Directory domains.

2 Installing and Uninstalling HP 3PAR Recovery Manager for Microsoft Exchange

Requirements for Configuring an Administrator Account

Before proceeding with the installation or performing any administrative operations, ensure the following user privileges for *Administrator* meet the following requirements:

- Exchange permissions must be assigned to a user account through Microsoft Exchange
- Domain account(s) must be present in the local administrator's group in order to install and to run Recovery Manager
- Apply a role of greater than *read only administrator* to the Windows domain account running Recovery Manager Software for Microsoft Exchange

Upgrading to Recovery Manager for Exchange

This section provides instructions for upgrading to HP 3PAR Recovery Manager Software for Microsoft Exchange from version 4.1.0 to version 4.3.0.

NOTE: To migrate from versions 4.1.0 or 4.2.0, remove the current version of Recovery Manager for Exchange, install Recovery Manager for Exchange 4.1.0 or 4.2.0 and move the Repository folder from the old `\vcdba\Exchange\Repository_2010 folder)` to the new `\RM\Exchange\Repository` or `\RM\Exchange\Repository_2010` corresponding folder location of version 4.3.0.

Production Server

1. (For Exchange 2010) Back up the repository to a safe location; i.e., back up the folder `Exchange\Repository\Repository_E2010` and all directories and files under it.
2. Uninstall Recovery Manager for Exchange. See "Modifying, Repairing, or Removing HP 3PAR Recovery Manager Software for Microsoft Exchange" (page 24).
3. Install Recovery Manager for Exchange 4.3.0. See "Installing HP 3PAR Recovery Manager Software for Microsoft Exchange" (page 20).

Backup Server

1. (For Exchange 2007) Backup the repository to a safe location, i.e. the folder Exchange\Repository and all directories and files under it.
2. Uninstall Recovery Manager for Exchange. See "Modifying, Repairing, or Removing HP 3PAR Recovery Manager Software for Microsoft Exchange" (page 24).
3. Install Recovery Manager for Exchange 4.3.0. See "Installing HP 3PAR Recovery Manager Software for Microsoft Exchange" (page 20).
4. Move the Repository folder from the old `\vcdba\Exchange\Repository` to the new `\RM\Exchange\Repository` location.
5. Check to see that the old virtual copies can be seen from the Graphical User Interface (GUI) and reregister the Mailbox Server(s) if necessary.

Installing HP 3PAR Recovery Manager Software for Microsoft Exchange

Install HP 3PAR Recovery Manager Software for Microsoft Exchange on a host computer where Microsoft Exchange is running.

During the installation, an automated installer checks to make sure you have the correct authority and then runs a check to see whether the required components are installed. You are then guided through the steps required to install the components that are necessary for HP 3PAR Recovery Manager Software for Microsoft Exchange to function properly.

To run the installation, you must have Microsoft 2008 or R2 with administrative and Power user privileges. The 4.3.0 installer will guide you to install following all required components:

- Microsoft .NET Framework
- Microsoft Visual C++ 2008 Redistributable Package
- 3PAR CLI (3.1.1 MU1 or above)
- 3PAR VSS Provider 2.1.1 for Microsoft

NOTE: For details on system requirements, see the latest HP 3PAR Configuration Matrix.

WARNING! Before installing Recovery Manager, create a backup of your repository data.

CAUTION: Back up your data before upgrading the Recovery Manager or all data will be lost. See "Upgrading to Recovery Manager for Exchange" (page 19) for instructions on performing a backup.

NOTE: HP recommends that you install the application directly from the system console. If you perform the installation using a remote desktop connection, you need to log off and log in again after the installation has completed.

1. Log on as System Administrator.

   NOTE: In order to log in as the System Administrator, you must have system administrator rights.

   NOTE: If the current user is not part of the administrative group, then the installation does not continue.

2. Insert the Recovery Manager CD into the CD-ROM drive.
3. Open a Windows Explorer window by clicking **Start→All Programs→Accessories→Windows Explorer**.
4. Click the CD-ROM drive to expand the files.
5. Double-click `Setup.exe` to launch the installation wizard.

   When you first initiate the installation, the system prerequisites are checked to make sure all of the necessary components required to run HP 3PAR Recovery Manager Software for Microsoft Exchange are installed. If a necessary component is missing, you are guided through the steps to perform the necessary installation and the overall progress is shown for completing that step in the process.

   NOTE: If you click **Start**, all prerequisites will be installed in default folder. If you want to change folder then click on hyperlink to install all perquisites one by one and all options to change.

   During the process for each step, you are prompted for the appropriate information needed to install the associated component.

NOTE: In some cases, you may be prompted to remove a previous version of HP 3PAR Recovery Manager Software for Microsoft Exchange, the 3PAR CLI, or 3PAR VSS Provider. In this case, you need to manually remove the previous version from the Control Panel before continuing since the older versions are not automatically removed.

When all of the necessary components have been installed, you are prompted with a message to install HP 3PAR Recovery Manager Software for Microsoft Exchange.

6. Click **Install**. The HP 3PAR Recovery Manager Software for Microsoft Exchange Installation wizard interface appears.
7. Click **Next** to start the wizard, agree to the license, then click **Next** again. You are asked to supply the destination folder.
8. Accept the default location, or specify the installation directory by clicking **Change** and choosing an alternate destination. Click **Next** when you are done to advance to the features selection.
9. Select the default features, or make any alterations that are necessary. If you want to change an option, click on an icon to change how a feature is to be installed. The icons indicate whether the features are to be installed on the local hard drive, are installed when required, or for which no feature alterations are available.

   You can click **Disk Costs** if space is not available in the last selected path, there is change button to change the installation path.

   NOTE: Select any of following two options to install the feature.

   - This feature will be installed on local hard drive.
   - This feature, and all sub-features, will be installed on the local hard drive.

     Note "Will be installed when required," run from CD-ROM or Network.

   NOTE: The Disk Cost button analyzes the amount of available storage space and compares it to the amount required for the Recovery Manager installation.

10. Click **Next** to confirm the feature selections.
11. Click **Install** to start the installation. A status bar shows the progression as the application is installed and a concludes with a screen indicating whether the installation has been completed successfully.
12. When the installation is completed, click **Finish**.

    Once the installation is completed, the system configuration information is gathered and displayed in a text file named `RMECfgChk.txt`. This information is useful for verifying whether all the required components are present on the system.
13. Deal with any remaining messages for the prerequisite interface and the click **Close** to complete the installation.

NOTE: If you encounter a message relating to `RMECfgChk.txt`, the contents might not be right if you are using remote desktop session to install the product. Please log off and log in after installation and run `RMECfgChk.cmd` batch file from `<system drive>:\Program Files\3PAR\RME\Exchange\goodies"` folder.

NOTE: If you are using a remote desktop session to install Recovery Manager, log off all connected remote sessions after the installation is complete. The newly added environment variables then go into effect.

NOTE: The Recovery Manager for Exchange 2010 repository location is `<system drive>:\Program Files\3PAR\RME\Exchange\Repository_E2010`.

Verifying the Installation

1. Log on as the System Administrator.
2. Click **Start→Control Panel→Programs and Features**.
3. Verify Recovery Manager appears under the **Currently installed programs** column.

Understanding the Registry

After Recovery Manager is installed successfully, some information is written into the registry database under `HKEY_LOCAL_MACHINE\SOFTWARE\3PAR\RM_Exchange`.

△ **CAUTION:** DO NOT edit the registry key value unless asked by your local service provider for support purposes.

The TraceLevel has the following values:

- 1 — Error messages logged
- 2 — Error and warning messages logged
- 3 — Error, warning, and informational messages logged
- 4 — Error, warning, informational and debug messages logged
- 5 — Error, warning, informational, debug and verbose messages logged

Editing the Registry

1. Click **Start→Run**.
2. Enter **`regedit`** in the **Run** window and click **OK**.
3. On the left-hand side of the registry window, click **HKEY_LOCAL_MACHINE→SOFTWARE→3par→RM_Exchange**.
4. On the right-side of the window, double-click **TraceLevel**.

5. Modify the **Value Data** field and click **OK** to save the change.

Table 2 System Registry Values for Recovery Manager

Name	Value
BackupTimeout	The timeout value for the Symantec NetBackup initialization process detection in minutes. This setting is optional if the default is not appropriate.
GUILog	Location of the GUI Log File (Java errors only).
InstallPath	Recovery Manager Installation path.
JarPath	Path to the GUI jar file.
RCQueryTimer	The monitoring interval for remote copy progress on the target server in minutes. This setting is optional if the default is not appropriate.
RepPath	Root path to the Recovery Manager repository.
TraceHistory	Number of Trace files to keep before deleting.
TraceLevel	The trace level for the log file: 1 — Error messages logged 2 — Error and warning messages logged 3 — Error, warning, and informational messages logged 4 — Error, warning, informational and debug messages logged 5 — Error, warning, informational, debug and verbose messages logged The default value is 5.
TraceLog	The location where the log file resides.

NOTE: See "Event Messages" (page 126) for descriptions of events and possible actions to fix possible problems.

Environment Variables

Installation of Recovery Manager adds the full path to its executables and libraries to the system's and users `PATH` environment variable. If for some reason this has not been done, neither the GUI nor the CLI will work. If this is the case, manually add the full paths for the `bin` and `ext` directories under **RM_Exchange** to the `PATH` environment variable.

NOTE: An installation log file is created in %HOMEPATH% folder called RME_4.3.0_InstallerLog.txt for troubleshooting purposes.

Modifying, Repairing, or Removing HP 3PAR Recovery Manager Software for Microsoft Exchange

△ **CAUTION:** Back up your data before upgrading Recovery Manager or all data will be lost. See "Upgrading to Recovery Manager for Exchange" (page 19) for instructions on performing a backup.

To modify which features are installed:

1. Log on as the System Administrator.
2. Click **Start→Control Panel→Programs and Features**.
3. Select **HP 3PAR Recovery Manager Software for Microsoft Exchange**.
4. Click **Modify**. The Program Maintenance dialog appears.
5. Check the **Modify** radio button and click **Next**. The Custom Selection dialog appears where you can change the way features are installed.

To repair Recovery Manager from Windows 2008:

1. Log on as the System Administrator.
2. Click **Start→Control Panel→Programs and Features**.
3. Select **HP 3PAR Recovery Manager Software for Microsoft Exchange**.
4. Click **Repair**. The Program Maintenance dialog appears.
5. Check the **Repair** radio button and click **Next**. An attempt is made to fix missing or corrupt files, outdated shortcuts and bad registry entries.

To remove Recovery Manager from Windows 2008:

1. Log on as the System Administrator.
2. Click **Start→Control Panel→Programs and Features**.
3. Select **HP 3PAR Recovery Manager Software for Microsoft Exchange**.
4. Click **Remove**. The Program Maintenance dialog appears.
5. Check the **Remove** radio button and click **Next**. HP 3PAR Recovery Manger Software for Microsoft Exchange is removed from the system.

NOTE: Removing the Recovery Manager installation will not remove the Recovery Manager repository for virtual copy management.

NOTE: If you remove a previous version of the Inform CLI as per the installer instructions then unisntall 3PAR VSS provider too. The installer gives you the option to reinstall 3PAR VSS provider again. This step is mandatory, otherwise products that depend on VSS Provider (e.g., Recovery Manager Software for Exchange or Recovery Manager Software for SQL) might not function properly.

3 Configuring Recovery Manager

Configuring the Database

- Be sure to use Exchange files created on basic disks using the NTFS file system. Recovery Manger does not support other types of file systems.
- Maintain a 1:1 relationship between mailbox databases/storage groups and volumes:
  - Do not add more than one mailbox database/storage group plus its data files to a volume.
  - Do not add files from one database (including its data files) to multiple volumes.
  - Do not store non-Exchange data on volumes that store Exchange data files.

△ **CAUTION:** (For Exchange 2010) Be sure to maintain a one mailbox database:one volume relationship.

- If you add multiple mailbox databases to one volume, backup and disaster recovery operations on one mailbox database can result in conflicts between the databases in the volume.
- If you disperse files from one mailbox database among volumes, backup and disaster recovery operations on the mailbox database will not back up or restore all the files related to that database.

(For Exchange 2007) Be sure to maintain a one storage group:one volume relationship.

Configuring Recovery Manager

Installation Location

By default Recovery Manager installs in `%SystemDrive%\Program Files\3PAR\RM\Exchange`

Search Path

The Recovery Manager executables are stored in the directory you specify during installation. Recovery Manager automatically adds the specified directory to the Windows environment variable `PATH`; you can therefore issue Recovery Manager CLI commands from any directory.

Changing the Recovery Manager TCP/IP Port

The Recovery Manager listening service on each Recovery Manager Agent component installed on the mailbox/Exchange server and Recovery Manager backup server communicates through a TCP/IP port. By default, Recovery Manager communications use port 9933. If port 9933 is available, no extra port configuration is necessary.

If port 9933 is not available, you must change the Recovery Manager TCP/IP port.

NOTE: The TCP/IP port used by Recovery Manager for Exchange must be the same on all associated hosts in the centralized backup configuration.

1. Select an available port. The valid TCP/IP port range is 1024 to 65535.
2. To set a new port number, issue the `RMExch portconfig` command.

   For example, to change the port number to 9950:

   ```
   RMExch portconfig -h spotted -p 9950
   ```

3. Restart the HP 3PAR Recovery Manager Software for Exchange Agent service.

4. Repeat these steps for all associated hosts in the centralized backup configuration.

Configuring Mailbox/Exchange Database Policies

- To use the Recovery Manager GUI to set mailbox database policies (or storage group policies for Exchange 2007), see "Using the Recovery Manager GUI" (page 33).
- To use the Recovery Manager CLI to set mailbox database policies (or storage group polices for Exchange 2007), see "Using the Recovery Manager CLI" (page 57) for information about using the `RMExch policy` command.

Configuring Mount Functionality

The Windows automount feature is not compatible with Recovery Manager. To ensure that the Windows automount feature is disabled:

1. Open a command prompt (cmd) window.
2. Enter: **`diskpart`**
3. At the `DISKPART` prompt, enter: **`automount disable`**
4. Exit the command prompt window.

Configuring Recovery Manager for DAG (or CCR for Exchange 2007)

(For Exchange 2010) Recovery Manager for Exchange (4.1.0 and later) supports Database Availability Groups (DAG). DAG configurations can be implemented at a single site or span multiple sites. Each configuration must have one central Recovery Manager for Exchange backup server and at least one active mailbox/Exchange server and a potential maximum of 15 passive mailbox/Exchange servers.

- If your DAG configuration uses a single HP 3PAR Storage System at a single site, you require one backup server.
- If your DAG configuration spans to multiple HP 3PAR Storage Systems at a single site, you require:
  - One backup server
  - An additional host server for verifying mailbox virtual copies. This is optional when the storage systems are at single site.
  - You need to connect one HP 3PAR Storage System to the backup server
  - The other HP 3PAR Storage Systems must be connected to additional hosts for virtual copy verification purposes, unless the production DAG host is used as the verification server.
- If your DAG configuration spans multiple HP 3PAR Storage Systems at multiple sites, you require one backup server per site

(For Exchange 2007) Recovery Manager for Exchange 2007 supports CCR.

- If your CCR configuration uses a single HP 3PAR Storage System, you can rely on a single backup server. You do not need to perform any additional configuration steps.
- If your CCR configuration spans to two HP 3PAR Storage Systems, you require two backup servers: one connected to each HP 3PAR Storage System. One backup server acts as the backup server managed CCR active node, and the other acts as the peer backup server managed CCR passive node. If the storage systems are at single site, this is optional.

  Both backup servers can execute Recovery Manager CLI commands.

  You must use the `RMExch` peer CLI command to configure the peer backup server as described in `RMExch` peer (page 64). To display the current configuration, use the `RMExch` peer display CLI command.

Configuring the Provider

You must use the provider's `ProvCfg.exe` utility to configure the provider to use the HP 3PAR Storage System connecting to both the backup and Exchange production server. Use `ProvCfg.exe` to register additional storage systems. For more information, see the user guide of the provider.

- If your DAG configuration (or CCR configuration for Exchange 2007) has one HP 3PAR Storage System, add only that one HP 3PAR Storage System.
- If your DAG configuration (or CCR configuration for Exchange 2007) has two HP 3PAR Storage Systems at one site, add both HP 3PAR Storage Systems to your backup server.
- If your configuration has two HP 3PAR Storage Systems at two sites, add one HP 3PAR Storage System to each backup server.

For the appropriate configuration diagrams, see "Backup Configurations " (page 14).

Grouping Volumes into Autonomic Groups

You can group virtual volumes into autonomic groups (domain sets, volume sets, or host sets).

Domain Sets

If your Exchange configuration involves multiple mailbox databases (or storage groups for Exchange 2007) that belong to different HP 3PAR Virtual Domains, you can use domain sets to group these virtual domains into one HP 3PAR Storage System domain set. This configuration enables you to use just one Recovery Manager backup server to manage all your mailbox databases/storage groups.

When working with domain sets, keep in mind the following:

- All hosts, users, and virtual volumes must belong to the same virtual domain.
- To create a Remote Copy group for a virtual volume that is in a user-defined domain, the target virtual volume must be in the same user-defined domain.

To configure domain sets, use CLI commands:

1. Ensure you are running HP 3PAR InForm Operating System Software 2.3.1 or higher.
2. Ensure you have access to all domains.
3. Create a domain set that contains all the virtual domains for all the mailbox databases/storage groups.
4. Move the backup server to a domain within the domain set.
5. Create a Command Provisioning Group (CPG) belonging to the new virtual domain.
6. Create a virtual volume belonging to the CPG you just created.
7. Create a host belonging to the virtual domain.
8. Export the VLUN to the host.
9. On the Recovery Manager backup and production servers, set the user for the VSS provider.
10. Ensure the HP 3PAR Storage System connection is good.

NOTE: For more information on HP 3PAR Command Line Interface (CLI) commands, see the *HP 3PAR InForm OS Command Line Interface Reference*. For more information on 3PAR VSS Provider Software, see the *3PAR VSS Provider Software for Microsoft Windows User's Guide*.

Volume Sets

To configure volume sets:

- In a volume set, place one mailbox database/storage group and its log files.
- Do not place one volume in more than one volume set.
- Do not place unrelated volumes in a volume set.

Host Sets

You can configure your system with host sets and volume sets, or with host sets only.

Configuring Multiple Domains

Multiple domain configurations allow you to use one backup server for multiple Active Directory domains. You can use a multiple-domain setup with any Recovery Manager for Exchange 2010 configuration.

All multiple domain configurations must follow these rules:

- All backup components (for example, the backup server, the backup software client, and the Remote Copy target server) must be in the local domain.
- The production servers and the Windows hosts enabled for mounting virtual copies can be in any domain; local or nonlocal.

For more information about Recovery Manager for Exchange configurations, see "Recovery Manager Layout" (page 12). For an example multiple-domain configuration, see "Multiple Domain Backup Configurations" (page 16).

Multiple Domain Requirements

For Exchange 2010™:

- You must install the Client Access server role on each Recovery Manager for Exchange 2010 machine. For more information, see Microsoft documentation on the Client Access server role.
- You must configure a Windows Remote Management (WinRM) listener on each Recovery Manager for Exchange 2010 machine. Use `quickconfig`to enable the winRM configuration on all involved hosts and `Enable-PSRemoting`to enable the winRM client listening port. Make sure the remote domain host IP can be resolved from the local domain controller. For more information, see Microsoft documentation on Windows Remote Management.
- Ensure your domain names follow Microsoft naming conventions for Active Directory and for fully qualified domain names (FQDN). For more information, see Microsoft documentation on Active Directory and FQDN naming conventions.

For Exchange 2007™:

Ensure your domain names follow Microsoft naming conventions for Active Directory and for fully qualified domain names (FQDN). For more information, see Microsoft documentation on Active Directory and FQDN naming conventions.

Registering Domains

You do not need to register the local domain. To register an additional domain:

1. Use the Recovery Manager GUI or the `RMExch RegisterDomain` CLI command.

   For more information, see "Registering Nonlocal Domains" (page 35) or "`RMExch RegisterDomain`" (page 76).

2. If you used the CLI command to register the domain, refresh the GUI.

   After you register a domain, the Recovery Manager GUI displays the FQDN of the registered domain in the node tree pane. You can now add mailbox/Exchange servers and Windows hosts to the domain. For more information, see "Managing Domain Components" (page 29).

Modifying Domain Credentials

To modify the credentials stored for a domain, use the Recovery Manager GUI or the `RMExch ModifyDomain` CLI command.

For more information, see "Modifying Domain Credentials" (page 36) or "RMExch ModifyDomain" (page 68).

Unregistering a Domain

1. Remove all mailbox/Exchange servers and Windows hosts from the domain.

   Recovery Manager does not allow you to unregister domains that contain Recovery Manager for Exchange components.

2. Unregister the domain using the Recovery Manager GUI or the `RMExch UnRegisterDomain` CLI command.

   For more information, see "Unregistering a Domain" (page 36) or "RMExch UnRegisterDomain" (page 87).

Managing Domain Components

- To use the GUI to manage Recovery Manager operations on mailbox databases/storage groups and Windows hosts in nonlocal domains, use the same GUI procedures as you do for mailbox databases/storage groups and Windows hosts in the local domain.

  For more information, see "Using the Recovery Manager GUI" (page 33).

- To use CLI commands to manage mailbox databases/storage groups in nonlocal domains, use the same commands as for mailbox databases/storage groups in the local domain and use the `-domain` option to specify the domain name.

  For more information, see "Using the Recovery Manager CLI" (page 57).

  If you do not specify a domain name when you issue a CLI command, Recovery Manager attempts to execute the command in the local domain.

Configuring the Host Computer and the HP 3PAR Storage System

See the *HP 3PAR InForm OS Concepts Guide* and the *HP 3PAR InForm OS CLI Administrator's Manual* for information about configuring the controller nodes on the HP 3PAR Storage System to communicate with the host computer.

4 Configuring Backup Software

Overview

HP 3PAR Recovery Manager Software for Microsoft Exchange can be used with either Symantec NetBackup or HP Data Protector to back up and restore the virtual copies created by Recovery Manager. Keep in mind:

- If you are using backup software in the backup environment, you must install a backup master or client on the backup server.
- If you are using Database Availability Group (DAG) configurations that span multiple sites (and multiple HP 3PAR Storage Systems), you must also set up multiple master servers for your backup software.
- If you are using a multiple-domain configuration, you must use Symantec NetBackup software.

NOTE: For information about the supported versions of Symantec NetBackup and HP Data Protector, see the latest HP 3PAR InForm OS Configuration Matrix. To obtain a copy of this documentation, go to http://www.hp.com/go/3par/, navigate to your product page, click **Support for your product**, and then click **Manuals**.

Before You Begin

Ensure that you have set up a storage unit for storing virtual copy backups. For more information, see the documentation for the backup software you are using.

Configuring Symantec NetBackup

To set up your Symantec NetBackup software, see the Symantec NetBackup documentation.

To configure Symantec NetBackup to function with Recovery Manager for Exchange, set the following parameters during the configuration process:

Backup Policy Parameter	Setting
Policy type	**MS-Windows-NT**
Clients	Select the machine on which the Recovery Manager Backup Server component is installed.
Type of backup	**User backup**
Starting times for backups	Activate all the time slots: • **Modify Day**: Mon • **Start Time**: 12:00:00AM • **End Day**: Sun • **End Time**: 12:00:00AM • **Duration (days)**: 7

NOTE: The use of a NetBackup Media Servers is supported in this version. .

NOTE: If the Windows Open File Backup option in NetBackup is enabled, the NetBackup client takes additional temporary read-only (RO) and read/write (RW) snapshots on your base volumes. After the backup process is complete, Windows displays this event message: `Target LUN is not a 3PAR Virtual Volume.`

To deactivate this function, disable the Windows Open File Backup in NetBackup.

NOTE: If you plan on backing up multiple Mailbox Databases using NetBackup and Recovery Manager for Exchange, you need a different policy for each storage group that will be backed up at the same time. For example, if the first backup of Mailbox Database One has not yet completed, in order for the backup of Mailbox Database Two to be performed correctly by Recovery Manager for Exchange and NetBackup, it must use a different policy.

For more information on installing Symantec NetBackup, see Symantec NetBackup documentation.

Configuring HP Data Protector

Requirements

- HP Data Protector Software 6.2
- Data Protector patch for `omnidl` (Patch # DPWIN_00514)
- Each data list name (also known as the backup specification) must be unique across the entire system

Setting Up the HP Data Protector Backup Specification

To use HP Data Protector with Recovery Manager, you must set up a default backup specification. The backup specification specifies the default mount point and the necessary devices for tape backup.

1. Open the Data Protector GUI.
2. Select **Backup→Add Backup**.
3. In the **Create New Backup** dialog box, select **Blank_Filesystem_Backup** and click **OK**.
4. Click **Next** (do not select any items).
5. Select the device that Data Protector is to use for backups.
6. Click **Next** until the **Manual add...** appears.
7. Click **Manual add...**
8. Select **Windows filesystem** and click **Next**.
9. Enter the appropriate client system, mount point, and description. HP recommends:

Client system	*<server_used_as_backup_client>*
Mount point	C:
Description	default

NOTE: Recovery Manager uses this information only to create a backup template. Recovery Manager does not use the actual data entered.

10. Click **Next** until the **Finish** button is enabled.
11. Save the backup specification.

    When you issue the `RMExch backup` command with the `-dl` option, use the name with which you saved the backup specification (e.g., **DPbackup**) as the value of the `-dl` option.

Setting Up HP Data Protector Cell Manager Access

To use HP Data Protector with Recovery Manager, you must enable the system accounts on the registered client system to access the Data Protector Cell Manager.

1. Open the Data Protector GUI.
2. In the toolbar drop-down list, select **Users**.
3. Under the **Users** folder in the left pane, choose **admin**, and then choose **SYSTEM**.
4. In the **Client system** drop-down list on the **General** tab in the right pane (or General/Properties of the Data Protector User tab for Exchange 2007), select **<Any>**.

For more information on installing HP Data Protector, see HP Data Protector documentation.

Using Your Backup Software

- The default mount point for virtual copy backups is:

  `<system drive>:\3parSnapshot`

- You must manually synchronize backups. If a backup expires in your backup software, you must manually remove the backup from Recovery Manager. If you remove a valid backup from Recovery Manager, you must manually remove it from your backup software.
- Recovery Manager does not track restore progress. You must use your backup software to monitor restore progress.
- For more information about using CLI commands with your backup software, see `RMExch backup`, `RMExch deletebackup`, `RMExch listbackup`, and `RMExch restore` in "Using the Recovery Manager CLI" (page 57).
- For more information about using your backup software to back virtual copies up to media or to restore virtual copies from media, see "Using the Recovery Manager GUI" (page 33).

Using Symantec NetBackup

- Symantec NetBackup software is case-sensitive. If you are using NetBackup, make sure all information entered pertaining to the policy is supplied with the proper case.
- Any time you are using NetBackup to back up to media or restore from media, you can monitor the progress using the progress log:

  `<RM_installation_location>\log\nbulog\Mailbox_Database_timestamp.log`

- To modify the timeout value for NetBackup software initialization, see "Understanding the Registry" (page 22).

Using HP Data Protector

For each HP Data Protector backup you create, a postscript (.bat) file is created in the `$DP_HOME\bin` folder (where $DP_HOME is the Data Protector install location; for example, `C:\ program files\Omniback`). This script cleans up after the associated backup is complete.

Recovery Manager does not clean these postscripts. After a backup is complete (either successfully or with failures), you can manually remove the associated postscript batch file if desired.

5 Using the Recovery Manager GUI

This chapter provides instructions for using the HP 3PAR Recovery Manager Software Graphical User Interface (GUI) to back up and restore mailbox databases (or storage groups for Exchange 2007).

Overview of the Recovery Manager GUI

The Recovery Manager Graphical User Interface (GUI):

- Is a windows application containing a menu bar, a node tree pane, informational pane, and a command log window
- Enables you to create, remove, mount, unmount, back up, and restore a virtual copy for a mailbox database/storage group
- Allows you to back up and restore mailbox databases (or storage group for Exchange 2007) at a point-in-time
- This version of Recovery Manager supports Microsoft Exchange 2007 and 2010.

NOTE: The GUI is not available for the Recovery Manager Agent for Exchange Server installations.

Menu Bar

The menu bar consists of the following:

- **Console** menu - allows you to exit the GUI; register the server; and register, modify, and unregister domains.
- **Actions** menu - allows you to access virtual copy functionality.
- **Scheduled Tasks** menu - provides access to the Task Manager.
- **About** menu - provides an **About 3PAR Recovery Manager** screen and access to other helpful links, such as descriptions for event messages that may be generated during operation. A help option is available from this menu for quickly accessing relevant information.

Node Tree Pane

The node tree pane presents the system's Exchange servers. When the Recovery Manager GUI starts, it analyzes the servers' domains, mailbox databases/storage groups, mailbox information, and virtual copies, then displays them graphically as a nested tree in the left pane.

Informational Pane

The informational pane displays detailed information about each item selected in the node tree pane. If the pane's contents exceed the pane's width, a scroll bar appears at the bottom of the pane. When viewing information, you have the option of sorting the content by clicking on the applicable table headings.

Status and Summary Information

After launching HP 3PAR Recovery Manager for Exchange, you can click on the **MS Exchange** node to see a detailed status and summary of relevant information in a tabular format:

For Exchange 2010:

- Domain Name
- Number of the mailbox database associated with each domain
- Mailbox Databases for each domain

- Member of DAG
- Virtual Copy count for each domain
- Backup copy count for each domain

For Exchange 2007:

- Domain Name
- Instance Name
- Number of the Storage Groups associated with each instance
- Member of LCR/CCR (Yes/No)
- Mailbox Database Count for each Storage Group
- Virtual Copy count for each Storage Group
- Backup copy count for each Storage Group

Sorting is available for each column in the tables and columns having numbers are right aligned.

Displaying Domain Information

The node tree pane displays the local domain and its components under the **Local Domain** node, directly beneath the **MS Exchange** node.

If you have configured multiple Recovery Manager domains, the pane displays nonlocal domains (named as their fully qualified domain names) and their components after the **Local Domain** node.

Displaying Server Information

For Exchange 2010™:

Recovery Manager supports Database Availability Groups (DAG), which are available in Microsoft Exchange Server 2010. The informational pane includes a **Database Availability Group** column that shows the DAG name for the mailbox database.

For Exchange 2007™:

Recovery Manager supports Local Continuous Replication (LCR) and Cluster Continuous Replication (CCR). LCR- and CCR-enabled storage groups are marked with the  and  icons, respectively, in the node tree pane. The **LCR**/**CCR** column in the informational pane show which storage group is LCR- or CCR-enabled.

Displaying Mailbox Database/Storage Group Information

To display information about a mailbox database/storage group, click the mailbox database/storage group name in the node tree pane. In the informational pane, Recovery Manager displays detailed information about the selected mailbox database/storage group, as described in Table 3 (page 34).

Table 3 Mailbox Database Information Columns (for Exchange 2010)

Column...	Displays...
Name	The name of the mailbox database
Active Server	The server that currently hosts the mailbox database
DB File Path	The full path of the `.edb` file
Database Copies	The servers that have copies of the database
Log File Path	The full path of the log file location

Table 3 Mailbox Database Information Columns (for Exchange 2010) *(continued)*

Column...	Displays...
Log File Prefix	The log base name
Database Availability Group	The name of the Database Availability Group

Table 4 Storage Group Information Columns (for Exchange 2007)

Column...	Displays...
Store	The name of the information store.
Store Type	The type of information store: **Mailbox Store** or **Public Store**
Status	The status of the data store: **Mounted** or **Unmounted**
EDB File	The location of the EDB (property store) file store

Updating the Information Displayed (for Exchange 2007)

You must manually update the information displayed in the Recovery Manager GUI when:

- You enable or disable LCR or CCR for a storage group.
- In a CCR setup, the active node and passive node pair are switched (for example, a failover takes place).

To rescan the server:

1. Ensure that the storage group is in a healthy state.

   For example, if you are re-scanning the server after a failover, the storage group might remain in the **Initializing** state for a few seconds.
2. Right-click the **MS Exchange** node and select **Rescan Server Configuration**.

Starting the GUI

To start the Recovery Manager GUI, double-click the **HP 3PAR Recovery Manager for Exchange** icon on your desktop.

Stopping the GUI

To stop the Recovery Manager GUI, select **Console→Exit** from the menu bar. For more information, see "Menu Bar" (page 33).

Managing Domains

Working with the Local Domain

- If you are using only the local Active Directory domain, the Recovery Manager GUI displays all your Recovery Manager components under the **Local Domain** node.
- If you are using multiple domains, the GUI displays the Recovery Manager components related to backups—as well as any mailbox/Exchange servers and Windows hosts added to the local domain—under the **Local Domain** node.

Recovery Manager automatically registers the local domain.

Registering Nonlocal Domains

To register a nonlocal Active Directory domain:

1. Make sure Recovery Manager for Exchange is configured for multiple domains.

   For more information, see "Configuring Multiple Domains" (page 28).

2. Right-click the **MS Exchange** node and select **Register Domain**.
3. In the **Register Domain** dialog box, enter the server name, Windows domain and username, and password.
4. Click **Ok**.

Modifying Domain Credentials

1. Right-click the **MS Exchange** node and select **Manage Domains**.
2. In the **Registered Domain** dialog box, select the row containing the domain name to modify, and click **Modify**.
3. In the **Modify Domain** dialog box, enter the new server name, domain user name (domain\user name), and password.
4. Click **Ok**.

Unregistering a Domain

1. Remove all mailbox/Exchange servers and Windows hosts from the domain you are unregistering.

   Recovery Manager does not allow you to unregister domains that contain Recovery Manager for Exchange components.
2. Right-click the **MS Exchange** node and select **Manage Domains**.
3. In the **Registered Domain** dialog box, select the row containing the domain name to unregister, and click **Unregister**.
4. Click **Ok**.

Working in Multiple Domains

To use the GUI to manage Recovery Manager operations on mailbox databases/storage groups and Windows hosts in nonlocal domains, use the same GUI procedures as you do for mailbox databases/storage groups and Windows hosts in the local domain.

Registering the Servers

Before the GUI can manage servers, you must register all servers.

To register a server:

1. Right-click the **MS Exchange** node and select (for Exchange 2010) **Server/Mailbox Registration** (for Exchange 2007) **Server Registration** from the context menu.
2. Select a mailbox database/storage group that is managed by the Recovery Manager for Exchange GUI.
3. Click **OK**.

   Recovery Manager takes a few minutes to scan all mailbox databases/storage groups, then it updates the node tree with your selection. This process might take longer the first time you register mailbox databases/storage groups.

   NOTE: When using the GUI to register mailbox databases, the mailbox database names containing invalid characters such as `/\\<>:*.\"?|` cannot be added to RME for both Exchange 2007 and 2010.

Setting the Recovery Manager Policy

Recovery Manager applies policy settings at the mailbox database/storage group level (or storage group level for Exchange 2007); therefore, each mailbox database/storage group can have its own policy. In addition, you can configure individual virtual copies with their own policy settings.

How Recovery Manager Policies Work

The Recovery Manager policy-setting feature allows you to:

- Specify and configure either a numeric-based or expiration-based policy
- Specify a retention time during which the mailbox database/storage group and its virtual copies cannot be removed (if you have an HP 3PAR Virtual Lock license)

NOTE: Modifications you make to an existing policy are not retroactive. Virtual copies created under a previous policy (whether numeric or expiration-based) retain the policy setting under which they were created.

In addition, when you switch policy type, the system retains the virtual copies that exist at the time of the policy change as follows:

- If you switch from an expiration-based policy to a numeric-based policy, the system does not remove the expiration dates from the existing virtual copies, and these existing virtual copies expire according to their set expiration date.
- If you switch from a numeric-based policy to an expiration-based policy, the system does not apply expiration values to the existing virtual copies. These existing virtual copies continue to reside on the system until you manually delete them or manually set an expiration time for each individual virtual copy.

Numeric-Based Policies

If you specify a numeric-based policy, you can modify the maximum number of virtual copies allowed per mailbox database/storage group.

- By default, Recovery Manager allows you to create a maximum of 10 virtual copies per mailbox database/storage group.
- The numeric-based policy also enables you to set Recovery Manager to automatically remove the oldest virtual copy for each mailbox database/storage group, after the maximum limit of virtual copies is reached, before creating a new virtual copy. If you do not choose to automatically remove virtual copies when required in order to create a new virtual copy, you must manually delete old virtual copies before you can create new copies.
- (for Exchange 2007) If a single backup server is managing active and passive nodes, the maximum virtual copy count specified in the policy is enforced on a per-node basis. Therefore, the backup server can contain twice the maximum number of virtual copies.

NOTE: A virtual copy must be unmounted to be removed. If the oldest virtual copy for which retention time has elapsed is mounted (and the maximum limit has been reached), Recovery Manager displays an error message and cancels creation of the new virtual copy.

To create a new virtual copy after the maximum limit of virtual copies is reached, you must unmount the oldest virtual copy.

Expiration-Based Policies

If you choose an expiration-based policy, you can use the Task Manager to set Recovery Manager to automatically remove virtual copies after a specified period of time has elapsed.

If you specify an expiration time for a remote virtual copy:

- If HP 3PAR Remote Copy Software is set up in asynchronous periodic mode, Recovery Manager sets the expiration time for the remote virtual copy on the backup server only, not for the virtual copy created on the primary server.
- If Remote Copy is set up in synchronous mode, Recovery Manager sets the expiration time for both the virtual copy on the primary server and the remote virtual copy on the backup server.

For more information, see the *HP 3PAR Remote Copy Software User's Guide*.

The expiration-based policy option is only available if your HP 3PAR Storage System is running HP 3PAR InForm Operating System Software 2.3.1 or above.

Retention Time Restrictions

When you set a retention time for virtual copies, Recovery Manager creates a virtual lock on the mailbox database/storage group and its virtual copies. The mailbox database/storage group and virtual copies created within the retention period cannot be removed during the retention period.

When setting a retention time, keep in mind the following restrictions:

- You must have an HP 3PAR Virtual Lock license to set retention times.
- The minimum retention time is 1 hour; the maximum is 43,800 hours/1,825 days (5 years). The default retention time on a system is 336 hours (14 days).
- You can set a retention time for both numeric-based and expiration-based policies.
- The retention time cannot exceed the maximum retention time set for the HP 3PAR Storage System.
- The retention time cannot be longer than the expiration time (if the policy is expiration-based).
- If you create a remote virtual copy and Remote Copy is set up in asynchronous periodic mode, the retention time is applied to the remote copy on the backup server only. If Remote Copy is set up in synchronous mode, the retention time is applied to both the remote copy on the backup server and the virtual copy on the primary server.
- After the retention time is set, it can be increased, but it cannot be removed or reduced.

Setting Recovery Manager Policies

1. In the node tree pane, right-click the mailbox database/storage group you want to configure and select **Policy**.
2. Depending on whether you want to set a maximum number of copies or you want to set an expiration time frame, do the following in the **Policy Setup** dialog box:

To set:	Follow these steps:
Maximum number of virtual copies	1. Select the **Numeric** radio button. 2. In the **Maximum Virtual Copies kept in Storage System** text box, enter the desired maximum as a number between 1 and 500. 3. To remove the oldest virtual copy each time a copy above the maximum is created, check the **Remove the oldest Virtual Copies** checkbox. To keep the oldest virtual copy (and therefore prevent new virtual copies from being made after the maximum number is reached), uncheck the **Remove the oldest Virtual Copies** checkbox.
Expiration time frame for virtual copies	1. Select the **Expiration** radio button. 2. In the **Default Expiration Time** text box, enter the number of hours or days after which you want Recovery Manager to remove each virtual copy. The minimum expiration period is 1 hour; the maximum is 43,800 hours/1,825 days (5 years). 3. In the drop-down list, select either **Hours** or **Days**.

3. To modify the default retention time for the mailbox database/storage group and its virtual copies, enter the number of hours or days you want to keep the mailbox database/storage group and its contents.

   The minimum retention period is 1 hour; the maximum is 43,800 hours/1,825 days (5 years). For more information about retention time restrictions, see "How Recovery Manager Policies Work" (page 37).

4. Click **Finish**.

   The virtual copy policy is effective immediately for all future virtual copies.

NOTE: You can also use the CLI command `RMExch policy` to set Recovery Manager policies. For more information, see "Using the Recovery Manager CLI" (page 57).

Modifying the Time Constraints for a Virtual Copy

To modify the retention time or the expiration time or both for a virtual copy:

1. In the node tree pane, right-click the virtual copy you want to modify, and select **Edit Time Constraints**.
2. To set a new retention time, check the **Retention Time** checkbox and enter a new value.
3. To set a new expiration time, check the **Expiration Time** checkbox and enter a new value.

   For more information on setting the retention and expiration time, see "How Recovery Manager Policies Work" (page 37).
4. Click **Ok**.

NOTE: You can also use the CLI command `RMExch setvc` to modify time constraints for a virtual copy. For more information, see "Using the Recovery Manager CLI" (page 57).

Configuring Email Notifications

You can configure Recovery Manager to automatically send an email when:

- You create a virtual copy or remote virtual copy, or Recovery Manager automatically creates a virtual copy or remote virtual copy according to the task schedule.
- You create a backup or Recovery Manager automatically creates a backup according to the task schedule.
- You restore a mailbox database/storage group.

In addition, you can configure the email to notify you only when an operation completes, only when an error message displays, or when either occurs.

NOTE: For more information about scheduling automatic virtual copies, remote virtual copies, and backups, see "Scheduling Automated Tasks with Task Scheduler" (page 44).

To configure email notifications:

1. In the node tree pane, right-click the mailbox database/storage group for which you want to configure email notifications, and select **Email Config**.
2. In the **Email Configuration** pane, enter the appropriate information in the following text boxes:
   - **Email Type** - SMTP
   - **SMTP Host Name** - Name of the email server
   - **Port** - Port of the email server
   - **Sender Email Address** - Email address of the sender
   - **Password** - Password for the sender's email address
   - **Receiver Email Address** - Email address of the person to be notified of task activity and/or errors
   - **Email TestTimeout (sec)** - Specified number of seconds for timeout value during an email configuration
3. To send email notifications via the Secure Sockets Layer protocol, ensure the **SSL** checkbox is checked.
4. To make sure the email configuration works, click the **Test Connection** button.

5. In the **Operations** pane, check the desired checkboxes in the tab for each type of task (**Create Virtual Copy**, **Backup**, and/or **Restore**) for which you want emails:
   - **Info** - Recovery Manager sends informational emails for successful operations.
   - **Error** - Recovery Manager sends informational emails for operations that were not completed successfully.

   Both informational and error emails contain the result of the operation and the related CLI output.
6. Click **Finish**.

   Recovery Manager encrypts the password and saves the configuration as an XML file with the filename `EmailConfig.xml`. Each time a virtual copy or backup is created or a restoration is performed on this mailbox database/storage group, Recovery Manager checks the XML file and, if email is configured for the task, sends an email with the task information and/or error messages.

Deleting Email Configurations

To permanently stop all email notifications for a mailbox database/storage group:

1. Select the mailbox database/storage group for which you do not want to receive any email notifications.
2. Select **Actions→Delete Email Config**.

Creating Virtual Copies of Mailbox Databases/Storage Groups

You can use Recovery Manager to manually create virtual copies at the mailbox database/storage group level. You can also schedule Recovery Manager to automatically make virtual copies of mailbox databases/storage groups.

NOTE: You can configure Recovery Manager to automatically send email notifications when virtual copies are manually or automatically created. For more information, see "Configuring Email Notifications" (page 39).

How Virtual Copy Creation Works

Recovery Manager creates virtual copies for Microsoft Exchange Server at the mailbox database/storage group level because this is the recoverable unit defined by Microsoft.

The log files for all the mailbox/storage group data stores are managed at the mailbox database/storage group level. Therefore, when Recovery Manager creates a virtual copy for a mailbox database/storage group, it creates a virtual copy of all virtual volumes where the information store, log, and system files reside in order to preserve data consistency.

If you have Remote Copy set up, you can also create a virtual copy to be saved on a remote server; this type of copy is called a remote virtual copy.

NOTE: You can only create a virtual copy of a mailbox database/storage group that is online.

NOTE: For more information about setting up mailbox databases/storage groups and volumes to avoid data loss, see "Configuring the Database" (page 25).

Manually Creating a Virtual Copy

The following icons for creating a virtual copy indicates:

-  - virtual copy created with validation
-  - LCR virtual copy created with validation

-  - virtual copy created without validation
-  - LCR virtual copy created without validation

1. In the node tree pane, right-click the mailbox database/storage group for which you want to create a virtual copy, and select **Create→Virtual Copy**.

   If you are creating a DAG mailbox virtual copy, select a specific database source and click **NEXT**.
2. In the **Validate Virtual Copy** area, select whether you want Recovery Manager to validate or skip validation of the virtual copy on the specified server, and whether you want Recovery Manager to truncate the log.
3. Optional: If you want to adjust the expiration or retention time values (or both) for this virtual copy (or, if you are scheduling automatic copies, this group of virtual copies):
   - To adjust the expiration time, check the **Expiration Time** checkbox and enter the new expiration time.
   - To adjust the retention time, check the **Retention Time** checkbox and enter the new retention time.

     Valid retention time values are 0 (for no retention time) to 43,800 hours/1,825 days.

   For more information, see "Setting the Recovery Manager Policy" (page 36).
4. To immediately create one virtual copy, click **Finish** in the **Create Virtual Copy** dialog box. To schedule virtual copies, see "Scheduling Automatic Virtual Copies" (page 43).

Creating Remote Virtual Copies

How Remote Virtual Copy Works

When you create remote virtual copies, Recovery Manager uses Remote Copy to send the virtual copies to the Remote Copy backup server. The Remote Copy backup server is a remote server that is the Recovery Manager backup server.

To use remote virtual copy functionality:

- The HP 3PAR Remote Copy Software license must be installed.
- Remote Copy volume groups must be configured.
- Both the Remote Copy primary server and backup server must be running the same version of Recovery Manager.

For more information, see "Remote Copy for Recovery Manager" (page 110).

Manually Creating a Remote Virtual Copy

To create a remote virtual copy:

1. In the node tree pane, right-click the mailbox database/storage group for which you want to create a virtual copy, and select **Create→Remote Virtual Copy**.

   If you are creating a DAG mailbox remote virtual copy, select a specific database source and click **NEXT**.

2. In the **Validate Virtual Copy** area, select whether you want Recovery Manager to validate the server name or skip validation of the virtual copy, and whether you want Recovery Manager to defer log truncation (if validating) or truncate the log (if skipping validation) and click **Next**.

   Optional: If you want to adjust the expiration or retention time values (or both) for this virtual copy (or, if you are scheduling automatic copies, this group of virtual copies):

   - To adjust the expiration time, check the **Expiration Time** checkbox and enter the new expiration time.
   - To adjust the retention time, check the **Retention Time** checkbox and enter the new retention time.

     Even if the policy has a retention time value, you can override the policy for an individual virtual copy in this **Retention Time** checkbox. Valid values are 0 (for no retention time) to 43,800 hours/1,825 days.

   For more information, see "Setting the Recovery Manager Policy" (page 36).
3. Click **Next**.
4. In the **Target Server Name** field, enter the name of the Remote Copy backup server.
5. Optional: To view the policy values for the remote server, click **Fetch Policy**.
6. Optional. To edit the expiration or retention policy values of the remote virtual copy (or copies), edit the **Policy Info** area.
7. To immediately create one remote virtual copy, click **Finish** in the **Create Remote Virtual Copy** dialog box.
8. To schedule a Remote Copy, see "Scheduling Automated Tasks with Task Scheduler" (page 44)

Creating a Virtual Copy of an LCR-Enabled Storage Group (for Exchange 2007)

You can use Recovery Manager to create a virtual copy of a storage group for which Local Continuous Replication (LCR) is enabled.

When you create an LCR virtual copy, Recovery Manager uses Exchange's LCR copy as the source of the virtual copy. (An LCR copy is a replica of a storage group, created using Exchange's LCR feature, that is continually updated with Exchange data.) Recovery Manager also creates a virtual copy of all virtual volumes where the information store, log, and system files reside in order to preserve the data for consistency.

To create an LCR virtual copy of a storage group:

1. In the node tree pane, right-click the LCR-enabled storage group for which you want to create a virtual copy, and select **Create→LCR Virtual Copy**.
2. In the **Validate Virtual Copy** area, select whether you want Recovery Manager to validate the server name or skip validation of the LCR virtual copy, and whether you want Recovery Manager to truncate the log.
3. Optional: If you want to adjust the expiration or retention time policy values (or both) for this virtual copy (or, if you are scheduling automatic copies, this group of virtual copies):

   - To adjust the expiration time, check the **Expiration Time** checkbox and enter the new expiration time.
   - To adjust the retention time, check the **Retention Time** checkbox and enter the new retention time.

     Even if the policy has a retention time value, you can override the policy for an individual virtual copy in this **Retention Time** checkbox. Valid values are 0 (for no retention time) to 43,800 hours/1,825 days.

   For more information, see "Setting the Recovery Manager Policy" (page 36).

4. To immediately create one LCR virtual copy, click **Finish** in the **Create Virtual Copy** dialog box. To schedule virtual copies, see "Scheduling Automatic Virtual Copies" (page 43).

Creating a Virtual Copy of a CCR-Enabled Storage Group (for Exchange 2007)

You can use Recovery Manager to create a virtual copy of a storage group for which Cluster Continuous Replication (CCR) is enabled. You can create a virtual copy for an active node, a passive node, or both the passive and active node.

To create a CCR virtual copy of a storage group:

1. In the node tree pane, right-click the CCR-enabled storage group for which you want to create a virtual copy, and select **Create**.
2. Select one of the following options:

Option	Description
CCR Virtual Copy on Active Node	Recovery Manager creates a virtual copy of the resources that are on the active node of the Exchange cluster. Recovery Manager saves the virtual copy to the active node of the corresponding backup server (primary).
CCR Virtual Copy on Passive Node	Recovery Manager creates a virtual copy of the resources that are on the passive node of the Exchange cluster. Recovery Manager saves the virtual copy to the passive node of the corresponding backup server.
CCR Virtual Copy on Passive and Active Node	Recovery Manager first creates a virtual copy on the passive node and then saves the virtual copy to the passive node of the corresponding backup server. Next, Recovery Manager creates a virtual copy on the active node and then saves the virtual copy to the active node of the corresponding backup server.

3. In the **Validate Virtual Copy** area, select whether you want Recovery Manager to validate the server name or skip validation of the CCR virtual copy, and whether you want Recovery Manager to truncate the log.
4. Optional: If you want to adjust the expiration or retention time policy values (or both) for this virtual copy (or, if you are scheduling automatic copies, this group of virtual copies):
   - To adjust the expiration time, check the **Expiration Time** checkbox and enter the new expiration time.
   - To adjust the retention time, check the **Retention Time** checkbox and enter the new retention time.

     Even if the policy has a retention time value, you can override the policy for an individual virtual copy in this **Retention Time** checkbox. Valid values are 0 (for no retention time) to 43,800 hours/1,825 days.

   For more information, see "Setting the Recovery Manager Policy" (page 36).
5. To immediately create one CCR virtual copy, click **Finish** in the **Create Virtual Copy** dialog box. To schedule virtual copies, see "Scheduling Automatic Virtual Copies" (page 43).

Scheduling Automatic Virtual Copies

To schedule automatic virtual copies:

1. In the node tree pane, right-click the mailbox database/storage group for which you want to create a virtual copy, and select one of the following:
   - **Create→Virtual Copy**
   - **Create→Remote Virtual Copy**
   - (For Exchange 2007)**Create→LCR Virtual Copy**
   - (For Exchange 2007)**Create→CCR Virtual Copy**
2. Click **Next** in the **Create Virtual Copy** dialog box.

   The **Task Scheduler** appears. For more information, see "Scheduling Automated Tasks with Task Scheduler" (page 44).

Automating Tasks

You can use the Task Scheduler to schedule Recovery Manager to automatically create virtual copies, remote virtual copies, and backups, and to automatically analyze and synchronize (if desired) a repository.

Use Task Manager to manage all your scheduled virtual copies and backups for all Recovery Manager products running on your servers.

You can schedule tasks using `schtasks.exe` or Windows Task Scheduler API.

NOTE: The GUI remains the same regardless of the method you use to schedule a task. If you are using a Japanese OS, the `schtasks.exe` option is not supported. Use the default option of Windows Task Scheduler API to schedule tasks.

To change the option of scheduling tasks with `schtasks.exe` or Windows Task Scheduler API:

1. Close Recovery Manager GUI.
2. Go to **User→Username**. For example, if you have logged in as ABC\Administrator, go to C:\Users\Administrator.ABC.
3. Open `vcdbaConsole.properties` file in Notepad.
4. Change `vcdba.taskManager.useWindowsApi` parameter to `false`. The `schtasks.exe` option is now activated for scheduling tasks. To use Windows Task Scheduler API, set the parameter to `true`.
5. Save and close the file.
6. Start the Recovery Manager GUI.

NOTE: You must activate the Recovery Manager GUI before changing the options for scheduling tasks.

Scheduling Automated Tasks with Task Scheduler

To schedule automatic virtual copies, backups, and analysis and synchronization of the repository:

1. Set up a virtual copy creation, backup creation, or repository analysis task as desired. For more information, see:
   - "Scheduling Automatic Virtual Copies" (page 43)
   - "Scheduling Automatic Backups at the Mailbox Database/Storage Group Level" (page 51)
   - "Scheduling Automatic Repository Analysis and Synchronization" (page 55)
2. In the Task Scheduler dialog box, check the **Schedule this task** checkbox.
3. In the **Windows Task Name** text box, enter the name to be assigned to the task.
4. In the **Script File Name** text box, enter the name to be assigned to the script.
5. The **Task Command** shows the command for the task that is being scheduled.
6. Enter a description in the **Description** text box.

7. The **User Name** shows the user for the task.
8. In the **Password** text box, enter a local user password for the backup server.
9. In the **Password (confirm)** text box, reenter the password.
10. From the **Start Time** drop-down list, select the hour at which you want Recovery Manager to start creating automatic virtual copies.
11. To specify the frequency with which the automatic virtual copies are to be created, select the appropriate radio button in the left pane of the **Schedule Pattern** area.

    The type of calendar displayed depends on the frequency of the automatic virtual copies selected in the left pane of the **Schedule Pattern** area.

    - **Once** - Schedules one automated virtual copy.

      In the right pane, select the month and year in which to create the virtual copy from the drop-down list above the calendar view, then select the day on the calendar.

    - **Hourly** - Schedules automated virtual copies multiple times a day at the interval you specify.

      From the drop-down list in the right pane, select the number of hours you want to pass between automated copies.

      Choose **Indefinitely** option and specify the number of days for the task to run if you want the task to run indefinitely.

    - **Daily** - Schedules automated virtual copies on a daily basis at the interval you specify.

      - To schedule copies at regular intervals during the week, select the radio button for **Every day** in the right pane and enter the number of days between copies.
      - To schedule copies on a daily basis, select the radio button for **Every weekday** in the right pane and, in the **Start Date** text box, enter the start date or use the **Calendar** icon to select a start date.

    - **Weekly** - Schedules automated virtual copies by the day of the week.

      In the right pane, enter the number of weeks you want to pass between automated copies and check the checkbox for each day of the week on which a virtual copy is to be created.

    - **Monthly** - Schedules automated virtual copies by day or date of the specified months.

      - To schedule copies on a specific date at a specific monthly or daily interval, enter the date information in the calendar.

12. Click **Finish**.

NOTE: You can use the Task Manager to edit, run, delete, and view details of scheduled tasks. For more information, see "Managing Automated Tasks with Task Manager" (page 45).

NOTE: All tasks created in Task Scheduler and their associated script files are not automatically removed when you uninstall Recovery Manager. Retention of tasks allows you to upgrade your version of Recovery Manager without losing scheduling information.

Managing Automated Tasks with Task Manager

To use Task Manager to manage all your scheduled virtual copies and backups for all Recovery Manager products running on your servers:

1. In the node tree pane, ensure a node is selected.
2. Select **Scheduled Tasks→Task Manager**.

   Recovery Manager lists all scheduled tasks in the Task Manager dialog box in the **Task Name** column.

Other columns show the name of the script associated with the task, , the next time the task is scheduled to run, and its current status.

3. To manage a scheduled task, select it and click one of the following buttons:
   - **Edit** - Opens the Task Scheduler, with which you can modify the task. To save your changes, you must enter your password. For more information, see "Scheduling Automated Tasks with Task Scheduler" (page 44).
   - **Detail** - Displays task information in the Task Detail dialog box.
   - **Delete** - Deletes the task and its associated script file.
   - **Run Now** - Performs the selected task immediately (in addition to its scheduled run time).
   - **Refresh** - Updates the list and status of scheduled tasks.
4. To exit the Task Manager dialog box, click **OK**.

Mounting a Virtual Copy

When you mount a virtual copy, Recovery Manager mounts all stores (mailbox/storage group, public store, logs) under the virtual copy.

The following icons display the virtual copy mounting status:

-  - mounting of virtual copy with validation
-  - mounting of virtual copy without validation

NOTE: You can mount a virtual copy to only one host at a time.

1. In the node tree pane, right-click the virtual copy you want to mount, and select **Mount**.
2. In the **Host Name** field, select the host name.
3. (For Exchange 2010) In the **Mount Point** field, select the mount point.
4. Click **OK**.

   Recovery Manager:
   - Makes the virtual copy available to the selected host server
   - Displays data for the mounted virtual copy (store) in the informational pane
   - Displays **Mounted** in the **Virtual Copy Status** column
   - Displays the host server to which the virtual copy was mounted in the **Mounted Host** column

Unmounting a Virtual Copy

When you unmount a virtual copy, Recovery Manager unmounts all stores (mailbox/storage group, public store, logs) under the virtual copy.

The following icons display the virtual copy unmounting status:

-  - unmounted virtual copy with validation
-  - unmounted virtual copy without validation
-  - unmounted LCR virtual copy with validation
-  - unmounted LCR virtual copy without validation

To unmount a virtual copy, right-click the mounted virtual copy and select **Unmount**.

Recovery Manager:

- Updates the informational pane for the unmounted virtual copy
- Displays **Unmounted** in the **Virtual Copy Status** column
- Removes the host name from the **Mounted Host** column

Refreshing Virtual Copy Information

If you are using both the Recovery Manager GUI and the CLI, and you use the CLI to make changes without stopping and restarting the GUI, you must manually update the virtual copy information. You can perform this update at several levels.

Refreshing All Virtual Copies

To refresh all virtual copies, right-click the **Virtual Copy Management** node in the node tree pane and select **Refresh**.

Refreshing a Specific Mailbox Database

To refresh all virtual copies for a specific storage group, right-click the storage group under the **Virtual Copy Management** node and select **Refresh**.

Refreshing a Specific Virtual Copy

To refresh a specific virtual copy, right-click the virtual copy and select **Refresh**.

Backing Up a Virtual Copy

You can use Recovery Manager to back up virtual copies to media using HP Data Protector or Symantec NetBackup.

To back up a virtual copy to media, you must first configure your backup software (Data Protector or NetBackup) as described in Chapter 4 (page 30).

You can back up virtual copies at the mailbox database/storage group level or by individual virtual copy. You can also schedule Recovery Manager to automatically create backups of mailbox databases/storage groups.

NOTE: You can configure Recovery Manager to automatically send email notifications when backups are manually or automatically created. For more information, see "Configuring Email Notifications" (page 39).

Manually Creating Backups at the Mailbox/Storage Group Level

When you create a backup of a mailbox database/storage group level virtual copy, Recovery Manager automatically creates a virtual copy of the mailbox database/storage group and mounts it, your backup software backs up the virtual copy to media, and Recovery Manager unmounts the virtual copy. You can also choose to have Recovery Manager automatically remove the newly created virtual copy.

To create a backup of a virtual copy at the mailbox database/storage group level:

1. In the node tree pane, right-click the mailbox database/storage group node you want to back up and select **Backup to Media**.

2. (For Exchange 2010) Select whether to:
   - Validate the server name (unavailable for Exchange 2007)
   - Skip validation of the virtual copy

     If you skip validation, ensure the server name displayed in the **Backup Client** text box is correct.
   - Truncate the log
3. (For Exchange 2010) Click **Next**.
4. From the **Select Vendor** (or **Vendor**for Exchange 2007) drop-down list, select the backup software you are using:
   - Symantec NetBackup
   - HP Data Protector
5. In the **Parameters** area, enter the required information, depending on your backup software:

If you are using:	Enter these parameters:
Symantec NetBackup	• **Master Server Name**: The NetBackup master server • **NBU Policy Name**: The name of the policy you are using • **NBU Full Schedule Name**: The name of the schedule within the policy you are using For more information, see Symantec NetBackup documentation and "Configuring Backup Software" (page 30)
HP Data Protector	• **Data List**: The name of the data list For more information about data lists, see the description of backup specifications in HP Data Protector documentation.

NOTE: After the first successful backup, Recovery Manager saves the information entered in the **Parameters** area and displays it as the default the next time you create a backup.

6. To automatically remove the newly created virtual copy after backup, ensure the **Remove Virtual Copy from Storage System after backup** checkbox is checked.
7. Select whether you want Recovery Manager to defer truncation of the Exchange log after backup.

8. To immediately create one backup, click **Finish**.
   - Recovery Manager creates the backup, names it as its timestamp, and adds it to the **Backup Management** node under the relevant mailbox database/storage group in the node tree pane if:
     - You are using an expiration-based policy, or
     - You are using a numeric-based policy but either have not reached the maximum number of virtual copies allowed copies allowed or the policy is configured to remove old copies as necessary (i.e., the **Remove the oldest Virtual Copies** checkbox is checked).
   - Recovery Manager does not create the backup if you are using a numeric-based policy and:
     - The policy is not configured to remove the oldest virtual copies (i.e., the **Remove the oldest Virtual Copies** checkbox is not checked), and
     - You have reached the maximum number of virtual copies allowed and therefore Recovery Manager cannot create a new virtual copy.

     For more information, see "Setting the Recovery Manager Policy" (page 36).

     NOTE: To monitor NetBackup progress, use the progress log at the following location: `<RM_installation_location>\log\nbulog\mailbox_database_timestamp.log`

Creating Backups at the Storage Group Level for CCR (for Exchange 2007)

You can use Symantec NetBackup or HP Data Protector to create backups of CCR virtual copies on either the active or the passive node.

To back up a CCR virtual copy at the storage group level:

1. In the node tree pane, right-click the storage group node you want to back up, and select one of the following:
   - **Backup→on Active Node**
   - **Backup→on Passive Node**
2. From the **Vendor** drop-down list, select the backup software you are using:
   - Symantec NetBackup
   - HP Data Protector

3. In the **Parameters** area, enter the required information, depending on your backup software:

If you are using:	Enter these parameters:
Symantec NetBackup	• **Master Server Name**: The NBU master server • **NBU Policy Name**: The name of the policy you are using • **NBU Full Schedule Name**: The name of the schedule within the policy you are using For more information, see Symantec NetBackup documentation and "Configuring Backup Software" (page 30).
HP Data Protector	• **Data List**: The name of the data list For more information about data lists, see the description of backup specifications in HP Data Protector documentation.

4. To automatically remove the newly created virtual copy after backup, ensure the **Remove Virtual Copy from Storage System after backup** checkbox is checked.
   - Symantec NetBackup
   - HP Data Protector
5. To immediately create one backup, click **Finish**.
   - Recovery Manager creates the backup, names it as its timestamp, and adds it to the **Backup Management** node under the relevant storage group in the node tree pane if:
     - You are using an expiration-based policy, or
     - You are using a numeric-based policy but either have not reached the maximum number of virtual copies allowed or the policy is configured to remove old copies as necessary (i.e., the **Remove the oldest Virtual Copies** checkbox is checked).

   If Recovery Manager creates the new backup:
   - If you are creating a backup of a CCR virtual copy on the active node, Recovery Manager creates a virtual copy on the cluster's active node and backs it up to the corresponding backup server.
   - If you are creating a backup of a CCR virtual copy on the active and passive nodes and the policy is set to remove the virtual copy created for backup purposes (in other words, the **Remove virtual copy from Storage System after backup** checkbox is checked in the selected server's policy), Recovery Manager creates a virtual copy on the cluster's passive node, backs it up to the corresponding backup server, and removes the virtual copy.
   - If you are creating a backup of a CCR virtual copy on the active and passive nodes and the policy is set to retain the virtual copy created for backup purposes (in other words, the **Remove virtual copy from Storage System after backup** checkbox is unchecked in the

selected server's policy), Recovery Manager creates both the CCR virtual copy and its backup on the backup server of the selected server.

- Recovery Manager does not create the backup if you are using a numeric-based policy and:
  - The policy is not configured to remove the oldest virtual copies (i.e., the **Remove the oldest Virtual Copies** checkbox is not checked), and
  - You have reached the maximum number of virtual copies allowed and therefore Recovery Manager cannot create a new virtual copy.

  For more information, see "Setting the Recovery Manager Policy" (page 36).

6. Verify that the virtual copy has been backed up. To do so, ensure that the GUI displays the information described in Table 5 (page 51).

Table 5 Verifying the Virtual Copy Backup Status

Column	Value
Virtual Copy Status	• If the associated policy is set to remove the virtual copy from the HP 3PAR Storage System after backup, the status is **Removed**. • If the virtual copy is not removed, the status is **Mounted**. For more information on virtual copy status, seeSection (page 47).
Backup Mechanism	**NBU**
Backup Type	**FULL**
Backup Keyword	The Recovery Manager-generated keyword for the NBU backup, in the format: `exchange server_storagegroup_timestamp`

7. If the backup fails, refresh the GUI to reset the columns in the informational pane (as described in Table 5 (page 51)) back to their previous values.

Scheduling Automatic Backups at the Mailbox Database/Storage Group Level

To schedule automatic backups of a mailbox databases/storage groups:

1. In the node tree pane, right-click the mailbox database/storage group you want to back up, and select **Backup to Media**.
2. In the **Backup to Media** dialog box, enter the appropriate information. For more information, see "Manually Creating Backups at the Mailbox/Storage Group Level " (page 47).
3. Click **Next**.
4. In the Task Scheduler, schedule backups as desired. For more information, see "Scheduling Automated Tasks with Task Scheduler" (page 44).

Creating a Backup of a Virtual Copy

When you create a backup of one virtual copy, Recovery Manager copies the existing virtual copy, and the backup software backs the copy up to the media using the same timestamp as the original copy. Recovery Manager does not create a new virtual copy for backups of an individual virtual copy.

To create a backup of one virtual copy:

1. In the node tree pane, right-click the virtual copy you want to back up and select **Backup to Media**.

   If you are creating a backup of a DAG mailbox virtual copy, select a specific database source and click **NEXT**.
2. From the **Vendor** drop-down list, select the backup software you are using:
   - Symantec NetBackup
   - HP Data Protector
3. In the **Parameters** area, enter the required information, depending on your backup software:

If you are using:	Enter these parameters:
Symantec NetBackup	• **Master Server Name**: The NBU master server • **NBU Policy Name**: The name of the policy you are using • **NBU Full Schedule Name**: The name of the schedule within the policy you are using For more information, see Symantec NetBackup documentation and "Configuring Backup Software" (page 30).
HP Data Protector	• **Data List**: The name of the data list For more information about data lists, see the description of backup specifications in HP Data Protector documentation.

4. To immediately create one backup, click **Finish**.
   - Recovery Manager creates the backup, names it as its timestamp, and adds it to the **Backup Management** node under the relevant mailbox database/storage group in the node tree pane if:
     - You are using an expiration-based policy, or
     - You are using a numeric-based policy but either have not reached the maximum number of virtual copies allowed or the policy is configured to remove old copies as necessary (i.e., the **Remove the oldest Virtual Copies** checkbox is checked).
   - Recovery Manager does not create the backup if you are using a numeric-based policy and:
     - The policy is not configured to remove the oldest virtual copies (i.e., the **Remove the oldest Virtual Copies** checkbox is not checked), and
     - You have reached the maximum number of virtual copies allowed and therefore Recovery Manager cannot create a new virtual copy.

     For more information, see "Setting the Recovery Manager Policy" (page 36).

Scheduling an Automatic Backup to Media

To schedule an automatic backup of one virtual copy:

1. In the node tree pane, right-click the storage group/mailbox node, and select **Backup to Media**.
2. In the **Backup to Media** dialog box, enter the appropriate information. For more information, see "Manually Creating Backups at the Mailbox/Storage Group Level " (page 47).
3. Click **Next**.

4. In the **Task Scheduler** dialog box, check the **Schedule this task** checkbox.

   Recovery Manager enables you to schedule an automatic backup of a virtual copy once. Therefore, in the left pane of the **Schedule Pattern** area, the **Once** radio button is automatically selected and the other frequency options are disabled.
5. In the **Password** text box, enter a local user password for the backup server.
6. From the **Start Time** drop-down list, select the hour at which you want Recovery Manager to create the backup.
7. From the drop-down list above the calendar view in the right pane of the **Schedule Pattern** area, select the month and year in which to create the backup.
8. On the calendar, select the day on which to create the backup.
9. Click **Finish**.

Restoring from a Virtual Copy

You can use either the file copy restore feature or the volume restore feature of Recovery Manager to restore a virtual copy to its source mailbox database/storage group.

Recovery Manager can perform the restore from a mounted or an unmounted virtual copy, with the following restrictions:

Virtual Copy Type	Restore Options
Mounted virtual copy Non-promotable virtual copy	File copy restore
Promotable virtual copy	Volume restore

Restoring a Mailbox Database/Storage Group with File Copy Restore

1. In the node tree pane, right-click the virtual copy to use for the restore, and select **Restore Using→File Copy**.
2. To confirm you understand the warning, check the **Click to continue** checkbox.
3. Click **Ok**.

   Recovery Manager overwrites the mailbox database/storage group with the virtual copy. The mailbox database/storage group is now restored.

Restoring a Mailbox Database/Storage Group with Volume Restore

⚠ **WARNING!** DO NOT perform a volume restore if multiple mailbox database/storage groups (or any data files) share any volumes. Data files suffixes are: `.LOG` and `.EDB`.

To determine how or whether your mailbox database/storage groups share volumes, execute the `chk_multi_storage.cmd` script. By default, this script is installed at: `Program Files/3PAR/RM/Exchange/bin`

If you perform a volume restore on a volume that hosts multiple mailbox databases/storage groups and/or data files, the operation deletes all mailbox database/storage group data not contained in the promoted virtual copy.

1. In the node tree pane, right-click the virtual copy you want to use for the restore, and select **Restore Using→Volume**.
2. To confirm you understand the ramifications of proceeding with the restore, check the **Click to continue** checkbox.
3. Click **Ok**.

   The virtual copy completely overwrites the mailbox database/storage group. The mailbox database/storage group is now restored.

Restoring a Mailbox Database/Storage Group from a Media Backup

You can restore backups to their original location (i.e., the volume(s) or directory location of the virtual copy that was used to create the backup, not to the original Exchange data location), or you can specify an alternate location.

1. Under the **Backup Management** node in the node tree pane, right-click the backup you want to use for the restore, and select **Restore**.

   By default, Recovery Manager restores the backed-up virtual copy to its original location, which is displayed in the **Alternate Location** text box. The original location is either the directory `C:\3parSnapshot` or `F:\3parSnapshot`, depending on your system drive.
2. If you want to restore the backup to a different location, enter the alternate location in the **Alternate Location** text box or select a location from the file chooser.
3. Click **OK**.

   The backup software mounts the backup to the specified location as a virtual copy. If you specified an alternate restore location, the restored data appears in the alternate location.

   You can monitor the progress of the NetBackup restore in the progress log located at:

   (for Exchange 2010) `<RM_Exchange_Install_Location>\log\nbulog\Mailbox_database_timestamp.log`

   (for Exchange 2007) `<RM_Exchange_Install_Location>\log\nbulog\exchserver_storagegroup_timestamp.log`

Analyzing and Synchronizing the Repository

You can use Recovery Manager to compare and synchronize virtual copies in the Recovery Manager repository with the HP 3PAR Storage System. You can also schedule Recovery Manager to automatically analyze and synchronize (if desired) the repository with the HP 3PAR Storage System.

Manually Analyzing and Synchronizing the Repository

To manually analyze and synchronize (if desired) a mailbox database/storage group repository with the HP 3PAR Storage System:

1. Under **Virtual Copy Management** in the node tree pane, right-click the mailbox database/storage group you want to analyze, and select **Analyze**.
2. To automatically synchronize the HP 3PAR Storage System and the repository (if necessary), check the **Synchronize result with Repository** checkbox.

   To analyze the repository without synchronizing it, leave the **Synchronize result with Repository** checkbox unchecked.
3. To analyze immediately, click **Finish**.
   - If you opt to automatically synchronize the results, Recovery Manager analyzes the repository, synchronizes the repository and the HP 3PAR Storage System (if necessary), and updates the list of virtual copies under the **Virtual Copy Management** node in the node tree pane.
   - If you opt to only analyze the repository, Recovery Manager displays the **Analyze Repository** dialog box and performs the analysis. To view the list of virtual copies not in the repository, if any, click the **Detail** button in the **Analyze Repository** dialog box.

     To synchronize the results (if necessary), repeat the above steps to launch the **Analyze Repository** dialog box. Be sure to check the **Synchronize result with Repository** checkbox before continuing.

Scheduling Automatic Repository Analysis and Synchronization

To schedule automatic analysis and synchronization (if desired) of a mailbox database/storage group repository with the HP 3PAR Storage System:

1. Under **Virtual Copy Management** in the node tree pane, right-click the mailbox database/storage group you want to analyze, and select **Analyze**.
2. To automatically synchronize the HP 3PAR Storage System and the repository (if necessary), check the **Synchronize result with Repository** checkbox in the **Analyze Repository** dialog box.

   To analyze the repository without synchronizing it, leave the **Synchronize result with Repository** checkbox unchecked.
3. Click **Next**.
4. In the Task Scheduler, schedule analyze task as desired. For more information, see "Scheduling Automated Tasks with Task Scheduler" (page 44).

Validating a Virtual Copy

You can validate a mounted virtual copy for a mailbox database/storage group with Exchange APIs through Recovery Manager. To validate a virtual copy, right-click the mounted virtual copy you want to validate, and then select **Validate**.

Removing Virtual Copies

You can remove two types of virtual copy: virtual copies with a status of **Available**, and virtual copies with a status of **Mounted**.

⚠ **WARNING!** If you remove a virtual copy from the HP 3PAR Storage System while Recovery Manager is creating a backup, and you then delete this virtual copy from the Recovery Manager repository before a restore operation has taken place, all data is lost and you cannot recover the mailbox database/storage group.

Table 6 Virtual Copy Status Descriptions

Virtual Copy Status	Description
Available	A virtual copy has a status of **Available** when it exists in the HP 3PAR Storage System and in the Recovery Manager repository, and it is currently not mounted to a host.
Mounted	A virtual copy has a status of **Mounted** when it is mounted to a host. The virtual copy exists in both the HP 3PAR Storage System and the Recovery Manager repository.

Removing *Available* Virtual Copies

1. Ensure the virtual copy has a status of **Available**. If it is mounted to a host server, unmount it.

   For more information, see "Unmounting a Virtual Copy" (page 46).
2. In the node tree pane, right-click the virtual copy and select **Remove**.

Viewing Event Message Descriptions

You can view a description of all Recovery Manager error messages (aka event messages), including tips for troubleshooting each event.

1. Ensure you have an item in the node tree pane selected.
2. Select **About→Event Messages**.

   Recovery Manager uses your default browser to display the `Event Messages` file. The file contains all the events for Recovery Manager for Exchange in order of event ID.

Viewing Online Help

To view online help for Recovery Manager for Microsoft Exchange 2007 and 2010, select **Help→Online Help**.

Recovery Manager for Microsoft Exchange 2007 and 2010 Online Help appears in a web browser.

6 Using the Recovery Manager CLI

Recovery Manager for Exchange Command Line Interface (CLI)

Recovery Manager for Exchange provides a Command Line Interface (CLI) that allows you to:

- Create virtual copies
- Remove virtual copies
- Validate virtual mounted copies with the `eseutil.exe` tool
- Reset mounting status in a repository or release operation lock status
- Compare current repository list for the specified mailbox database (or storage group for Exchange 2007) with the virtual copies on an HP 3PAR Storage System to detect any out-of-sync snapshots
- Mount virtual copies
- Unmount virtual copies
- Back up virtual copies to media using Symantec NetBackup or HP Data Protector
- Restore backed-up virtual copies using Symantec NetBackup or HP Data Protector
- List available backups to restore from
- Delete a backup entry from the repository

  (Note: This does not remove the backup entry from the backup software)
- Create and modify storage group/mailbox policies
- Restore a mailbox database (or storage group for Exchange 2007) through file copy restore from a mounted virtual copy
- Restore a mailbox database/storage group through volume restore from an unmounted virtual copy
- Display virtual copies currently in the repository and their status
- Set and display the maximum number of virtual copies to maintain or virtual copy expiration time
- Set and display virtual copy retention time
- Set and display the Recovery Manager for Exchange communication port
- Set and display advanced configuration for backup timeout and remote copy monitoring interval
- Set and display Remote Copy history
- Gather system configuration for troubleshooting purposes

NOTE: For more information on user roles and rights, see the *HP 3PAR InForm OS CLI Administrator's Manual*.

Recovery Manager Commands

This section describes how to administer Recovery Manager for Exchange from the Command Line Interface.

RMExch analyze

SYNTAX

(for Exchange 2010)`RMExch analyze <-mdb mailbox database> [-domain DomainName] [-inserv StorageSystemId] [-sync [-f]]`

(for Exchange 2007) `RMExch analyze -s <ExchangeServer> -g <StorageGroup>[-sync] [-f] [-inserv StorageSystemId] [-domain <DomainName>]`

DESCRIPTION

The `RMExch analyze` command analyzes the existing repository and lists any out-of-sync virtual copies information between the repository and HP 3PAR Storage System.

PARAMETERS

The following options are supported:

- (for Exchange 2010)`-mdb <mailbox_DB_name>` - The name of the mailbox database to analyze.
- (for Exchange 2010) `-domain Domain Name`. Optional - Domain name to which mailbox database belongs.
- `-inserv StorageSystemId`. Optional - HP 3PAR Storage System identifier. Recommended when more than one HP 3PAR Storage Systems are configured.
- (for Exchange 2007)`-s <ExchangeServer>`- The name of the exchange server for which the storage group belongs.
- (for Exchange 2007)`-g <StorageGroup>`- The name of the storage group for which the virtual copy timestamp belongs.
- (for Exchange 2010) `-sync`. Optional - Syncs out of sync information and virtual volumes, VLUNs with user confirmation.
- `-sync` - Automatically updates the repository to match system information. If a virtual copy is missing virtual volumes, it is removed from the repository.

  If virtual copies are using an expiration-based policy, any out-of-sync expiration times are updated to match the HP 3PAR Storage System expiration time. If virtual copies have a retention time set, any out-of-sync retention times are updated to match the HP 3PAR Storage System retention time.
- (for Exchange 2010) `-f`. Optional - Valid with `-sync` to bypass user confirmation.
- `-f` - Forces the command. This option can only be used if the `-sync` option is used.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

NOTE: Use quotes ("") for names that include spaces.

NOTE: When multiple HP 3PAR Storage Systems are configured on a single backup server, for correct results use `-inserv` option.

Examples

The following commands will analyze existing repository and output any out-of-sync information. Use quotes ("") for names that include spaces.

- (For Exchange 2010) `RMExch analyze -mdb mydb2 -inserv 214`
- (For Exchange 2010) `RMExch analyze -mdb "mailbox database 2"`
- (For Exchange 2007) `RMExch analyze -s bottlenosed -g "First storage group"`

RMExch backup

SYNTAX

(for Exchange 2010)`RMExch backup -mdb <mailbox_DB_name> -s <ExchangeServer> [-defer|-nc|-t <Timestamp>] [-mpl] -vs <verification_server/backup_server> [-p <policyName>] [-d <fullScheduleName>] [-m <masterServer>] [-mp <"mountpoint">] [-remove] [-noemail] [-dl DataListName] [-domain <DomainName>]`

(for Exchange 2007)`RMExch backup -s <ExchangeServer> -g <storagegroup> [-t <Timestamp>] [-p <PolicyName>] [-remove] [-d <fullScheduleName>] [-m <masterServer>] [-defer | -nc] [-mp <"mountpoint".] [-noemail] [-dl DataListName] [-domain <DomainName>]`

DESCRIPTION

The `RMExch backup` command backs up a virtual copy to media, or creates a virtual copy and backs up to media (also known as a quick backup). For the latter case, no timestamp is needed.

PARAMETERS

The following options are supported:

- (for Exchange 2010)`-mdb <mailbox_DB_name>` - The name of the mailbox database/storage group to back up.
- (for Exchange 2010)`-vs <verification_server/backup_server>` - The server on which to perform verification and/or backup. This server must have a Recovery Manager for Exchange backup server installed and access to the backup software (i.e., Symantec NetBackup or HP Data Protector).
- `-t <Timestamp>` - Optional. The timestamp of the virtual copy to back up. Use if the virtual copy has already been created. Do not use to create a virtual copy and then perform a backup.
- `-s <ExchangeServer>` - The name of the Exchange server.
- (for Exchange 2007)`-g <Storage_group>` - The name of the storage group to which the timestamp belongs.
- `-p <policyName>` - Symantec NetBackup policy name. Only valid if Symantec NetBackup software is in use.
- `-d <fullScheduleName>` - Name of Symantec NetBackup backup schedule. Only valid if Symantec NetBackup software is in use.
- `-m <masterServer>` - Name of the Symantec NetBackup master server. Only valid if Symantec NetBackup software is in use.
- `-remove` - Optional. Used with quick backups. Specify this option to remove the virtual copy after a quick backup.

- If the policy is a numeric-based policy, the `-remove` option removes both the newly created virtual copy and the oldest virtual copy.

  NOTE: HP does not recommend using the `-remove` option with the `RMExch backup` command on virtual copies that use a numeric-based policy. If you want to automatically delete the oldest virtual copy, configure the policy to remove the oldest virtual copy. For more information, see the `RMExch policy` command.

- If the policy specifies an expiration time or a retention time or both, this option overrides the policy and removes the virtual copy immediately.

This option cannot be used with the `-t` option.

If the `-remove` option is not specified, by default the virtual copy is retained.

- `-nc` - Optional. Skips the integrity check (not recommended). This cannot be used with the `-t` option.
- `-defer` - Optional. Specify this option to defer the Exchange log truncation after the successful backup is confirmed in automatic creation. This option cannot be used with the `-t` option.

NOTE: The `-defer` option is not supported when the Recovery Manager for Exchange backup server is the same as the production server.

NOTE: The `-defer` option defers log truncation until backup completion. This keeps the Exchange writer in the "waiting for completion" state for that period.

- `-mp "mountpoint"` - Optional. Specifies the mount point (delimited by quotation marks), for a backup location other than in the default directory.
  - The full path is required.
  - The default location is `<System Drive>:\3parsnapshot`.
  - If the specified virtual copy is already mounted, this parameter will be ignored.
- `-noemail` - Optional - Do not send an email notification even if configured for this operation.
- `-dl DataListName` - Specifies the data list name and indicates the backup software in use is HP Data Protector. For more information about data lists, see the description of backup specifications in the *HP Data Protector Administrator's Guide*.

  Optional: If not specified, Recovery Manager for Exchange proceeds as if the backup software used is Symantec NetBackup.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager fro Exchange uses the local domain.
- (for Exchange 2007)`-lcr` - Optional. Take the snapshot from the local continuous replication copy.
- (for Exchange 2007`-active` - Optional. One-step backup from the active CCR node (applies for CCR configurations only, and can only perform backup for the node at the local site). The active node is the default if `-active` is not specified.
- (for Exchange 2007`-passive` - Optional. One-step backup on the passive CCR node (applies for CCR configurations only, and can only perform backup for the node at the local site). The active node is the default if `-passive` or `-active` are not specified.

NOTE: Use quotes ("") where spaces are included.

NOTE: Symantec NetBackup software is case sensitive. Make sure all information entered pertaining to the policy is supplied with the proper case.

Example

(for Exchange 2010) The following command uses NetBackup to perform a backup of virtual copy `020405162103` whose data has currently been mounted on the server `S1`.

```
RMExch backup -mdb mailboxdatabase -t 020405162103 -vs S1 -p test -d
full -m bottlenosed
```

The following command uses Data Protector to perform a backup of virtual copy `07221102153`.

```
RMExch backup -mdb mailboxdatabase -t 072211021532 -vs S1 -dl rme_dl
```

(for Exchange 2007) The following command performs a backup of virtual copy `020405162103` whose data has currently been mounted.

```
RMExch backup -s bottlenosed -g sg2 -t 020405162103 -p test -d full -m
bottlenosed
```

RMExch config

SYNTAX

To change/query the timeout value for NetBackup initialization process detection:

```
RMExch config -h <WindowsHost> -bktmout [-sec <seconds>]
```

To change/query the monitoring interval for remote copy progress on target server:

```
RMExch config -h <WindowsHost> -rcintvl [-min <Minutes>]
```

DESCRIPTION

The `RMExch config` command will display or change the timeout value for NetBackup initialization process detection for backup operation and the monitoring interval for remote copy progress on target server.

PARAMETERS

The following options are supported:

- `-h <WindowsHost>` - Specify the Recovery Manager installed Windows host to change or query settings. If host is in another domain, specify the FQDN.
- `-bktmout` - Setup or inquiry for Backup process timeout value to confirm that NetBackup has received the backup request. The timeout range is 0 to 86400 seconds. Default is 30 seconds.
- `-sec <seconds>` - Optional. Number of seconds.
- `-min <minutes>` - Optional. Number of minutes.
- `-rcintvl` - Setup or inquiry for Remote Copy process monitoring interval within a range of 3 to 15 minutes. Default is 3 minutes.

Example

The following command will change remote copy monitoring interval to 10 minutes.

```
RMExch config -h Grampus -rcintvl -min 10
```

RMExch create

SYNTAX

```
(for Exchange 2010) RMExch create -s <ExchangeServer> -vs
<verification_server> -mdb <mailbox_DB_name> [-nc [-truncate]] [-rc
<TargetServer> [-defer]] [-noemail] [-exp <time>{h|H|d|D}] [-retain
<time>{h|H|d|D}] [-f] [-domain <DomainName>]
```

```
(for Exchange 2007) RMExch create -s <ExchangeServer> -g <StorageGroup>
 [-nc [-truncate]]
[-rc <TargetServer> [-defer] [-active] [-passive] [-both] [-lcr]
[-noemail] [-exp <time>{h|H|d|D}] [-retain <time>{h|H|d|D}] [-f]
[-domain <DomainName>]
```

DESCRIPTION

The `RMExch create` command creates a virtual copy of a mailbox database (or storage group for Exchange 2007) on the primary host where Exchange is running.

By default, Recovery Manager for Exchange exposes the virtual copy to the backup host during virtual copy creation for data-integrity checking. Also by default, the Exchange transaction log is truncated after the virtual copy validates successfully.

This command only supports online backup of an entire mailbox database/storage group. Therefore, you must make sure the mailbox database/storage group is online before creating a virtual copy.

PARAMETERS

The following options are supported:

- `-s <ExchangeServer>` - The name of the Exchange server.
- (for Exchange 2010)`-mdb <mailbox_DB_name>` - The name of the mailbox database to shadow copy.
- (for Exchange 2007)`-g <StorageGroup>` - The storage group to shadow copy. This parameter is case sensitive.
- (for Exchange 2010) `-vs <verfication_server>` - The server on which snapshot verification is performed. This cannot be used with the `-nc` option.
- `-nc` - Optional. Skip the integrity check. Not recommended. This cannot be used with the `-vs` option.
- `-truncate` - Optional. Force truncation of log upon successful VC creation when `-nc` is used.
- `-rc <TargetServer>` - Optional. Indicates the virtual copy creation is for Remote Copy. Specify the target server on which to create the virtual copy once Remote Copy completes.
- `-defer` - Optional. Defer the log truncation decision after the Remote Copy completes. This cannot be used with the `-nc` or `-truncate` options.
- `-noemail` - Optional. Do not send an email notification even if configured for this operation.
- `-exp <time>{h|H|d|D}` - Optional. If the policy is expiration-based, set the expiration time for this virtual copy to the specified time. Valid values are:
  - To set the expiration time in hours: 1-43800h (or H)
  - To set the expiration time in days: 1-1825d (or D)
  - To remove the expiration period: 0h

- (for Exchange 2007) `-lcr` - Optional - Take the snapshot from the local continuous replication copy.
- (for Exchange 2007)`-active` - Optional - Take the snapshot from the active CCR node (applies for CCR configurations only). The active node is the default if -active is not specified
- (for Exchange 2007)`-passive` - Optional - Take the snapshot on the passive CCR node (applies for CCR configurations only). The active node is the default if -passive or -active are not specified.
- (for Exchange 2007)`-both` - Optional - Take the snapshot on both active and passive nodes.

NOTE: If you specify an expiration time for a remote virtual copy:

- If Remote Copy is set up in asynchronous periodic mode, Recovery Manager for Exchange sets the expiration time for the remote virtual copy on the backup server only, not for the virtual copy created on the primary server.
- If Remote Copy is set up in synchronous mode, Recovery Manager for Exchange sets the expiration time for both the virtual copy on the primary server and the remote virtual copy on the backup server.

  For more information, see the *HP 3PAR Remote Copy Software User's Guide*.

If not specified, Recovery Manager creates the virtual copy using the expiration time specified in the current policy.

- `-retain n{h|H|d|D}` - Optional. Set the retention time for the specified virtual copy to the specified time. The virtual copy cannot be removed during this time period.

NOTE: Retention time restrictions are:

- You must have an HP 3PAR Virtual Lock license to use the `-retain` option.
- The minimum retention period is 1 hour; the maximum is 43,800 hours/1,825 days (5 years).
- The default retention time is 336 hours (14 days).
- The retention time cannot exceed the value of the system's virtual volume maximum retention time.
- You can set a retention time regardless of whether the policy is numeric- or expiration-based.
- The retention time cannot be longer than the expiration time (if the policy is expiration-based).
- If you create a remote virtual copy and Remote Copy is set up in asynchronous periodic mode, the retention time is applied to the remote copy on the backup server only. If Remote Copy is set up in synchronous mode, the retention time is applied to both the remote copy on the backup server and the virtual copy on the primary server.
- The retention time cannot be removed or reduced after it is set.
- To override the mailbox database/storage group policy and set no retention time for this virtual copy, use a value of 0h.

  If Remote Copy is set up in synchronous mode, both local and remote policy needs to be identical. Recovery Manager for Exchange sets the expiration time for both the virtual copy on the primary server and the remote virtual copy on the backup server.

- `-f` - Optional. When used with the `-retain` option, does not request confirmation for the retention time modification.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

NOTE: Use quotes ("") for names that include spaces.

Examples

(for Exchange 2010) The following command will create a snapshot for the mailbox database/storage group `mb2` on the Exchange server `bottlenosed`, and will be verified on the server `raptors`.

```
RMExch create -s bottlenosed -vs raptors -mdb "mb2"
```

(for Exchange 2007) The following command will create a snapshot for the storage group `sg2` on exchange server `bottlenosed`.

```
RMExch create -s bottlenosed -g sg2
```

NOTE: The target server to create snapshots upon the completion of Remote Copy process has to have the same version of Recovery Manager Backup Server component installed. Refer to Remote Copy Integration for more information on the Remote Copy setup.

NOTE: It is the responsibility of the user to perform data integrity checking and transaction log truncation to the virtual copy created with the `-nc` option. Skipping data integrity checking is not recommend.

NOTE: VSS will wait for up to 10 seconds for the writers to freeze I/O, and this interval is not configurable. In most cases 10 seconds is a sufficient window to successfully create a virtual copy. However, in some circumstances under very heavy load, 10 seconds may not be enough and the virtual copy will fail on this attempt, which is by design. VSS does not automatically retry the shadow copy creation, you must retry the virtual copy creation using the Recovery Manager for Exchange GUI or the command line.

NOTE: During virtual copy creation, Recovery Manager for Exchange dismounts and unmasks the virtual copy device from the Windows server, and breaks the virtual copy away from VSS control. During this process a “delayed write error” message may appear, or the message "the system failed to flush data to the transaction log" may appear in the System Event Log. This is normal.

NOTE: The `-defer` option defers log truncation until backup completion. This keeps the Exchange writer in the “waiting for completion” state for that period.

(for Exchange 2007) If you specify the `-both` option during the CCR configuration, Recovery Manager for Exchange first attempts to take a snapshot on the passive node, then it attempts to take a snapshot on the active node. A success status indicates that at least one of the snapshots was successfully created.

RMExch deletebackup

SYNTAX

(for Exchange 2010) `RMExch deletebackup -mdb <mailbox_DB_name> -t <backuptimestamp> [-domain <DomainName>]`

(for Exchange 2007) `RMExch deletebackup -s <ExchangeServer> -g <storagegroup> -t <backuptimestamp> [-domain <DomainName>]`

DESCRIPTION

The `RMExch deletebackup` command removes a backup entry in the backup repository. It will not communicate to the backup software to delete the actual backup.

PARAMETERS

The following options are supported:

- (for Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database/storage group to delete.
- (for Exchange 2007) `-s <ExchangeServer>` - The name of the exchange server for which the storage group belongs.
- (for Exchange 2007) `-g <StorageGroup>` - The name of the storage group of the virtual copy that was backed up to belongs.
- `-t <BackupTimestamp>` - The timestamp to delete.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

NOTE: Use quotes ("") where spaces are included.

Example

(for Exchange 2010) The following command will delete a backup with the timestamp `020405162103`

```
RMExch deletebackup -mdb mb2 -t 020405162103
```

(for Exchange 2007) The following command will delete a backup with the timestamp `020405162103`

```
RMExch deletebackup -s bottlenosed -g sg2 -t 020405162103
```

RMExch display

SYNTAX

(for Exchange 2010) `RMExch display <-mdb MailboxDatabase> [-domain DomainName] [-h WindowsHost] [-inserv StorageSystemId][-t timestamp] [-exp] [-retain]`

(for Exchange 2007) `RMExch display <-s Exchangeserver> <-g storagegroup> [-h WindowsHost][-t timestamp] [-inserv StorageSystemId] [-exp] [-retain] [-domain <DomainName>]`

DESCRIPTION

The `RMExch display` command displays all virtual copies in the repository.

PARAMETERS

The following options are supported:

- (for Exchange 2010) `-mdb MailboxDatabase` - The name of the mailbox database/storage group for which virtual copies are listed.
- (for Exchange 2007) `-s <ExchangeServer>` - The name of the exchange server for which the storage group belongs. If this is not given then the machine name will be used.
- (for Exchange 2007) `-g <StorageGroup>` - The name of the storage group for which the virtual copy information is to be retrieved.
- (for Exchange 2010)`-h WindowsHost` - Optional. Specify a Recover Manager installed Windows host to query the information.
- `-h <WindowsHost>` - Optional. Specifies a Recovery Manager installed Windows host to query repository information.
- `-t <timestamp>` - Optional. Specify a timestamp to display more detail for that virtual copy.
- `-inserv StorageSystemId` - Optional. HP 3PAR Storage System Identifier
- `-exp` - Optional. Display the expiration time for the listed virtual copies.
- `-retain` - Optional. Display the retention time for the listed virtual copies.
- (for Exchange 2010) `-domain Domain Name` - Optional. Domain name to which mailbox database belongs.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

NOTE: Use quotes ("") where spaces are included.

NOTE: (for Exchange 2007) If a storage group name is given, the Exchange Server name must also be provided. If both the Exchange Server and storage group names are not given, then the Exchange Server defaults to the machine name.

Examples

(for Exchange 2010) The following commands will display the virtual copies for mailbox database/storage group `Alpha`.

```
RMExch display -mdb Alpha
```

(for Exchange 2007) The following commands will display the virtual copies for Exchange server `Alpha` and storage group `Zeta`.

```
RMExch display -s Alpha -g Zeta
RMExch display -s xexchange -g ssg2 -inserv 418
```

RMExch displayDomain

SYNTAX

```
RMExch displayDomain
```

DESCRIPTION

The `RMExch displayDomain` displays a list of the registered domain controllers.

PARAMETERS

None.

Example

The following command lists the registered domain controllers.

```
RMExch displayDomain
```

RMExch listbackup

SYNTAX

(for Exchange 2010) `RMExch listbackup -mdb <mailbox_DB_name> [-domain <DomainName>]`

(For Exchange 2007) `RMExch listbackup -s <ExchangeServer> [-bs Backup Server] [-domain <DomainName>]`

DESCRIPTION

The `RMExch listbackup` command prints a list of the virtual copies backups that have been backed up by the `RMExch backup` command.

PARAMETERS

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database/storage group for which virtual copy backups are listed.
- (For Exchange 2007) `-s <ExchangeServer>` - The name of the exchange server to which the storage group belongs.
- (For Exchange 2007) `-bs <Backup Server>` - List the backups maintained on the target backup server.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

Example

(For Exchange 2010) The following command lists the backups performed through Recovery Manager for Exchange for mailbox database/storage group `MB1`.

```
RMExch listbackup -mdb MB1
```

(For Exchange 2007) The following command lists the backups performed through Recovery Manager for Exchange for the host `bottlenosed`.

```
RMExch listbackup -s bottlenosed
```

RMExch ModifyDomain

SYNTAX

```
RMExch ModifyDomain -domainhost <DomainHost> -u <domain\username> -p <password>
```

DESCRIPTION

The `RMExch ModifyDomain` command modifies an Active Directory domain.

PARAMETERS

The following options are supported:

- `-domainhost <DomainHost>` - The fully qualified domain name (FQDN) of the domain host you are modifying.
- `-u <domain\username>` - The username that has access to the Active Directory controller.
- `-p <password>` - The password for the username.

NOTE: Use quotes ("") for names that include spaces.

Example

The following command changes the credentials stored for the domain controller `kings`.

```
RMExch ModifyDomain -domainhost kings.kingsmain.main.com -u
kingsmain\admin -p adminpwd
```

RMExch mount

SYNTAX

(For Exchange 2010) `RMExch mount -mdb <mailbox_DB_name> -t <Timestamp> -h <Hostname> [-mp "MountPoint"] | [-domain <DomainName>]`

(For Exchange 2007) `RMExch mount -s <ExchangeServer> -g <StorageGroup> -t <Timestamp>`
`-h <Hostname> [-mp "mountpoint"] | [-domain <DomainName>]`

DESCRIPTION

The `RMExch mount` command mounts a virtual copy created by the `RMExch create` command. When using the `RMExch mount` command to mount a virtual copy, the program will check to see if the virtual copy is already mounted to a host machine. The virtual copy must have an "Available" status, before it can be mounted

PARAMETERS

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database to mount.
- (For Exchange 2007) `-s <ExchangeServer>`- The name of the Exchange server for which the storage group belongs.
- (For Exchange 2007) `-g <StorageGroup>` - The name of the storage group for which the virtual copy timestamp belongs.
- `-t <Timestamp>` - The timestamp of the virtual copy to mount.
- `-h <host>` - Windows host name to mount the virtual copy. The target host must have Recovery Manager for Exchange installed.

  If you are using a multiple domain configuration and the Windows host is not in the local domain, use the `-h` option to specify the fully qualified domain name (FQDN) of the host's domain.

- `-mp "mountpoint"` - Optional. Enclose the mount point in quotation marks if you prefer to mount the volume(s) elsewhere besides default directory. Full path is required. Default is to mount to `<System Drive>:\3parsnapshot`.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

NOTE: Use quotes ("") where spaces are included.

NOTE: The `<InServHost>` is the host name defined in the system. Available host names defined in the system can be listed by executing the HP 3PAR InForm CLI `showhost` command.

NOTE: The `-expose` option was deprecated in release 3.1.1.

NOTE: The Mount/Unmount operation is not supported on VMs.

Examples

(For Exchange 2010) The following command will mount the virtual copy `020405162103` to the directory `d:\Rmmount`.

```
RMExch mount -mdb bottlenosed -t 020405162103 -h bottlenosed -mp
"d:\RMmount"
```

(For Exchange 2007) The following command will mount the virtual copy `020405162103` to the directory `d:\Rmmount`.

```
RMExch mount -s bottlenosed -g sg2 -t 020405162103 -h bottlenosed -mp
 "d:\RMmount"
```

RMExch peer (For Exchange 2007)

SYNTAX

```
RMExch peer [[<display>]|[-clear]|[-bs <peer_server>]]
```

DESCRIPTION

The `RMExch peer` command configures the peer backup servers for two HP 3PAR Storage System CCR configurations. The backup server executes all commands and sends certain commands to the peer backup server to run (such as create and backup) for the passive node option. Once the configuration is set, you will not need to run this command again unless you want to change the peer relationship between the backup servers.

PARAMETERS

The following options are supported:

- `-bs <peer_server>` - The server's name you would like to designate as your peer backup server.
- `-display` - Used if the `-bs` parameter is not used. Displays the current configuration of your peer backup servers.
- `-clear` - To remove the peer relationship between backup servers. Once the peer relationship is removed, both backup servers are no long able to manage CCR nodes.

NOTE: The `RMExch peer` command is intended only for CCR configuration. The `-bs` option only needs to be run once to set up the peer relationship and to manage the CCR configuration.

Examples

The following command will configure the peer backup server .

```
RMExch peer -bs server1
```

RMExch policy

SYNTAX

(For Exchange 2010) `RMExch policy -mdb <mailbox_DB_name> [-i <MaxVCAllowed> [-r]] [-exp <time>{h|H|d|D}] [-retain <time>{h|H|d|D}] [-f] [-domain <DomainName>]`

(For Exchange 2007) `RMExch policy -s <ExchangeServer> -g <StorageGroup> [-i <MaxVCAllowed> [-r]] [-exp <time>{h|H|d|D}] [-retain <time>{h|H|d|D}] [-f] [-domain <DomainName>]`

DESCRIPTION

The `RMExch policy` command displays or updates the policy for the specified mailbox database/storage group. Policies can be numeric-based or expiration-based.

If the policy is numeric-based and you specify `-i`, Recovery Manager for Exchange updates the policy to the argument following `-i`. If you specify `-r`, Recovery Manager for Exchange automatically removes the oldest virtual copy if the maximum number is exceeded. If you do not specify `-r`, Recovery Manager for Exchange does not automatically remove the oldest virtual copy when the maximum number is exceeded. The maximum value allowed is 500.

If the policy is expiration-based and you specify `-exp`, Recovery Manager for Exchange updates the policy to the argument following `-exp`.

If you do not specify a policy, Recovery Manager for Exchange by default uses a numeric-based policy with a maximum of 10 virtual copies.

PARAMETERS

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database.
- (For Exchange 2007) `-s <ExchangeServer>` - The name of the Exchange server to display/update the policy configuration.
- (For Exchange 2007) `-g <StorageGroup>` - The name of the storage group.
- `-i <MaxVCAllowed>` - Optional. If the policy is numeric-based, set the maximum number of virtual copies allowed for every storage group under the specified server.
- `-r` - Optional. If the policy is numeric-based, Recovery Manager for Exchange removes the oldest virtual copy once the maximum number of virtual copies has been created. To retain the oldest virtual copy, set the policy without this option.
- `-exp <time>{h|H|d|D}` - Optional. If the policy is expiration-based, set the expiration time to the specified time. Valid values are:
  - To set the expiration time in hours: 1-43800h (or H)
  - To set the expiration time in days: 1-1825d (or D)
  - To remove the expiration time: 0h
- `-retain n{h|H|d|D}` - Optional. Set the retention time for virtual copies to the specified time. A virtual copy cannot be removed during this time period.

NOTE: Retention time restrictions are:

- You must have an HP 3PAR Virtual Lock license to use the `-retain` option.
- The minimum retention period is 1 hour; the maximum is 43,800 hours/1,825 days (5 years).
- The default retention time is 336 hours (14 days).
- The retention time cannot exceed the value of the system's virtual volume maximum retention time.
- You can set a retention time regardless of whether the policy is numeric- or expiration-based.
- The retention time cannot be longer than the expiration time (if the policy is expiration-based).
- The retention time cannot be removed or reduced after it is set.

For more information on setting retention times for individual virtual copies, see the `RMExch create` and `RMExch setvc` commands.

- `-f` - Optional. When used with the `-retain` option, does not request confirmation for the retention time modification.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

  NOTE: Use quotes ("") where spaces are included.

Examples

(For Exchange 2010) The following command displays the current number of virtual copies allowed for the mailbox database `mb2`:

```
RMExch policy -mdb mb2
```

(For Exchange 2010) The following command changes the maximum virtual copies allowed for the mailbox database named `bottlenosed` to 10 and remove the oldest virtual copy when the maximum number is reached:

```
RMExch policy -mdb bottlenosed -i 10 -r
```

(For Exchange 2010) The following command sets the expiration time to 25 hours for virtual copies in mailbox database `mb2`:

```
RMExch policy -mdb mb2 -exp 25h
```

(For Exchange 2007) `RMExch policy -s bottlenosed -g storageGroup`

RMExch portconfig

SYNTAX

```
RMExch portconfig -h <WindowsServer> [-p <portnumber>]
```

DESCRIPTION

The `RMExch portconfig` command will display or update the current port configuration for the Recovery Manager for Exchange service and RMExch CLI for the specified windows server. When only the `-h` argument is supplied, this command will list the current port number used by Recovery Manager for the Windows server. When `-p` is supplied, the port will be updated to the argument followed by `-p`. The default port used by Recovery Manager for Exchange is 9933. This should be run against all of the production servers and backup servers. If you update the port setting on a Windows server, you will need to restart the Recovery Manager for Exchange Agent Service before connecting through that port.

PARAMETERS

The following options are supported:

- `-h <WindowsServer>` - The name of the Windows server to display/update the port configuration. If the server is in another domain, specify the FQDN.
- `-p <portnumber>` - Optional. If specified, the command will update the port used. If unspecified, the command will show the current configuration. Valid port number values are 1024 to 65535.

Examples

The following command will display the current port configuration for server `Alpha`.

```
RMExch portconfig -h Alpha
```

The following command will update the port configuration for server `Alpha` to `9950`.

```
RMExch portconfig -h Alpha -p 9950
```

RMExch rcstatus

SYNTAX

(For Exchange 2010) `RMExch rcstatus -mdb <mailbox_DB_name> <[-query]|[<-update> [-t <timestamp> -ts <RecordKeeper> -status <RCStatus>]]> [-domain <DomainName>]`

(For Exchange 2007) `RMExch rcstatus -s <ExchangeServer> -g <StorageGroup> <[-query]|<-update> [-t <timestamp> -ts <RecordKeeper> -status <RCStatus>]]> [-domain <DomainName>]`

DESCRIPTION

The `RMExch rcstatus` command will display or update status of the Remote Copy operation history for periodic mode volume groups.

PARAMETERS

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database to which the virtual copy timestamp belongs.
- (For Exchange 2007) `-s <ExchangeServer>` - Exchange server for which storage group belongs.
- (For Exchange 2007) `-g <StorageGroup>` - The storage group of the virtual copy.
- `-update` - Update the status of Remote Copy history for a specific timestamp.
- `-query` - Query Remote Copy history for specified storage group.
- `-t <Timestamp>` - The timestamp of the virtual copy.
- `-ts <Record Keeper>` - The target host to update the Remote Copy status record.
- `-status` - The status to save in record.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

NOTE: The `-update` option without timestamp and host will update all periodic mode Remote Copy records from the original target server.

NOTE: Use quotes ("") where spaces are included.

Examples

(For Exchange 2010) The following command updates the status of an existing Remote Copy status history for the specified host.

```
RMExch rcstatus -mdb mb2 -update -t 050106113456 -ts Grampus -status Success
```

(For Exchange 2007) The following command updates the status of an existing Remote Copy history for the specified host.

```
RMExch rcstatus -s bottlenosed -g sg2 -t 050106113456 -ts Grampus -status Success
```

RMExch RegisterDomain

SYNTAX

```
RMExch RegisterDomain -domainhost -u <domain\username> -p <password>
```

DESCRIPTION

The `RMExch RegisterDomain` command registers a new Active Directory domain.

PARAMETERS

The following options are supported:

- `-domainhost <DomainHost>` - The fully qualified domain name (FQDN) of the new domain host. The host name should be any Exchange server in the domain you are registering.
- `-u <domain\username>` - The username that has access to the Active Directory controller.
- `-p <password>` - The password for the username.

NOTE: Use quotes ("") for names that include spaces.

Example

The following command registers the domain controller `kings`.

```
RMExch RegisterDomain -domainhost kings.kingsmain.main.com -u
kingsmain\administrator -p administratorpassword
```

RMExch remove

SYNTAX

(For Exchange 2010) `RMExch remove -mdb <mailbox_DB_name> -t <Timestamp> [-domain <DomainName>]`

(For Exchange 2007) `RMExch remove -s <ExchangeServer> -g <StorageGroup> -t <Timestamp> [-domain <DomainName>]`

DESCRIPTION

The `RMExch remove` command removes the virtual copy from the system and the repository.

To be successfully removed, the virtual copy must have an "Available" status; if the virtual copy is mounted it will not be removed. In addition, the retention time set in the virtual copy policy must have expired, or the virtual copy must have no retention time.

PARAMETERS

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database.
- (For Exchange 2007) `-s <ExchangeServer>` - The name of the Exchange server to which the storage group belongs.
- (For Exchange 2007) `-g <StorageGroup>` - The name of the storage group to which the virtual copy timestamp belongs.
- `–t <Timestamp>` - The timestamp of the virtual copy to remove.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

NOTE: Use quotes ("") for names that include spaces.

Example

(For Exchange 2010) The following command will remove the virtual copy with timestamp `020405162103`.

```
RMExch remove -m mdb2 -t 020405162103
```

(For Exchange 2007) The following command will remove the virtual copy with timestamp `020405162103`.

```
RMExch remove -s bottlenosed -g sg2 -t 020405162103
```

RMExch report

SYNTAX

```
RMExch report -h <WindowsHost> -output <OutputDirectory>
```

DESCRIPTION

The `RMExch report` command will execute the `RMReport batch` script under the `<InstallationPath>\Exchange\goodies` folder and gather needed information on the specified Windows host for troubleshooting purposes.

PARAMETERS

The following options are supported:

- `-h <WindowHost>` - Specify a Recovery Manager installed Windows host to run the RMREPORT utility.
- `-output <OutputDirectory>` - The full path folder to receive the generated report.

NOTE: Use quotes ("") where spaces are included.

Example

The following command will collect remote information related to Recovery Manager for Exchange activities.

```
RMExch report -h Grampus -output c:\MyReport
```

RMExch repository

SYNTAX

```
RMExch repository [-a <newRepositoryLocation>]
```

DESCRIPTION

The `RMExch repository` command will display or move the current repository locations for Recovery Manager for Exchange. If no arguments are specified, then the current location is displayed. If `-a` is specified along with a directory, then the repository will be moved to the new location.

PARAMETERS

The following options are supported:

- `-a <newRepositorylocation>` - The target directory to which to move the repository.

Example

The following command will change the repository location to `e:\3PAR Storage`:

```
RMExch repository -a "e:\3PAR Storage"
```

RMExch reset

SYNTAX

To reset the Recovery Manager for Exchange locking on remote Windows host:

```
RMExch reset -s <ExchangeServer> -opt lock
```

(For Exchange 2010) To reset the mount status of a particular timestamp record:

```
RMExch reset -s <ExchangeServer -mdb <mailbox_DB_name> -t <timestamp>
-opt status
```

(For Exchange 2007) To reset the mount status of a particular timestamp record:

```
RMExch reset <-s exchange server> <-g storage group> <-t timestamp>
<-opt status>
```

DESCRIPTION

The `RMExch reset` command resets a virtual copy mounting status in the repository record and internal process locking status on any designated Recovery Manager for Exchange installed system with only the `status` option being supported. Executing this command with the `status` option will force the removal of currently exposed VLUNs and set the mounting status to "Available".

PARAMETERS

The following options are supported:

- `-s <ExchangeServer>` - The name of the Exchange server. If the server is in another domain, specify the FQDN.
- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database.
- (For Exchange 2007) `-s <ExchangeServer>` - The name of the exchange server to which the storage group belongs. If the host is in another domain, specify the FQDN.
- (For Exchange 2007) `-g <StorageGroup>` - The name of the storage group to which the virtual copy timestamp belongs.
- `–t <Timestamp>` - Optional - The timestamp of the virtual copy. Requires the `-opt status` option.
- `-opt <Option>` - Specifies whether to reset the locking or mounting status. Currently supported options are `lock` and `status`. The `lock` option is only used to unlock Recovery Manager for Exchange from previous virtual copy creation failure caused by unexpected termination.

NOTE: Reset status of a specific timestamp will force the removal of currently exposed VLUNs.

NOTE: Use quotes ("") for names that include spaces.

NOTE: When Recovery Manager for Exchange is processing user requests, it will activate an internal locking mechanism. Any incoming request will get “Server <system name> has a Recovery Manager command running already” message. Wait until it finishes before continuing. However, in the case of unexpected termination, the locking status may not get deactivated properly. Use this command to release the lock for the operation to go back to normal status.

Examples

(For Exchange 2010) The following commands will release the lock at the Exchange server.

```
RMExch reset -s bottlenosed -opt lock
```

(For Exchange 2010) The following command will reset the existing mount status to available.

```
RMExch reset -mdb mydb1 -t 050106113456 -opt status
```

(For Exchange 2007) The following commands will reset the existing mount status to available.

```
RMExch reset -s bottlenosed -g sg2 -t 050106113456 -opt status
RMExch reset -s bottlenosed -g "First storage group" -t 050106113456
-opt status
```

RMExch restore

The restore operation is now automated but is not applicable to Single Cluster Copy and LCR Passive restore. For more information about specific restoration operations, see "Process of Restoration for Specific Microsoft Exchange Configurations" (page 117).

SYNTAX

For MEDIA RESTORES

(For Exchange 2010) `RMExch restore -mdb <mailbox_DB_name> -t <Timestamp> [-p <policyName>] [-m <masterServer>] [-vs <backup_server>] [-a <altLocation>] [-src <OrignalClientWithBackups>] [-noemail] [-dp]`

(For Exchange 2010) `RMExch restore <-mdb mailbox database> <-t timestamp> <-nbu|-dp> [-vs backup server to restore files on] [-a altLocation] [-src OrignalClientWithBackups] [-domain]`

(For Exchange 2007) `RMExch restore -s <ExchangeServer> -g <storagegroup> -t <Timestamp> [-p <policyName>] [-m <masterServer>] [-a <altLocation>] [-src <OrignalClientWithBackups>] [-noemail] [-dp]`

For FILECOPY and VOLUME RESTORES

(For Exchange 2010) `RMExch restore -mdb <mailbox_DB_name> -t <Timestamp> <-filecopy | -promote> [-noemail] [-domain <DomainName>]`

(For Exchange 2007) `[-noemail] [-domain <DomainName>]`

DESCRIPTION

The `RMExch restore` command can perform one of three functions. It can restore a previously backed-up virtual copy from media, perform a file copy restore from a mounted virtual copy, or perform a volume restore from an unmounted virtual copy.

Media backups can be restored to their original location, that being the volume(s) or directory locations of the virtual copies that were backed up, not the original exchange data locations. Alternatively, an alternate location can be specified.

File copy restores copy the virtual copy's files to the original database location and overwrite the current database files. The virtual copy to use for the restore must be mounted to the production server hosting the mailbox database. See "Recovering Data with HP 3PAR Recovery Manager" (page 91).

Volume promote restores overwrite all data on the original database volume. This overwrites ALL data on the original volume and should only be performed with caution. See "Recovering Data with HP 3PAR Recovery Manager" (page 91).

⚠ **WARNING!** DO NOT perform a volume promote restore if multiple storage groups share any volumes. This includes all data files .LOG, .EDB, .CHK (and .STM for Exchange 2003). If you are not sure how or if your storage groups share volumes, execute the script `chk_multi_storage.cmd`, which is by default installed at `Program Files/3PAR/RM/Exchange/bin/` to determine how any storage groups may be sharing volumes.

PARAMETERS

For MEDIA RESTORES The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database to restore.
- (For Exchange 2007) `-s <ExchangeServer>` - The name of the Exchange server for which the storage group belongs.
- (For Exchange 2007) `-g <storagegroup>` - The name of the storage group for which the timestamp belongs.
- (For Exchange 2010)`-vs <restore_server>` - The server must have access to the backup tool (i.e. Netbackup). The specified server must be the same server used during backup, and have a Recovery Manager for Exchange backup server installation. This option is deprecated.
- `-t <Timestamp>` - The timestamp of the virtual copy to restore.
- `-p <policyName>` - Name of the Symantec NetBackup policy set up for Recovery Manager for Exchange. Valid only if the backup software in use is Symantec NetBackup.
- `-m <masterServer>` - Symantec NetBackup master server name. Valid only if the backup software in use is Symantec NetBackup. If not specified, the current server name is used as the default.
- `-a <altLocation>` - Optional. Alternate restore location.
- `-src <OrignalClientWithBackups>` - Optional. Specifies the client name to use for finding backups or archives from which to restore files. The default is the current client name.
- `-noemail` - Optional. Do not send an email notification even if configured for this operation.
- `-logfiles` - Optional. Used for Point Of Failure recovery. Specify the log files path to pick the additional log files.
- `-dp` - Indicates that HP Data Protector is to be used. If not specified, Recovery Manager proceeds as if the backup software used is Symantec NetBackup.
- `-pointofFailure` - Specifies restoring to a point-of-failure.
- `-nbu` - Uses NetBackup

NOTE: Use quotes ("") where spaces are included.

NOTE: If the restore is directed to the original location, ensure the original location is still valid.

NOTE: Symantec NetBackup software is case sensitive. Make sure all information entered pertaining to the policy is with the exact case.

NOTE: Make sure the Symantec NetBackup software bin directory is in the system search path for this command to run.

Examples

(For Exchange 2010) The following command will perform a restore of a virtual copy `020405162103` from NetBackup media to drive `j:` on server `Joshua`.

```
RMExch restore -mdb "mailbox rex" -t 020405162103 -nbu -a J: -vs joshua
```

(For Exchange 2007) The following command will perform a restore of a virtual copy with the timestamp `020405162103` to original database location:

```
RMExch restore -s bottlenosed -g sg2 -t 020405162103 -filecopy
```

(For Exchange 2007) The following command will perform a volume restore of an unmounted virtual copy with the timestamp `020405162103` to the original database volumes:

```
RMExch restore -s bottlenosed -g sg2 -t 020405162103 -promote
```

The following command will perform a restore of virtual copy 020405162155 from Data Protector media to drive `j:`.

```
RMExch restore -mdb "mailbox rex" -t 020405162155 -dp -a J:
```

Parameters

For FILECOPY and VOLUME RESTORES

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database.
- (For Exchange 2007) `-s <ExchangeServer>` - The name of the Exchange server for which the storage group belongs.
- (For Exchange 2007) `-g <storagegroup>` - The name of the storage group for which the timestamp belongs.
- `-t <Timestamp>` - The timestamp of the virtual copy to restore.
- `<-filecopy | -promote>` - Specify to perform a file copy restore or a volume promote restore.
- `-filecopy` - Specify to perform a file copy restore.
- `-promote` - Specify to perform a volume promote restore.
- `-noemail` - Optional. Do not send an email notification even if configured for this operation.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.
- `-logfiles` - Optional. Used for Point Of Failure recovery. Specify the log files path to pick the additional log files.

NOTE: Use quotes ("") where spaces are included.

EXAMPLES

(For Exchange 2010) The following command will perform a Point-in-Time file copy restore of a virtual copy `020405162103`.

```
RMExch restore -mdb “mailbox rex” -t 020405162103 -filecopy
```

(For Exchange 2010) The following command will perform a Point-in-Time Volume restore of virtual copy `020405162103`.

```
RMExch restore -mdb “mailbox rex” -t 020405162103 -promote
```

(For Exchange 2007) The following command will perform a Point-in-Time restore of a virtual copy with the timestamp `020405162103` to original database location:

```
RMExch restore -s bottlenosed -g sg2 -t 020405162103 -filecopy
```

(For Exchange 2007) The following command will perform a Point-in-Time volume restore of an unmounted virtual copy with the timestamp `020405162103` to the original database volumes:

```
RMExch restore -s bottlenosed -g sg2 -t 020405162103 -promote
```

RMExch setvc

SYNTAX

(For Exchange 2010) `RMExch setvc -mdb <mailbox_DB_name> -t <timestamp> [-retain <time>{h|H|d|D} [-f]] [-exp <time>{h|H|d|D}] [-domain <DomainName>]`

(For Exchange 2007) `RMExch setvc -s <ExchangeServer> -g <storagegroup> -t <timestamp> [-retain <time>{h|H|d|D} [-f]] [-exp <time>{h|H|d|D}] [-domain <DomainName>]`

DESCRIPTION

The `RMExch setvc` command sets or increases retention time for a virtual copy, and it sets or modifies the expiration time for a virtual copy, if the virtual copy was created using an expiration-based policy.

PARAMETERS

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database.
- (For Exchange 2007) `-s <ExchangeServer>` - The name of the Exchange server to which the storage group belongs.
- (For Exchange 2007) `-g <storagegroup>` - The name of the storage group to which the timestamp belongs.
- `-t <Timestamp>` - The timestamp of the virtual copy for which you are modifying the policy.
- `-retain <time>{h|H|d|D}` - Optional. Set or extend the retention time for the specified virtual copy to the specified time. For more information about setting the retention time, see the `RMExch create` command.
- `-f` - Optional. When used with the `-retain` option, does not request confirmation for the retention time modification.
- `–exp <time>{h|H|d|D}` - Optional. If the current policy is expiration-based, set or modify the expiration time of the specified virtual copy to the specified time.

  The minimum expiration period is 1 hour; the maximum is 43,800 hours/1,825 days (5 years). To remove the expiration period, specify 0h.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager uses the local domain.

Example

(For Exchange 2010) The following command extends the retention period for virtual copy `020412162103` in database `mb2` to 8 days from the current day. Recovery Manager for Exchange automatically performs the command and does not request confirmation:

```
RMExch setvc -mdb mb2 -t 020412162103 -retain 8d -f
```

(For Exchange 2010) The following command sets the expiration date for virtual copy `110412162103` in database `mb2` to 25 hours from creation:

```
RMExch setvc -mdb mb2 -t 110412162103 -exp 25h
```

(For Exchange 2010) The following command removes the expiration date for virtual copy `110412162103` in database `mb2`:

```
RMExch setvc -mdb mb2 -t 110412162103 -exp 0h
```

(For Exchange 2007) The following command extends the retention period for virtual copy `020412162103` in storage group `sg2` on Exchange server `Server1` to 8 days from creation. Recovery Manager for Exchange automatically performs the command and does not request confirmation:

```
RMExch setvc -s Server1 -g sg2 -t 020412162103 -retain 8d -f
```

(For Exchange 2007) The following command sets the expiration date for virtual copy `110412162103` in storage group `sg2` on Exchange server `Server1` to 25 hours from creation:

```
RMExch setvc -s Server1 -g sg2 -t 110412162103 -exp 25h
```

(For Exchange 2007) The following command removes the expiration date for virtual copy `110412162103` in storage group `sg2` on Exchange server `Server1`:

```
RMExch setvc -s Server1 -g sg2 -t 110412162103 -exp 0h
```

RMExch unmount

SYNTAX

(For Exchange 2010) `RMExch unmount -mdb <mailbox_DB_name> -t <Timestamp> [-domain <DomainName>]`

(For Exchange 2007) `RMExch unmount -s <ExchangeServer> -g <StorageGroup> -t <Timestamp> [-domain <DomainName>]`

DESCRIPTION

The `RMExch unmount` command unmounts a currently mounted virtual copy. When using `RMExch mount` to mount a virtual copy, the program will check to see if the virtual copy is mounted to a host machine. The virtual copy must have a status of "Mounted" or "Exposed" before it can be unmounted.

PARAMETERS

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database.
- (For Exchange 2007) `-g <StorageGroup>` - The name of the storage group for which the virtual copy timestamp belongs.
- `-t <Timestamp>` - The timestamp of the virtual copy to unmount.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

NOTE: The `-h` option was deprecated in release 3.1.1.

NOTE: Use quotes ("") where spaces are included.

Examples

(For Exchange 2010) The following command will unmount the virtual copy `020405162103`.

```
RMExch unmount -mdb "mb2" -t 020405162103
```

(For Exchange 2007) The following command will unmount the virtual copy `020405162103`.

```
RMExch unmount -s bottlenosed -g sg2 -t 020405162103
```

RMExch UnRegisterDomain

SYNTAX

```
RMExch UnRegisterDomain -domainhost <DomainHost>
```

DESCRIPTION

The `RMExch UnRegisterDomain`command modifies an Active Directory domain.

PARAMETERS

The following option is supported:

- `-domainhost <DomainHost>` - The fully qualified domain name (FQDN) of the domain host you are removing from set of Recovery Manager for Exchange domains.

  NOTE: Use quotes ("") for names that include spaces.

Example

The following command removes the registration for the domain host `kings`.

```
RMExch UnRegisterDomain -domainhost kings.kingsmain.main.com
```

RMExch validate

SYNTAX

(For Exchange 2010) `RMExch validate -mdb <mailbox_DB_name> -t <Timestamp> [-domain <DomainName>]`

(For Exchange 2007) `RMExch validate -s <ExchangeServer> -g <StorageGroup> -t <Timestamp> [-domain <DomainName>]`

DESCRIPTION

The `RMExch validate` command verifies the data integrity of the exchange database files in the specified virtual copy that is already mounted on the system.

PARAMETERS

The following options are supported:

- (For Exchange 2010) `-mdb <mailbox_DB_name>` - The name of the mailbox database.
- (For Exchange 2007) `-s <ExchangeServer>` - The name of the Exchange server for which the storage group belongs.
- (For Exchange 2007) `-g <StorageGroup>` - The name of the storage group for which the virtual copy timestamp belongs.
- `–t <Timestamp>` - The already mounted timestamp for validation.
- `-domain <DomainName>` - Optional. Specifies the domain to which the Exchange server or mailbox belongs.

  If this option is not specified, Recovery Manager for Exchange uses the local domain.

⚠ **WARNING!** If the validation operation failed on the virtual copy, the failed virtual copy cannot be used for backup and restoration purposes. It is the responsibility of the user to manually remove the failed virtual copy.

NOTE: Use quotes ("") for names that include spaces.

Example

(For Exchange 2010) The following command validates the specified mailbox database.

```
RMExch validate -mdb “mb2” -t 020405162103
```

(For Exchange 2007) The following command validates the specified Exchange database.

```
RMExch validate -s bottlenosed -g sg2 -t 020405162103
```

Running Recovery Manager as a Scheduled Job

In addition to creating virtual copies using the Command Line Interface, you can also schedule automatic creation of virtual copies for a specific storage group using the Recovery Manager for Exchange GUI or using Windows:

Scheduling Virtual Copies using the Recovery Manager GUI

You can schedule virtual copies at the same time you create a virtual copy of a storage group. For more information, see “Automating Tasks” (page 44).

Scheduling Virtual Copies with Windows Task Scheduler

NOTE: Because the command `RMExch create` communicates with Exchange, you must have Exchange administrator privileges to schedule this task.

To create virtual copies using the Windows Task Scheduler:

1. Click **Start** > **Programs** > **Accessories > System Tools** > **Task Scheduler**.

   Result: The Task Scheduler appears.
2. Double-click **Create Task**.
3. In the **Name** text box on the **General** tab, enter a name for the task.
4. In the **Security** options area on the **General** tab, select the desired options.
5. Select the **Triggers tab**.
6. Click **New**.
7. Enter scheduling information for the automatic creation of virtual records and select **OK**.
8. Select the **Actions** tab.
9. Click **New**.
10. Click the **Browse** button next to the **Program/script** text box.
11. Navigate to the Recovery Manager for Exchange installation location. The default location is:

    `C:/Program Files/3PAR/RM/Exchange/bin`
12. Click **RMExch.exe** and click **Open**.
13. In the **Add arguments** text box, enter:

    `RMExch create -s <ExchangeServer> -mdb <mailbox_DB_name>`

    If the name has spaces, use double-quotes (“ “) to surround the name.

    For example:

    (For Exchange 2010) `RMExch create -s “Exchange Server 1” -mdb Mailboxdatabase3`

    (For Exchange 2007) `RMExch create -s <ExchangeServer> -g <storage group name>`
14. Click **OK**.
15. In the **Conditions and Settings** tabs, refine the settings as desired.
16. Click **OK**.

    Result: Virtual copies are created as you have scheduled. Depending on the policy set with the Recovery Manager for Exchange GUI, older virtual copies on the system might automatically be removed if the number of virtual copies exceeds your specified maximum threshold (see “Setting the Recovery Manager Policy” (page 36)).

7 Rapid Backup and Recovery for Exchange

Key Microsoft Exchange File Types

Before describing backup and recovery for HP 3PAR Recovery Manager Software for Microsoft Exchange, you must understand the elements of Exchange.

The Microsoft Exchange mailbox database uses three key file types for all operations:

- Log file (`*.LOG`). A file in which transaction log records are stored.
- Checkpoint file (`*.CHK`). Maintains information about the location in the transaction logs last committed to the database.
- Database file (`*.EDB`). Properties data file to store all user data.

`LOG` files are accessed in a sequential order; `EDB` files are accessed with random I/O patterns. For optimal performance and to facilitate database management, transaction logs should be placed on a volume that performs sequential I/O in an optimal manner such as a RAID 1 volume. The `EDB` files should be placed on a separate volume that is optimized for random I/O such as a RAID 5 volume. For additional information on creating volumes, see the *HP 3PAR InForm OS CLI Administrator's Manual*.

From the performance and management point of view, a dedicated volume should be created for every log file group on each mailbox database, and another data volume should be created for `EDB` files for each data store on every mailbox database. For example, if you have two storage groups, each with a log and five mailbox stores, create two RAID 1 volumes for the logs, and ten RAID 5 volumes for the `EDB` files.

When a change is made to the mailbox database, Exchange updates the data in the memory (32K pages) and synchronously writes a record of the transaction to the log in sequential order. This record allows Exchange to recreate the transaction in the event of a failure. The database engine then writes the data to the disk in large I/O operations. Exchange supports circular logging to save disk space on the volume containing log files. However, circular logging makes hard recovery (restoring from backup) impossible. Therefore, HP recommends that you disable the circular logging feature (circular logging is disabled by default in Microsoft Exchange).

Backup

An online backup of Exchange runs while the data store is mounted. A full backup backs up the entire information store and transaction log. It also truncates the log after the log has been backed up to reduce disk space usage.

Virtual Copies

A virtual copy is a copy of another virtual volume (`EDB` or `LOG`) created using copy-on-write techniques. Unlike a physical copy, which is a duplicate of the entire virtual volume, a virtual copy, or snapshot, only records the changes to the original virtual volume. Therefore, minimal storage space is used. This allows an earlier state of the original virtual volume to be recreated by starting with its current state and rolling back all the changes that have been made since the virtual copy was created. The system allows you to make up to 500 virtual copies of each virtual volume, assuming that sufficient storage space was allocated when the base virtual volume was created.

Advantages of Using Recovery Manager

Traditionally, databases are backed up to tape. Backing up to tape is a time-consuming task, especially if the database is growing rapidly. Recovery Manager offers the following advantages over traditional tape backup:

- Creating virtual copies of databases using Recovery Manager requires only seconds and can be accomplished via a click of the mouse through the Recovery Manager GUI, or by scheduling

virtual copies either through Recovery Manager or via Windows' automatic scheduled task application. For more information, see "Using the Recovery Manager GUI" (page 33) or "Running Recovery Manager as a Scheduled Job" (page 88).

- With Recovery Manager's optional policy settings, you can maintain a specified number of the latest virtual copies to stay online. These online virtual copies can then be mounted to the staging Exchange server for point-in-time recovery, thus eliminating the need to restore from tape, which can take hours.
- After the virtual copy has been mounted to the backup server, you can perform a backup to tape of the virtual copy using Recovery Manager.
- You can easily recover data using Recovery Manager's file copy and volume promote restore features.

NOTE: Backup to tape can be performed in one easy command with a quick backup. For more information, see "`RMExch backup`" (page 59).

Recovering Data with HP 3PAR Recovery Manager

This release version of HP 3PAR Recovery Manager Software for Microsoft Exchange now automates the restoration operations for all configurations except for Single Copy Clusters (SCC) for Exchange 2007 and Media restore (both Exchange 2007 and 2010). The manual steps are required only in the case of restoring SCC and Media restore configurations. For information about using Auto-Restore feature, see "Recovering Data with Auto-Restore" (page 91)

In many cases, the Exchange server is able to quietly recover when a server crashes and the contents of the database buffer in the memory are lost. Exchange automatically recovers when you start the information store after the failure using the checkpoint file to identify the oldest transaction not flushed to disk and then replaying log files forward. If the checkpoint file is missing, all the log files are scanned to determine whether any committed transactions have not been written to the database. At the end, the database is consistent and can start normally.

Recovery Manager provides several options for a full mailbox database recovery:

- Point-in-time recovery
- FileCopy and Volume Promotion Point-in-time recovery
- FileCopy and Volume Promotion Point-of-failure recovery
- Single mailbox recovery

Recovering Data with Auto-Restore

You can use an auto-restore feature to restore a database from a virtual copy from the following configurations:

- (For Exchange 2010) Recovery procedures for Exchange 2010 Database Availability Group (DAG) configurations should be run on the active copy of the mailbox database
- (For Exchange 2007) Recovery procedures for Local Continuous Replication (LCR) or Cluster Continuous Replication (CCR) Exchange 2007 configurations should be run on the active copy of the database (the active node for CCR)
- Exchange 2010 DAG (both active and passive node recovery)
- Exchange 2007 CCR (active node recovery)
- Exchange 2007 LCR

Figure 8 Supported Configurations for Auto-Restore

Supported Configurations for Auto-Restore				
	File Copy		Promote	
	Point-in-Time	Point-of-Failure	Point-in-Time	Point-of-Failure
Exchange 2010	Yes	Yes	Yes	Yes
Active 2010 DAG	Yes	Yes	Yes	Yes
Passive 2010 DAG	Yes	Yes	Yes	Yes
Exchange 2007	Yes	Yes	Yes	Yes
CCR 2007 Active Node	Yes	Yes	Yes	Yes
CCR 2007 Passive Node	Not Supported			
Exchange 2007 LCR	Yes	Yes	Yes	Not Supported
Exchange 2007 SCC	Manual Steps			

There are two options available for a file or volume copy (promote) restore:

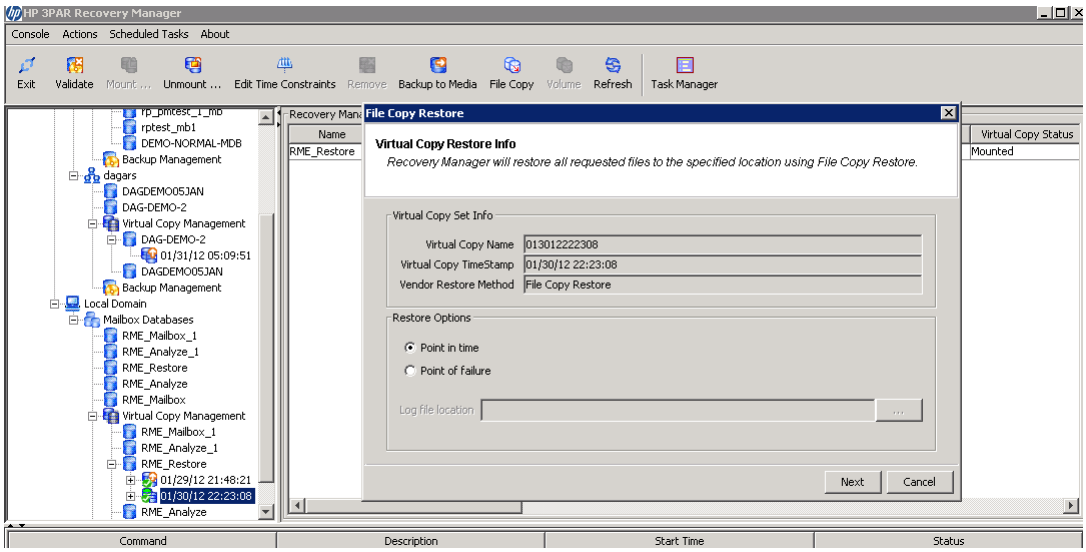
- Point-in-Time – restores or recovers a set of data or a particular setting from a time in the past before data corruption occurred
- Point-of-Failure – restores or recovers a set of data or a particular setting to a specific point of failure by applying the transaction logs

Performing a File Copy Restore to a Point-in-Time

The file copy option is available only when the VC copy is mounted on the production server. The volume restore is available when the VC copy is not mounted on any server.

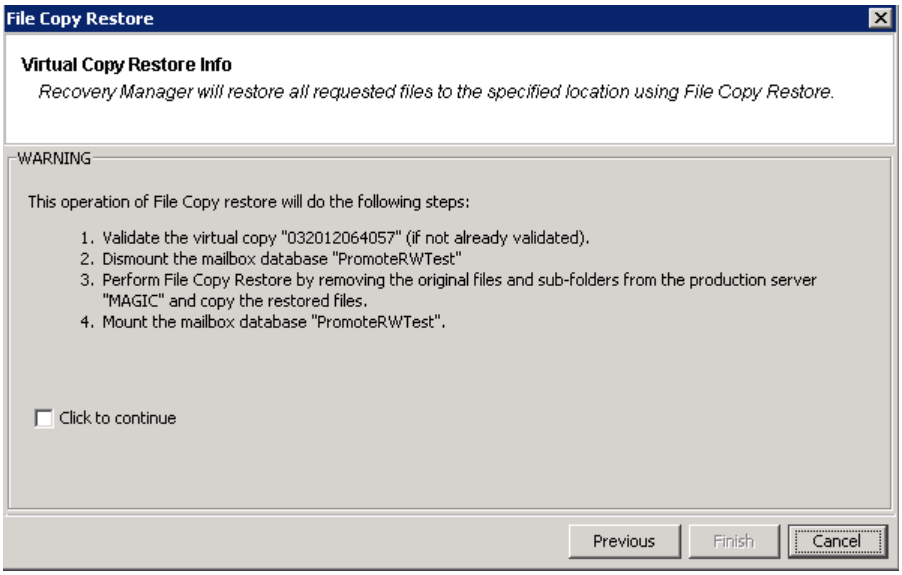
1. Locate the specific Virtual Copy timestamp in the left pane and right-click.
2. Select **Restore Using→File Copy**.
3. Select **Point in Time** and click **Next**.

Figure 9 File Copy Restore at Point in Time



4. Read the following operation before checking the **Click to continue** box and clicking **Finish** to proceed with restoration.

Figure 10 File Copy Restore at Point in Time Operations



5. Review the Restore Virtual Copy log and click **Ok**.

NOTE: You can also use `RMExch restore` CLI command to perform the file copy restore to a point-in-time operation. For more information, see "`RMExch restore`" (page 81)

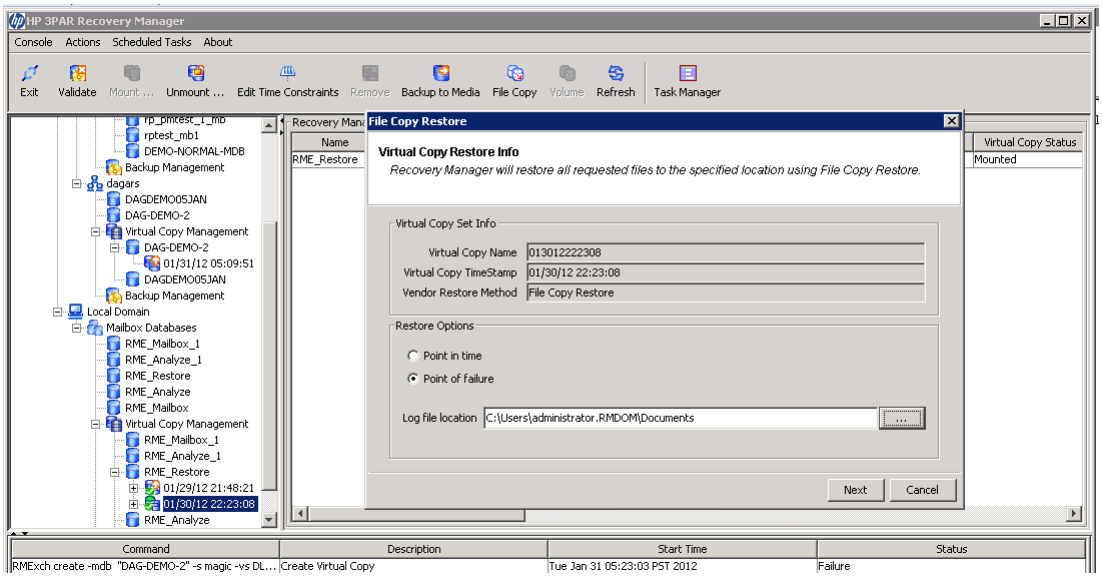
For more details of the steps performed during a data restoration of a specific Microsoft Exchange configuration, refer to "Process of Restoration for Specific Microsoft Exchange Configurations" (page 117).

Performing a File Copy Restore to a Point of Failure

1. Locate the specific database timestamp in the left pane and right-click.
2. Select **Restore Using→File Copy**.
3. Select **Point of failure**.

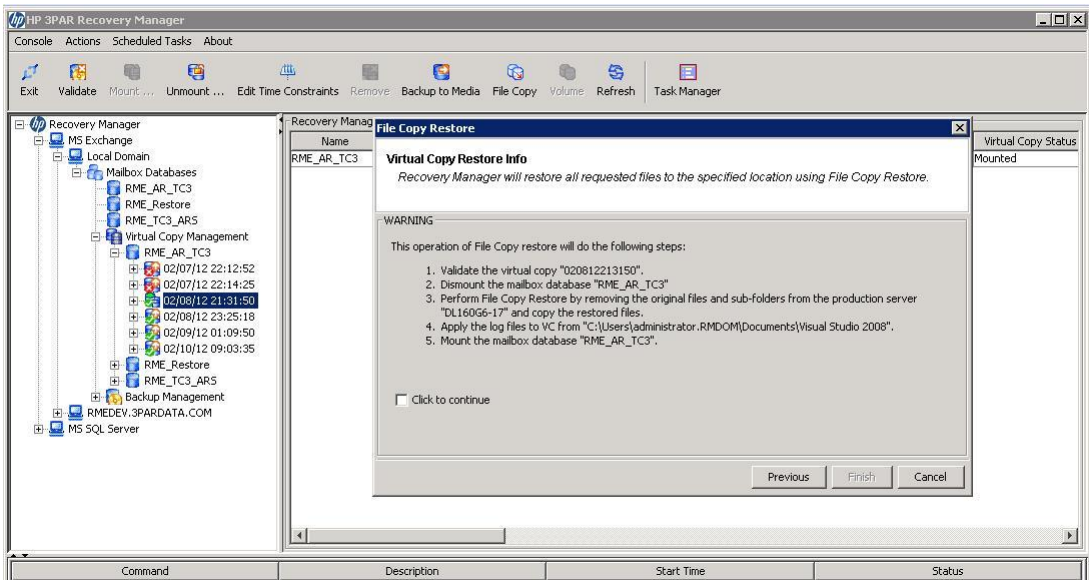
   Search and enter the log file location. The log file location refers to the path on the production server. The search option is available or enabled only when the backup and production servers are on same machine. If both the backup and production servers are on different systems, you must manually enter the path of the production server.

Figure 11 File Copy Restore at Point of Failure



4. Click **Next** to continue.
5. Read the following operation before checking the **Click to continue** box and clicking **Finish** to proceed with restoration.

Figure 12 File Copy Restore at Point of Failure Operations



6. Review the Restore Virtual Copy log and click **Ok**.

NOTE: You can also use `RMExch restore` CLI command to perform the file copy restore to a point-of-failure operation. For more information, see "`RMExch restore`" (page 81)

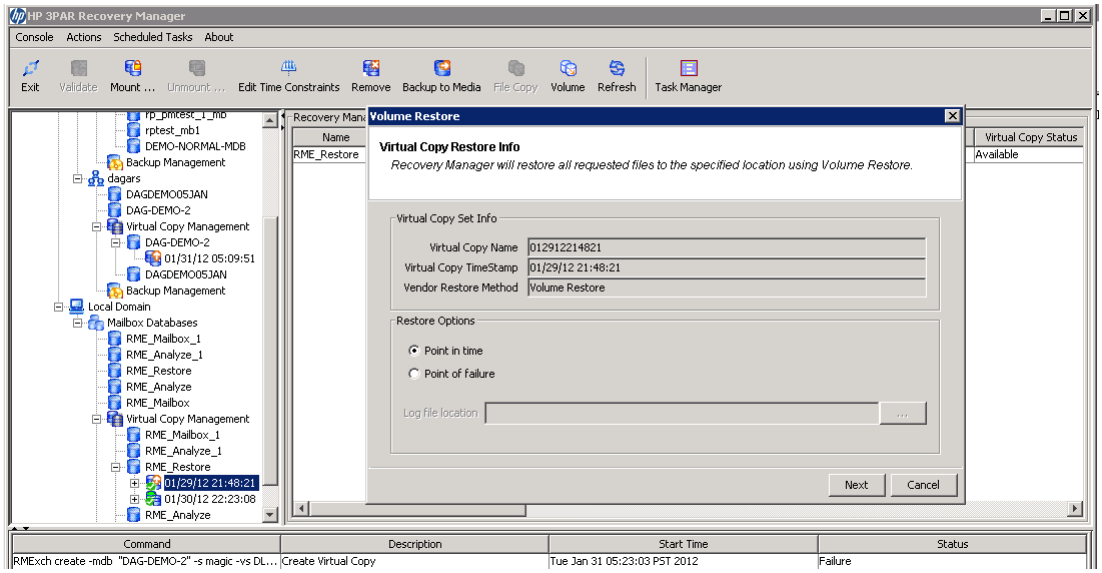
For more details of the steps performed during a data restoration of a specific Microsoft Exchange configuration, refer to "Process of Restoration for Specific Microsoft Exchange Configurations" (page 117).

Performing a Volume Copy Restore to a Point-in-Time

1. Locate the specific database timestamp in the left pane and right-click.
2. Select **Restore Using→Volume**.

3. Select **Point in Time** and click **Next**.

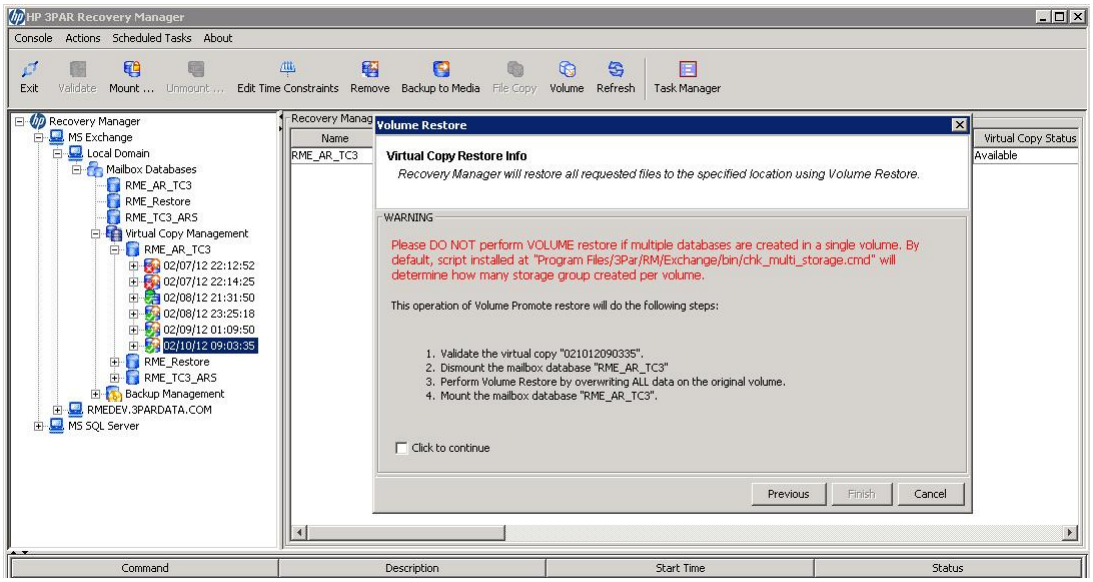
Figure 13 Volume Copy Restore at Point in Time



4. Read the following operation before checking the **Click to continue** box and clicking **Finish** to proceed with restoration.

⚠ **WARNING!** Do not perform a volume restore if multiple databases are created in a single volume.

Figure 14 Volume Copy Restore at Point in Time Operations



5. Review the Restore Virtual Copy log and click **Ok**.

NOTE: You can also use `RMExch restore` CLI command to perform the volume copy restore to a point-in-time operation. For more information, see "`RMExch restore`" (page 81)

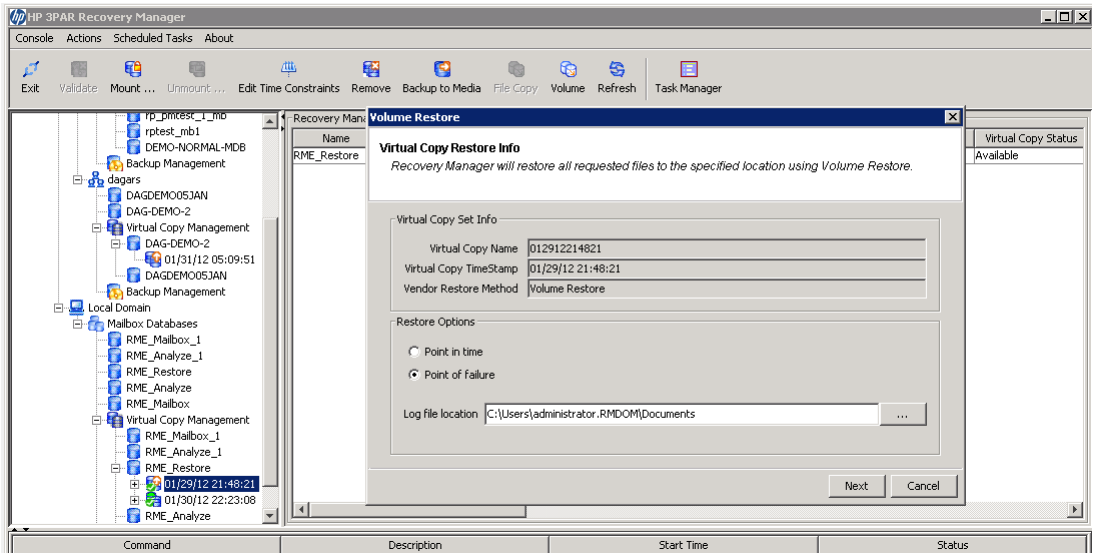
For more details of the steps performed during a data restoration of a specific Microsoft Exchange configuration, refer to "Process of Restoration for Specific Microsoft Exchange Configurations" (page 117).

Performing a Volume Copy Restore to a Point-of-Failure

1. Locate the specific database timestamp in the left pane and right-click.
2. Select **Restore Using→Volume**.
3. Select **Point of failure**.

   Search and enter the log file location.

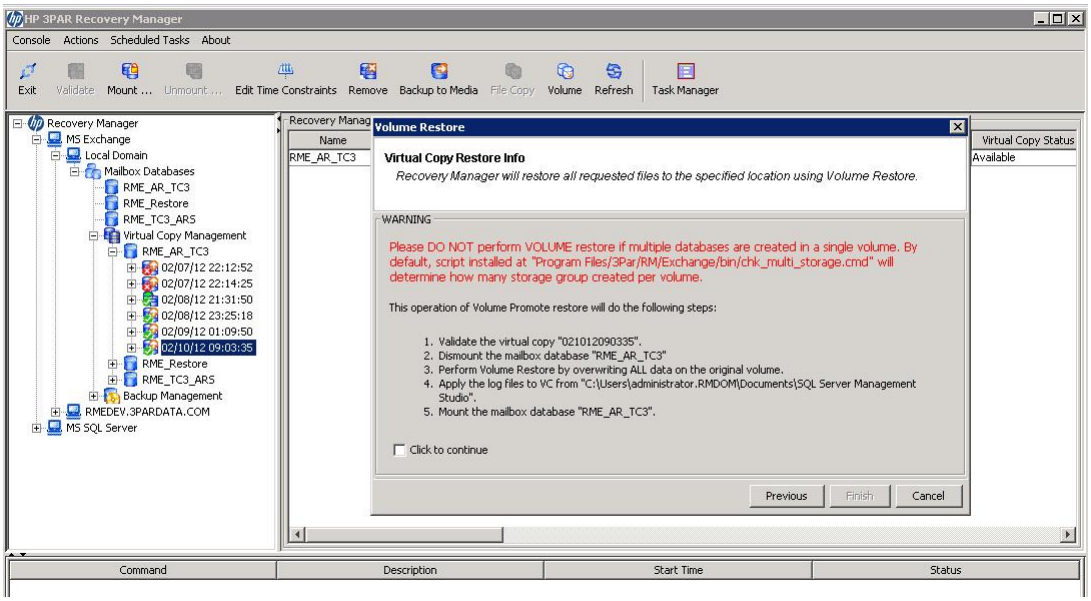
Figure 15 Volume Copy Restore at Point of Failure



4. Read the following operation before checking the **Click to continue** box and clicking **Finish** to proceed with restoration.

⚠ **WARNING!** Do not perform a volume restore if multiple databases are created in a single volume.

Figure 16 Volume Copy Restore at Point of Failure Operations



5. Review the Restore Virtual Copy log and click **Ok**.

NOTE: You can also use `RMExch restore` CLI command to perform the volume copy restore to a point-of-failure operation. For more information, see "`RMExch restore`" (page 81)

For more details of the steps performed during a data restoration of a specific Microsoft Exchange configuration, refer to "Process of Restoration for Specific Microsoft Exchange Configurations" (page 117).

Recovering Data with Manual Restore

In the following sections, manual steps are available for performing a point-in-time and point-of-failure restoration of data.

Point-in-Time Recovery

(For Exchange 2010) Recovery procedures for Exchange 2010 Database Availability Group (DAG) configurations should be run on the active copy of the mailbox database

(For Exchange 2007) Recovery procedures for LCR or CCR Exchange 2007 configurations should be run on the active copy of the database (the active node for CCR).

Use the point-in-time recovery manual steps for cases involving Single Copy Cluster (SCC).

Use the following manual steps to perform a point-in-time recovery:

1. In the **Exchange Management Console**, right-click the desired database you want to recover and select **Properties**.
2. Under the **General** tab, select **This database can be overwritten by a restore**.
3. Click **OK**.
4. On the **Database Management** tab in the Exchange Management Console, right-click the mailbox database you want to recover and select **Dismount Database**.

NOTE: If in a cluster, go to the **Cluster Administrator** and take the **Exchange Information Store Instance** resource offline. If not in a cluster, go to the **services** menu and stop the **Exchange Information Store Service**.

5. Mount the desired virtual copy to the staging Exchange server either from the Recovery Manager GUI or from the command line using the `RMExch mount` command. For more information, see "Using the Recovery Manager GUI" (page 33) or "Using the Recovery Manager CLI" (page 57).
6. Delete the original `.EDB`, `.LOG`, and `.CHK` files for a clean restore.

△ **CAUTION:** ONLY remove the files, NOT the parent/intermediate folders for these files. The original database path and its structures must be kept the same.

7. Delete all catalog subdirectories under your database directories. You can move these files to new locations instead of deleting them.
8. From the backup server, execute the Recovery Manager file copy restore command:
   (For Exchange 2010) `RMExch restore -mdb <mailbox_DB_name> -t <timestamp> -filecopy`
   (For Exchange 2007) `RMExch restore -s <exchangeServer> -g <storageGroup> -t <timestamp> -filecopy`.
   You can alternately use the GUI to perform a file copy restore (for more information, see "Using the Recovery Manager GUI" (page 33)).

9. After the file copy restore completes and the database files are successfully recovered, you can remount the database to continue its operation.

   If performing the restore in a DAG environment, reseed the database replication if necessary.

10. (For Exchange 2007) If you are performing the restore in a CCR environment, reseed the remote database using the `Update-StorageGroupCopy` command from the Exchange Management Shell. In some cases, you may need to use `Resume-StorageGroupCopy` to resume the replication.

Volume Promote Point-In-Time Recovery

To perform a volume promote point-in-time recovery:

1. Make sure the virtual copy you would like to promote has a status of **Available**. If it is **Mounted**, unmount it.
2. Execute the volume promote restore command from the Recovery Manager for Exchange backup server.

(For Exchange 2007) For single copy cluster volume promote restores (not CCR), the following extra steps need to be performed:

1. All of the resources the storage group uses, including the disk(s) for the storage group's Log path, System path, and its mailbox(es)' database(s), need to be put in extended maintenance mode.
2. From the command line, issue the following command for all disks the storage group uses:

```
cluster res "resourcename" /maint:on
cluster res "resourcename" /waitmaint
```

3. From the Cluster Administrator, take the Disk(s) offline.
4. From the backup server, execute the Recovery Manager command for the volume promote restore. For information about the restore-promote command, see "Using the Recovery Manager CLI" (page 57). For information on using the GUI to execute a volume restore, see "Restoring from a Virtual Copy" (page 53).

⚠ **WARNING!** DO NOT perform a volume promote restore if multiple storage groups share any volumes. This includes all data files `.LOG`, `.EDB`, and `.CHK`. If you are not sure how or if your storage groups share volumes, execute the script `chk_multi_storage.cmd` by default installed at `Program Files/3PAR/RM/Exchange/bin`.

5. In the **Computer Management** window, for volume promote restores, right-click the **Disk Management** node and select **Rescan Disks**.
6. From the Cluster Administrator, bring the Disk(s) back online.
7. Follow the appropriate steps depending on whether you are performing the operation for "Single Copy Clusters" (page 98) or "Continuous Copy Replication Clusters" (page 99)

Single Copy Clusters

1. For the disk(s) previously put in maintenance mode, take ALL of them out of maintenance mode.
2. From the command line, issue the following command for all disks the storage group uses:

```
Cluster res "resourcename" /maint:off
```

3. Verify the `EDB`, `LOG`, `CHK` files are correctly appearing in the original database locations.
4. Mount the databases within the storage group.

   The database is recovered to the point-in-time when the virtual copy was taken.

Continuous Copy Replication Clusters

1. Reseed the remote database using the command `Update-StorageGroupCopy` from the Exchange Management Shell.
2. Use `Resume-StorageGroupCopy` to resume the replication.

NOTE: For Exchange 2007 virtual copies created off the LCR copy, a volume promote restore is not supported.

Point-of-Failure Recovery for File Copy Restore

To perform a point-of-failure recovery for file copy restore:

1. Move the currently existing log files on your mailbox database volumes that you want to roll forward.

NOTE: If Windows does not allow you to move, or even copy, Exchange `.LOG` files because they are "being used by another program," part of Exchange is still "live." If this is the case, move on tothe next step.

2. Perform the point-in-time recovery for file copy restore: step 1 to step 4.
3. With the Exchange database(s) dismounted, preserve the current log files on your mailbox database volumes if you were not able to do so for step 1.
4. Mount the desired virtual copy for the staging Exchange server either from the Recovery Manager GUI or from the command line using the `RMExch mount` command. For more information, see "Using the Recovery Manager GUI" (page 33) or "Using the Recovery Manager CLI" (page 57).
5. Delete the original `.EDB`, `.LOG`, and `.CHK` files for a clean restore.

△ **CAUTION:** ONLY remove the files, NOT the parent/intermediate folders of the files. The original database path and its structures must be kept the same. You can moved the files to new locations instead of deleting them.

6. Go to the backup server and execute the Recovery Manager file copy restore command:
   (For Exchange 2010) `RMExch restore -mdb <mailbox_DB_name> -t <timestamp> -filecopy`
   (For Exchange 2007) `RMExch restore -s <exchangeServer> -g <storageGroup> -t <timestamp> -filecopy`.
   You can also perform a file copy restore using the GUI. For more information, see "Using the Recovery Manager GUI" (page 33).
7. Copy the `.LOG` files that you preserved and overwrite the logs recovered, including the extra logs not covered by the virtual copy. This process makes the recovery more forward-in-time.
8. Delete the checkpoint file (`.CHK`).
9. Remount the database(s) to continue.

   The Exchange server performs a soft recovery and automatically replays the log. After the store is mounted, Recovery Manager confirms the restore.

Point-of-Failure Recovery for Volume Restore

To perform a point-of-failure recovery for volume restore:

1. Move the currently existing log files on your mailbox database volumes that you want to roll forward.

NOTE: If Windows does not allow you to move, or even copy, Exchange `.LOG` files because the files are being used by another program, part of Exchange is still live. If this is the case, move on to the next step.

2. Perform a point-in-time recovery for volume restore: step 1 to step 4.
3. With the Exchange database(s) dismounted, preserve the current log files on your mailbox database volumes if you were not able to do so for step 1.
4. After you have taken all the disk(s) out of maintenance mode, perform the following:
   a. Copy the `.LOG` files that you preserved and overwrite the logs recovered, including the extra logs not covered by the virtual copy. This process makes the recovery more forward-in-time.
   b. Delete the checkpoint file (`.CHK`).
   c. Remount the database(s) to continue.

      The Exchange server performs a soft recovery and automatically replays the log. After the store is mounted, Recovery Manager confirms the restore.

Data Restoration Using a Recovery Database (For Exchange 2010)

A recovery database is a mailbox database that allows Recovery Manager to mounting a restored mailbox database and extract data from the restored database as part of the recovery operation. Recovery databases allow you to recover data from a backup or a copy of a database without disrupting access to current data. Use the Restore-Mailbox cmdlet to extract mailbox content from a restored database.

The following are required to restore data using a recovery database:

- A recovery database must be created.
- Recovery databases can only be used for Exchange 2010 mailbox databases.
- The target mailbox used for data merges and extraction must be in the same Active Directory forest as the database mounted in the recovery database.
- The database and `.LOG` files containing the recovered data must be restored or copied into the recovery database folder structure that was created when the recovery database was created.
- The database must be in a clean shutdown state. Use the `Eseutil.exe` tool to put the database into a clean shutdown state.

Creating a Recovery Database

To create a recovery database:

1. Start the Exchange Management Shell by clicking **Start→Program Files→Exchange→Exchange Management Shell**.
2. In the **Exchange Management Shell** window, enter the following:

```
New-MailboxDatabase -Recovery -Name <rec_database> -Server <servername>
```

   - `<rec_database>` — The name of the recovery database being created
   - `<servername>` — The name of the mailbox server

3. Create a second recovery database, specifying a custom path for the database file and log folder as follows:

```
New-MailboxDatabase -Recovery -Name <rec_database> -Server <servername>
-EdbFilePath "<dbpath>" -LogFolderPath "<lfpath>"
```

- <rec_database> — The name of the recovery database being created
- <servername> – The name of the mailbox server
- <dbpath> — The path to the database file
- <lfpath> — The path to the log file

Restoring a Mailbox Database Using a Recovery Database

You can restore a mailbox database using a recovery database by manually copying the database files to the appropriate folder on the server.

NOTE: Keep the original backup file in case you need to start over.

1. Verify that the database that you want to restore is consistent and that it is in a clean shutdown state:
   a. Open a command prompt window.
   b. Change to the ExchSrvr\Bin folder.
   c. Enter the following:

```
Eseutil /mh YourDatabaseName.edb
```

   d. Press **Enter**.
   e. Note whether the `State` line shows as `State: Clean Shutdown` or `State: Dirty Shutdown`.
2. A soft recovery should have been performed immediately after the virtual copy for the database was created. If it was not performed or if the database is not consistent and the database log files exist, use the `Eseutil.exe` tool to perform a soft recovery on the database and commit any uncommitted logs to the database:
   a. Open a command prompt window.
   b. Change to the `ExchSrvr\Bin` folder.
   c. Enter:

```
eseutil /r rnn /ddatabase_folder_path
```

   rnn — The log file prefix

   `database_folder_path` — The name of the folder where the database files (`.edb`, `.stm`) are located

   `/d` — Do not add a space after this switch

   For example:

```
eseutil /r r00 /dc:\Program Files\Exchsrvr\Recovery Storage Group"
```

   d. Press **Enter**.

3. Start the Exchange Management Shell by clicking **Start→Program Files→Exchange→Exchange Management Shell**.
4. In the Exchange Management Shell, enter the following:

```
Restore-Mailbox -Identity <ID> -RecoveryDatabase <rec_database>
```

   - <ID> — The user whose mailbox you wish to recover
   - <rec_database> — The name of the recovery database that was previously created

5. To restore mailbox content into the Recovery folder, enter:

```
Restore-Mailbox -Identity Scott -RecoveryDatabase <rec_database> -RecoveryMailbox
 <user_mb> -TargetFolder Recovery
```

   - <rec_database> — The name of the recovery database that was previously created
   - <user_mb> — The user name of the user mailbox

6. To restore specific email messages, enter:

```
Restore-Mailbox -Identity Scott -RecoveryDatabase <rec_database> -SubjectKeywords
 "<keyword>" -ContentKeywords "<contentword>" -IncludeFolders \<folder>,\<folder>
```

   - <ID> — The user whose mailbox you wish to recover
   - <rec_database> — The name of the recovery database that was previously created
   - <keyword> — A keyword in the email subject line
   - <contentword> — A keyword in the email contents
   - <folder> — A specific folder in the user mailbox

7. To restore all mailboxes in the mailbox database that are present in the recovery database, enter:

```
Get-Mailbox -Database <dbname> | Restore-Mailbox -RecoveryDatabase <rec_database>
```

   - <dbname> — The name of the mailbox database
   - <rec_database> — The name of the recovery database that was previously created

8. If databases are currently mounted in the recovery database:
   a. Dismount the databases.
   b. Use the `Eseutil.exe` tool to verify that the databases are in a clean shutdown state.
      i. Open a command prompt window.
      ii. Change to the `ExchSrvr\Bin` folder.
      iii. Enter:

```
Eseutil /mh YourDatabaseName.edb
```

      iv. Press **Enter**.
      v. Note whether the `State` line shows as `State: Clean Shutdown` or `State: Dirty Shutdown`.
      vi. If the databases are consistent, delete all transaction log files (`.log`) and checkpoint files (`.chk`) for the Recovery Storage Group.
9. Start the Exchange System Manager and view the properties of the database that you restored. On the **Database** tab of the **Mailbox Store Properties** dialog box, verify that the **This database can be overwritten by a restore** checkbox is selected.
10. Mount the database.

    To merge data from the recovered databases in the recovery database to a mailbox in a regular mailbox database, use the Exchange Server version of Microsoft Exchange Mailbox Merge Wizard (`Exmerge.exe`).

    To download `Exmerge.exe`, visit the following Microsoft Web site:

    http:// www.microsoft.com/downloads/details.aspx?displaylang=en"& familyid=429163EC-DCDF- 47DC-96DA-1C12D67327D5

Single Mailbox Recovery (For Exchange 2007)

Following are two methods for single mailbox recovery using Exchange.

- "Restoring a Mailbox from a Backup to a Recovery Server" (page 103)
- "Data Restoration Using a Recovery Database (For Exchange 2010)" (page 100)

Restoring a Mailbox from a Backup to a Recovery Server

To restore a mailbox from backup, you must have a recovery server that has sufficient storage capacity to install Exchange Server and to restore the private information store database. This server can be on the same physical network as your production Exchange Server computer.

To restore a mailbox from a backup to a recovery server:

1. Take note of the following information that is on the production Exchange Server computer:
   - Organization Name
   - Administrative Group Name
   - Storage Group Name
2. On the recovery server, install the Windows Server operating system, and then create a new Active Directory forest.
3. Run **Exchange Server Setup** and create a new organization that uses the same name as your existing Exchange organization.

4. Do one of the following:
   - If the name of your administrative group is *First Administrative Group*, go to the next step, or
   - Install Exchange Server to an administrative group other than the First Administrative Group:
     a. Run **Exchange Server Setup** and then install Microsoft Exchange System Management Tools.

        NOTE: At this point, do not install Microsoft Exchange Messaging and Collaboration Services. Type the name of your administrative group (the same name as the administrative group on your production server).

     b. Start the **Exchange System Manager**.
     c. Right-click your organization, and then click **Properties**.
     d. Click the **General** tab, select the **Display administrative groups** check box, and then click **OK**.
     e. Quit and then restart the Exchange System Manager.
     f. Right-click **Administrative Groups**, point to **New**, and then click **Administrative Group**.
     g. In the **Name** box, type the name of the administrative group, and then click **OK**.

        NOTE: You must use the same name that you used to name the administrative group on your production Exchange Server computer.

     h. Quit the Exchange System Manager.
5. Run the **Exchange Server Setup** and install Microsoft Exchange Messaging and Collaboration Service and Microsoft Exchange System Management Tools (if the Exchange System Management Tools are not already installed on the server).
6. Configure the storage group name to use the same name as the production Exchange Server computer.
   a. Start the **Exchange System Manager**.
   b. Expand **Administrative Groups**, and then expand **AdministrativeGroupName**.
   c. Expand **Servers** and then expand **YourServerName**.

      NOTE: If the name of the storage group on the production server uses a name other than *First Storage Group*, configure the storage group name to use the same name as the storage group on the production Exchange Server computer.

7. Dismount the database:
   a. Right-click the **Mailbox Store** and click **Dismount Store**.
   b. Click **Yes** when you are prompted to continue.
   c. Right-click the **Mailbox Store** and select **Properties**.
   d. Select the **Database** tab and check the **This database can be overwritten by a restore** checkbox.
   e. Click **OK**.
   f. Quit the Exchange System Manager.
8. Delete the existing database and log files that are on the recovery server.
9. Restore the database files from backup.
10. To repair the database, run the following repair utility:

```
eseutil /r E0n /d<database file directory location> /l<log file directory>
/s<system file directory>
```

Replace `n` (in `EOn`) with the storage group number, e.g. E01, E02, E03.

11. Mount the database.
    a. Start the Exchange System Manager.
    b. Expand **Administrative Groups**, and then expand **AdministrativeGroupName**.
    c. Expand **Servers**, expand **YourServerName**, and then expand **YourStorageGroupName**.
    d. Right-click the **Mailbox Store**, and click **Mount Store**.
    e. Click **OK** when you receive the message that indicates that the store successfully mounted.
12. Create a new user in **Active Directory Users and Computers**. Make sure that you do not make the new user account mailbox-enabled. To create the new user:
    a. Start **Active Directory Users and Computers**.
    b. Right-click **Users**, point to **New**, and then click **User**.
    c. Specify the user name and the user logon name in the appropriate boxes, and click **Next**.
    d. Specify the password information for the user, and click **Next**.
    e. Click to clear the **Create an Exchange mailbox** checkbox, and click **Next**.
    f. Click **Finish**.
13. In the Exchange System Manager, expand the **Mailbox Store**, right-click **Mailboxes**, and click **Run Cleanup Agent**.
14. Recover the mailbox.
    a. Right-click the mailbox that you want to recover and click **Reconnect**.
    b. In the list of Active Directory accounts, click the user account that you created earlier and click **OK**.
15. Use Microsoft Outlook to export the mailbox data to a `.pst` file or use the `Exmerge.exe` tool to extract data from multiple mailboxes.

    To download `Exmerge.exe`, visit the following Microsoft Web site:

    http://www.microsoft.com/downloads/details.aspx?displaylang=en&familyid=429163ECDCDF- 47DC-96DA-1C12D67327D5

Using the Recovery Storage Group Feature (For Exchange 2007)

The recovery storage group is a specialized storage group in Exchange. After you restore a mailbox store to the recovery storage group, use the `Exmerge.exe` tool to move the recovered mailbox data from the recovery storage group to the regular storage group.

How Recovery Storage Groups Operate

In previous versions of Exchange Server, a separate Microsoft Active Directory forest needs to be configured on a recovery server if you want to mount another copy of a production Exchange database, or to mount a different version of a production Exchange database. With the Recovery Storage Group feature in Exchange Server, a separate recovery computer is not always needed when you want to recover data from a mailbox store. After you create a Recovery Storage Group, and one or more databases have been added to it, you can either restore online backup sets, or you can copy offline database files to the Recovery Storage Group. To extract or to merge data from recovered databases in the Recovery Storage Group to a mailbox in a regular storage group, use the Exchange Server version of Microsoft Exchange Mailbox Merge Wizard (`Exmerge.exe`).

To use a Recovery Storage Group, the Active Directory topology of the Exchange Server computer must be intact and must be in the same state as when the copy of the database was made. This means that the mailbox or the mailboxes that you want to recover must not be deleted or purged from the system, or moved to a different database or to a different server.

The Recovery Storage Group feature is not intended for use in disaster recovery operations that involve multiple servers or multiple storage groups. It is intended as a substitute in situations where

previously an alternative forest recovery server was required. Use the Recovery Storage Group feature in recovery situations where both the following conditions are true:

- The logical information in Active Directory about the storage group and its mailboxes is intact and unchanged.
- You want to recover data from a single mailbox, a single database, or a group of databases that are in a single storage group. For example, you can use a Recovery Storage Group to recover items that were deleted and purged from a user mailbox, or you can use a Recovery Storage Group to restore or to repair a copy of an alternative database while another copy of the database remains in production.

Creating a Recovery Storage Group

To create a Recovery Storage Group:

1. Start the **Exchange Management Console**.
2. Select **Toolbox** on the bottom of the left panel.
3. Double-click **Database Recovery Management** in the middle panel.
4. Select **Create a recovery storage group**.
5. For the storage group or mailbox database names, select the same name as the storage group and mailbox database names you'd like to recover.
6. Select locations where you'd like the recovery storage group files and mailbox database file(s) to reside.
7. Create your recovery storage group.
8. Mount the virtual copy you would like to restore from to the production server.
9. Copy the `EDB`, `CHK`, and `LOG` files to the locations you selected for the recovery storage group.
10. Rename all the `CHK` and `LOG` files to have the same header as the Recovery Storage Group. For example, if your Recovery Storage Group has a header of **R00**, then rename all your **E00** headers to **R00**.
11. Mount the Mailbox Database from the **Troubleshooting Assistant**.
12. Select **Merge or copy mailbox contents** and select the specific actions you would like to perform.

Restoring a Mailbox Store to the Recovery Storage Group

You can restore a mailbox store to a Recovery Storage Group by manually copying the database files to the appropriate folder on the server.

NOTE: Keep the original backup file in case you need to start over.

1. Verify that the database that you want to restore is consistent and that it is in a clean shutdown state.
   a. Open a command prompt window.
   b. Change to the ExchSrvr\Bin folder.
   c. Enter the following:

```
Eseutil /mh YourDatabaseName.edb
```

   d. Press **Enter**.
   e. Note whether the `State` line shows as `State: Clean Shutdown` or `State: Dirty Shutdown`.
2. A soft recovery should have been performed immediately after the virtual copy for the database was created. If it was not performed or if the database is not consistent and the database log files exist, use the `Eseutil.exe` tool to perform a soft recovery on the database and commit any uncommitted logs to the database:

a. Open a command prompt window.
b. Change to the `ExchSrvr\Bin` folder.
c. Enter:

```
eseutil /r rnn /ddatabase_folder_path
```

rnn — The log file prefix

`database_folder_path` — The name of the folder where the database files (`.edb`, `.stm`) are located

`/d` — Do not add a space after this switch

For example:

```
eseutil /r r00 /dc:\Program Files\Exchsrvr\Recovery Storage Group"
```

d. Press **Enter**.

3. Immediately after the successful completion of a repair, perform an offline defragment of the repaired database.
   a. Open a command prompt window.
   b. Change to the `ExchSrvr\Bin` folder.
   c. Enter:

```
eseutil /d <YourDatabaseName.edb>
```

   d. Press **Enter**.
4. Copy the `.edb` database files from the virtual copy to the appropriate folders that you specified earlier when you created the Recovery Storage Group.
5. If databases are currently mounted in the Recovery Storage Group, do the following:
   a. Dismount the databases.
   b. Use the `Eseutil.exe` tool to verify that the databases are in a clean shutdown state.
      i. Open a command prompt window.
      ii. Change to the `ExchSrvr\Bin` folder.
      iii. Enter:

```
Eseutil /mh <YourDatabaseName.edb>
```

      iv. Press **Enter**.
      v. Note whether the `State` line shows as `State: Clean Shutdown` or `State: Dirty Shutdown`.
      vi. If the databases are consistent, delete all transaction log files (`.log`) and checkpoint files (`.chk`) for the Recovery Storage Group.
6. Start the Exchange System Manager and view the properties of the database that you restored. On the **Database** tab of the **Mailbox Store Properties** dialog box, verify that the **This database can be overwritten by a restore** checkbox is selected.

7. Mount the database.

   To merge data from the recovered databases in the Recovery Storage Group to a mailbox in a regular storage group, use the Exchange Server version of Microsoft Exchange Mailbox Merge Wizard (`Exmerge.exe`).

   To download `Exmerge.exe`, visit the following Microsoft Web site:

   http://www.microsoft.com/downloads/details.aspx?displaylang=en#&familyid=429163ECDCDF- 47DC-96DA-1C12D67327D5

8 Using HP 3PAR Peer Motion Manager Software with Recovery Manager

HP 3PAR Peer Motion Manager is a feature of the HP 3PAR InForm Software and manages the migration of data in between existing storage systems or third party storage arrays. HP 3PAR Recovery Manager now supports HP 3PAR Peer Motion Manager data migration activities without any impact on host operations while monitoring the primary storage system.

NOTE: When using HP 3PAR Peer Motion Manager to move virtual volumes in between storage systems, you must delete `repository` or `repository_2010` folder and subfolders from `c:\program files\3par\RM\exchange` (default) folder and relaunch Recovery manager GUI.

For more information about performing Peer Motion data migration, refer to the HP 3PAR Peer Motion User Guide. Go to http://www.hp.com/go/3par/, navigate to your product page, click **Support for your product**, and then click **Manuals**.

9 Remote Copy for Recovery Manager

Overview

HP 3PAR Remote Copy Software helps you safeguard against disasters that might occur at one location by allowing you to keep copies of data on a separate server, which can be placed at a remote location. For example, if there were a fire or earthquake at one location, all of the data stored there could be lost unless a backup copy can be recovered from a separate location not affected by the disaster.

To maintain updated copies of data at a remote location, Remote Copy uses two HP 3PAR Storage Systems: a primary server (used for production) and a backup server, which can be located anywhere. Therefore, when disaster strikes in one location, there is always a backup of your data at the backup site.

Recovery Manager automatically detects the Remote Copy mode in use (synchronous or asynchronous periodic) and creates virtual copies as appropriate for the configured mode.

For more information, see the *HP 3PAR Remote Copy Software User's Guide*.

How Remote Copy Works

When you synchronize data between a production system (the Remote Copy primary system) on one site and the backup server at another site, the systems involved perform the following steps in sequence:

NOTE: For the Recovery Manager GUI to manage virtual copies on the Remote Copy backup server, you must register the mailbox server using the precise server name.

Synchronous Mode Remote Copy

- Recovery Manager leverages the VSS framework to freeze the I/O at the application level.
- For synchronous mode Remote Copy, the VSS provider creates a virtual copy of the storage groups and log volumes.
- At the same time on the remote backup site, the Remote Copy backup server takes a snapshot of the secondary volumes.
- The Remote Copy backup server saves the virtual copy in its repository at the remote site, and the local backup server saves a local copy of the virtual copy.

NOTE: Running Recovery Manager with synchronous mode Remote Copy requires 3PAR VSS Provider Software 2.1.0 or higher.

Asynchronous Periodic Mode Remote Copy

- Recovery Manager leverages the VSS framework to freeze the I/O at the application level.
- For asynchronous periodic mode Remote Copy, the VSS provider creates a virtual copy of the mailbox database/storage group and log volumes.
- Remote Copy synchronizes the data on the primary server with the data on the backup server (thus updating the backup server).
- After synchronization is complete, Remote Copy creates a virtual copy (aka a snapshot) on the backup server.
- The backup server saves the virtual copy in its repository at the remote site.
- For asynchronous periodic mode Remote Copy, Recovery Manager removes the virtual copy created on the production system (the Remote Copy primary system).

Setting Up Remote Copy

Procedure 1

1. Install and configure Remote Copy. For more information, see the *HP 3PAR Remote Copy Software User's Guide*.

   NOTE: Be sure to configure the backup server with the same names, structure, and Windows authentication mode settings as the primary server.

2. Use the `provcfg.exe` tool (HP's hardware provider tool) to configure the HP 3PAR Storage Systems in the Remote Copy setup to be the default HP 3PAR Storage Systems.

   CAUTION: For Remote Copy to function correctly, the Remote Copy Storage Systems must be the default HP 3PAR Storage Systems.

   If the Remote Copy HP 3PAR Storage Systems are not the default HP 3PAR Storage Systems, Recovery Manager will not be able to locate the relevant Remote Copy volume groups, and the Remote Copy operations will fail.

3. After you have set up Remote Copy on two HP 3PAR Storage Systems, create a Remote Copy volume group for testing purposes.
4. Configure the Remote Copy volume group for synchronization either in synchronous mode or in asynchronous periodic mode with a period value of zero.

Support for Remote Copy Modes and Policies

Recovery Manager supports Remote Copy in synchronous and asynchronous periodic mode.

- If you are using synchronous Remote Copy, the policies on the production system (the Remote Copy primary system) and the backup system must match. If the policies do not match, Recovery Manager cannot create virtual copies on a synchronous Remote Copy system.

  However, if you manually specify an expiration value, a retention value, or both when you create a virtual copy, Recovery Manager creates the virtual copy on a synchronous Remote Copy system even if the policies on the primary and backup servers do not match.

  NOTE: For more information on specifying values at the time you create virtual copies, see:

  - The sections on manually creating virtual copies in "Using the Recovery Manager GUI" (page 33)
  - The description of the `RMExch create` command in "Using the Recovery Manager CLI" (page 57)

- If you are using asynchronous periodic Remote Copy, you can create Recovery Manager virtual copies even if policies on the servers do not match. If policies do not match, the virtual copies use the policies on the backup server.
- If you are running Remote Copy in a Synchronous Long Distance configuration, the virtual copies on the synchronous and asynchronous periodic Remote Copy backup servers do not have the exact same timestamp.

Support for GeoCluster for Microsoft Windows

Recovery Manager for Exchange supports the use of both Remote Copy and HP 3PAR GeoCluster Software for Microsoft Windows:

- When synchronous mode Remote Copy is used with Recovery Manager for Exchange and GeoCluster, you can use Recovery Manager to create virtual copies on both the production system (the Remote Copy primary system) and the backup system.
- When Synchronous Long Distance Remote Copy is used with Recovery Manager for Exchange and GeoCluster, you can use Recovery Manager to create virtual copies on all three systems: the production system (the Remote Copy primary system), the synchronous mode backup system, and the asynchronous periodic mode backup system.

Setting Up Remote Copy Volume Groups for Mailbox Databases/Storage Groups

1. Identify the virtual volumes that contain the mailbox database/storage group and log files to be copied.
2. Create one (and only one) Remote Copy volume group per mailbox database/storage group.
3. Add the virtual volumes belonging to the mailbox database/storage group files and log files to the primary Remote Copy volume group, and add the associated secondary virtual volumes to the secondary volume group on the backup server.

△ **CAUTION:** The relationship between mailbox databases/storage groups and Remote Copy volume groups is 1:1.

- You must add mailbox database/storage group files to a primary Remote Copy volume group for Remote Copy to function.
- You must add files from only one mailbox database/storage group to one primary volume group.
  - Do not disperse files from one mailbox database/storage group over multiple primary Remote Copy volume groups.
  - Do not add files from multiple mailbox database/storage groups to the same Remote Copy volume group.

If you do not ensure your system meets these requirements, you run the risk of data corruption and loss.

4. Synchronize the Remote Copy primary and secondary volume groups.

Recovering a Mailbox Database/Storage Groups from a Remote Copy Backup Server

If a mailbox database/storage group crashes at the site that holds the production system (the Remote Copy primary system), you can recover the data from the backup server at the remote site as long as it is set up in an identical manner to the original production server.

NOTE: If you are performing a promote restore for volumes in a Synchronous Long Distance Remote Copy relationship, you must manually stop Remote Copy before initiating the volume promote restore.

1. On the backup server, use Recovery Manager to mount the virtual copy to the production server.
2. Log onto the production server and stop the Exchange instance and its dependent services.
3. From the mounted virtual copy, manually copy all necessary mailbox database/storage group and log files to the corresponding mailbox database/storage group location.

4. Restart the Exchange instance and its dependent services.
5. Log back onto the backup server and unmount the virtual copy.

10 Support and Other Resources

Related Documents

For Information About…	Read the…
Using the HP 3PAR InForm OS Command Line Interface (CLI) to configure and manage the HP 3PAR Storage System	*HP 3PAR InForm OS CLI Administrator's Manual*
Using the HP 3PAR InForm Management Console to configure and administer HP 3PAR Storage Systems	*HP 3PAR InForm Management Console Help*
Assigning the appropriate user roles and rights	*HP 3PAR InForm OS Concepts Guide* *HP 3PAR InForm OS CLI Administrator's Manual*
Using the HP 3PAR InForm OS Command Line Interface (CLI) for remote clients to install and configure Recovery Manager	*HP 3PAR InForm OS Command Line Interface Reference*
Identifying HP 3PAR Storage System components and fixing problems	*HP 3PAR InForm OS Messages and Operator's Guide*
Understanding the HP 3PAR Storage System and its features	*HP 3PAR InForm OS Concepts Guide*
Shadow copies using HP 3PAR VSS Provider Software for Microsoft Windows	*HP 3PAR VSS Provider Software for Microsoft Windows User's Guide*
Platform-specific release levels	For information about supported hardware and software platforms, refer to the *Single Point of Connectivity Knowledge for HP Storage Products* (SPOCK) Web site at http://spock.corp.hp.com.

Typographical Conventions

The following typographical conventions are used in this document.

Table 7 Typographical Conventions

Typeface	Meaning	Example
ABCDabcd	Used for dialog box elements such as titles and button labels.	Enter your system name in the **Value** box and click **OK**.
`ABCDabcd`	Used for file names, paths, and screen output, and for text you are to enter.	`Found < 12 > 73G disks.` Enter `cli` at the Windows command prompt.
`ABCDabcd`	Used to contrast your input with system output.	`cli% removevv VV1` `Removing vv VV1.`
`ABCDabcd` **`ABCDabcd`**	Used for variables in file names, paths, and screen output, and variables in user input.	**`[root@(`*`systemID-nodeID`*`)root]`** `To continue Enter your system name ==>` **`systemname`**

NOTE: The InServ Storage Server has been rebranded as HP 3PAR Storage System. There are instances in this document where screenshots and/or menu items and command output refer to the HP 3PAR Storage System as InServ or InServ Storage Server.

Advisories

To avoid losing data, be sure to observe the cautions and warnings in this document.

WARNING! Warnings alert you to actions that can cause injury to people or irreversible damage to data or the operating system.

CAUTION: Cautions alert you to actions that can cause damage to equipment, software, or data.

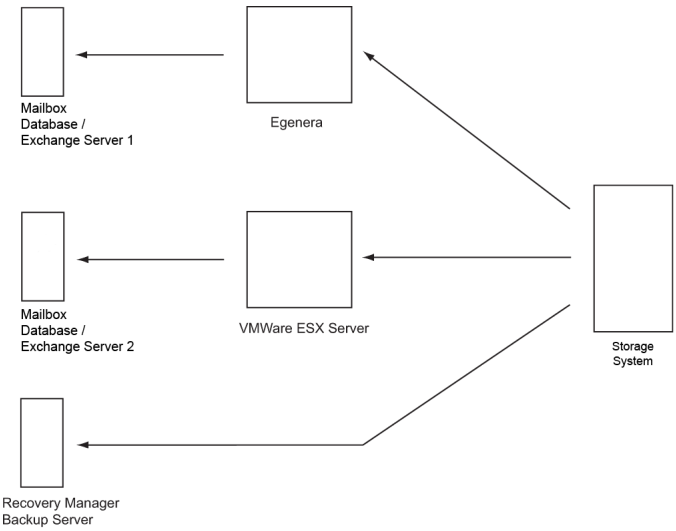
NOTE: Notes are reminders, tips, or suggestions that supplement the procedures included in this document.

A Server Virtualization Environments

VMWare and Egenera

Support for VMWare and Egenera environments is provided under certain specific conditions. New volumes presented to VMWare and Egenera servers are not surfaced automatically, so the `RMExch mount` command is limited to being executed on the backup host. Figure 17 (page 116) shows the relationships between the HP 3PAR Storage System and VMWare and Egenera in a virtualization environment:

Figure 17 Server Virtualization Environment



The following requirements need to be met for VMWare and Egenera to be supported:

1. The disks presented to the Exchange Servers need to be raw devices with physical compatibility.
2. The backup server needs to be connected directly to the HP 3PAR Storage System and not through VMWare or Egenera.
   - The `RMExch mount` command cannot be run against a virtual machine from the VMWare or Egenera server with the `-h` option.
   - You must manually perform the actions to expose the volumes to the server.

Due to these restrictions, restores performed in these virtualized environments require a different set of steps than shown in "Rapid Backup and Recovery for Exchange" (page 90). File copy and volume promote restores are not supported for virtualized environments.

To perform a restore:

1. Follow steps 1 to 4 in "Point-in-Time Recovery" (page 97).
2. Mount the virtual copy to the backup server or restore it from backup media to the production server.
3. On the production server, move the `.EDB`, `.LOG`, and `.CHK` files from the original locations to another location. The original locations can be determined from the Exchange Management Console.
4. Copy the `.EDB`, `.LOG`, and `.CHK` file(s) from the mounted or restored virtual copy location to the actual database location.

B Process of Restoration for Specific Microsoft Exchange Configurations

The table below provides the specific steps performed during restoration for certain Microsoft Exchange configurations. The following steps appear in the wizard prior to initializing restoration.

Table 8 Description of Steps Performed During Restoration for Specific Microsoft Exchange Configurations

File Copy Restore Process for Exchange 2010	Volume Copy Restore Process for Exchange 2010	File Copy Restore Process for Exchange 2007	Volume Copy Restore Process for Exchange 2007
Normal Node 1. Validate the virtual copy '011812013058'. 2. Dismount the mailbox database 'DEMO-NORMAL-MDB'. 3. Perform File Copy Restore by removing the original files and subfolders from the production server 'raptors' and copy the restored files. 4. If (Point of Failure) - Apply the log files to VC from C:\Test". 5. Mount the mailbox database 'DEMO-NORMAL-MDB'.	**Normal Mode** 1. Validate the virtual copy '011812013058'. 2. Dismount the mailbox database 'DEMO-NORMAL-MDB'. 3. Perform Volume Restore by overwriting ALL data on the original volume. 4. If (Point of Failure) - Apply the log files to VC from "C:\Test". 5. Mount the mailbox database 'DEMO-NORMAL-MDB'.	**Normal Mode** 1. Validate the virtual copy '011812022411'. 2. Dismount the mailbox database(s) for storage group 'RMEDEV_AJAY_SG'. 3. Perform File Copy Restore by removing the original files and subfolders from the production server 'Chilean' and copy the restored files. 4. If (Point of Failure) - Apply the log files to VC from "C:\Test;". 5. Mount the mailbox database(s) for storage group 'RMEDEV_AJAY_SG'.	**Normal Mode** 1. Validate the virtual copy '011812022411'. 2. Dismount the mailbox database(s) for storage group 'RMEDEV_AJAY_SG'. 3. Perform Volume Restore by overwriting ALL data on the original volume. 4. If (Point of Failure) - Apply the log files to VC from "C:\Test;" 5. Mount the mailbox database(s) for storage group 'RMEDEV_AJAY_SG'.
DAG Active Node 1. Validate the virtual copy '011812013058'. 2. Suspend the replication to passive nodes. 3. Dismount the mailbox database 'DEMO-NORMAL-MDB'. 4. Perform File Copy Restore by removing the original files and subfolders from the production server 'raptors' and copy the restored files. 5. If (Point of Failure) - Apply the log files to VC from "C:\Test". 6. Mount the mailbox database 'DEMO-NORMAL-MDB'. 7. Resume the replication to passive nodes.	**DAG Active Node** 1. Validate the virtual copy '011812013058'. 2. Suspend the replication to passive nodes. 3. Dismount the mailbox database 'DEMO-NORMAL-MDB'. 4. Perform Volume Restore by overwriting ALL data on the original volume. 5. If (Point of Failure) - Apply the log files to VC from "C:\Test". 6. Mount the mailbox database 'DEMO-NORMAL-MDB'. 7. Resume the replication to passive nodes.	**CCR Active Node** 1. Validate the virtual copy '010912053630'. 2. Suspend the replication to passive nodes. 3. Bring the Microsoft Exchange Information Store instance OFFLINE on 'CCR-MBX1'. 4. Dismount the mailbox database(s) for storage group 'CCR-DEMO-SG'. 5. Perform File Copy Restore by removing the original files and subfolders from the production server 'pe2970-10' and copy the restored files. 6. If (Point of Failure) - Apply the log files to VC from "C:\test". 7. Bring the Microsoft Exchange Information Store instance ONLINE on 'CCR-MBX1'. 8. Mount the mailbox database(s) for storage group 'CCR-DEMO-SG'. 9. Resume the replication to passive nodes.	
DAG Passive Node 1. Validate the virtual copy '011112021504'. 2. Activate the passive node 'MAGIC' of DAG named 'dagars'.	**DAG Passive Node** 1. Validate the virtual copy '011112021504'. 2. Activate the passive node 'MAGIC' of DAG named 'dagars'.		

Table 8 Description of Steps Performed During Restoration for Specific Microsoft Exchange Configurations *(continued)*

File Copy Restore Process for Exchange 2010	Volume Copy Restore Process for Exchange 2010	File Copy Restore Process for Exchange 2007	Volume Copy Restore Process for Exchange 2007
3. Suspend the replication to passive nodes. 4. Dismount the mailbox database 'DAGDEMO05JAN'. 5. Perform File Copy Restore by removing the original files and subfolders from the production server 'raptors' and copy the restored files. 6. If (Point of Failure) - Apply the log files to VC from "C:\test|". 7. Mount the mailbox database 'DAGDEMO05JAN'. 8. Resume the replication to passive nodes.	3. Suspend the replication to passive nodes. 4. Dismount the mailbox database 'DAGDEMO05JAN'. 5. Perform Volume Restore by overwriting ALL data on the original volume. 6. If (Point of Failure) - Apply the log files to VC from "C:\test|". 7. Mount the mailbox database 'DAGDEMO05JAN'. 8. Resume the replication to passive nodes.		

C Troubleshooting

Known Issues

- If a virtual volume name on the HP 3PAR Storage System is changed, the virtual copy taken before the name change will not be able to perform a volume promote restore.
- For media backup virtual copy, it is recommended that a policy be maintained per storage group to avoid the possibility of having the batch file overwritten under some conditions.

Known Microsoft Issues

- On a computer that is running a clean installation of Windows Vista Service Pack 1 (SP1) or Windows Server 2008, an event ID 10 may be logged in the System log by VDS Dynamic Provider. Refer to the following website for more details:

  http://support.microsoft.com/kb/948275
- Under some conditions, there may be a problem when deleting folders on directory-mounted virtual volumes. This is a Windows known issue. Refer to the following web site:

  http://support.microsoft.com/?kbid=319368
- (For Exchange 2007) When upgrading an update roll-up patch on Exchange 2007 and executing a snapshot creation with the validate (`-vs`) option without re-logging the console, an application error message is displayed. To avoid this error, log off and log in after the update.

Troubleshooting

This appendix is designed to be used like a Frequently Asked Questions section. It will help find solutions to some of the common issues that may arise when running Recovery Manager for Exchange.

NOTE: Recovery Manager for Exchange depends on the VSS Framework and the Microsoft Exchange writer to be in a good state to function properly. If a problem occurs, check the status of the Exchange Writer with the command `vssadmin list writers`.

NOTE: (For Exchange 2007) The state of the Microsoft Exchange writer should be 'stable' (for the Replication Writer in CCR configurations). If it is not stable, restart the Information Store service. You may also need to restart the VSS Service.

Problem:

You may get the following message when operating in the Windows 2008 environment while executing Create VC or Mount VC with the Disk Management window open.



Suggestion:

This popup can be ignored by clicking Cancel as advised by Microsoft on their support site: http://support.microsoft.com/kb/969601.

Problem:

The virtual copy creation always fails on mailbox database/storage group integrity checking.

Suggestion:

Make sure that the Exchange management tool on all Recovery Manager for Exchange installed hosts have the same service pack installed.

Problem:

Recovery Manager is running on both backup and server production server but Recovery Manager consistently fails to issue a command to the remote system.

Suggestion:

Make sure the communication port for Recovery Manager is set to be the same on all Recovery Manager installed systems. You need to restart the Recovery Manager for Exchange Agent service on every system followed by the `port change` command. If the firewall or security monitoring software is installed, verify that the communication port and remote registry service ports (139 and 445) are allowed for access.

Problem:

Recovery Manager cannot locate the Exchange Server.

Suggestion:

Recovery Manager uses the Active Directory structure to locate Exchange server information within the same domain or, if you have registered multiple Active Directory domains, within the registered domains. Recovery Manager cannot access the Exchange information if you have only configured local domains and the information is not in the same domain, or if you have set up multiple Active Directory domains but the information is in an unregistered domain.

Problem:

Recovery Manager cannot detect the mailbox database/storage group.

Suggestion:

The Recovery Manager user has to have Exchange Administrator privilege to access Exchange Active Directory objects.

Problem:

Virtual copy creation always fails on the mailbox database/storage group.

Suggestion:

There are a few things to check on your system.

1. Make sure both the data and log files of your mailbox database/storage group are installed on an HP 3PAR volume.
2. Make sure your HP 3PAR volume is formatted as Basic Disk type.
3. Make sure you have allocated snapshot space for your HP 3PAR volumes.
4. Make sure your system configuration conforms to the HP 3PAR support matrix.

Problem:

The Recovery Manager interface takes a long time to start or to bring up the server registration dialog.

Suggestion:

When Recovery Manager is started for the first time, or when you click on the server registration, Recovery Manager will try to scan the entire network for available Exchange servers. Exchange object query might cause this latency.

Problem:

Recovery Manager always fails to issue a command from the user interface and command line right after the installation.

Suggestion:

If the software is installed through a remote desktop session, the newly added environment variables will not become effective until you log off the session. If the software is installed directly from the system console, these variables should be available immediately.

Problem:

Symantec NetBackup takes a substantial amount of time to start a backup process. However, Recovery Manager claims that the backup has failed.

Suggestion:

Timeout for backup initialization detection can be modified to accommodate the timing issue. Please refer to the `RMExch config` command for more information.

Problem:

NetBackup takes a substantial amount of time to complete a backup process.

Suggestion:

Make sure you have the latest maintenance package installed for your NetBackup application. For more information, see the latest HP 3PAR InForm OS Configuration Matrix. To obtain a copy of this documentation, go to http://www.hp.com/go/3par/, navigate to your product page, click **Support for your product**, and then click **Manuals**.

Problem:

`RMExch` cannot connect to the specified server.

Suggestion:

Make sure the Recovery Manager for Exchange Agent service is started and that the port settings on all Recovery Manager installed systems are the same. If you changed the port setting, you need to restart the Recovery Manager for Exchange Agent service before running any commands.

Problem:

`RMExch create` is not creating a virtual copy.

Suggestion:

Check to see if you have reached the maximum number of virtual copies allowed by your policy for this Exchange server. Also check whether the oldest virtual copy is mounted, as this will not allow a create if the maximum number of virtual copies has been reached.

Problem:

The mounted virtual copies always show up as read-only.

Suggestion:

Make sure the Virtual Disk Service is not disabled on your system. If this service is disabled, Recovery Manager will not be able to make the virtual copy writable.

Problem:

Recovery Manager fails to create a virtual copy for a mailbox database/storage group on the HP 3PAR volume, which is also a system drive.

Suggestion:

Performing a snapshot of a mailbox database/storage group on the system volume is currently not supported by Recovery Manager for Exchange.

Problem:

Recovery Manger shows the **Error - VSS Asynchronous operation failed. It is recommended that you wait 10 minutes and then try the operation again** message when the `create` command is executed.

Suggestion:

When you encounter this error message, run the `vssadmin list writers` command to list all of the available writers on the system that are taking the snapshot of the Exchange mailbox database/storage group. Make sure the Microsoft Exchange Writer status is stable. If the status is other than stable, you need to restart the Exchange server service to reset the writer status.

Problem:

Recovery Manager shows the **ERROR: Failed - Virtual Copy creation failed for mailbox database/storage group <StorageGroup>** message after an unexpected termination of the virtual copy create process.

Suggestion:

When Recovery Manager unexpectedly terminates, an internal locking file might still exist on your Exchange server system. You need to remove the locking file manually for the create process to run through. The locking file can be located under: `<InstallationPath>\Exchange\vclock`. Use the `RMExch reset` command to reset the lock.

Problem:

The event viewer shows the **Volume Shadow Copy Service error: Unexpected error IOCTL_STORAGE_QUERY_PROPERTY(\\.\PHYSICALDRIVE2, StorageDeviceProperty) - BuildLunInfoForDrive. hr = 0x80070002** error when a virtual copy creation is in progress.

Suggestion:

When this message is logged by the Volume Shadow Copy service, it notifies the user that the initial search on the imported volume is not complete. It will try again to make sure the snapshot can be imported successfully. If the snapshot process still fails and this error is logged, please contact HP.

Problem:

Recovery Manager creates the virtual copy successfully but does not show it in GUI or CLI.

Suggestion:

If the virtual copy is requested on a passive from active node or vice versa, it will be created on the desired node. The virtual copy is visible only on the node where it is created. Check the appropriate node.

Problem:

Recovery Manager shows the virtual copy as available but it is mounted or vice versa.

OR

Recovery Manager shows the virtual copy as available but it still cannot be mounted because the status indicates that the virtual copy is already mounted.

Suggestion:

This mismatched entry might be due to a previously failed Recovery Manager operation. Check for mismatched entries using the `analyze` command.

To resolve mismatched entries, follow the steps detailed below:

1. Remove VLUNs and virtual volumes for the mismatched volume. To do so, run:

   (For Exchange 2010) `RMExch analyze -mdb <mailbox_db>`

   (For Exchange 2007) `RMExch analyze -s <exchange server> -g <storage group>`

   This command shows which virtual volumes and VLUNs might be left over from a previously failed operation. Remove these VLUNs and virtual volumes manually from the HP 3PAR Storage System.

2. Remove timestamp entries from the repository. To do so, run:

   (For Exchange 2010) `RMExch analyze -mdb <mailbox_db>`

   (For Exchange 2007) `RMExch analyze -s <exchange server> -g <storage group>`

   This shows all "Missing VVs" from a mailbox database/storage group. These are the virtual volumes entries that are deleted from HP 3PAR Storage System but are still in the repository. Remove the respective timestamps from repository by deleting the directory:

   (For Exchange 2010) `<installpath>\3PAR\RM\Exchange\Repository\<exchange server>\<mailbox_db>\<time stamp>`

   (For Exchange 2007) `<installpath>\3PAR\RM\Exchange\Repository\<exchange server>\<storage group>\<time stamp>`

Problem:

Recovery Manager takes too long to create a virtual copy.

Suggestion:

Once the snapshot is created, it is verified and `.log` files are truncated. For this, the checkpoint is fetched and log file names are traversed one by one. This may take a longer due to a large number of `.log` files for a mailbox database/storage group. If a virtual copy creation is taking too long, check the virtual copy creation with the `-nc` switch. This will skip log verification and log truncation. Then, verify this snapshot using the `validate` command. After it is validated, to truncate logs, create a snapshot using the `-truncate` and `-nc` switches. Finally , try a regular virtual copy creation. If the virtual copy creation with `-nc` is also taking a longer time, send an **RMReport** to HP Customer Support.

Problem:

After installing Recovery Manager, it is unable to manage the Exchange cluster from Exchange management. It returns a COM class factory error.

OR

After installing Recovery Manager, an MSCluster-related COM class factory error is returned.

Suggestion:

If the previous version of Recovery Manager is uninstalled, the `msclus.dll` is unregistered and results in the COM class factory error. To resolve this, run:

```
- regsvr32 C:\Windows\system32\msclus.dll
```

Problem:

How to recover the Exchange writer status from last error “Non-retryable” to “No error”.

Suggestion:

If the Exchange writer status shows the last error as “Non-retryable” on a CCR active or passive node or an LCR passive copy, try one of the following methods to get the writer into a “stable” state with no last error.

Restart the Microsoft Exchange Replication service from the passive node.

OR

```
Net stop MSExchangeRepl
Net start MSExchangeRepl
```

If restarting the Microsoft Exchange Replication service does not solve the problem, try one of the following methods:

Restart the Microsoft Exchange Information Store service.

OR

```
Net stop MSExchangeIS
Net start MSExchangeIS
```

Problem:

How to recover the System Writer status from last error “Non-retryable” to “No error”.

Suggestion:

Restart the Cryptographic Services service.

OR

```
Net stop CryptSvc
Net start CryptSvc
```

Problem:

The Remote Copy status for volume group <remote copy group> does not permit synchronization.

Suggestion:

The involved Remote Copy group has virtual volumes that are not in the synced state. Wait until all virtual volumes in the group display in synced state and then retry the operation.

Problem:

An LDP COM error message like the following appears:

RME5220: ERROR: COM: Failed to bind to LDAP path <CN=Recovery Storage Group,CN=InformationStore,CN=WWDC1-EX-CPBE01,CN=Servers,CN=Denver,CN=Administrative Groups,CN=Westwood,CN=Microsoft Exchange,CN=Services,CN=Configuration,DC=westwood2000>: 0xc1032221.

Suggestion:

You may not have permissions for the specified mailbox database/storage group or the mailbox database/storage group is absent.

Problem:

When using Symantec NetBackup, you see this message: **0x1: ERROR: Cannot connect to [NBU server name]; socket error**.

Suggestion:

Check whether you are using a different version of the NBU master server and the NBU client. If so, upgrade the NBU client to the same version as the NBU master server.

Problem:

The `setup.exe` asks to uninstall 3PAR VSS 2.1.0 provider or 3PAR Inform CLI 2.3.1 or both while these are supported as per configuration matrix. The installer does not provide an option to install HP 3PAR Recovery Manager Software for Exchange 4.3.0.

Suggestion:

Run RME_2k8_x64.msi directly from folder `\HP3PAR\RecoveryManagerExchange`.

Problem:

Auto restore fails at mount occasionally.

Solution:

Check if SAN policy is set to "Shared all" or "Offline All". Please change SAN policy to "Online All' and rerun the task. To change SAN policy:

1. Open MS-DOS Prompt.
2. Run `diskpart.exe`.
3. Enter `san policy="onlineall"`.

An output displays `DiskPart successfully changed the SAN policy for the current operating system`.

D Event Messages

This appendix provides information for all of the events generated by HP 3PAR Recovery Manager Software for Microsoft Exchange 2010.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages

Event ID	Error Message	Description/Action
3006	RME3006: ERROR: 3PAR VSS provider not found, exiting.	3PAR VSS Provider Software could not be located. • Verify that **3PAR VSS Provider** is installed using **Add/Remove Programs**. • If VSS Provider is installed, run `vssadmin list providers` to check that 3PAR VSS Provider Software is installed properly.
3007	RME3007: ERROR: You can not set the retention time which is greater than HP 3PAR Storage System Retention Time: %1 Hours. Note: If the volume is not in any domain, then its retention time cannot exceed the value of the system's VVRetentionTimeMax. The default value for the system's VVRetentionTimeMax is 14 days. If the volume belongs to a domain, then its retention time cannot exceed the value of the domain's VVRetentionTimeMax, if set. The retention time cannot be removed or reduced once it is set. If the volume has its retention time set, it cannot be removed within its retention time. If both expiration time and retention time are specified, then the retention time cannot be longer than the expiration time. "	Check if the volume belongs to a domain and set the appropriate retention time.
3008	RME3008: ERROR: The restore operation cannot be continued.	The restore operation failed. Refer to the failure reasons and take corrective actions. Also, try the restore operation again.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
3009	RME3009: ERROR: Could not determine the mount status of mailbox database '%1'.	The Mailbox Database is not mounted. • Use Exchange Management Shell to mount the database. Or use Mount-Database `cmdlet` to mount the database
3010	RME3010: ERROR: The Circular logging is enabled for the mailbox database '%1'.	The circular logging must be disabled for the Mailbox database and to continue with the restore operation. • Go to Mailbox properties, click on **Maintenance** tab and uncheck the **Enable Circular Logging** box.
3011	RME3011: ERROR: The Circular logging is enabled for the storage group '%1'.	The circular logging must be disabled for the Mailbox database and to continue with the restore operation. • Go to Storage Group properties, under **General** tab and uncheck the **Enable Circular Logging** box.
3012	RME3012: ERROR: Failed to get information for the Cluster Mailbox '%1'.	The backup server is unable to retrieve the cluster information. • Install "Failover Clustering Tools" feature on the RM backup server. • Ensure the settings for servers participating in cross domain configuration are correct. Refer user guide for cross domain configuration setup if necessary.
3013	RME3013: ERROR: The Clustered Mailbox Server '%1' is NOT valid.	The clustered Mailbox server in CCR configuration is not a valid. • Correct the errors via Exchange Management Shell and continue the operation again.
3014	RME3014: ERROR: The restore operation is carried out on virtual copy taken from Passive Node '%1' of Cluster.	RME 4.4 does not support restore operation of Virtual copy taken from a passive node within a cluster. • To restore from passive copy, perform the failover to passive node and then perform the restore operation of the virtual copy.
3015	RME3015: ERROR: The virtual copy '%1' is not mounted to the active server '%2' and can not be filecopy restored.	For a *FileCopy* restore operation, mount the previously created virtual copy to the originating server. • To perform the *FileCopy*, unmount the VC and mount it to correct production server.
3016	RME3016: ERROR: The restore of virtual copy '%1' is done from passive node. The volume promote is not supported from passive node in LCR configuration.	RME 4.4 does not support restore operation of a virtual copy taken from passive node within a cluster.
3017	RME3017: ERROR: Failed to get replication status for the storage group '%1' on server '%2'.	The replication status for the storage group on server could not be obtained because of exchange error. • Refer to the exchange error and take corrective actions.
3018	RME3018: ERROR: Failed to suspend replication for the storage group '%1' on server '%2'.	The storage group on server cannot be suspended because of exchange error. • Refer to the exchange error and take corrective actions.
3019	RME3019: The replication for the storage group '%1' is suspended on server '%2'.	The replication status for the storage group is suspended.
3020	RME3020: ERROR: The copy status for the storage group '%1' on server '%2' is not healthy.	For create and restore operations, the passive copy of cluster should be in HEALTHY status. The replication status for the passive copy of the storage group is not in sync with the active copy. • Wait for the replication to finish if the replication is pending. • Or use EMS or `cmdlet Update-StorageGroupCopy` to update the copy status.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
3021	RME3021: ERROR: Failed to resume replication for the storage group '%1' on server '%2'.	The storage group on server cannot be resumed because of exchange error. • Refer to the exchange error and take corrective actions.
3022	RME3022: The replication for the storage group %1 is resumed on server %2.	The replication status for the storage group is resumed.
3023	RME3023: ERROR: The copy status for the storage group %1 on server %2 is not suspended.	The replication cannot be resumed as the copy status of the storage group is not in a SUSPENDED state.
3024	RME3024: ERROR: Failed to get passive copies for the mailbox database '%1'.	In DAG setup, unable to get the passive copies of the mailbox database. • Ensure all passive copies are available and active.
3025	RME3025: ERROR: Failed to suspend replication for the mailbox database '%1' on server '%2'.	Failure to suspend the replication of the passive copies of mailbox database. • Refer to the exchange error and take corrective actions.
3027	RME3027: ERROR: Failed to resume replication for the mailbox database '%1' on server '%2'.	Failure in resuming the replication of the passive copies of mailbox database. • Refer to the exchange error and take corrective actions.
3030	RME3030: ERROR: The copy status of the mailbox database '%1' on server '%2' is not HEALTHY.	For create and restore operations, the passive copy of DAG must be in HEALTHY status. The replication status for the passive copy of the mailbox database is not in sync with the active copy. • Wait for the replication to finish if the replication is pending. • Or use EMS or `cmdlet Update-MailboxDatabaseCopy` to update the copy status.
3031	RME3031: ERROR: Failed to activate mailbox database '%1' on server '%2'.	Failure to activate the passive copy of mailbox database on the server. • Refer to the exchange error and take corrective actions.
3033	RME3033: ERROR: The log files path location is INVALID. Please specify a valid path.	Specify a valid path for Point Of Failure restore.
3034	RME3034: ERROR: The Log files location '%1' is not found on server '%2'.	Cannot locate the aforementioned path on the server. • Ensure the path exists on the server.
3035	RME3035: ERROR: No valid log files found at '%1' on server '%2'.	No valid log files found in the aforementioned path to perform Point Of Failure restore. • Ensure the log files exist on the server.
3056	RME3056: ERROR: One of the drives is not a 3PAR volume.	Some of the target volumes are not HP 3PAR virtual volumes. All of the drives need to be HP 3PAR drives. • Verify that all database and log destinations belong to an HP 3PAR Storage System.
3076	RME3076: ERROR: You have reached the maximum number of virtual copies allowed for the current policy. Please delete one or update the policy to allow deletion of oldest virtual copies.	The maximum number of virtual copies for the current policy has been reached. • Delete the existing virtual copy. • Modify the policy to allow more virtual copies for a mailbox database/storage group or to delete older copies.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
3077	RME3077: ERROR: The maximum number of virtual copies <Max. Count> has been reached for Exchange Server <Server Name> policy and the oldest Virtual Copy is currently mounted. Please unmount this Virtual Copy before creating another Virtual Copy.	The maximum number of virtual copies for the specified Exchange Server policy has been reached. • Unmount the oldest virtual copy to allow it to be deleted during virtual copy creation. • Modify the policy to allow more virtual copies for a mailbox database/storage group.
3126	RME3126: ERROR: Could not delete the local configuration file.	Failed to save the information to the configuration file. • Check that you have the correct permissions to the `RMExchange Repository` directory.
3150	RME3150: ERROR: The zip file already exists.	The specified zip file already exists. • Change the zip file name or delete the existing zip file.
3151	RME3151: ERROR: The filename must end with .zip.	An invalid file name format was specified for the zip file. • Check the syntax for the zip file name specified by the `RMExch report` command.
3157	RME3157: ERROR: Number of virtual copies need to be in the range of 1 to <Max. Count>.	The number of virtual copies is out of the range specified by the current policy. • Reduce the number of virtual copies for this procedure or modify the policy by raising the maximum number of virtual copies allowed.
3158	RME3158: ERROR: Invalid parameter entered for policy command.	An invalid parameter was specified for the `RMExch policy` command. Check the syntax for the `RMExch policy` command for the correct parameters.
3164	RME3164: ERROR: There is a conflict with the specified path for repository relocation.	A conflict was detected regarding the specified repository relocation path. • Verify the path given for repository relocation.
3173	RME3173: ERROR: The Virtual Copy is not found in the repository, check if parameters are correct.	The specified virtual copy could not be located in the repository. • Check the syntax for the `RMExch backup` command.
3176	RME3176: ERROR: Verification has encountered an error. Please run Validate command on this snapshot.	A verification error for the snapshot operation occurred. • Run `RMExch validate` to verify that the snapshot was created.
3198	RME3198: ERROR: Backup error occurred. Check to see if your policy name is correct.	An error occurred during the backup. • Check the `RMExch backup` command parameters to ensure that the correct policy name is used.
3200	RME3200: ERROR: NetBackup process has failed with error code <Error Code>. Check if NetBackup is included in environment variable "PATH". Consult NetBackup manual for this error code.	The Symantec NetBackup process has generated an error. • Verify that NetBackup is installed properly and verify that the `bin` subfolder is specified in the `PATH` environment variable. • Refer to NetBackup documentation for information on the error code.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
3205	RME3205: ERROR: Mount this Virtual Copy before running restore.	The virtual copy was not mounted before attempting to restore. • Mount the virtual copy and then try a file copy restore.
3206	RME3206: ERROR: Unmount this Virtual Copy before running promotion restore.	The virtual copy was not unmounted before promoting the restore. • Unmount the virtual copy and then try a volume promote restore.
3216	RME3216: ERROR: Promotion of volume <Volume Name> failed.	Promotion of the specified volume has failed. • Consult the Windows event log for the specific error message.
3220	RME3220: ERROR: The backup you would like to restore is not found. Please check your parameters.	A restore for the specified backup could not be performed. • Check the syntax for the `RMExch backup` command.
3501	RMCOMN3501: ERROR: The volume is spread across multiple Storage Systems. This configuration isn't supported.	The database or log target volume cannot be spread across multiple HP 3PAR Storage Systems as this configuration is not supported. • Refer to the required setup and configuration.
3801	3PARVSS3801: ERROR: Invalid timeout value specified. The valid range is <number 1> to <number 2> seconds.	An invalid timeout value has been specified. • Verify that the specified timeout value is within the supported range of 3 minutes (180 seconds) to 10 minutes (600 seconds).
3802	3PARVSS3802: ERROR: Invalid retry value specified. The valid range is <number 1> to <number 2>.	An invalid retry value has been specified. • Verify that the specified retry value is within the supported range of 0 to 10.
3803	3PARVSS3803: ERROR: Unable to access connection setup.	The connection setup could not be accessed. • Verify that the 3PAR VSS Provider Software Registry Key is still valid on the system. If the Registry Key cannot be found, reinstallation is required.
3804	3PARVSS3804: ERROR: Unable to find configuration for Storage System <Inserv Name>.	The configuration information for the specified HP 3PAR Storage System could not be located. • Verify that the correct HP 3PAR Storage System name is entered for the inquiry.
3805	3PARVSS3805: ERROR: Can not remove default Storage System configuration. You need to select another Storage System configuration as default entry before removing this configuration.	Removal of the currently designated default HP 3PAR Storage System configuration is not allowed. • Designate another HP 3PAR Storage System configuration as the default before performing this operation.
3806	3PARVSS3806: ERROR: Unable to read Storage System node name entry from registry.	The specific HP 3PAR Storage System configuration information can not be located in the registry. • Try reregistering the HP 3PAR Storage System configuration using the appropriate HP 3PAR VSS Provider Software CLI command. Consult VSS Provider documentation for details.
3807	3PARVSS3807: ERROR: Unable to read Storage System password file path entry from registry.	The specific HP 3PAR Storage System password file information cannot be located. • Try re-registering the HP 3PAR Storage System configuration using the appropriate HP 3PAR VSS Provider Software CLI command. Consult VSS Provider documentation for details.
3808	3PARVSS3808: ERROR: Unable to access Storage System	The specific HP 3PAR Storage System connection information cannot be located.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
	connection setup.	• Make sure you have proper permission to access the registry. • Try re-registering the HP 3PAR Storage System configuration using the appropriate HP 3PAR VSS Provider Software CLI command. Consult VSS Provider documentation for details.
3809	3PARVSS3809: ERROR: Invalid input for '-sockssl' option.	An invalid input has been specified for the `-sockssl` option. • Verify that the specified input is supported.
3810	3PARVSS3810: ERROR: Process has failed to create the password information. Please make sure you have entered the correct information.	Unable to access the specified HP 3PAR Storage System. • Make sure you have entered the correct HP 3PAR Storage System name and user authentication information.
3811	3PARVSS3811: ERROR: Unable to access generated password information.	Unable to generate password information for the configuration. • Make sure you have a proper connection to the HP 3PAR Storage System.
3812	3PARVSS3812: ERROR: Unable to verify credential information.	The authentication information could not be verified. • Check that the specified authentication information is valid and up-to-date. • If the original user account or password on the HP 3PAR Storage System has been modified, you need to run the configuration tool again to update the cached information.
3813	3PARVSS3813: ERROR: Unable to get Storage System information. Please make sure you have entered the right information and have proper access right.	The HP 3PAR Storage System information could not be retrieved. • Make sure you have entered the right information and have proper access rights. • Check whether there is any issue with your network connection to the HP 3PAR Storage System.
3814	3PARVSS3814: ERROR: Unable to find license information in the target Storage System. Please make sure you have entered the right information.	The HP 3PAR Storage System license information could not be located for the target HP 3PAR Storage System. • Make sure you have entered the correct information and have proper access rights. • Check whether there is any issue with your network connection to the HP 3PAR Storage System.
3815	3PARVSS3815: ERROR: Unable to find VSS Provider license in the target Storage System. Please make sure you have entered the right information.	The HP 3PAR VSS Provider Software for Microsoft Windows license information could not be located. • The VSS Provider for Microsoft Windows license is required on the target HP 3PAR Storage System. • Contact HP for licensing assistance.
3816	3PARVSS3816: ERROR: Unable to find Virtual Copy license in the Storage System. Please make sure you have entered the right information.	Virtual copy license information could not be located for the HP 3PAR Storage System. • The HP 3PAR Virtual Copy license is required on the HP 3PAR Storage System. • Contact HP for licensing assistance.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
3817	3PARVSS3817: ERROR: VSS Provider license has already expired. Please contact 3PAR support for assistance.	The VSS Provider for Microsoft Windows license has expired on the target HP 3PAR Storage System. • Contact HP for licensing assistance.
3818	3PARVSS3818: ERROR: Unable to encrypt/decrypt authentication data. Additional information: <Exception Message>.	The authentication data has been corrupted on your system. • Rerun the configuration setup for this specific HP 3PAR Storage System.
3819	3PARVSS3819: ERROR: Invalid log level specified. The valid range is 1 to 5.	An invalid log level has been specified. • Make sure the specified log level range is from 1 to 5.
3820	3PARVSS3820: ERROR: Unable to access log level setup.	The log level setup could not be accessed. • Make sure you have the proper permission and privilege to access the registry setup.
3821	3PARVSS3821: ERROR: Fail to spawn an InForm CLI process.	An attempt to spawn an HP 3PAR InForm OS Command Line Interface (CLI) process has failed. • Make sure you have the CLI installed on your system and that it is registered in the system environment variable's `PATH`.
3822	3PARVSS3822: There is no existing Storage System configuration entry.	No existing HP 3PAR Storage System configuration entry could be located. • You must have at least one HP 3PAR Storage System configuration entry. • Use the configuration tool to add the appropriate entry to the list.
5050	3PARVSS5050: ERROR: Unsupported feature <Feature Name>.	The specified volume snapshot attribute is not supported by HP 3PAR VSS Provider Software. • Please refer to the latest version of the *HP 3PAR VSS Provider Software for Microsoft Windows User's Guide* for a list of supported features.
5051	3PARVSS5051: ERROR: The shadow copy set has exceeded the maximum number (64) of allowable volumes.	Microsoft VSS only allows a maximum of 64 volumes to participate in a snapshot process.
5052	RM5052: ERROR: Could not allocate memory.	This type of memory allocation failure can result from a system-wide contention for resources. • Check the event log for more detailed information.
5053	3PARVSS5053: ERROR: Could not communicate with the 3PAR InForm CLI.	This problem can be caused by incorrect authentication setup, the unavailability of a CLI tool, or a licensing issue. • Verify the HP 3PAR InForm OS Command Line Interface (CLI) installation. • Check to make sure the `bin` subfolder is in `PATH`. • Check the Application Log of the Event Viewer for more information.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5054	3PARVSS5054: ERROR: CLI: <command>.	The command submitted to the CLI has generated an error. • Check the Application Log of the Event Viewer for more information.
5055	3PARVSS5055: ERROR: <Token>: Invalid token.	Unable to identify requested information received from the HP 3PAR Storage System. • Check that your HP 3PAR Storage System version is supported by VSS Provider and that there are no network problems that could result in a partial data transmission. • To determine the version for a particular HP 3PAR Storage System, run the `showversion` command. • For the VSS Provider version, run `vssadmin list providers` and check the VSS Provider entry that specifies the version and other details.
5056	3PARVSS5056: ERROR: Could not open volume mapping file: <Volume Map File>.	Unable to build the internal virtual volume database. • Check that your HP 3PAR Storage System version is supported by VSS Provider and that there are no network problems that could result in a partial data. transmission. • To get the version for a particular HP 3PAR Storage System, run `showversion`. • For the VSS Provider version, run `vssadmin list providers` and check the VSS Provider entry that specifies the version and other details.
5057	3PARVSS5057: ERROR: Could not open file: <File Name>.	Unable to open the designated file for internal processing. • Check that you have the correct privileges to access the Windows temporary folder.
5058	3PARVSS5058: ERROR: Could not create file: <File Name>.	Unable to create the designated output file for internal processing. • Check that you have the correct privileges to access the Windows temporary folder.
5059	3PARVSS5059: ERROR: SYSTEM: <Error Code &/or Description>.	A Windows system decode error code has been generated. • To get a more detailed description, consult msdn.microsoft.com or Windows Help.
5061	3PARVSS5061: ERROR: IOCTL inquiry call failed.	Unable to perform an inquiry on the targeted volume. This might be caused by specifying an invalid volume during snapshot creation. • Make sure all volumes that participate in the snapshot process are valid and HP 3PAR storage volumes. • Check to see that the volumes are accessible and are not in a bad or offline state.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5062	RM5062: ERROR: Could not query windows registry key <Registry Key>.	Unable to access registry for the specified key name. • Use `regedit` to check that the registry still has the corresponding key and that you have permission to access it.
5063	3PARVSS5063: ERROR: Could not query windows registry key name <Registry Key>.	Unable to access the registry for the specified key name. • Use `regedit` to check that the registry still has the corresponding key and that you have permission to access it.
5064	RM5064: ERROR: Could not open windows registry key for 3PAR VSS Provider.	Unable to access the registry for the HP 3PAR VSS Provider Software installation. • Verify the VSS Provider installation using **Add/Remove program** or by running `vssadmin list providers`. • Check that the registry still has the corresponding key and that you have proper permission to access it. If this key is missing, you need to reinstall the VSS Provider package.
5065	3PARVSS5065: ERROR: Target LUN <Lun Id> is not a 3PAR Virtual Volume.	The designated target LUN is not an HP 3PAR virtual volume. • Verify that all database and log destinations belong to the HP 3PAR Storage System.
5066	3PARVSS5066: ERROR: Target LUN <Lun Id> could not be identified.	The specified target volume does not have adequate device information and does not allow for proper identification.
5067	3PARVSS5067: ERROR: Destination LUN <Lun Id> could not be identified.	The specified destination volume does not have adequate device information and does not allow for proper identification.
5071	3PARVSS5071: ERROR: Unexpected snapshot set ID at <Server Name>.	An unexpected snapshot set ID was encountered during the snapshot set preparation. • Restart both the Volume Shadow Copy Service and the HP 3PAR VSS Provider Service to reset the status.
5072	3PARVSS5072: ERROR: <Error Code> call out of order.	The internal VSS call stack is not in the correct order. • Restart both the Volume Shadow Copy Service and the HP 3PAR VSS Provider Service to reset the status.
5073	3PARVSS5073: ERROR: Could not detect 3PAR InForm CLI installation.	Unable to get the CLI registration information for the local system. • Verify the CLI package installation using **Add/Remove Programs**. • Verify the registry keys for the CLI installation.
5102	RME5102: ERROR: The VSS Writer ran out of memory or other system resources. The recommended way to handle this error is to wait ten minutes and then repeat the operation. If the VSS Writer is in a bad state, restart the writer's service. Check the application event log.	A resource allocation error occurred during a VSS Writer operation. • Try waiting 10 minutes and then retry the operation. • Run `vssadmin list writers` to verify that the VSS writer is in a **Healthy** state.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5103	RME5103: ERROR: The VSS Writer operation failed because of a time-out between the Freeze and Thaw events.	The VSS Writer operation has exceeded the 20–second timeout limit for the freeze and thaw stage allocated by Exchange. • Verify that the Exchange writer is in a **Healthy** state using `vssadmin list writers`.
5104	RME5104: ERROR: The VSS Exchange Writer has failed. This can be verified by running the command "vssadmin list writers" from the command line. To put it into a stable state and to continue creating snapshots, restart the Microsoft Exchange information store.	The VSS Exchange Writer has failed. • This can be verified by running the `vssadmin list writers`command from the command line. • You may need to restart the VSS service and/or Exchange Information Store service.
5106	RME5106: ERROR: The VSS Writer is not responding.	The VSS Writer is not responding. • Run `vssadmin list writers` to verify that the VSS writer is in a **Healthy** state.
5108	RME5108: ERROR: The VSS Writer infrastructure is not operating properly. Check that the Event Service and VSS have been started, and check for errors associated with those services in the error log.	The VSS Writer is not operating properly. • Check that the Event Service and VSS have been started. • Run `vssadmin list writers` to verify that the VSS writer is in a **Healthy** state and check the system event log for errors associated with those services.
5111	RME5111: ERROR: The 3PAR VSS Provider is not registered on this computer.	A registered version of VSS Provider was not detected. • Check that HP 3PAR VSS Provider Software is properly installed on the system. • Run `vssadmin list writers` to verify that VSS Provider is properly registered. • If you cannot resolve the problem, uninstall the VSS Provider package and install it again.
5112	RME5112: ERROR: An unexpected 3PAR VSS Provider error occurred.	An unexpected error was generated by VSS Provider. • Restart the Volume Shadow Copy Service and HP 3PAR VSS Provider Software service.
5113	RME5113: ERROR: The VSS Provider is in use.	Another snapshot request is currently in process. • Wait 10 minutes and retry the operation.
5118	RME5118: ERROR: An unexpected VSS provider error has occurred.	An unexpected error was generated by VSS Provider. • Check the Windows event log to determine the specific VSS Provider error.
5121	RME5121: ERROR: Could not bind to the domain for Exchange Server Information.	A domain binding error occurred while accessing the Exchange Server Information. • Check the Active Directory connection.
5122	RME5122: ERROR: The system was unable to flush I/O writes. This can be a transient problem. It is recommended to wait ten minutes and try again, up to three times.	The system was unable to flush I/O writes. This can be a transient problem. • Try waiting 10 minutes and try again, up to three times. • If the operation cannot be completed after three retries, run `vssadmin list writers` to verify that the VSS writer is in a healthy state.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5123	RME5123: ERROR: The system was unable to hold I/O writes. Try again when the Exchange Server is not as busy.	The system was not able to process I/O writes. • Try again when the Exchange Server is not as busy. • Run `vssadmin list writers` to verify that the VSS writer is in a healthy state.
5124	RME5124: ERROR: Your database is spread across multiple Storage Systems on the production server. Please move the Mailbox Database to only one Storage System and perform this operation again.	The mailbox database/storage group is spread across multiple HP 3PAR Storage Systems. • The database or log target volume must belong to a single HP 3PAR Storage System. Refer to the preferred configuration setup.
5126	RME5126: ERROR: The creation of a shadow copy is in progress, and only one shadow copy creation operation can be in progress at one time.	The system was unable to complete the shadow copy operation because another snapshot request was being processed. Additional information can be found in the application event log. • Wait 10 minutes and retry the operation.
5127	RME5127: ERROR: A backup for same mailbox/storage group is already in progress, and only one backup operation at a time is allowed.	Another Data Protector or NetBackup request is in process, and only one backup operation at a time is allowed. • Retry the operation.
5128	RME5128: ERROR: Cannot find the Virtual Copy in the Repository.	The repository might be out of sync. • Run `RMExch analyze` to determine the out-of-sync entries. • See Appendix B, “Troubleshooting,” for more details.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5134	RME5134: ERROR: removevlun operation failed.	The `removevlun` operation has failed. • Verify that you can connect to the required HP 3PAR Storage System from the CLI command window.
5135	RME5135: ERROR: createvlun operation failed.	The `createvlun` operation has failed. • Verify that you can connect to the required HP 3PAR Storage System from the CLI command window.
5136	RME5136: ERROR: removevv operation failed.	The `removevv` operation has failed. • Verify that you can connect to the required HP 3PAR Storage System from the CLI command window.
5137	RME5137: ERROR: showvv operation failed.	The `showvv` operation has failed. • Verify that you can connect to the required HP 3PAR Storage System from the CLI command window.
5138	RME5138: ERROR: createsv operation failed.	The `createsv` operation has failed. • Verify that you can connect to the required HP 3PAR Storage System from the CLI command window.
5139	RME5139: ERROR: promotesv operation failed.	The `promotesv` operation has failed. • Verify that you can connect to the required HP 3PAR Storage System from the CLI command window.
5142	RME5142: ERROR: showhost operation failed.	The `showhost` operation has failed. • Verify that you can connect to the required HP 3PAR Storage System from the CLI command window.
5143	RME5143: ERROR: showvlun operation failed.	The `showvlun` operation has failed. • Verify that you can connect to the required HP 3PAR Storage System from the CLI command window.
5144	RME5144: ERROR: 3PAR <Recovery Manager component> license has expired. Contact 3PAR representatives to acquire a new license.	The license for a Recovery Manager component appears to have expired. • Verify that there is not a communications problem by connecting to the required HP 3PAR Storage System from the CLI command window. • Check the validity of the Recovery Manager License for the HP 3PAR Storage System using the `showlicense` command.
5145	RME5145: ERROR: Could not retrieve 3PAR <Recovery Manager component> license. Contact 3PAR representatives to acquire a valid license.	The licence for Recovery Manager component could not be verified. • Verify that there is not a communications problem by connecting to the required HP 3PAR Storage System from the CLI command window. • Check the validity of the Recovery Manager License for the HP 3PAR Storage System using the `showlicense` command.
5146	RME5146: ERROR: Datastore '<Datastore Name>' is already mounted to host '<Host Name>'.	The selected virtual copy has already been mounted to the specified host.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5147	RME5147: ERROR: Cannot remove a mounted virtual copy. Please unmount it and try again.	A mounted virtual copy could not be removed. • Unmount the virtual copy before deleting it.
5148	RME5148: ERROR: The Exchange server is set to include all Mailbox Databases. Please remove this umbrella to register individual Mailbox Databases.	The Exchange server cannot determine which specific mailbox databases/storage groups to set up as the current range is too wide. • Unregister all mailbox databases/storage groups and then register only the desired databases one by one.
5151	RME5151: ERROR: The VSS Provider does not appear to be installed. You cannot create a Virtual Copy without the provider. Please Check the VSS provider installation.	VSS Provider does not appear to be installed. • Verify the proper HP 3PAR VSS Provider Software installation using **Add/Remove Programs** or run the `vssadmin list providers` command to verify the installation.
5152	RME5152: ERROR: Creating this Virtual Copy will exceed the maximum number of Virtual Copies allowed by the Policy. Maximum number of Virtual Copies is set to '<Max. VC count in Policy>'.	The maximum number of virtual copies has been exceeded. • Check the policy setting for the particular mailbox database/storage group. If the option for retaining the oldest virtual copy is set, subsequent virtual copy creation will not be allowed after it reaches the maximum limit.
5154	RME5154: ERROR: Missing Mailbox Database name.	The mailbox database/storage group name is missing from the `RMExch` command syntax. • The mailbox database/storage group name must be included in the CLI command parameters.
5155	RME5155: ERROR: NetBackup restore process has failed.	The NetBackup restore has failed. • Check the application event log and NetBackup logs on the NetBackup server.
5156	RME5156: ERROR: Could not retrieve the Recovery Manager for Exchange install location from the registry. Check the Recovery Manager for Exchange installation.	The installation location for Recovery Manager for Exchange could not be retrieved from the registry. • Check that you have access to the registry location for the Recovery Manager application and ensure that the registry value for the repository location exists. • To locate the registry key, open the Windows Registry using `regedit`. Check for the following key: `HKEY_LOCAL_MACHINE\SOFTWARE\3PAR\RM_Exchange`
5157	RME5157: ERROR: Could not open the Recovery Manager for Exchange registry key. Check the Recovery Manager for Exchange installation.	The registry key for Recovery Manager for Exchange could not be opened. • Check that you have access to the registry location for the Recovery Manager application and ensure the registry value for the repository location exists. • To locate the registry key, open Windows Registry using `regedit`. Check for the following key: `HKEY_LOCAL_MACHINE\SOFTWARE\3PAR\RM_Exchange`
5158	RME5158: ERROR: Could not retrieve the Recovery Manager for Exchange repository location from registry. Check the Recovery Manager for Exchange installation.	The repository location for Recovery Manager for Exchange could not be retrieved from the registry. • Check that you have access to the registry location for the Recovery Manager application and ensure the registry value for the repository location exists. • To locate the registry key, open Windows Registry using `regedit`. Check for the following key: `HKEY_LOCAL_MACHINE\SOFTWARE\3PAR\RM_Exchange`

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5159	RME5159: ERROR: Maximum number of volumes exceeded.	Microsoft VSS only allows a maximum of 64 volumes to simultaneously participate in a snapshot process. • Reduce the number of volumes for the snapshot.
5160	RME5160: ERROR: The replication status of a Mailbox Database is '<Status>'. A copy of unhealthy Mailbox Database cannot be made.	A copy process was not completed due to the status of the mailbox database/storage group. • Check the mailbox database/storage group status. Get it into a **Healthy** state and then try to create a copy.
5162	RME5162: ERROR: Unable to get Netbackup install information from registry.	The NetBackup installation information could not be retrieved from the registry. • Check that NetBackup is properly installed and make sure you have access to the registry entry. • Confirm the NetBackup installation using **Add/Remove Programs**. • Use `regedit` to check for the following registry key: `HKEY_LOCAL_MACHINE\SOFTWARE`
5163	RME5163: ERROR: Could not open NetBackup path registry key '<Registry key path>'.	Could not open the NetBackup path for the specified registry key. • Check that NetBackup is properly installed and make sure you have access to the registry entry. • Confirm the NetBackup installation using **Add/Remove Programs**. • Use `regedit` to check for the registry key.
5166	RME5166: ERROR: Could not retrieve Exchange server information from the Active Directory.	The Exchange server information could not be retrieved from the Active Directory. • Check the Active Directory connection. Try opening the Exchange administrative UI or Exchange Console to determine if the connection is active.
5167	RME5167: ERROR: One of the databases in the Mailbox Database may be dismounted, cannot continue with Virtual Copy creation.	Virtual copy creation could not be completed due to a possible database dismount in the associated mailbox database/storage group. • Mount all the databases in the mailbox database/storage group and try to create the virtual copy.
5168	RME5168: ERROR: Two or more files of this Mailbox Database share volume(s). Please unmount the shared volume(s) before proceeding.	Multiple files from the mailbox database/storage group share volumes. • Check the file path and volume mapping to determine which volume is shared with the other mailbox database/storage group(s). Unmount this shared volume.
5169	RME5169: ERROR: A VSS unexpected error has occurred. It is recommended to wait ten minutes and try again, up to three times.	An unexpected VSS error has occurred. • Try waiting ten minutes and try again, up to three times. • Check the application and system event logs for VSS errors.
5171	RME5171: ERROR: The Exchange recovery process failed, you will need to do a manual repair of the Exchange databases.	The Exchange database verification has failed. • Make sure both systems have the same level of Exchange server package installed. • Manually repair the Exchange database if necessary.
5172	RME5172: ERROR: The Exchange recovery process failed '<Mailbox Database>': You will need to do a manual repair of the Exchange databases.	The Exchange database verification has failed. • Make sure both systems have the same level of Exchange server package installed. • Manually repair the Exchange database if necessary.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5173	RME5173: ERROR: Failed to identify Recovery Manager for Exchange agent.	The Recovery Manager for Exchange Agent service is not functioning properly. • Restart the Recovery Manager for Exchange service from Windows Services and try the operation again.
5174	RME5174: ERROR: The mount point you have provided does not exist.	The specified mount point does not exist. • Make sure the mount point being provided already exists on the system.
5176	RME5176: ERROR: Unmount all mailbox stores within a Mailbox Database before attempting a restore.	All mailbox stores within the mailbox database were not unmounted before attempting a restore. • Unmount all mailboxes in the mailbox database and then try to restore.
5179	RME5179: ERROR: Unmount all public folder stores within a Mailbox Database before attempting a restore.	All public folder stores within the mailbox database were not unmounted before attempting a restore. • Unmount all public folder stores in the mailbox database and then try to restore.
5180	RME5180: ERROR: All databases in the Mailbox Database must be dismounted to perform a restore.	All databases in the mailbox database were not unmounted before attempting a restore. • Unmount all databases in the mailbox database and then try to restore.
5182	RME5182: ERROR: Could not open include file <File Path>. Check to see if your policy name is correct.	The specified NetBackup include file could not be opened. • Check the NetBackup policy setting; NetBackup is case sensitive.
5184	RME5184: ERROR: Failed to unmount from specified mount point.	Could not unmount from the specified mount point. • If the mounting status still shows **Mounted**, use the `reset` command to reset the mount status.
5185	RME5185: ERROR: Failed to locate snapshot information from provider: <Snapshot Info Path>.	The specified snapshot information could not be located. • Check the HP 3PAR VSS Provider Software log for more detailed information.
5186	RME5186: ERROR: Could not retrieve value from provider's XML repository to set snapshot volume.	The value required to set the snapshot volume could not be retrieved from the VSS Provider's XML repository. • Check the VSS Provider log for more detailed information.
5187	RME5187: ERROR: Failed to get Exchange Server install location from registry.	The Exchange Server install location could not be determined from the registry. • Make sure the Exchange Server or Exchange Management tool package is installed on the system.
5190	RME5190: ERROR: Failed to confirm data integrity of the Virtual Copy <Timestamp>. Try performing recovery operations and integrity check to fix.	The data integrity of the specified virtual copy could not be confirmed. • Perform an integrity check on the virtual copy using the Microsoft Exchange utility `eseutils.exe`. Consult Microsoft Exchange documentation for details on how to use this utility.
5191	RME5191: ERROR: Virtual Volume <Virtual Volume Name> is currently exposed to host(s).	The specified virtual volume is currently exposed to a host. • Make sure the virtual copy is not exposed to other hosts from the HP 3PAR Storage System.
5194	RME5194: ERROR: Invalid backup component document path to import Virtual Copies.	The backup document generated during the virtual copy creation is corrupted.

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5195	RME5195: ERROR: Failed to perform remote copy command for group <Remote Copy Group Name>.	The Remote Copy command for the specified group could not be performed. • Check the Remote Copy connection and the HP 3PAR Storage System setup. Consult the *HP 3PAR InForm OS CLI Administrator's Manual* or the **HP 3PAR InForm Management Console Help** for details on setting up and checking Remote Copy functionality.
5196	RME5196: ERROR: Failed to query remote copy registered volumes information.	Could not query the Remote Copy registered volumes information. • Check the Remote Copy connection and the HP 3PAR Storage System setup. Consult the *HP 3PAR InForm OS CLI Administrator's Manual* or the **HP 3PAR InForm Management Console Help** for details on setting up and checking Remote Copy functionality.
5198	RME5198: ERROR: Unexpected remote copy status: <Status Code> for group <Remote Copy Group Name>.	An unexpected Remote Copy status code has been generated for the specified group. • Check the Remote Copy connection and the HP 3PAR Storage System setup. Consult the *HP 3PAR InForm OS CLI Administrator's Manual* or the **HP 3PAR InForm Management Console Help** for details on setting up and checking Remote Copy functionality.
5199	RME5199: ERROR: Remote copy group <Remote Copy Group Name> is not found.	The specified Remote Copy volume group could not be located. • Check the Remote Copy connection and the HP 3PAR Storage System setup. Consult the *HP 3PAR InForm OS CLI Administrator's Manual* or the **HP 3PAR InForm Management Console Help** for details on setting up and checking Remote Copy functionality.
5212	RME5212: ERROR: Failed to cleanup previously created snapshot for remote copy.	A previously created snapshot could not be cleaned up for the Remote Copy procedure. • Manually remove the snapshot from the HP 3PAR Storage System. • Use `RMExch analyze` to determine which snapshots are on the HP 3PAR Storage System but not reflected in the Recovery Manager repository. Use `removevv` (and if required `removevlun`) to remove the unwanted virtual volumes. See Appendix B, "Troubleshooting," for more details.
5213	RME5213: ERROR: Failed to send notification command for remote copy.	The notification command was not sent for Remote Copy. • Check the communications between your system and the target system using `ping`. You may also need to check the firewall settings.
5215	RME5215: ERROR: Exception occurred during remote copy process.	An exception error occurred during the Remote Copy process. • Run `RMReport` to send the information to HP support.
5219	RME5219: ERROR: Failed to set mount point for volume.	The mount point for the volume could not be set. • Make sure the mount point exists and is not being used by another application.
5427	RME5427:ERROR: Unable to find the specified Mailbox Database '<Mailbox Database Name>' in Active Directory.	The specified mailbox database name could not be located in the Active Directory. • This error occurs when attempting to remove or mount a virtual copy when the mailbox database has already been removed or updated from the Exchange server.
5408	RME5408: ERROR: Remote Copy is not ready for sync.	Remote Copy cannot initiate the synchronization operation. • Check that the Remote Copy volume group is in a "Synced" state, using the `showrcopy` CLI command. (Refer to the *HP 3PAR InForm OS CLI Administrator's Manual* for details.) • Use `ProvCfg` to check that the primary HP 3PAR Storage System is configured as the default on the primary production server. (For `ProvCfg.exe` utility details, refer to the provider's user's guide.)

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5412	RME5412: ERROR: Unable to locate remote copy group.	The Remote Copy volume group could not be located. • Use `ProvCfg` to check that the target HP 3PAR Storage System is configured as the default for the Remote Copy backup server. (For `ProvCfg.exe` utility details, refer to the provider's user's guide.)
5414	RME5414: ERROR: Virtual copy verification failed.	Virtual copy verification has failed. • Try to verify the virtual copy using the `RMExch validate` command.
5437	RME5437: ERROR: Backup document (bcd.xml) for virtual copy is missing or is corrupted. Therefore, virtual copy cannot be mounted.	`bcd.xml` is missing for a virtual copy. Therefore, it cannot be mounted using the `RMExch mount` command. • Clear this virtual copy by running `Rmexch analyze -sync` • If required, mount this virtual copy using HP 3PAR CLI commands.
5438	RME5438: ERROR: Data Protector Actions: <DataProtector command error>	HP Data Protector did not allow the operation. • Check that you have met the prerequisites for using Data Protector for backup initiated by Recovery Manager. • Check that the correct permissions are assigned to Data Protector backup client users.
3231	RME3231: Error: Server <server name> is not a valid server or is not reachable.	The server could not be accessed. • Check whether the server name and domain name are entered correctly. • If the server name and domain name are correct, check whether you can ping <server name>.
3243	RME3243: ERROR: Failed to log in to Storage System due to invalid username or password.	Could not access the HP 3PAR Storage System. • Check whether the HP 3PAR VSS Provider Software can access the HP 3PAR Storage System with the registered credentials. • Run `provcfg inserv -detail`. • Refer to the *HP 3PAR VSS Provider Software User's Guide* for more details.
3247	RME3247: ERROR: Please use a version of VSS Provider that supports synchronous Remote Copy virtual copies, and enable synchronous remote virtual copies.	To set up synchronous Remote Copy, see Chapter 9, "Remote Copy for Recovery Manager."

Table 9 HP 3PAR Recovery Manager Software for Microsoft Exchange Event Messages *(continued)*

Event ID	Error Message	Description/Action
5526	RME5526: ERROR: Recovery Manager for Exchange does not support this particular NetBackup model.	You must install the Symantec NetBackup client to perform backups using NetBackup. • To set up Symantec NetBackup, see Chapter 5, "Configuring Backup Software."
5528	RME5528: ERROR: Check NetBackup client installation on <host name>.	NetBackup does not appear to be installed on the specified host. • Verify that the NetBackup client is installed correctly on the backup client <host name>.
5531	RME5531: ERROR: Check Data Protector client installation on <host name>.	Installation files might be corrupted or missing. `omnib.exe` does not seem to exist. • Verify that the Data Protector client is installed correctly on the backup client <host name>. • Verify that the correct `omnidl` patch for Data Protector is installed.
5530	RME5530: ERROR: Check Data Protector client installation on <host name>. Could not find file <Data Protector Home> `\\bin\\utilns\\omnidl.exe`.	`omnidl.exe` does not appear to exist. • Verify that the Data Protector client is installed correctly on the backup client. • Verify that the correct `omnidl` patch is installed for Data Protector.