

Microsoft Exchange 2010 Backup and Recovery Support with EMC NetWorker

Technical Note

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This technical note describes the backup and recovery procedure support for Microsoft Exchange 2010.

A fully integrated Microsoft Exchange 2010 backup solution is currently being developed for the next major release of the NetWorker Module for Microsoft Applications (NMM) software. This technical note outlines a solution that consists of a single new client binary that has been developed.

This document contains the following sections:

- [Updates to the nsr_exchange2010 binary](#)
- [Microsoft Exchange 2010 backups with NetWorker](#)
- [Limitations in backing up Microsoft Exchange 2010 data](#)
- [Backing up Microsoft Exchange 2010 data with NetWorker](#)
- [Restoring Microsoft Exchange 2010 data with NetWorker](#)

The nsr_exchange2010 binary, version 1.1

The following feature support has been added for the nsr_exchange2010.exe binary, version 1.1:

- Support for incremental backups
- Enhanced logging and diagnostics
- Changes to the format of the save set name. The save set no longer references the drive letter where the original files resided. The new format is:
Exchange_Snap_<date>-<time>-<pid>

To determine which version of the nsr_exchange2010.exe binary that is currently installed on your Exchange 2010 server:

1. In **Windows Explorer**, navigate to the following location:
C:\Program Files\Legato\nsr\bin
2. Right mouse click the following file:
nsr_exchange2010.exe
3. Select **Properties** and then click the **Versions** tab.
4. The latest file version of the binary is 1.1.xxx.0

Note: The download details for the new binary are discussed later in this technical note.

The nsr_exchange2010 binary, version 1.0

The initial version of the nsr_exchange2010 binary introduces the following feature support:

- VSS-based full backups for Microsoft Exchange Server 2010
- Microsoft Exchange log truncation
- Stand-alone, DAG Active Node, and DAG Passive Node backups
- Microsoft Exchange Database Recoveries in the case of database loss and corruption
- Mailbox level recoveries using Recovery Databases and Microsoft Exchange tools
- Target and source based deduplication

Updates to the nsr_exchange2010 binary

In order to allow EMC to proactively notify customers of any updates to the nsr_exchange2010.exe binary or new developments for the Microsoft Exchange 2010 backup solution, send an email to:

nw_exchange2010@emc.com.

Include the following information:

- Site ID
- Company Name
- Contact Name

- Contact Email Address
- Contact Phone Number

In addition to this technical note, the NetWorker Procedure Generator provides detailed backup and recovery procedure support instructions for Microsoft Exchange 2010.

Microsoft Exchange 2010 backups with NetWorker

IMPORTANT: *This client binary requires that the NetWorker client software be installed on the Microsoft Exchange 2010 system.*

When Microsoft Exchange 2010 support is offered in the next major release of the NetWorker Module for Microsoft Applications (NMM) software, it is strongly recommended that this interim solution be immediately replaced with the new NMM solution.

This section outlines the basic backup workflow for this solution:

1. The system checks for all databases in the site and databases that have been specified for backup.
Databases that meet the following criteria are excluded from the backup:
 - Databases that have been marked by the Microsoft Exchange 2010 system as having a backup in progress.
 - Databases that are not in a healthy state.
 - Recovery Databases (RDB).
 - Databases that do not have a valid copy on this system.
2. The VSS Writer uses the Microsoft Windows VSS framework with Microsoft Exchange 2010 to create a volume snapshot of the required volumes.

IMPORTANT: *This solution only supports the use of the default Microsoft Software Shadow Copy provider VSS provider:*

1. *Remove all other VSS providers, such as the following:*

Symantec VSS Provider

EMC VSS Hardware Provider

NetApp VSS Hardware Provider

2. *To check the VSS providers that are installed on the system, use the following command:*

vssadmin list providers

3. By default, the backup solution invokes the system to perform internal Microsoft Exchange database consistency checks prior to the backup. If the consistency check fails, the backup is aborted and is marked as failed.

To disable the consistency check, use the following switch when the backup command is configured:

-nocheck

4. The NetWorker client performs the backup.
5. The backup status is reported to the native Microsoft Exchange 2010 VSS writer.

6. Upon successful backup, Microsoft Exchange performs a transaction log truncation. If the backup fails, the logs are not truncated.
7. All backup steps are logged and reported in the savegroup completion report of the NetWorker server.

Limitations in backing up Microsoft Exchange 2010 data

The following limitation applies to Microsoft Exchange 2010 backups with the NetWorker software:

Note: Only full and incremental Microsoft Exchange backups are supported. Differential backups are not supported.

Aborting a backup in progress by attempting to stop a savegroup might fail:

- If the savegroup cannot be stopped, on the Microsoft Exchange 2010 client machine in the **Process Manager**, stop the **save.exe** process.
- If the save process does not exist in the **Process Manager**, stop the **diskshadow.exe** process. The **diskshadow.exe** process will restart automatically when required.

Note: Do not stop the **nsr_exchange2010.exe** process as it might prevent VSS snap cleanups from occurring.

Logging

The following logging considerations apply:

- In the nsr_exchange2010 version 1.1 binary, successful backups are now also logged to the client Application Event Log file.
- In the nsr_exchange2010 version 1.0 binary, all of the logging of the backup is done on the server. For example, savegroup log files and daemon.raw.

Microsoft Exchange 2010 backup limitations

When configuring selected Microsoft Exchange 2010 databases for backup, take note of the following Microsoft Exchange 2010 VSS Writer limitations:

- [Defining individual databases for backup on Windows 2008 R2 on page 5](#)
- [Defining individual volumes on Windows 2008 R2 on page 5](#)

Note: On Windows 2002 SP2, you can only backup all of the databases on the Microsoft Exchange server. Defining the save set per volume or per database to achieve parallel backup savestreams is not supported. Specifying an individual save set or volumes in the **Save set** field will result in an error during the backup.

Defining individual databases for backup on Windows 2008 R2

Defining multiple databases in the client save set field provides the ability to take advantage of concurrent savestreams to reduce back times. The maximum number of concurrent or parallel savestreams for a Microsoft Exchange client is defined by the parallelism value for the client and is addressed later in this procedure. In order to take advantage of parallel savestreams, each database (edb and logs files) must reside on its own dedicated volumes or LUN(s) as recommended by Microsoft:

<http://technet.microsoft.com/en-us/library/ee832794.aspx>

If the defined databases share the same volume or LUN, do not use parallel save streams. In this situation:

- Set the client parallelism of the NetWorker client to 1.
Or
- Configure the system to backup all databases. [How to configure a backup of all of the databases](#) provides detailed instructions.

Defining individual volumes on Windows 2008 R2

To reduce backup time and to take advantage of concurrent savestreams, you can define multiple volumes in the client save set field. The maximum number of concurrent or parallel save streams for a Microsoft Exchange client is defined by the parallelism value for the client.

In the case where multiple databases reside on the same volume, consider the following limitations:

- If multiple databases reside on the same volume, multiple volumes can be backed up concurrently. However, the databases on each volume will be saved sequentially.
- If the database and transaction log files are cross hosted on volumes by volume, backups are not supported and should not be configured. For example, the log file for database db1 resides on the same volume as the edb file for database db2.

In this case, perform either of the following operations:

- Configure the system. [How to configure a backup of all of the databases](#) provides detailed instructions.
Or
- Limit the client parallelism value for the NetWorker client created for the Microsoft Exchange 2010 backup to 1.
- Active and passive database types make use of different components of the same VSS parent writer to perform a backup. If a volume contains both an active and a passive database, this applies to either the database location or the log location, the backup must be limited to either the active or the passive databases.

To limit the backup to either the active or the passive databases, use the following switches in the **backup** command:

- `-active`
- `-passive`

Backup performance

If previously generated transaction logs have not been purged for a long period of time, the first backup of the Microsoft Exchange database can take a significant amount of time.

Microsoft Exchange databases with high change rates generate a large number of transaction logs which negatively affects backup performance.

Backing up Microsoft Exchange 2010 data with NetWorker

To backup Microsoft Exchange 2010 data, perform these steps:

- [Task 1: Ensure that the NetWorker software has been installed on page 6](#)
- [Task 2: Copy the backup executable file on page 6](#)
- [Task 3: Ensure that the Microsoft Exchange 2010 client has been configured on the NetWorker server on page 6](#)
- [Task 4: Customize the Save set field on page 7](#)
- [Task 5: Customize the Backup command field on page 9](#)
- [Task 6: Select the backup level on page 11](#)
- [Task 7: Consider Transaction Log truncation on page 12](#)
- [Task 8: Monitor the backup on page 13](#)

Task 1: Ensure that the NetWorker software has been installed

The *NetWorker Installation Guide* provides detailed instructions on how to install the NetWorker software.

For Microsoft Windows Server 2008 R2 environments, ensure that the NetWorker client release 7.5 SP2 or later has been installed.

Task 2: Copy the backup executable file

When the NetWorker software installation is complete, the application binary that performs the Microsoft Exchange backup must be copied to the Microsoft Exchange server.

On the Microsoft Exchange 2010 client machine:

1. Download and save the **nsr_exchange2010.exe** from either of the following locations:
 - http://powerlink.emc.com/km/live1/en_US/Offering_Technical/Technical_Documentation/nsr_exchange2010.exe
 - <ftp.legato.com/pub/NetWorker/Updates/Exchange2010>

Note: On the ftp.legato.com site, login as anonymous.

2. Copy the **nsr_exchange2010.exe** file to the NetWorker software bin directory. For example:
C:\Program Files\Legato\nsr\bin

Note: If version 1.0 of the nsr_exchange2010.exe binary is already present in the bin directory, rename the nsr_exchange2010.exe binary before copying the downloaded binary.

Task 3: Ensure that the Microsoft Exchange 2010 client has been configured on the NetWorker server

The *NetWorker 7.5 Administration Guide* provides detailed instructions on how configure backup clients.

Task 4: Customize the Save set field

You can customize the entries in the client **Save set** field:

- [How to configure a backup of all of the databases on page 7](#)
- [How to configure a backup per individual databases on page 7](#)
- [How to configure a backup per volumes on page 8](#)

How to configure a backup of all of the databases

To customize the client **Save set** field:

1. Right-click the Microsoft Exchange 2010 client in the NMC window.
2. Select **Properties**.
3. In the **Save set** field, specify:

APPLICATIONS: \Microsoft Exchange 2010

Note: While a volume snapshot operation is performed for all volumes simultaneously, the backup operation is performed sequentially. Each database is saved after the completion of the previous one.

To achieve higher performance using parallel backups, see the following sections:

- [How to configure a backup per individual databases on page 7](#)
- [How to configure a backup per volumes on page 8](#)

To achieve higher performance using parallel backups when the Microsoft Exchange LUN architecture as been configured, refer to the Microsoft Best Practices available at:

<http://technet.microsoft.com/en-us/library/ee832794.aspx>

How to configure a backup per individual databases

Note: Individual databases on Windows 2008 R2 can only be backed up. This is not supported on Windows 2008 SP2.

In this configuration:

- Each database including its log files is treated separately without impact on other parallel sessions.
- A backup failure on one database does not impact backups of other parallel databases.
- Transaction logs are truncated for all successful backups and skipped for failed ones.

To customize the **Client save set** field:

1. Right-click the Microsoft Exchange 2010 client in the NMC window and then select **Properties**.

2. In the **Save set** field specify:

APPLICATIONS:\Microsoft Exchange 2010\database_name

Where *database_name* specifies the database to be backed up on the Microsoft Exchange server.

The volume snapshot is performed for the volume where the database and the log files reside. The backup operation is performed for specified databases only.

3. To perform parallel backups, list multiple save sets in the Client resource. For example:

APPLICATIONS:\Microsoft Exchange 2010\DB-Store-01

APPLICATIONS:\Microsoft Exchange 2010\DB-Store-02

APPLICATIONS:\Microsoft Exchange 2010\DB-Store-03

4. Select **Globals (1 of 2)**. By default, clients are configured with a parallelism value of 4. This allows a maximum of 4 simultaneous savestreams to be backed up at once.

a. If multiple databases reside on the same volume/LUN set the **parallelism** value to 1.

b. If multiple databases do not reside on the same volume/LUN, set the **parallelism** value to suit your backup environment. If greater than 4 simultaneous save streams are required, refer to the *NetWorker Performance Optimization Planning Guide*. This guide describes how to tune the client parallelism values to suit the backup environment.

Note: If the Microsoft Exchange 2010 client is also an Avamar client, the maximum supported parallelism is 4.

How to configure a backup per volumes

Note: You can only backup volumes on Windows 2008 R2. This is not supported on Windows 2008 SP2.

In this configuration:

- Each volume that hosts a database is treated separately without impact on other parallel sessions.
- Only volumes that host a database should be entered as save sets. Volumes that host database log files are automatically discovered and are included.
- Backup failure on one database does not impact backups of other parallel databases.
- Transaction logs are truncated for all successful backups and skipped for failed ones.

To customize the **Client save set** field:

1. Right-click the Microsoft Exchange 2010 client in the NMC window and then select **Properties**.

2. In the **Save set** field specify:

APPLICATIONS:\Microsoft Exchange 2010\volume:

Where *volume* specifies the volume on the Microsoft Exchange server with the Microsoft Exchange databases that are to be backed up.

If the Microsoft Exchange log files reside on a separate volume, the volume snapshot is performed simultaneously for the specified volume and all of the dependent volumes. The backup operation, however, is sequential. Each database on each specified volume is saved after the completion of the previous one.

3. To perform parallel volume backups, list multiple volumes in the **Save set** field in the client resource. This allows one database on each volume to be backed up at the same time as one database on the other defined volumes.

For example:

APPLICATIONS:\Microsoft Exchange 2010\D:

APPLICATIONS:\Microsoft Exchange 2010\E:

APPLICATIONS:\Microsoft Exchange 2010\F:

4. Select **Globals (1 of 2)**. By default, clients are configured with a parallelism value of 4. This allows a maximum of 4 simultaneous save streams to be backed up at once.
 - a. If the database and transaction log files are cross hosted on volumes, set the **parallelism** value to 1.
 - b. If the database and transaction log files are not cross hosted on the volumes, set the **parallelism** value to suit your backup environment. If greater than 4 simultaneous save streams are required, refer to the *NetWorker Performance Optimization Planning Guide*. This guide describes how to tune the client parallelism values to suit the backup environment.

Note: If the Microsoft Exchange 2010 client is also an Avamar client, the maximum supported parallelism is 4.

Task 5: Customize the Backup command field

By default, the backup of all healthy and mounted databases on the system are attempted regardless of their ownership. In the case of replicated systems, this includes both active and passive replicated databases. Although not considered a best practice, if a volume or LUN contains both active and passive databases and log files, only one database type and its log files which are determined by the OS, will be saved. If the active database and the log files reside on a different volume or LUN, then the passive database and the log files, both active and passive databases, as well as the associated log files, are backed up.

Note: If a volume contains both active and passive databases for both the database and the log file locations on Windows 2008 SP2, only one database which is determined by the OS, will be saved. Backups cannot be configured to control the active or the passive database.

Optional switches

To customize the backup command of the client:

1. Click **Apps and Modules**.
2. In the **Backup Command** field, specify the following: **nsr_exchange2010 <optional switches>**

[Table 1: Windows 2008 R2 Optional Switches](#) and [Table 2: Windows 2008 R2 Additional Optional Switches](#) provides details on the optional switches.

3. Click **Ok**.

This table lists additional switches for the **nsr_exchange2010 backup** command:

Switch	Definition/ Usage
-v	Verbose mode level 1. Increases the reporting verbosity and includes status messages for each backup step.
-vv	Verbose mode level 2. Increases reporting verbosity and includes detailed job output and temporary file content.
-vvv	Verbose mode level 3. Enables maximum reporting verbosity and includes the following information: <ul style="list-style-type: none"> • Detailed Microsoft Exchange 2010 server and database status for all of the servers within the site. • Includes Microsoft Windows VSS writer status for all of the writers available on the system. • Performs the save operation in verbose mode. This flag can result in a very large output and should be used for diagnostic purposes only.
-nocheck	Skip Microsoft Exchange 2010 database consistency checks prior to the backup. This option is not enabled by default. To disable the Microsoft Exchange 2010 database consistency checks, ensure that the Enable 24x7 ESE Database Scan (Background Database Maintenance) attribute for Public and Mailbox Databases in Microsoft Exchange has been enabled. This option is enabled by default. Note: Skipping explicit database consistency checks during a backup operation increases the backup performance and also reduces the system load during the backup.
-rdb	Recovery Database Include Microsoft Exchange recovery databases in the selection process. By default, recovery databases are skipped.
-p	Pretend No snapshot or backup operations are invoked. Note: Used only for debugging purposes.

Table 1: Optional Switches

Windows 2008 R2 additional optional switches

This table lists the additional switches that are only available for Windows 2008 R2:

Switch	Definition/ Usage
-passive	Applies to DAG configurations only. Skip active databases when performing selection process. By default, active databases are included.
-active	Applies to DAG configurations only. Skip passive databases copies when performing selection process. By default, databases copies are included.

Table 2: Windows 2008 R2 Additional Optional Switches

To control whether the active or the passive databases that are present on the system will be saved, specify either of the following switches:

- -active (no passive databases)
- -passive (no active database)

Note: All of the databases and the log files will be backed up if the:

- Active and passive databases and the log files are on separate volumes or LUNs.
- –active switch or the –passive switch is not used.

If both active and passive database backups are required:

1. Create one instance of the client with the –active switch.
2. Create another instance of the client with the –passive switch.

Note: Passive copy can be behind in time compared to production, by design in the case of lagged copy configuration, due to suspended replication, or due to slow network.

To determine the amount of time the passive database copy is behind the active database instance:

1. Run following command from the **Exchange Management Shell**:
Get-MailboxDatabaseCopyStatus -ConnectionStatus | Format-List
2. For each database, inspect the **LastCopiedLogTime** property. The **LastCopiedLogTime** property is only populated for passive copies.

Task 6: Select the backup level

The backup level is determined by the level of the NetWorker client or group. The backup level can be defined explicitly or through the schedule. No special configuration is required.

Backup levels:

- Full backup – A full backup consists of a full Microsoft Exchange database backup, a checkpoint file backup, and a backup of all of the present transaction logs. The backup is followed by a request to purge the transaction logs.
- Incremental backup – An incremental backup consists of only a Microsoft Exchange 2010 transaction log backup which is followed by request for a transaction log purge.
- Skip – The backup is skipped.
- * – All other backup levels (1-7) result in a full backup operation.

Incremental Backups

The following facts apply to incremental backups:

- If the Microsoft Exchange circular logging attribute is enabled, the backup level is upgraded from an incremental backup to a full backup and a warning is printed.
- Each backup operation creates a checkpoint file in the same location and name as the Microsoft Exchange checkpoint file. However, the .nsr extension is added. This checkpoint file logs the backup times and it also provides transaction log tracing. The checkpoint file is analyzed when the backup begins and is compared to the current system state to determine if an incremental backup can be safely performed. If the NetWorker backup checkpoint file is not found on the client, the backup level is upgraded from an incremental backup to a full backup and a warning is printed.

- A request for an incremental backup checks the logged state of the last successful full backup, last incremental backup (if any), and also checks for the presence of all of the required transaction logs since then. If any of the required transaction logs are missing, a warning is printed and the backup level is upgraded from an incremental backup to a full backup.
- Exchange 2010 Server uses fixed-size 1 MB transaction logs, so any new mail items that are not yet flushed to disk are not included in incremental backup.

Note: Since standard Microsoft Exchange rules apply for transaction log truncation, some overlapping transaction logs might be found in multiple backup sets. This occurs because Microsoft Exchange does not truncate all of the logs immediately after the backup.

Backup dependencies

Consider the following backup dependencies:

- Standard NetWorker backup dependency rules apply to Microsoft Exchange 2010 backups. For example, if a full backup that is required by a later incremental backup is beyond its retention policy, the volume will not become recyclable until all of the dependent incremental backups expire.
- Per-database backup configuration is required for dependency tracking. If not, multiple database backups will have the same name in the NetWorker media database which will interfere with the checks that the NetWorker server performs.

Task 7: Consider Transaction Log truncation

The Microsoft Exchange application performs the actual truncation operation which is separate from the backup process. The backup process only notifies the Microsoft Exchange Replication service that the logs should be truncated.

When transaction logs are truncated, consider the following:

For standalone databases:

- In order for truncation to occur, the backup must successfully complete.
- Truncation will occur only to transaction loads that are no longer required.
- Logs that are internally required by the currently running instances will not be truncated.

For DAG replicated configurations:

- Log truncation will be delayed until all of the necessary log files are replayed into all of the other copies.
- The Replication service will delete the backed up log files from both the active and the copy log file paths. This occurs after it verifies that the log files that are to be deleted have been successfully applied to the copy database.

IMPORTANT: It is recommended to perform the backup from the copy, not from the active database. If a backup is performed on the active database, the Microsoft Exchange Replication service might not be able to verify the pending log shipment requirements and might skip the log truncation. This is a limitation of Microsoft Exchange 2010. <http://technet.microsoft.com/en-us/library/dd335087.aspx> provides more information.

Task 8: Monitor the backup

Each backup can be monitored from the NetWorker Management Console (NMC).

Note: Selecting the save group completion details in NMC often does not display all of the data because the number of text lines allowed in the NMC group details is limited (savegroup suppression). This will limit the output details when backups are run with the verbose option.

The save set-specific logs are stored on the NetWorker backup server in:

```
nsr\ntp\sg\<savegroup_name>\*
```

All successful backups are logged in client's **Windows Application Event Log** window.

Restoring Microsoft Exchange 2010 data with NetWorker

When restoring from a Microsoft Exchange 2010 backup, you can use the NetWorker User program to mark multiple databases and log files for restore. However, the multiple databases and log files will be recovered sequentially.

To recover multiple databases in parallel, open multiple instances of the NetWorker User program and mark a different database and its log files for recovery in each instance. The following procedure outlines the steps to recover multiple databases in the same NetWorker User instance (sequential restore).

This section outlines how to perform a browseable recovery and includes the following sections:

- [Overview on page 13](#)
- [How to recover a single mailbox on page 14](#)
- [How to perform a standalone server recovery \(overwrite the original database\) on page 20](#)
- [How to perform a DAG recovery \(overwrite the original database\) on page 25](#)

Overview

Currently, the only method to restore an Exchange 2010 backup is through a browseable restore. Save set recoveries are *not* supported.

When performing a browseable restore, the edb, log and chk directories are all contained in a directory in the NetWorker User Recover window prefixed with the following:

Exchange_Snap_<date>-<time>-<pid>

For example, a database residing on the G volume backed up on April 7, 2010 appears as a folder named:

Exchange_Snap_07042010-0632-0486

When performing a save set or browseable restore, the files must be recovered using the Relocation option to either:

- Restore to the original file location – The original database must be first unmounted to allow it to be overwritten.
- Restore to a new location – Can be used as a newly created database or accessed as a Microsoft Exchange Recovery Database (RDB) for the purpose of mailbox recovery.

Note: Restoring a public folder database using RDB is not supported. <http://technet.microsoft.com/en-us/library/ee332351.aspx> provides details on how to use RDB.

How to recover a single mailbox

To recover a single mailbox, perform these tasks:

- [Task 1: Use the NetWorker User program to restore the database on page 14](#)
- [Task 2: Perform a point-in-time or an incremental restore on page 14](#)
- [Task 3: Extract the mailbox from the database on page 17](#)

Task 1: Use the NetWorker User program to restore the database

To restore the database:

1. Login to the Microsoft Exchange server with an account that has Organization Management rights in Microsoft Exchange 2010.

Note: By default, the account that installed Microsoft Exchange 2010 is given Organization Management rights. <http://technet.microsoft.com/en-us/library/dd335087.aspx> provides more information.

2. Open the **NetWorker User** program on the Microsoft Exchange 2010 server:
3. Connect to the appropriate NetWorker server.
4. Click **Recover**.
5. Select the source client which is the Microsoft Exchange 2010 server and then click **Ok**.
6. Select the destination client which is the Microsoft Exchange 2010 server and then click **Ok**.
7. From the **Options** menu, select **Recover Options**.
8. In the **Relocate recovered data to** field:
 - a. Type the original directory of the Microsoft Exchange 2010.
 - b. If required, select **Browse** to navigate to the folder.

Task 2: Perform a point-in-time or an incremental restore

This section explains how to:

- [Restore from full backup on page 15](#)
- [Restore from Incremental backups on page 16](#)
- [Restore additional transaction log backups on page 17](#)
- [Restore from the last full backup on page 17](#)

When restoring data from the NetWorker User program, by default, the last backup instances of the databases and logs are shown:

- If a point-in-time restore operation, or a restore from an incremental backup is required, the browse time must be changed to mark the previous backup version.
- If a point-in-time, or an incremental restore is required, refer to the following sections which outline how to restore the full database (including associated transaction log files) and the subsequent incremental transaction log file backups:
 - [Restore from incremental backups on page 16](#)
 - [Restore additional transaction log backups on page 17](#)
- If the restore is from the last full backup, refer to the section [Restore from the last full backup on page 17](#) which outlines how to restore the full database (including associated transaction log files) backup.

Restore from a full backup

1. In the directory tree window, select the directory directly above the database backup.

For example a database residing on the G volume backed up on April 7, 2010 appears as a folder named: G:\db\Exchange_Snap_07042010-0632-0486.

The G:\db folder would be selected (not marked).

2. From the **View** menu:
 - a. Select **Versions**.
 - b. Select the required version.
3. Click **Change Browse Time**.
4. In the directory tree window:
 - a. Navigate to the backup directory.
 - b. Mark the backup directory.

For example if the database backup resides on G:\db\ Exchange_Snap_<date>-<time>-<pid>, mark G:\db\ Exchange_Snap_<date>-<time>-<pid>\

Note: If the logs files for this database reside on the same volume, marking the Exchange_Snap_<date>-<time>-<pid> directory will also mark the log files.

5. If the logs files for this database reside on a different volume:
 - a. Navigate to the volume in the directory tree that contains the log file backup.
 - b. Mark the directory. Log backups are also prefixed with Exchange_Snap_<date>-<time>-<pid>.

For example a log file residing on volume D backed up on April 7, 2010 appears as a folder named D:\logs\Exchange_Snap_07042010-0632-0487 and this folder would be marked for restore.
6. Click **Recover**.

Restore from incremental backups

When restoring from an incremental backup, ensure that the database and its corresponding log file backup has completed and then restore the additional transaction log files that were saved after the full backup was performed.

To restore from an incremental backup:

1. Close the **Restore Status** window and then click **Recover**.
2. Select the Source client which is the Microsoft Exchange 2010 server and then click **Ok**.
3. Select the Destination client which is the Microsoft Exchange 2010 server and then click **Ok**.
4. From the **Options** menu, select **Recover Options**.
5. In the **Relocate recovered data to** field:
 - a. Type the original Microsoft Exchange 2010 directory.
 - b. If required, select **Browse** to navigate to the folder.
6. In the directory tree window, select the directory directly above the transaction log backup.
For example, if the transaction log backup resides on D:\logs\ Exchange_Snap_<date>-<time>-<pid>, select (do not mark) G:\logs.
7. From the **View** menu:
 - a. Select **Versions**.
 - b. Select the required version.
8. Click **Change Browse Time**.
9. In the directory tree window:
 - a. Navigate to the backup directory.
 - b. Mark the backup directory.
10. Click **Recover**.

IMPORTANT: When restoring from an incremental backup, ensure that all of the incremental backups are restored from the full backup that you are restoring from, up to and including the last required transaction log file backup. Any gap in the transaction log sequence will stop the recovery at the point of the highest uninterrupted log sequence.

11. Close the **NetWorker User** window when all restores have completed.

IMPORTANT: Once the recovery operation of the incremental backup begins, do not mount the database until all of the logs and the databases have been recovered from the full and incremental backups that you are restoring from. Attempting a parallel operation on a database while a recovery operation is in progress might result in a -515 error. The database will need to be restored again, recovered, and then restarted.

Restore additional transaction log backups

To restore additional transaction log backups:

1. Repeat the steps outlined in [Restore from Incremental backups on page 16](#).
2. Close the **NetWorker User** window when all restores have completed.

Note: When multiple incremental transaction log backups are restored, the restore session might detect that a log file being restored, already exists. This might occur if some of the transaction logs were not purged immediately after the backup and as a result exist in multiple incremental backup sets. If this occurs, the duplicates can be disregarded. Multiple copies of the transaction logs are only included for safety purposes.

Restore from the last full backup

To restore from the last full backup:

1. Navigate to the volume where the database which is backed up resides. Database backups are prefixed with Exchange_Snap_<date>-<time>-<pid>.

For example a log file residing on volume G backed up on April 7, 2010 appears as a folder named G:\db\Exchange_Snap_07042010-0632-0486

2. Mark this folder which in turn marks all of the subfolders.
3. Navigate to the volume where the transaction log files for the database reside.

Log backups are prefixed with Exchange_Snap_<date>-<time>-<pid>. For example a log file residing on volume D backed up on April 7, 2010 appears as a folder named:

Exchange_Snap_07042010-0632-0487

4. Mark this folder which in turn marks all of the subfolders.
5. Click **Recover**.
6. Close the **NetWorker User** window when the recovery is complete.

Task 3: Extract the mailbox from the database

To extract the mailbox from the database:

1. Ensure that all required transaction logs have been restored using the NetWorker software. Any gap in the transaction log sequence will stop the recovery at the point of the highest uninterrupted log sequence.

From a command prompt, navigate to the directory that contains the recovered **edb** file. For example:

G:\recovery_edb

IMPORTANT: *Once the **eseutil** program has completed, you cannot playback the transaction logs.*

2. To automatically play back all of the available transaction logs found in log directory, apply the restored Exchange transaction logs and put the recovered database in a clean shutdown state:

```
eseutil /R Exx /I /L <full path to log directory in restore folder> /D
```

For example:

```
G:\RDB\db>eseutil /R E00 /I /L "G:\recovery_logs" /D
```

You can recover to a specific point in time by limiting the available transaction logs sequence.

Note: If the process fails with a -1216 error:

1. Perform an **eseutil /P** to repair the database.
 2. Put the database into a consistent state.
 3. Retry the clean shutdown.
-

IMPORTANT: Once started, do not interrupt the **eseutil** process or start other operations on the database. Attempting a parallel operation on a database while a recovery is in progress might result in a -515 error. The database will need to be restored again, recovered, and then restarted.

3. Confirm that the state of the database is "clean shutdown":

```
eseutil /mh <filename.edb>
```

Where <filename.edb> is the name of the restored edb file.

For example:

```
G:\RDB\db>eseutil /mh "Mailbox Database 0829899187.edb"
```

4. Open up the Microsoft Exchange Management shell.
5. Run the following command to create a Recovery Database:

```
New-MailboxDatabase -Recovery -Name <RestoreDB> -Server <ServerName> -EdbFilePath <path to edbfile.edb> -LogFolderPath <path to folder with logfiles>
```

Where:

- <path to edbfile.edb> is the path to the directory that contains the database edb file.
- <path to folder with logfiles> is the path to the folder where the restore was relocated to.
- <RestoreDB> is a user defined name for the new restore database.

For example:

```
New-MailboxDatabase -Recovery -Name RDB -Server exch2010 -EdbFilePath "G:\recovery_edb\Mailbox Database 0829899187.edb" -LogFolderPath "G:\recovery_logs"
```

6. Mount the Recovery Database that you have just created:

```
Mount-Database -Identity <RestoreDB>
```

For example:

```
Mount-Database -Identity RDB
```

7. Allow restores to the original mailbox database:

```
Set-MailboxDatabase -AllowFileRestore:true
```

8. If the mailbox that you are restoring no longer exists, recreate a mailbox for the active directory user:

```
Enable-Mailbox -Identity <user>
```

Note: For further details on the Enable-Mailbox command, refer to the following:

<http://technet.microsoft.com/en-us/library/aa998251.aspx>

9. Recover the single mailbox from the recovery database to a target mailbox in the active mailbox database.

- To restore the entire mailbox, overwrite the target mailbox:

```
Restore-Mailbox -Identity <mailboxname> -RecoveryDatabase <RestoreDB>
```

For example:

```
Restore-Mailbox -Identity e2k10\user1 -RecoveryDatabase RDB
```

IMPORTANT: If a mailbox was recreated for this user by using the enable-mailbox command, this restore-mailbox command will fail due to a GUID mismatch.

Use this command to create a new subfolder in the user's inbox for the restore mailbox items:

```
Restore-Mailbox -Identity <mailboxname> -RecoveryDatabase RestoreDB -TargetFolder "Recovery".
```

- To restore the entire mailbox, preserve the existing content and then direct the restored data to the subfolder in the mailbox:

```
Restore-Mailbox -Identity <mailboxname> -RecoveryDatabase RestoreDB  
-TargetFolder "Recovery".
```

For example:

```
Restore-Mailbox -Identity e2k10\user1 -RecoveryDatabase RDB  
-TargetFolder "Recovery".
```

- To restore a mailbox for a user into a subfolder of a different user's mailbox:

```
Restore-Mailbox -Identity <mailboxname> -RecoverMailbox <targetmailbox>  
-RecoveryDatabase RestoreDB -TargetFolder "<subfolder_name>"
```

For example:

```
Restore-Mailbox -Identity e2k10\user1 -RecoverMailbox e2k10\user2  
-RecoveryDatabase RDB -TargetFolder "Recovery"
```

Note: <http://technet.microsoft.com/en-us/library/bb125218.aspx> provides other examples of restore-mailbox use cases and parameters.

When the advanced Restore-Mailbox filters are used to search for specific mail items, some of the most recent items might be missing from the restore. This occurs because the Microsoft Exchange 2010 server performs the indexing as a scheduled task and not in real-time. Examples of affected filters include *ContentKeywords* and *SubjectKeywords*.

10. When the restore has completed and it has been confirmed that the mailbox has restored correctly, dismount:

```
Dismount-Database -Identity <RestoreDB>
```

For example:

```
Dismount-Database -Identity RDB
```

11. Delete the Recovery Database:

```
Remove-MailboxDatabase -Identity <RestoreDB>
```

```
Remove-MailboxDatabase -Identity RDB
```

12. If required, disallow restores to the mailbox databases:

```
Set-MailboxDatabase -AllowFileRestore:false
```

13. Delete the recover directory created.

The restore operation is complete.

Note: Only use the Recovery database to restore single items in the Mailbox databases. Microsoft does not support using the Recovery database to restore Public folder databases.

How to perform a standalone server recovery (overwrite the original database)

To recover a single mailbox, perform these tasks:

- [Task 1: Perform the standalone server recovery on page 20](#)
- [Task 2: Perform a point-in-time or an incremental restore on page 21](#)
- [Task 3: Complete the restore on page 24](#)

Task 1: Perform the standalone server recovery

To perform a standalone server recovery:

1. Login to the Microsoft Exchange server with an account that has Organization Management rights in Microsoft Exchange 2010.

Note: By default, the account that installed Microsoft Exchange 2010 is given Organization Management rights. <http://technet.microsoft.com/en-us/library/dd335087.aspx> provides more information on this right.

2. Open the Microsoft Exchange Management Console:
 - a. In the console tree, navigate to **Organization Configuration > Mailbox**.
 - b. In the result pane, select **Database Management**.
 - c. Right-click the database that you will be overwriting.
 - d. Click **Properties**.

3. Under the **Maintenance** tab:
 - a. Ensure that the **This database can be overwritten by a restore** attribute has been selected and then click **Ok**.
 - b. Right-click on the database that you will be overwriting and then select **Dismount Database**.
 - c. A warning appears asking if you want to dismount the database, select **Yes**.
4. Open the **NetWorker User** program on the Microsoft Exchange 2010 server:
 - a. Connect to the appropriate NetWorker server.
 - b. Click **Recover**.
 - c. Select the Source client which is the Microsoft Exchange 2010 server and then click **Ok**.
 - d. Select the Destination client which is the Microsoft Exchange 2010 server and then click **Ok**.
 - e. From the **Options** menu, select **Recover Options**.
 - f. In the **Relocate recovered data to** field, type the original directory of the Microsoft Exchange 2010. If required, select **Browse** to navigate to the folder.

Task 2: Perform a point-in-time or an incremental restore

This section explains how to:

- [Restore from a full backup on page 21](#)
- [Restore from an incremental backups on page 22](#)
- [Restore additional transaction log backups on page 23](#)
- [Restore from last full backup on page 23](#)

When restoring data from the NetWorker User program, by default, the last backup instances of the databases and logs are shown:

- If a point-in-time restore operation, or a restore from an incremental backup is required, the browse time must be changed to mark the previous backup version.
- If a point-in-time, or an incremental restore is required, refer to the following sections which outline how to restore the full database (including associated transaction log files) and the subsequent incremental transaction log file backups:
 - [Restore from an incremental backups on page 22](#)
 - [Restore additional transaction log backups on page 23](#)
- If the restore is from the last full backup, refer to the section [Restore from last full backup on page 23](#) which outlines how to restore the full database (including associated transaction log files) backup.

Restore from a full backup

1. In the directory tree window, select the directory directly above the database backup.
For example a database residing on the G volume backed up on April 7, 2010 appears as a folder named: G:\db\Exchange_Snap_07042010-0632-0486.
The G:\db folder would be selected (not marked).
2. From the **View** menu:
 - a. Select **Versions**.
 - b. Select the required version.
3. Click **Change Browse Time**.
4. In the directory tree window:
 - a. Navigate to the backup directory.
 - b. Mark the backup directory.

For example if the database backup resides on G:\db\ Exchange_Snap_<date>-<time>-<pid>, mark G:\db\ Exchange_Snap_<date>-<time>-<pid>

Note: If the logs files for this database reside on the same volume, marking the Exchange_Snap_<date>-<time>-<pid> directory will also mark the log files.

5. If the logs files for this database reside on a different volume:
 - a. Navigate to the volume in the directory tree that contains the log file backup.
 - b. Mark the directory. Log backups are also prefixed with Exchange_Snap_<date>-<time>-<pid>.
For example a log file residing on volume D backed up on April 7, 2010 appears as a folder named D:\logs\Exchange_Snap_07042010-0632-0487 and this folder would be marked for restore.
6. Click **Recover**.

Restore from an incremental backups

When restoring from an incremental backup, ensure that the database and its corresponding log file backup has completed and then restore the additional transaction log files that were saved after the full backup was performed.

To restore from an incremental backup:

1. Close the **Restore Status** window and then click **Recover**.
2. Select the Source client which is the Microsoft Exchange 2010 server and then click **Ok**.
3. Select the Destination client which is the Microsoft Exchange 2010 server and then click **Ok**.
4. From the **Options** menu, select **Recover Options**.
5. In the **Relocate recovered data to** field:
 - a. Type the original Microsoft Exchange 2010 directory.
 - b. If required, select **Browse** to navigate to the folder.

-
6. In the directory tree window, select the directory directly above the transaction log backup.
For example, if the transaction log backup resides on D:\logs\Exchange_Snap_<date>-<time>-<pid>, select (do not mark) G:\logs.
 7. From the **View** menu:
 - a. Select **Versions**.
 - b. Select the required version.
 8. Click **Change Browse Time**.
 9. In the directory tree window:
 - a. Navigate to the transaction log backup directory.
 - b. Mark the transaction log backup directory.
 10. Click **Recover**.

IMPORTANT: When restoring from an incremental backup, ensure that all of the incremental backups are restored from the full backup that you are restoring from, up to and including the last desired transaction log file backup. Any gap in the transaction log sequence will stop the recovery at the point of the highest uninterrupted log sequence.

Restore additional transaction log backups

1. To restore additional transaction log backups, repeat the steps outlined in [Restore from an incremental backups on page 22](#).
2. Close the **NetWorker User** window when all restores have completed.

Note: When multiple incremental transaction log backups are restored, the restore session might detect that a log file being restored, already exists. This might occur if some of the transaction logs were not purged immediately after the backup and as a result exist in multiple incremental backup sets. If this occurs, the duplicates can be disregarded. Multiple copies of the transaction logs are only included for safety purposes.

Restore from last full backup

To restore from the last full backup:

1. Navigate to the volume where the database which is backed up resides. Database backups are prefixed with Exchange_Snap_<date>-<time>-<pid>.
For example a log file residing on volume G backed up on April 7, 2010 appears as a folder named G:\db\Exchange_Snap_07042010-0632-0486
2. Mark this folder which in turn marks all of the subfolders.
3. Navigate to the volume where the transaction log files for the database reside. Log backups are prefixed with Exchange_Snap_<date>-<time>-<pid>.
For example a log file residing on volume D backed up on April 7, 2010 appears as a folder named Exchange_Snap_07042010-0632-0487
4. Mark this folder which in turn marks all of the subfolders.

5. Click **Recover**.
6. Close the **NetWorker User** window when the recovery is complete.

Task 3: Complete the restore

To complete the restore:

1. From a command prompt, navigate to the directory that contains the recovered **edb** file. For example: G:\recovery_edb.

IMPORTANT: Once the **eseutil** program has completed, you cannot playback the transaction logs.

2. To automatically play back all of the available transaction logs found in log directory, apply the restored Microsoft Exchange transaction logs and put the recovered database in a clean shutdown state:

```
eseutil /R Exx /I /L <full path to log directory in restore folder> /D
```

For example:

```
G:\RDB\db>eseutil /R E00 /I /L "G:\recovery_logs" /D
```

You can recover to a specific point in time by limiting the available transaction logs sequence.

Note: If the process fails with a -1216 error:

1. Perform an **eseutil /P** to repair the database.
2. Put the database into a consistent state.
3. Retry the clean shutdown.

Note: Once started, do not interrupt the **eseutil** process or start other operations on the database. Attempting a parallel operation on a database while a recovery is in progress might result in a -515 error. The database will need to be restored again, recovered, and then restarted.

3. From a command prompt:
 - a. Navigate to the directory that contains the **edb** file for the recovered database.
 - b. Run the following command to confirm that the state is "clean shutdown":

```
eseutil /mh <filename.edb>
```

Where <filename.edb> is the actual name of the restored edb file.

For example:

```
eseutil /mh "Mailbox Database 0829899187.edb"
```

4. In the Microsoft Exchange Management Console:
 - a. Right-click on the database.
 - b. Select **Mount Database**.

The restore operation is complete.

How to perform a DAG recovery (overwrite the original database)

To perform a DAG recover (overwrite the original database), perform these tasks:

- [Task 1: Perform the recovery from the DAG active copy on page 25](#)
- [Task 2: Perform a point-in-time or an incremental restore on page 26](#)
- [Task 3: Complete the restore on page 29](#)

Task 1: Perform the recovery from the DAG active copy

To perform a DAG recovery:

1. Perform the recovery from the DAG active copy. If required, failover the passive copy to the active copy.

Note: In the DAG setup, you can only recover to the active copy. Recovery is not possible for passive copies.

2. Login to the Microsoft Exchange server where the DAG mailbox active copies reside. Use an account that has **Organization Management** rights in Microsoft Exchange 2010.

Note: By default, the account that installed Microsoft Exchange 2010 is given Organization Management rights. <http://technet.microsoft.com/en-us/library/dd335087.aspx> provides more information.

3. Open the Microsoft Exchange Management Console.
 - a. In the console tree, navigate to **Organization Configuration > Mailbox**.
 - b. In the result pane, select the **Database Management** tab.
 - c. Right-click the database that you will be overwriting.
 - d. Click **Properties**.
4. Under the **Maintenance** tab:
 - a. Ensure that the **This database can be overwritten by a restore** attribute has been selected.
 - b. Click **Ok**.

5. In the Microsoft Exchange command shell, use the following command to stop replication to the passive copy:

```
Suspend-MailboxDatabaseCopy
```

For example:

```
Suspend-MailboxDatabaseCopy -Identity DB1\MBX3 -SuspendComment "Maintenance on EXMBX3" -Confirm:$false
```

6. Right-click on the database that you will be overwriting and then select **Dismount Database**.
7. A warning appears asking if you want to dismount the database, click **Yes**.

8. Open the **NetWorker User** program on the Microsoft Exchange 2010 server:
 - a. Connect to the appropriate NetWorker server.
 - b. Click **Recover**.
 - c. Select the source client which is the Microsoft Exchange 2010 server and then click **Ok**.
 - d. Select the destination client which is the Microsoft Exchange 2010 server and then click **Ok**.
 - e. From the **Options** menu, select **Recover Options**.
 - f. In the **Relocate recovered data to** field, type the original directory of the Microsoft Exchange 2010. If required, select **Browse** to navigate to the folder.

Task 2: Perform a point-in-time or an incremental restore

This section explains how to:

- [Restore from a full backup on page 26](#)
- [Restore from incremental backups on page 27](#)
- [Restore additional transaction log backups on page 28](#)
- [Restore from the last full backup on page 28](#)

When restoring data from the NetWorker User program, by default, the last backup instances of the databases and logs are shown:

- If a point-in-time restore operation, or a restore from an incremental backup is required, the browse time must be changed to mark the previous backup version.
- If a point-in-time, or an incremental restore is required, refer to the following sections which outline how to restore the full database (including associated transaction log files) and the subsequent incremental transaction log file backups:
 - [Restore from incremental backups on page 27](#)
 - [Restore additional transaction log backups on page 28](#)
- If the restore is from the last full backup, refer to the section [Restore from the last full backup on page 28](#) which outlines how to restore the full database (including associated transaction log files) backup.

Restore from a full backup

To restore from a full backup:

1. In the directory tree window, select the directory directly above the database backup.

For example a database residing on the G volume backed up on April 7, 2010 appears as a folder named: G:\db\Exchange_Snap_07042010-0632-0486.

The G:\db folder would be selected (not marked).
2. From the **View** menu:
 - a. Select **Versions**.
 - b. Select the required version.

3. Click **Change Browse Time**.
4. In the directory tree window:
 - a. Navigate to the backup directory.
 - b. Mark the backup directory.

For example if the database backup resides on G:\db\ Exchange_Snap_<date>-<time>-<pid>, mark G:\db\ Exchange_Snap_<date>-<time>-<pid>\

Note: If the logs files for this database reside on the same volume, marking the Exchange_Snap_<date>-<time>-<pid> directory will also mark the log files.

5. If the logs files for this database reside on a different volume:
 - a. Navigate to the volume in the directory tree that contains the log file backup.
 - b. Mark the directory. Log backups are also prefixed with Exchange_Snap_<date>-<time>-<pid>.
For example a log file residing on volume D backed up on April 7, 2010 appears as a folder named D:\logs\Exchange_Snap_07042010-0632-0487 and this folder would be marked for restore.
6. Click **Recover**.

Restore from incremental backups

When restoring from an incremental backup, ensure that the database and its corresponding log file backup has completed and then restore the additional transaction log files that were saved after the full backup was performed.

To restore from an incremental backup:

1. Close the **Restore Status** window and then click **Recover**.
2. Select the Source client which is the Microsoft Exchange 2010 server and then click **Ok**.
3. Select the Destination client which is the Microsoft Exchange 2010 server and then click **Ok**.
4. From the **Options** menu, select **Recover Options**.
5. In the **Relocate recovered data to** field:
 - a. Type the original Microsoft Exchange 2010 directory.
 - b. If required, select **Browse** to navigate to the folder.
6. In the directory tree window, select the directory directly above the transaction log backup.
For example, if the transaction log backup resides on D:\logs\ Exchange_Snap_<date>-<time>-<pid>, select (do not mark) G:\logs.
7. From the **View** menu:
 - a. Select **Versions**.
 - b. Select the required version.
8. Click **Change Browse Time**.

9. In the directory tree window:
 - a. Navigate to the transaction log backup directory.
 - b. Mark the directory.
10. Click **Recover**.

IMPORTANT: *When restoring from an incremental backup, ensure that all of the incremental backups are restored from the full backup that you are restoring from, up to and including the last desired transaction log file backup. Any gap in the transaction log sequence will stop the recovery at the point of the highest uninterrupted log sequence.*

Restore additional transaction log backups

1. To restore additional transaction log backups, repeat the steps outlined in [Restore from incremental backups on page 27](#).
2. Close the **NetWorker User** window when all restores have completed.

Note: When multiple incremental transaction log backups are restored, the restore session might detect that a log file being restored, already exists. This might occur if some of the transaction logs were not purged immediately after the backup and as a result exist in multiple incremental backup sets. If this occurs, the duplicates can be disregarded. Multiple copies of the transaction logs are only included for safety purposes.

Restore from the last full backup

To restore from the last full backup:

1. Navigate to the volume where the database which is backed up resides.
Database backups are prefixed with Exchange_Snap_<date>-<time>-<pid>.
For example a log file residing on volume G backed up on April 7, 2010 appears as a folder named G:\db\Exchange_Snap_07042010-0632-0486
2. Mark this folder which in turn marks all of the subfolders.
3. Navigate to the volume where the transaction log files for the database reside.
Log backups are prefixed with Exchange_Snap_<date>-<time>-<pid>.
For example a log file residing on volume D backed up on April 7, 2010 appears as a folder named Exchange_Snap_07042010-0632-0487
4. Mark this folder which in turn marks all of the subfolders.
5. Click **Recover**.
6. Close the **NetWorker User** window when the recovery is complete.

Task 3: Complete the restore

To complete the restore:

1. Open the Microsoft Exchange server where the active mailbox database copies reside.
2. From a command prompt, navigate to the directory that contains the recovered **edb** file.

For example:

```
G:\recovery_edb
```

3. To automatically play back all of the available transaction logs found in log directory, apply the restored Microsoft Exchange transaction logs and put the recovered database in a clean shutdown state:

```
eseutil /R E00 /I /L <full path to log directory in restore folder> /D
```

For example:

```
G:\RDB\db>eseutil /R E00 /I /L "G:\recovery_logs" /D
```

You can recover to specific point in time by limiting the available transaction logs sequence.

Note: If the process fails with a -1216 error:

1. Perform an **eseutil /P** to repair the database.
2. Put the database into a consistent state.
3. Retry the clean shutdown.

Note: Once started, do not interrupt the **eseutil** process or start other operations on the database. Attempting a parallel operation on a database while a recovery is in progress will result in a -515 error. The database will need to be restored again, recovered, and then restarted.

4. From a command prompt:
 - a. Navigate to the directory that contains the edb file for the recovered database.
 - b. Run the following command to confirm that the state is "clean shutdown":

```
eseutil /mh <filename.edb>
```

Where <filename.edb> is the actual name of the restored edb file.

For example:

```
G:\RDB\db>eseutil /mh "Mailbox Database 0829899187.edb"
```

5. In the Microsoft Exchange Management Console:
 - a. Right-click on the database.
 - b. Select **Mount Database**.
6. Open the Microsoft Exchange server where the passive copies reside.
7. Manually delete the following:
 - Log files
 - The database file for the Mailbox database

8. Open the Microsoft Exchange command shell, use the **Update-MailboxDatabaseCopy** command to reseed the passive mailbox database copies.

For example:

```
Update-MailboxDatabaseCopy -Identity DB1\MBX1 -SourceServer MBX2
```

9. Where MBX2 is the Microsoft Exchange Server where the active mailbox database copies reside.

The restore operation is complete.

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