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TECHNICAL NOTES

EMC NetWorker

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 has been developed.

This document contains the following sections:

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.*

IMPORTANT: *When Microsoft Exchange 2010 support is offered in the next major release of the 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 which 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 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 NetWorker server's savegroup completion report.

Limitations in backing up Microsoft Exchange 2010 data

This section lists the limitations in the Microsoft Exchange 2010 backup procedure:

- Only full Microsoft Exchange backups are supported. Incremental or 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.

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

- Monitoring savegroup 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\tmp\sg\<savegroup_name>*

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:

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 save streams to reduce back times. The maximum number of concurrent/parallel save streams 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 save streams, each database (edb and logs files) must reside on its own dedicated volumes/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 save streams, you can define multiple volumes in the client save set field. The maximum number of concurrent or parallel savestreams 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 with in the **backup** command:

  - –active
  - –passive

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

The *NetWorker 7.5.x Installation Guide* provides detailed instructions on how to install the NetWorker software.

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
2. Copy the **nsr_exchange2010.exe** file to the NetWorker software bin directory. For example:

   C:\Program Files\Legato\nsr\bin

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 Save set field to:

- How to configure a backup of all of the databases on page 6
- How to configure a backup per individual databases on page 7
- How to configure a backup per volumes on page 7

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: You can only backup individual databases on Windows 2008 R2; 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 dataabase 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 database 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, the *NetWorker Performance Optimization Planning Guide* describes how to tune the client parallelism values to suit the backup environment if greater than 4 simultaneous savestreams is desired.

Task 4: Customize the Save set field

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 hosting a database is treated separately without impact on other parallel sessions.
- Only volumes hosting a database should be entered as save sets. Volumes hosting 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 dependent volumes. The backup operation, however, is sequential. Each database on each specified volume is saved after 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 savestreams 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 the *NetWorker Performance Optimization Planning Guide* describes how to tune the client parallelism values to suit the backup environment if greater than 4 simultaneous savestreams is required.

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.
- If a volume contains both active and passive databases for both the database and log file locations:
  - Only one database which is determined by the OS, will be saved
  - Backups cannot be configured to control whether the active or the passive database is saved.

The procedures differ according to the operation system that is used. These sections provide details:

- Windows 2008 R2 optional on page 9
- Windows 2008 SP2 optional on page 10

Windows 2008 R2 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)

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.

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 provides details on the optional switches.
3. Click **Ok**.

Task 5: Customize the Backup command field

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

Switch	Definition/ Usage
-v	Verbose - Increase verbosity of reporting.
-vv	Very Verbose - Enable maximum verbosity of reporting to include the following information: • Microsoft Exchange 2010 server status for all servers in site. • Microsoft Exchange 2010 mailbox server status for all servers in site. • Microsoft Exchange 2010 DAG status for all replicated databases. • Microsoft Exchange 2010 mailbox database status. • Microsoft Exchange 2010 public folder database status. • Microsoft Windows VSS writer status for all writers available on the system.
-nocheck	Skip Microsoft Exchange database consistency checks prior to the backup. This option is not enabled by default.
-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.
-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: Windows 2008 R2 Optional Switches

Windows 2008 SP2 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 2: Windows 2008 SP2 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 - Increase verbosity of reporting.
-vv	Very Verbose Enable maximum verbosity of reporting to include the following information: • Microsoft Exchange 2010 server status for all servers in site. • Microsoft Exchange 2010 mailbox server status for all servers in site. • Microsoft Exchange 2010 DAG status for all replicated databases. • Microsoft Exchange 2010 mailbox database status. • Microsoft Exchange 2010 public folder database status. • Microsoft Windows VSS writer status for all writers available on the system.
-nocheck	Skip Microsoft Exchange database consistency checks prior to the backup. This option is not enabled by default.
-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 2: Windows 2008 SP2 Optional Switches

Task 6: 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.

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 log truncation. This is a limitation of Microsoft Exchange 2010. http://technet.microsoft.com/en-us/library/dd335087.aspx provides more information.*

Restoring Microsoft Exchange 2010 data with NetWorker

Backups that were performed with the nsr_exchange2010 application can be restored by using the NetWorker User program on the Microsoft Exchange 2010 server.

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

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>_<volume>

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_G

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: For details on the usage of the Microsoft Exchange recovery databases (RDB), refer to http://technet.microsoft.com/en-us/library/ee332351.aspx.

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

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:

   a. Connect to the appropriate NetWorker server and then click **Recover**.

   b. Select the Source client which is the Microsoft Exchange 2010 server and then click **Ok**.

   c. Select the Destination client which is the Microsoft Exchange 2010 server and then click **Ok**.

   d. From the **Options** menu, select **Recover Options**.

   e. 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.

3. In the **Recove**r window:

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

   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_G

   b. Mark this folder which in turn marks all of the subfolders.

   c. Click **Recover**.

   Note: Multiple databases can be marked for restore but they will be recovered sequentially.
   To recover multiple databases in parallel:
   1. Open multiple instances of NetWorker User.
   2. Mark a different database and its log files for recovery in each instance.

   d. Close the **NetWorker User** window when the recovery is complete.

Task 2: Extract the mailbox from the database

To extract the mailbox from the database:

1. From a command prompt, navigate to the directory that contains the recovered **edb** file. For example: G:\recovery_edb.
2. 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

   Note: If the clean shutdown 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.

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 to 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.

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.

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

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.
   b. Click **Ok**.

c. Right-click on the database that you will be overwriting and then select **Dismount Database**.

d. 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.

5. In the **Recove**r window:

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

      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_G

   b. Mark this folder which in turn marks all of the subfolders.

   c. Click **Recover**.

   Note: Multiple databases can be marked for restore but they will be recovered sequentially. To recover multiple databases in parallel:
   1. Open multiple instances of NetWorker User.
   2. Mark a different database and its log files for recovery in each instance.

   d. Close the **NetWorker User** window when the recovery is complete.

6. From a command prompt, navigate to the directory that contains the recovered edb file.

7. Put the recovered database in a clean shutdown state:

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

   Note: If the clean shutdown 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.

8. 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"
```

9. 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 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 and then 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.
9. In the **Recove**r window:
   a. Navigate to the volume where the database which is backed up resides. Database backups are prefixed with Exchange_Snap_<date>-<time>-<pid>_<volume>.

      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_G
   b. Mark this folder which in turn marks all of the subfolders.
   c. Click **Recover**.

   Note: Multiple databases can be marked for restore but they will be recovered sequentially. To recover multiple databases in parallel:
   1. Open multiple instances of NetWorker User.
   2. Mark a different database and its log files for recovery in each instance.

10. Close the **NetWorker User** window when the recovery is complete.
11. Open the Microsoft Exchange server where the active mailbox database copies reside.
12. From a command prompt, navigate to the directory that contains the recovered **edb** file.

    For example:

    G:\recovery_edb

13. 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

    Note: If the clean shutdown 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.

14. 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"

15. In the **Microsoft Exchange Management Console**:

    a. Right-click on the database.

    b. Select **Mount Database**.

16. Open the Microsoft Exchange server where the passive copies reside.

17. Manually delete the following:

    - Log files
    - The database file for the Mailbox database

18. 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

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

The restore operation is complete.