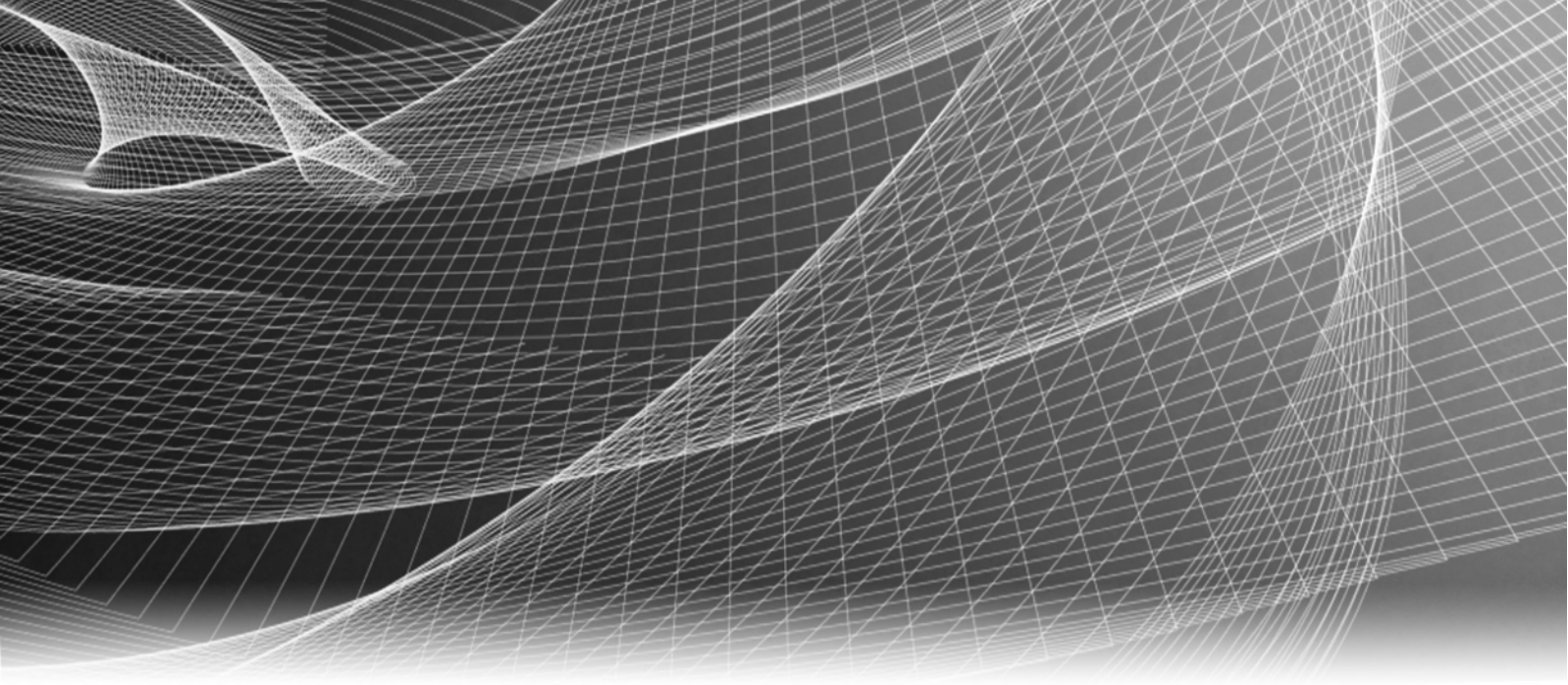


EMC® Avamar® 7.0 for Exchange VSS

User Guide

P/N 300-015-232
REV 02

EMC²

Published November, 2013

CONTENTS

TABLES

PREFACE

As part of an effort to improve its product lines, EMC periodically releases revisions of its *As part of an effort to improve its product lines, EMC periodically releases revisions of its* *software and hardware. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features.*

Contact your EMC technical support professional if a product does not function properly or does not function as described in this document.

Note: This document was accurate at publication time. Go to EMC Online Support (https://support.emc.com) to ensure that you are using the latest version of this document.

Purpose

This guide describes how to install EMC Avamar in a Microsoft Exchange Server 2013, 2010, or 2007 environment, and how to back up and restore data by using Avamar with Microsoft Volume Shadow Copy Service (VSS) technology.

Audience

The information in this document is primarily intended for:

- System administrators who are responsible for installing software and maintaining servers and clients on a network.
- Microsoft Exchange Administrators who are responsible for backing up and maintaining Microsoft Exchange servers.

Persons using this document should have current practical experience with the following:

- Operating system shell commands on the Exchange platform. Root permission is required.
- The specific version of Microsoft Exchange currently deployed at the site.

Revision history

The following table presents the revision history of this document.

Table 1 Revision history

Revision	Date	Description
02	November 25, 2013	• Added notes in multiple locations that Active only backups will fail in federated DAGS, and to use Passive only or Preferred passive options. • Added "Exchange DAG client configuration requirements" on page 37 describing how to enable permisssions for Exchange DAG clients to communicate with clients in the network. • Added troubleshooting steps for GLR errors in "GLR browsing fails with "Backup Browse Result Empty" or "GLR Failed in Multiple Child Domains"error" on page 137. • Removed notes that incorrectly stated that multi-streaming to Data Domain is not supported. These notes appeared in backup procedures, plug-in options reference, and command-line interface options. • Updated steps in "Performing disaster recovery" on page 140 to specify to install the Exchange VSS client and run the Cluster Configuration tool if part of a cluster.
01	July 10, 2013	Initial release of Avamar 7.0.

Related documentation

The following EMC publications provide additional information:

- *EMC Avamar Administration Guide*
- *EMC Avamar for Windows Server User Guide*
- *EMC Avamar Backup Clients User Guide*
- *EMC Avamar Operational Best Practices*
- *EMC Avamar Release Notes*
- *EMC Avamar Config Checker for Microsoft Windows Technical Note*

Conventions used in this document

EMC uses the following conventions for special notices:

NOTICE

NOTICE is used to address practices not related to personal injury.

Note: A note presents information that is important, but not hazard-related.

IMPORTANT

An important notice contains information essential to software or hardware operation.

Typographical conventions

EMC uses the following type style conventions in this document:

Bold	Use for names of interface elements, such as names of windows, dialog boxes, buttons, fields, tab names, key names, and menu paths (what the user specifically selects or clicks)
Italic	Use for full titles of publications referenced in text
`Monospace`	Use for: • System output, such as an error message or script • System code • Pathnames, filenames, prompts, and syntax • Commands and options
`Monospace italic`	Use for variables.
`Monospace bold`	Use for user input.
[ ]	Square brackets enclose optional values
|	Vertical bar indicates alternate selections — the bar means “or”
{ }	Braces enclose content that the user must specify, such as x or y or z
...	Ellipses indicate nonessential information omitted from the example

Where to get help

The Avamar support page provides access to licensing information, product documentation, advisories, and downloads, as well as how-to and troubleshooting information. This information may enable you to resolve a product issue before you contact EMC Customer Support.

To access the Avamar support page:

1. Go to https://support.EMC.com/products.
2. Type a product name in the **Find a Product** box.
3. Select the product from the list that appears.
4. Click the arrow next to the **Find a Product** box.
5. (Optional) Add the product to the **My Products** list by clicking **Add to my products** in the top right corner of the **Support by Product** page.

Documentation

The Avamar product documentation provides a comprehensive set of feature overview, operational task, and technical reference information. Review the following documents in addition to product administration and user guides:

- Release notes provide an overview of new features and known limitations for a release.
- Technical notes provide technical details about specific product features, including step-by-step tasks, where necessary.
- White papers provide an in-depth technical perspective of a product or products as applied to critical business issues or requirements.

Knowledgebase

The EMC Knowledgebase contains applicable solutions that you can search for either by solution number (for example, esgxxxxxx) or by keyword.

To search the EMC Knowledgebase:

1. Click the **Search** link at the top of the page.
2. Type either the solution number or keywords in the search box.
3. (Optional) Limit the search to specific products by typing a product name in the **Scope by product** box and then selecting the product from the list that appears.
4. Select **Knowledgebase** from the **Scope by resource** list.
5. (Optional) Specify advanced options by clicking **Advanced options** and specifying values in the available fields.
6. Click the search button.

Online communities

Visit EMC Community Network at http://community.EMC.com for peer contacts, conversations, and content on product support and solutions. Interactively engage online with customers, partners and certified professionals for all EMC products.

Live chat

To engage EMC Customer Support by using live interactive chat, click Join Live Chat on the Service Center panel of the Avamar support page.

Service Requests

For in-depth help from EMC Customer Support, submit a service request by clicking Create Service Requests on the Service Center panel of the Avamar support page.

Note: To open a service request, you must have a valid support agreement. Contact your EMC sales representative for details about obtaining a valid support agreement or with questions about your account.

To review an open service request, click the Service Center link on the Service Center panel, and then click View and manage service requests.

Facilitating support

EMC recommends that you enable ConnectEMC and Email Home on all Avamar systems:

- ConnectEMC automatically generates service requests for high priority events.
- Email Home emails configuration, capacity, and general system information to EMC Customer Support.

Your comments

Your suggestions help us to continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to:

BSGDocumentation@emc.com

Please include the following information:

- Product name and version
- Document name, part number, and revision (for example, 01)
- Page numbers
- Other details that will help us address the documentation issue

CHAPTER 1
Introduction

The following topics provide an introduction to using EMC® Avamar® to back up and restore data in a Microsoft Exchange Server environment:

Architecture

You can use Avamar to back up and restore Microsoft Exchange Server data in a variety of environments.

How Avamar works in a stand-alone environment

In a stand-alone Exchange server environment, all mailbox databases, log files, and checkpoint files reside on one server.

The following figure illustrates a basic system architecture when you use Avamar to back up a stand-alone Exchange server.

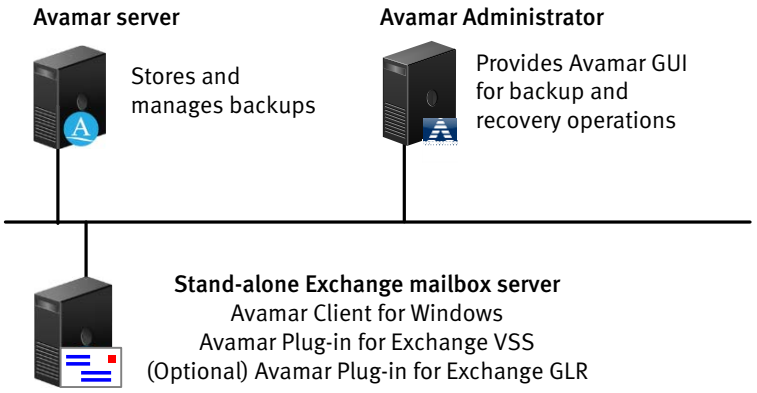


Figure 1 Stand-alone Exchange server environment with Avamar

Install the Avamar Client for Windows and the Avamar Plug-in for Exchange VSS on the Exchange server. Install the Avamar Plug-in for Exchange GLR to perform granular level recovery (GLR) of individual mailboxes, mail folders, or messages.

Avamar Client for Windows

When you install the Avamar Client for Windows, the installation includes the Avamar Plug-in for Windows File System and the Avamar agent, which is required for the Avamar Plug-in for Exchange VSS. You can use the Windows File System plug-in to back up operating system and Exchange Server binary files, which are required for disaster recovery.

Avamar Plug-in for Exchange VSS

The Exchange VSS plug-in enables you to back up and restore Exchange Server databases and storage groups.

The Exchange VSS plug-in uses Microsoft Volume Shadow Copy Service (VSS) technology to perform backups. VSS is a framework that enables performance of volume backups while applications on a system continue to write to the volumes.

Avamar Plug-in for Exchange GLR

The Exchange GLR plug-in enables you to perform GLR of individual mailboxes, mail folders, or messages from full backups of Exchange Server databases and storage groups. "Avamar architecture for GLR" on page 19 provides more information.

Avamar Administrator

Avamar Administrator is a graphical management console software application for remote administration of an Avamar system from a supported Windows or Linux client computer. You can configure, perform, monitor, and manage backups and restores using Avamar Administrator. The *EMC Avamar Administration Guide* provides complete instructions for installing and using Avamar Administrator.

How Avamar works in an Exchange Server 2013 or 2010 DAG environment

In an Exchange Server 2013 or 2010 Database Availability Group (DAG) environment, you install the Avamar Client for Windows and the Avamar Plug-in for Exchange VSS on each Exchange server with the Mailbox server role. Then use the Avamar Cluster Configuration Tool to configure the Exchange DAG client.

The following figure illustrates an Exchange Server 2013 or 2010 DAG environment with Avamar.

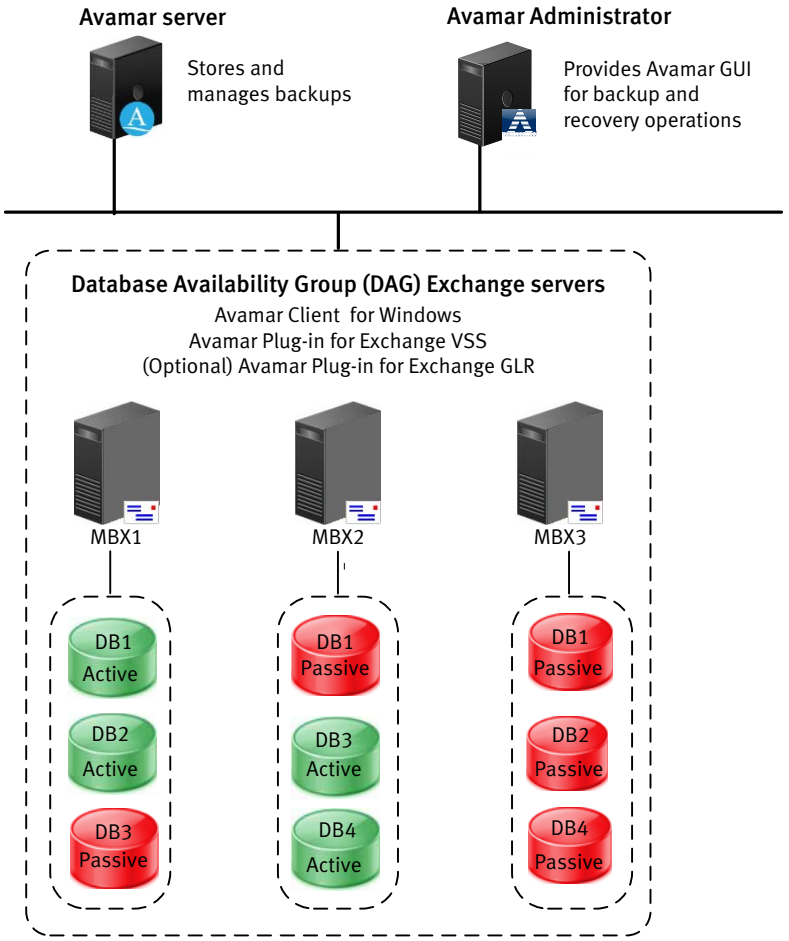


Figure 2 Exchange Server 2013 or 2010 DAG environment with Avamar

The Avamar Cluster Configuration Tool creates the DAG backup agent on each server in the DAG when you configure the Exchange DAG client. The tool also creates a cluster group that contains IP address, hostname, and service resources for the Exchange DAG client.

The Exchange DAG client enables you to perform federated backups of the databases in the DAG. During a federated backup, the Exchange DAG client passes backup requests to one or more servers in the DAG based on the specified backup settings. You can back up passive or active database copies, or a combination of both. "Federated backups with the Exchange DAG client" on page 25 provides more information.

Note: Backup of active only databases will fail.

During a restore, the Exchange DAG client automatically determines the server with the active copy of the database, and restores to the active copy. "Database restore to a DAG" on page 28 provides more information.

You also can back up and restore Exchange data on a specific server in a DAG. "Backups of a specific server in a DAG environment" on page 26 and "Database restore to a DAG" on page 28 provide more information.

The "Database Availability Groups" article in the Exchange Server 2013 and Exchange Server 2010 documentation on the Microsoft TechNet website at http://technet.microsoft.com/en-us/library/dd979799.aspx provides more information on DAGs.

How Avamar works in an Exchange Server 2007 cluster environment

You can use the Avamar Plug-in for Exchange VSS to back up Exchange data in the following types of Exchange Server 2007 cluster environments:

- Cluster continuous replication (CCR)
- Standby continuous replication (SCR)
- Single copy cluster (SCC)

Note: The Avamar Plug-in for Exchange VSS also supports backup and restore of Exchange data in a single-server Local Continuous Replication (LCR) environment. The Avamar system architecture, backup process, and restore process in an LCR environment are the same as in a stand-alone server environment.

The "High Availability" article in the Exchange Server 2007 documentation on the Microsoft TechNet website at http://technet.microsoft.com/en-us/library/bb124721.aspx provides more information on each of these configurations for Exchange Server 2007.

The Avamar system architecture, backup process, and restore process for each type of Exchange Server 2007 cluster environment is essentially the same. You install the Avamar Client for Windows and the Avamar Plug-in for Exchange VSS on both nodes in the cluster. Then use the Avamar Cluster Configuration Tool to configure the Avamar cluster client.

The following figure illustrates an Exchange Server 2007 cluster environment with Avamar.

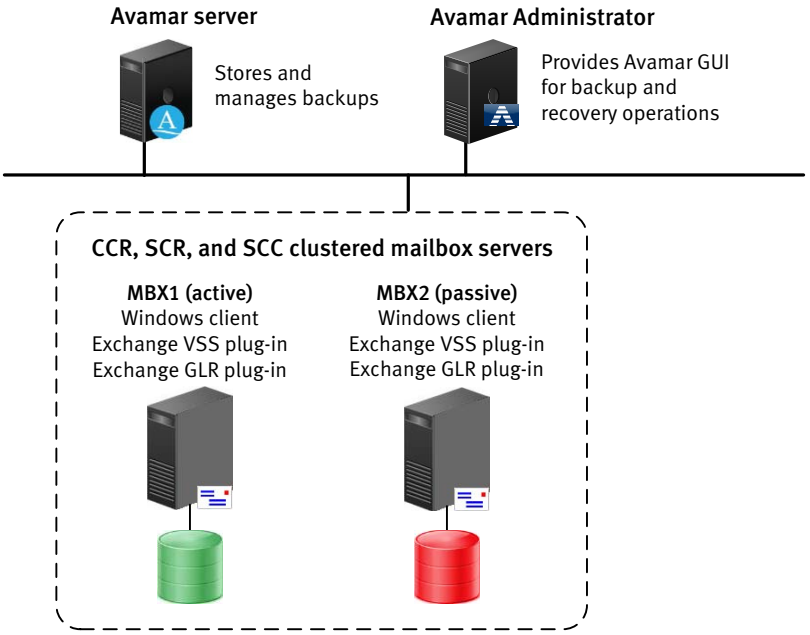


Figure 3 Exchange Server 2007 cluster environment with Avamar

The Avamar Cluster Configuration Tool creates the cluster backup agent on both nodes when you configure the Avamar cluster client. The tool also adds a service resource for the cluster backup agent to the existing Exchange cluster group.

The Avamar cluster client enables you to perform backups of Exchange data on the active node, regardless of which node is currently the active node. The cluster client automatically passes backup jobs to the currently active node. You also can back up data on the passive node by selecting the server name of the passive node as the client to back up. "Backups in an Exchange Server 2007 cluster" on page 26 provides more information.

During a restore, the Avamar cluster client automatically restores to the current active node. "Database restore to an Exchange Server 2007 cluster" on page 29 provides more information.

Avamar architecture for GLR

The Exchange GLR plug-in mounts a temporary virtual drive on a target server for GLR and restores the Exchange database or storage group to a recovery database (RDB) or recovery storage group (RSG) on the virtual drive. You can then browse the data in the RDB or RSG and restore individual mailboxes, folders, or messages to the Exchange server with the active database copies. The Exchange server that you use as the target server for GLR depends on the environment.

GLR on a proxy server

The recommended configuration for GLR in most environments is to use a proxy server. The proxy server is a separate Exchange mailbox server in the same Active Directory forest as the servers that you back up and restore. Ensure that the proxy server meets the requirements in "GLR system requirements" on page 39.

You install both the Exchange VSS plug-in and the Exchange GLR plug-in on the proxy server. On Exchange servers with the active database copies, you install only the Exchange VSS plug-in.

When you perform GLR, the Exchange GLR plug-in on the proxy server mounts the temporary virtual drive on the proxy server. You can browse Exchange data on the proxy server and restore the data to the Exchange server with the active database copies.

The following figure illustrates an environment with a proxy server for GLR.

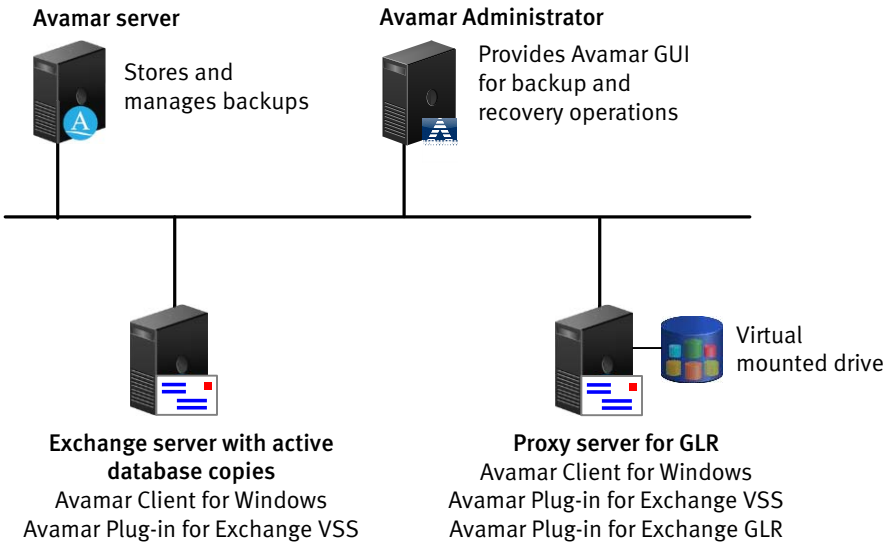


Figure 4 Exchange server environment with proxy server for Avamar GLR

Using a proxy server for GLR enables you to minimize the performance impact of GLR on the server with the active database copies. You offload system intensive GLR activities, such as mounting the virtual drive and browsing data, to the proxy server.

Also, since the Exchange GLR plug-in requires you to restart the server after installation, you only need to restart the proxy server, not the Exchange production server with the active database copies.

GLR on a stand-alone server

In an environment with a single stand-alone Microsoft Exchange server, you must install both the Exchange VSS plug-in and the Exchange GLR plug-in on the server to perform GLR.

When you perform GLR, the Exchange GLR plug-in mounts the temporary virtual drive on the stand-alone server. You can browse Exchange data on the virtual drive and restore the data to the Exchange server.

The following figure illustrates an environment with a stand-alone Exchange server for GLR.

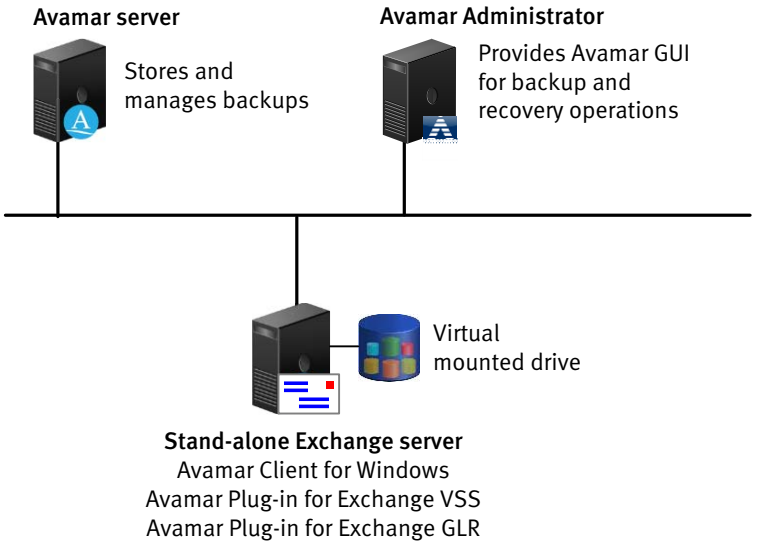


Figure 5 Stand-alone Exchange server environment with GLR

The GLR process places additional demands on computer hardware and resources beyond the base requirements for backup and restore. Ensure that the server meets the requirements in "GLR system requirements" on page 39.

GLR in a DAG environment

You can use any server in a DAG as the target server for GLR. You may want to use a DAG server that hosts primarily passive database copies. Alternatively, you may want to install the Exchange GLR plug-in on all servers in the DAG so that you can decide which server to use at the time that you perform GLR.

When you perform GLR, the Exchange GLR plug-in on the target server mounts the temporary virtual drive on the target server. You can browse Exchange data on the target server and restore the data to the Exchange server with the active database copies.

The GLR process of mounting and browsing an RDB or RSG requires additional computer hardware and resources. Use a server that hosts passive database copies to minimize the performance impact on mail users. The servers that you use for GLR must meet the requirements in "GLR system requirements" on page 39 to ensure sufficient performance.

The following figure illustrates a DAG environment where the Exchange GLR plug-in is installed on all servers in the DAG, but the DAG server with only passive database copies is the target server for GLR.

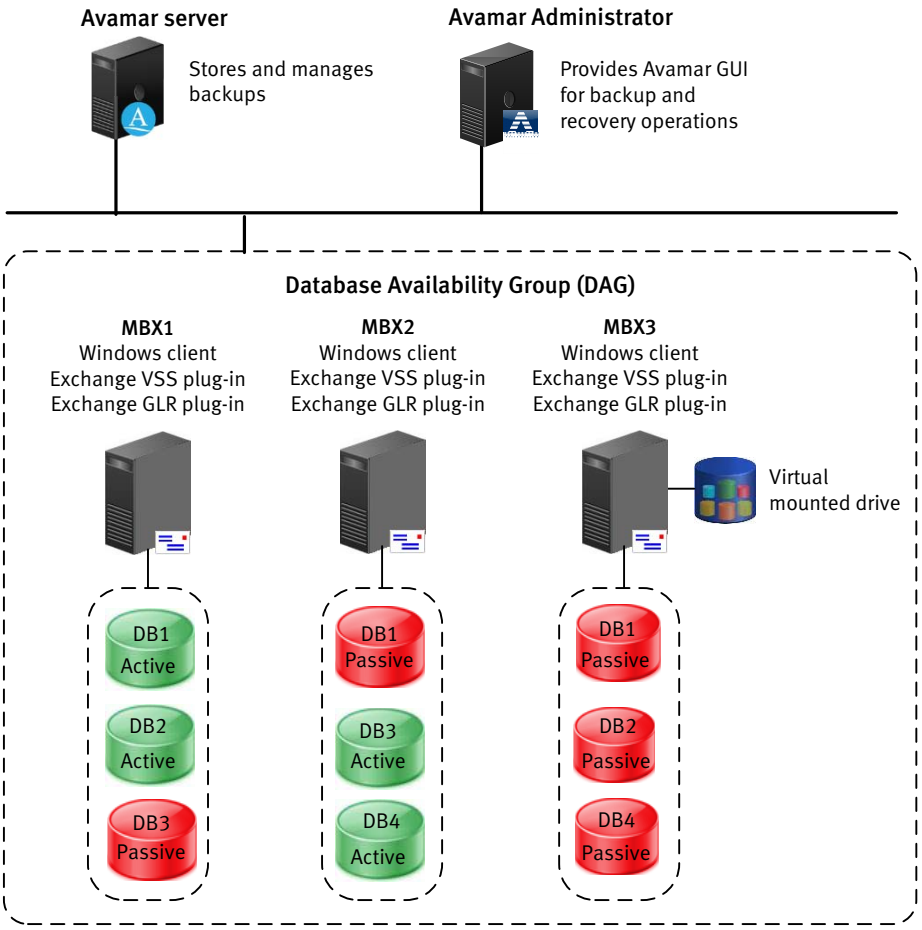


Figure 6 Exchange DAG environment with GLR

GLR in an Exchange Server 2007 cluster environment

You must install the Exchange VSS plug-in and the Exchange GLR plug-in on both nodes in an Exchange Server 2007 cluster environment. The nodes must meet the requirements in "GLR system requirements" on page 39.

You must use the active node as the target server for GLR.

When you perform GLR, the Exchange GLR plug-in mounts the temporary virtual drive on the active node. You can browse and restore the data to the active node.

The following figure illustrates GLR in an Exchange Server 2007 environment.

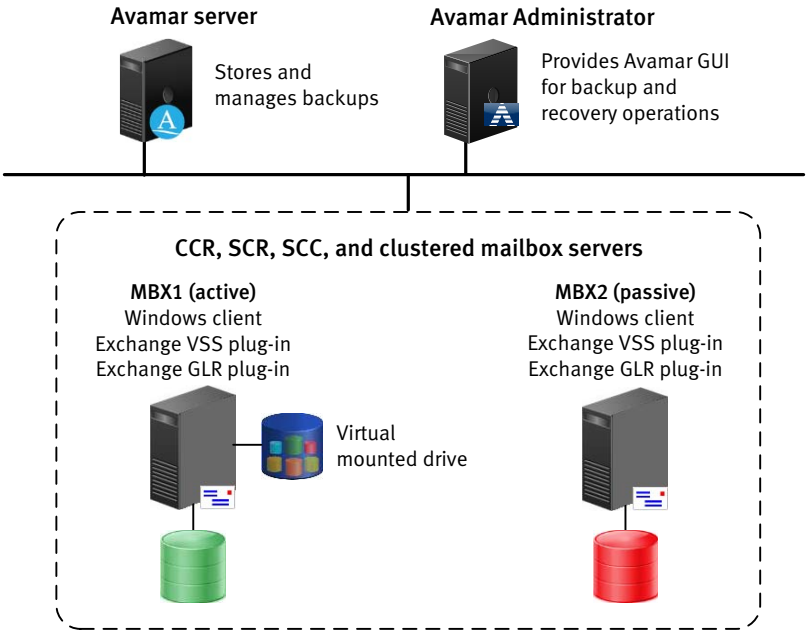


Figure 7 Exchange Server 2007 cluster environment with GLR

Data Domain system support

You can store backups on either the Avamar server or an EMC Data Domain® system. Backup metadata is stored on the Avamar server.

Before you can store backups on a Data Domain system, you must add the Data Domain system to the Avamar configuration by using Avamar Administrator. Then you select the Data Domain system in the plug-in options when you perform an on-demand backup or when you create a dataset for scheduled backups. You can also use the CLI to perform backups to a Data Domain system.

The steps to restore backups are the same whether you restore from the Avamar server or a Data Domain system. The restore process determines the location of the backup and restores the backup.

The *EMC Avamar and EMC Data Domain System Integration Guide* provides more information about Data Domain systems in an Avamar environment, including detailed steps to add a Data Domain system to the Avamar configuration.

Backup

When you perform a backup with the Avamar Plug-in for Exchange VSS, you can back up the entire Exchange Information Store, specific databases in Exchange Server 2013 or 2010, or specific storage groups in Exchange Server 2007. You cannot back up individual mailboxes, folders, or messages with the Exchange VSS plug-in. You also cannot back up an RDB or RSG.

Exchange data included in backups

When you back up the Exchange Information Store with the Exchange VSS plug-in, the backup includes the following data:

- All Exchange database (`.edb`) files for mailbox databases and public folder databases.
- The transaction log (`.log`) files for each database, which store operations such as message creation and modification. Committed operations are written to the `.edb` file.
- The checkpoint (`.chk`) files for each database, which store information about successful operations when they are committed to the database.

Backups of a specific database or storage group include the database file and the transaction log and checkpoint files for the database or storage group.

Backup types

The Exchange VSS plug-in can perform either full or incremental online backups of Exchange data:

- Full backups include the database files, transaction log files, and checkpoint files. Full backups are also called normal backups.
- Incremental backups include only the transaction log files and checkpoint files for a database.

The Exchange VSS plug-in does not support copy, differential, or offline backups.

Note: You must restore from a full backup when you perform granular level recovery with the Avamar Plug-in for Exchange GLR.

Perform a full backup of all databases and storage groups after you upgrade Exchange Server or install service packs. The target Exchange server for a restored database must have the same Exchange version and service pack as the Exchange server on which the backup occurred. Otherwise, restore fails.

Circular logging and incremental backups

Avamar does not support incremental backups of databases with circular logging enabled. When you enable circular logging for a database, Exchange overwrites transaction log files after the data in the log files is committed to the database. Circular logging enables you to save disk space by reducing the number of log files, but you can recover data only up until the last full backup.

If there are databases with circular logging enabled in the backup set and you perform an incremental backup, you can choose how the Exchange VSS plug-in handles the databases in the backup:

- Back up all databases but promote the backup to a full backup.
- Perform a full backup of only databases with circular logging enabled, and skip databases where circular logging is not enabled.
- Perform an incremental backup of only databases where circular logging is not enabled, and skip databases where circular logging is enabled.

Backup methods

You can perform both on-demand and scheduled backups with the Exchange VSS plug-in:

- Use Avamar Administrator to perform both on-demand and scheduled backups. Chapter 3, "Backup," provides more information.
- Use the `avexvss` command line interface on the Exchange server to perform on-demand backups. Appendix B, "Command Line Interface," provides more information.

Backup of a stand-alone server

When you back up a stand-alone Exchange server, you can back up the entire Exchange Information Store, specific databases in Exchange Server 2013 or 2010, or specific storage groups in Exchange Server 2007.

"Backing up a stand-alone environment" on page 62 provides more information.

Backups in a DAG environment

You can perform either federated backups or backups of a specific server in an Exchange Server 2013 or 2010 DAG environment.

Federated backups with the Exchange DAG client

With a federated backup, you select the Exchange DAG client that you configure with the Avamar Cluster Configuration Tool as the client to back up. The Exchange DAG client passes backup requests to the servers in the DAG.

You can choose whether to back up active or passive database copies, or a combination of both. The Exchange VSS plug-in provides the following options for selecting the type of database for a federated backup of a DAG:

- Back up a passive copy of each database, if a healthy passive copy is available. If a healthy passive copy is not available, then back up the active copy.
- Back up only the passive copy of each database.

  Note: Backup of active only databases will fail.

Backups of the passive database copies are recommended in most environments because the backups have less impact on Exchange server performance and mail users.

You also can specify the priority of the servers to which the Exchange DAG client passes backup requests. The prioritized list of servers is called the *preferred server order list* (PSOL). If you do not specify a list, then the Exchange VSS plug-in adds all servers in the DAG to the list in alphabetical order.

To optimize backup performance, specify servers with passive copies first in the PSOL if you are backing up passive database copies.

"Performing a federated backup in a DAG environment" on page 65 provides more information.

Backups of a specific server in a DAG environment

You can back up databases on a specific server in a DAG environment by selecting the server name as the client to back up. You can specify whether the Exchange VSS plug-in backs up only active database copies, only passive database copies, or all databases on the server.

"Backing up an active node in an Exchange Server 2007 cluster" on page 80 provides more information.

Backups in an Exchange Server 2007 cluster

You can back up the entire Exchange Information Store or individual storage groups on either the active node or the passive node in an Exchange Server 2007 cluster. The active node hosts all active copies of the databases, and the passive node hosts all passive copies of the databases.

To back up data on the passive node, select the server name of the passive node as the client to back up. This type of backup is called a *passive node backup*. Passive node backups are recommended in most environments because the backups have less impact on Exchange server performance and mail users. "Backing up a passive node in an Exchange Server 2007 cluster" on page 75 provides more information.

To back up data on the active node, select the Avamar cluster client that you configure with the Avamar Cluster Configuration Tool as the client to back up. The cluster client automatically passes backup jobs to the currently active node. This type of backup is called an *active node backup*. "Backing up an active node in an Exchange Server 2007 cluster" on page 80 provides more information.

You can schedule the following backups to occur on a regular basis in an Exchange Server 2007 cluster:

- Active node backups with the Avamar cluster client.
- Passive node backups of the node that is currently passive.
- Passive node backups of the node that is currently active. The passive node backup of the active node fails. However, scheduling passive node backups of an active node ensures that a passive node backup occurs if the node changes from active to passive.

"Performing scheduled backups" on page 84 provides more information.

Backup performance optimization

You can optimize backup performance by storing backups on a Data Domain system, implementing an efficient backup scheduling strategy, enabling multi-streaming, and managing consistency checks.

Backup storage

Performance is typically faster when you store backups on a Data Domain system instead of the Avamar server.

Backup scheduling

Schedule backups to occur at times of minimal user activity, and avoid backups during memory intensive system maintenance activities.

Back up the passive copy of a database in a DAG or cluster environment to minimize the impact on Exchange server performance and mail users.

Multi-streaming

Multi-streaming enables parallel processing of backup jobs by using multiple processors. You can use a maximum of 10 streams for each server. When you perform a federated backup of a DAG environment, you can use a maximum of 10 streams for each DAG server.

Each stream requires a separate processor. If you have multiple processors, multi-streaming enables you to improve backup performance when you store backups on either the Avamar server or on a Data Domain system.

Avamar consumes significantly more CPU during backups with multi-streaming. This additional CPU consumption on an active Exchange server can impact performance and affect end users. As a result, multi-streaming is recommended in DAG and cluster environments when you are backing up passive databases and nodes. "Multi-streaming requirements" on page 40 provides more information on system requirements for multi-streaming.

You can configure multi-streaming to create streams based on the number of volumes or on the number of databases. Balanced multi-stream backup performance occurs when all volumes are similar in overall size or when all databases are similar in size. Creating streams based on the number of volumes is recommended in most environments. If you balance databases across volumes so that each database is about the same size and each volume contains about the same number of databases, then there is little difference between creating streams by database or volume.

Consistency check management

A consistency check with the Exchange `eseutil` utility can cause severe performance issues or fail during a backup, especially in environments with many transaction logs.

If performance issues occur, you can throttle the consistency check by pausing the consistency check after a specific number of I/Os during the backup. The duration of the pause can be between 100 and 10,000 milliseconds.

You also can completely disable the consistency check during the backup. However, disabling the consistency check is recommended only in DAG environments with more than two servers. A consistency check verifies the integrity of a database. Disabling the consistency check increases the risk of backups of databases that are corrupt or missing files.

To throttle or disable the consistency check, specify the plug-in options when you perform an on-demand backup or create a dataset for scheduled backups.

Exchange database restore

You can restore an entire Exchange Information Store, database, or storage group from a backup with the Exchange VSS plug-in. This type of restore is most useful when an entire Exchange server or database has been lost or corrupted, or as part of a disaster recovery.

You can restore the Exchange Information Store, databases, or storage groups by using either Avamar Administrator or the `avexvss` command line interface. Chapter 4, "Exchange Database Restore," and Appendix B, "Command Line Interface," provide more information.

Restoring to a stand-alone server

When you restore the Exchange Information Store, databases, or storage groups to a stand-alone server from an Exchange VSS plug-in backup, the restore process overwrites the current databases at that location with the restored databases.

You can choose whether to replay transaction logs and automatically mount the databases after a successful restore. If you restore but do not replay the transaction logs, then you can manually copy additional logs before you manually mount the database.

"Restoring to a stand-alone server" on page 100 provides more information.

Database restore to a DAG

You can restore databases in a DAG to the active copy of the database from the following types of Exchange VSS plug-in backups:

- Federated backup with the Exchange DAG client of either an active copy or a passive copy of the database.
- Backup of either an active copy or a passive copy of the database on a specific server in a DAG.

When you restore databases from a federated backup in a DAG, you select the Exchange DAG client as the target client for the restore. The Exchange DAG client automatically determines the server with the active copy of the database, and restores to the active copy.

When you restore databases from a backup of a specific server in a DAG, you select the DAG server with the active database copies as the target client for the restore.

The restore process overwrites the current databases at that location with the restored databases. You can choose whether to replay transaction logs and automatically mount the databases after a successful restore. If you restore but do not replay the transaction logs, then you can manually copy additional logs before you manually mount the database.

You must suspend replication to the passive copies of a database before the restore. Avamar automatically suspends replication when you select the **Automate replication suspension** checkbox during a restore. You also can manually suspend replication to the by using Exchange Management Shell commands before you perform the restore. After the restore completes, you must manually resume replication.

"Restoring to a DAG" on page 103 provides more information.

Database restore to an Exchange Server 2007 cluster

You can restore storage groups or individual databases on the active node in an Exchange Server 2007 cluster from either an active node backup or a passive node backup with the Exchange VSS plug-in.

Select the Avamar cluster client as the target client for the restore. The Avamar cluster client automatically restores to the current active node.

The restore process overwrites the current databases at that location with the restored databases. You can choose whether to replay transaction logs and automatically mount the databases after a successful restore. If you restore but do not replay the transaction logs, then you can manually copy additional logs before you manually mount the database.

You must suspend replication to the passive node before the restore. Avamar automatically suspends replication when you select the **Automate replication suspension** checkbox during a restore. You also can manually suspend replication to the passive node by using Exchange Management Shell commands before you perform the restore. After the restore completes, you must manually resume replication.

"Restoring to an Exchange Server 2007 cluster" on page 107 provides more information.

Database restore to a file

You can restore databases from an Exchange VSS plug-in backup to a file either on the original server or on a different server. You specify the file system location for the restored files.

After the restore, you can configure the Exchange server to use the databases at the new location. You can also use third party tools such as Kroll OnTrack PowerControls to perform data mining and advanced data recovery.

"Restoring to a file" on page 111 provides more information.

Database restore to an RDB or RSG

You can restore a database or storage group from a backup to an RDB or RSG, and then perform GLR from the RDB or RSG. "GLR from an existing RDB or RSG" on page 32 provides more information.

Granular level recovery

You can restore individual mailboxes, mail folders, and messages by performing granular level recovery (GLR) from a backup of an Exchange database.

Avamar supports two methods to perform GLR:

- GLR with the Avamar Plug-in for Exchange GLR
- GLR from a recovery database (RDB) or recovery storage group (RSG)

GLR with the Exchange GLR plug-in

The Avamar Plug-in for Exchange GLR mounts a temporary virtual drive on the target server and restores an Exchange database or storage group from a backup to an RDB or RSG on the virtual drive. The drive mounts to the `C:\Program Files\avs\var\avfscache` folder, where *C:\Program Files\avs* is the Avamar installation folder. The backup must be a full backup with the Exchange VSS plug-in.

You can then browse and extract individual mailboxes, folders, or messages from the database to restore. The selected items restore from the Avamar server to a `Recovered Items` folder in the original mailbox or in a target mailbox that you specify. A user can browse and select the items to keep.

The virtual drive automatically dismounts and the RDB or RSG is deleted from the target server for GLR after one of the following specified time periods:

- The restore completes.
- The folder is inactive for one hour.
- The folder is inactive for two hours.

Note: You cannot perform GLR of items in public folder databases. Microsoft does not support public folder databases in RDBs or RSGs. You also cannot restore individual items from archive and disconnected mailboxes. You must restore the entire mailbox to a different live mailbox.

You must delete all RDBs on the target server before the restore. You cannot browse a backup for mailboxes, folders, or messages to restore when there is an RDB on the server. The GLR process automatically deletes RSGs on target Exchange Server 2007 servers.

"Performing GLR with the Exchange GLR plug-in" on page 118 provides more information.

The following figure illustrates the GLR process with the Exchange GLR plug-in.

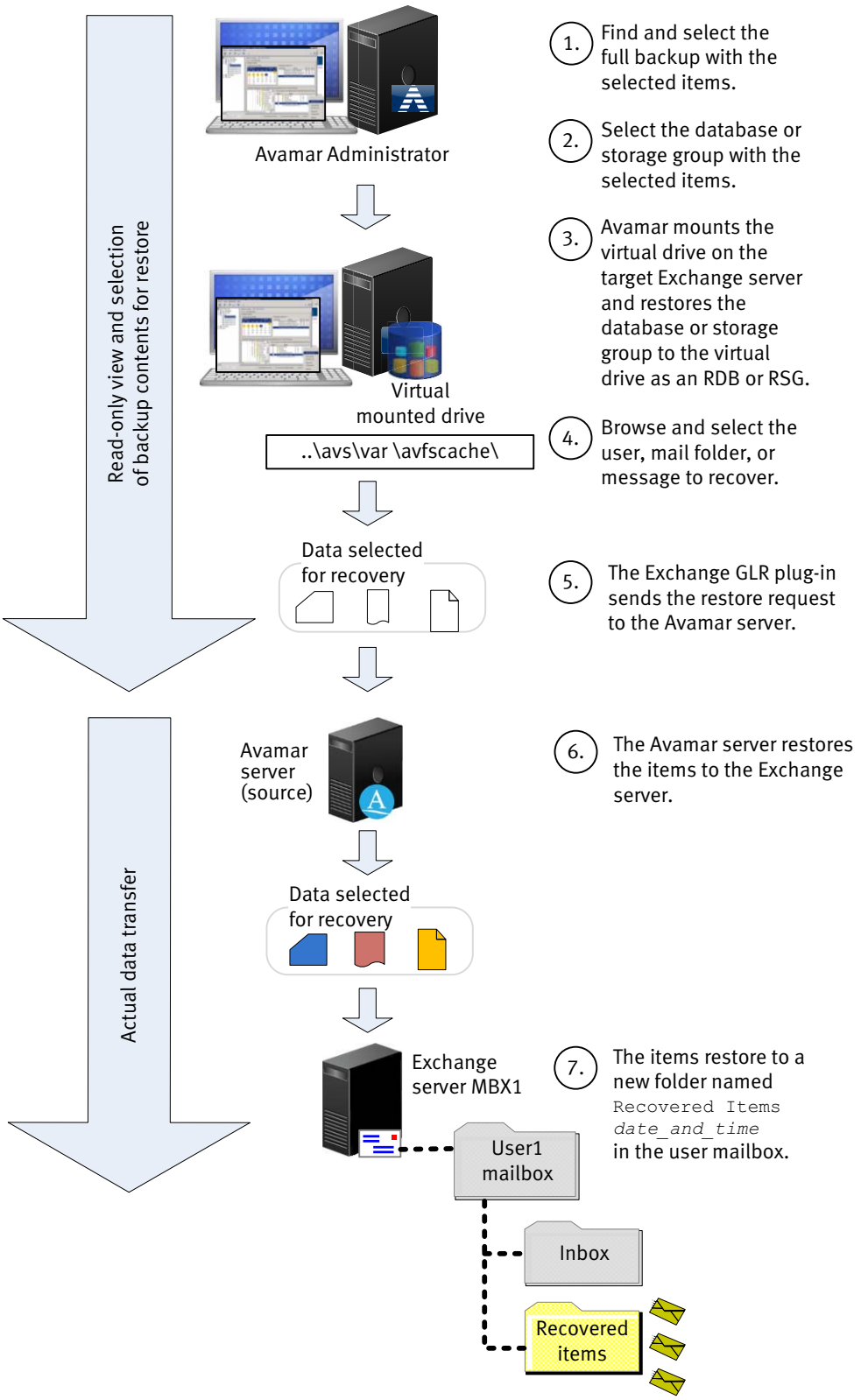


Figure 8 GLR process when you restore with the Exchange GLR plug-in

GLR from an existing RDB or RSG

You can restore a database or storage group from a backup to an RDB or RSG, and then perform GLR from the RDB or RSG. You can only restore to a single RDB or RSG at a time. The backup can be either a full or incremental backup with the Exchange VSS plug-in.

If an RDB is mounted on the target server, you must unmount or delete the RDB before the restore. If an RSG is mounted on the target server, you must delete the RSG.

After you restore to an RDB or RSG, you can perform GLR by using one of the following methods:

- Restore specific mailboxes by using Exchange Management Shell commands.
- Browse the RDB or RSG by using the Avamar Plug-in for Exchange GLR, and restore specific mailboxes, folders, or messages. The selected items restore from the RDB or RSG to a `Recovered Items` folder in the original mailbox or in a target mailbox that you specify. A user can browse and select the items to keep.

Note: You cannot perform GLR of items in public folder databases. Microsoft does not support public folder databases in RDBs or RSGs. You also cannot restore individual items from archive and disconnected mailboxes. You must restore the entire mailbox to a different live mailbox.

"Performing GLR from an existing RDB or RSG" on page 123 provides more information.

The following figure illustrates the GLR process when you restore to an RDB or RSG.

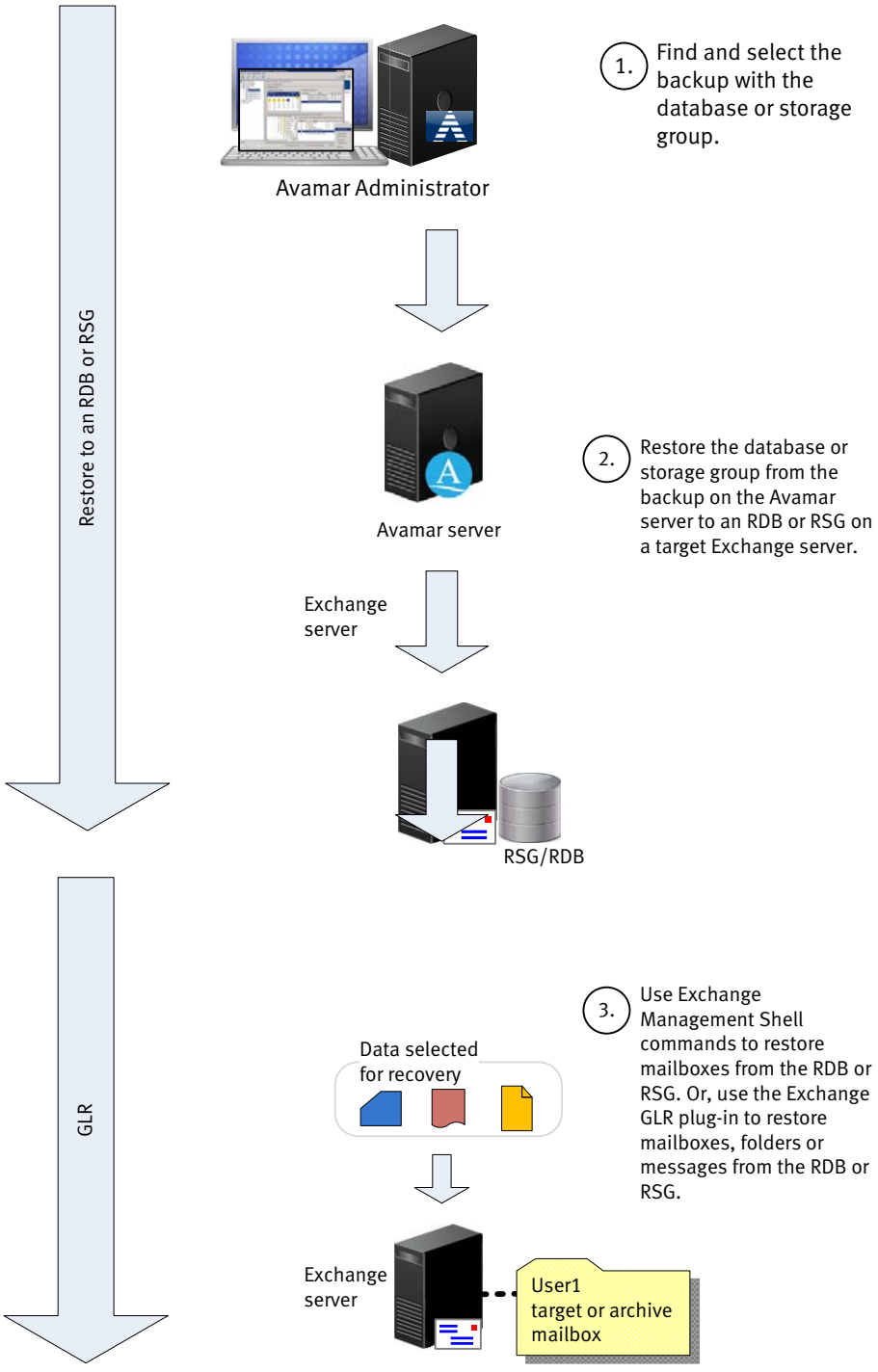


Figure 9 GLR process when you restore to an RDB or RSG

Disaster recovery

The redundancy and replication of a clustered environment reduces the need for full disaster recovery, or at least the urgency of an emergency. Often if one server in the cluster fails, the cluster fails over to another server and there is little or no noticeable disruption to users or service. This may give you some time to rebuild or bring replacement backup servers or cluster nodes online.

However, catastrophic events such as storms, power outages, earthquakes, fire, or intentional sabotage of physical equipment can take multiple machines or entire sites out of service. Even with remote mirror sites or other offsite backup servers, you may need to rebuild entire Exchange servers.

To ensure that you can perform a complete disaster recovery of a Microsoft Exchange environment when necessary, you must develop a comprehensive backup strategy to protect each component in the environment. Disaster recovery requires good planning, expertise in Exchange server installation, and regular scheduled full backups of the databases and servers.

Chapter 6, “Disaster Recovery,” describes how to prepare for and perform disaster recovery of an Exchange environment.

CHAPTER 2
Installation

The following topics explain how to install, upgrade, and uninstall Avamar client and plug-in software in supported Microsoft Exchange server environments:

Preparing to install the Avamar Plug-in for Exchange VSS

Review the system requirements for the Avamar client software, and ensure that the environment meets the requirements before you perform the installation. The Avamar Config Checker for Microsoft Windows provides an additional automated verification of the environment. You also must download the Windows client and plug-in installation package from the Avamar server.

Checking the system requirements

Ensure that the environment meets the client compatibility requirements in the *EMC Avamar Compatibility and Interoperability Matrix* on EMC Online Support at https://support.EMC.com. The requirements in the matrix include supported operating systems and application versions.

The Avamar Client for Windows and the Exchange VSS plug-in that you install on the host must be the same version number.

Supported configurations

The following table lists the Microsoft Exchange Server versions and operating systems that the Avamar Plug-in for Exchange VSS supports.

Table 2 Supported Microsoft Exchange Server versions and operating systems

Exchange Server version	Operating systems
2013	• Windows Server 2012 x64 • Windows Server 2008 R2 x64
2010 SP3	• Windows Server 2012 x64 • Windows Server 2008 R2 x64 • Windows Server 2008 SP2 x64
2007 SP3	• Windows Server 2008 R2 x64 • Windows Server 2008 SP2 x64 • Windows Server 2003 SP2 x64

For backup and recovery for Exchange 2003, use the Avamar 6.0 Exchange Database plug-in and the Exchange Message plug-ins. The *Avamar 6.0 for Exchange Guide* provides more information about using these legacy plug-ins.

Perform a full backup of all databases and storage groups after you upgrade Exchange Server or install service packs. The target Exchange server for a restored database must have the same Exchange version and service pack as the Exchange server on which the backup occurred. Otherwise, restore fails.

The Exchange VSS plug-in does *not* support the following configurations:

- Microsoft Exchange Server on Windows Small Business Server
- Installation of Microsoft Exchange Server and Microsoft SharePoint Server on the same server

Microsoft .NET Framework 4 requirement

The Exchange VSS plug-in requires installation of Microsoft .NET Framework 4 on each server in the Exchange forest. Search the Microsoft Download Center for "Microsoft .NET Framework 4" to find downloads and additional information.

Supported high availability configurations

The following table lists the Microsoft Exchange high-availability environments that the Avamar Plug-in for Exchange VSS supports.

Table 3 Exchange VSS plug-in support for high availability solutions

Exchange Server version	Operating systems	High availability support
2013	• Windows Server 2012 x64 • Windows Server 2008 R2 x64	DAGs
2010 SP3	• Windows Server 2012 x64 • Windows Server 2008 R2 x64 • Windows Server 2008 SP2 x64	DAGs
2007 SP3	• Windows Server 2008 x64 R2 • Windows Server 2008 x64 SP2 Enterprise/ DC Edition • Windows Server 2003 x64 Enterprise/DC Edition	• SCC • CCR • SCR

The Microsoft documentation for Exchange Server 2013 and 2010 recommends separate networks for public traffic and replication traffic. Using only one network connection can lead to unstable operations, such as databases that fail over to other systems when they experience network connection timeouts.

Exchange DAG client configuration requirements

Prior to configuring an Exchange Server 2013 or 2010 DAG, the Exchange DAG client needs permissions to communicate with clients in the network.

1. Open the Failover Cluster Manager snap-in.
2. Locate the network you want to modify.
3. Follow the instructions in the Microsoft TechNet article "Modify Network Settings for a Failover Cluster" to select the option **Allow cluster network communication on this network**, and then **select Allow clients to connect through this network**.

Exchange Server 2007 CCR requirements

In a Microsoft Exchange Server 2007 environment with CCR, configure the cluster by using the guidelines in the following articles:

- "Installing Cluster Continuous Replication on Windows Server 2008," which is available on the Microsoft TechNet website at the following URL:

  http://technet.microsoft.com/en-us/library/bb629714.aspx

- "Using Backup to Back Up and Restore Exchange Data," which is available on the Microsoft TechNet website at the following URL:

  http://technet.microsoft.com/en-us/library/aa998870.aspx

  This article discusses the exact conditions under which log files are removed, since log truncation with Exchange Server 2007 CCR depends on the state of the replication.

- "Event ID 214 is logged when you run a backup operation on a passive node after you install Exchange 2007 SP3 in an Exchange 2007 CCR environment", which is available on the Microsoft Support website at the following URL:

  http://support.microsoft.com/kb/2297394

  To resolve the issue described in the article, install Exchange 2007 SP3 Update Rollup 1 on all affected servers. You can download the update rollup at the following URL:

  http://www.microsoft.com/downloads/details.aspx?FamilyID=ae45d06e-dcb7-43d8-b1ff-d3953836425b

Hardware requirements

The following table lists the hardware requirements for the Avamar Plug-in for Exchange VSS.

Table 4 Hardware requirements

Requirement	Minimum
Memory (RAM)	64 MB.
Hard drive space	Software installation requires at least 100 MB of permanent hard drive space, with 1 GB recommended. Local cache files require an additional 12 MB of permanent hard drive space for each 64 MB of physical RAM.
Network interface	10BaseT or higher, configured with the latest drivers for the operating system.

Exchange transaction log and database file storage location requirements

Microsoft best practices recommend that you store transaction log files and database files on separate volumes. Backup failures can occur when the database and system path are in a subfolder of the transaction logs folder.

The Microsoft TechNet articles in the following table describe Microsoft best practices for transaction log and database file storage locations.

Table 5 Best practices for transaction log and database file locations

Exchange Server version	Microsoft TechNet article title
2013	"Exchange 2013 Storage Configuration Options"
2010	"Understanding Storage Configuration"
2007	"Recommendations for Configuring Storage Groups and Databases"

Backups with the Exchange VSS plug-in fail if the path to database, transaction log, or checkpoint files includes symbolic links (symlinks) or directory junctions. Exclude databases with files available through symlinks or directory junctions from backups with the Exchange VSS plug-in.

Granular level recovery requirements

The requirements for granular level recovery (GLR) depend on whether you use a proxy server for GLR or a production Exchange server.

GLR proxy server requirements

If possible, use an Exchange proxy server for Exchange GLR operations. Using a proxy server enables you to install the Exchange GLR plug-in on only the proxy server instead of on all Exchange servers in the forest. You also do not need to restart the production Exchange Server during the Exchange GLR plug-in installation when Avamar upgrades the drivers for GLR operations.

The proxy server must be an Exchange server with the Mailbox server role in the same Active Directory forest as the Exchange servers to which you restore.

GLR system requirements

The GLR process with the Avamar Plug-in for Exchange GLR places additional demands on computer hardware and resources beyond the base requirements for backup and restore. The following table describes the system requirements for the Avamar Plug-in for Exchange GLR.

Table 6 Exchange GLR plug-in requirements

Requirement	Description
Memory (RAM)	The Avamar Plug-in for Exchange GLR requires additional memory (RAM). Start with1 GB of RAM. The required amount of additional or total memory depends on current system performance with existing memory: • If resources are already strained and performance is slow with regular operations of the Avamar Plug-in for Exchange VSS, then add significantly more memory to support Avamar Plug-in for Exchange GLR operations. • If performance is currently adequate with regular operations of the Avamar Plug-in for Exchange VSS, then additional memory may not be required to support Avamar Plug-in for Exchange GLR operations.
Disk staging area	Additional disk space is required to provide a disk staging area to hold writes to the Exchange database and log files.

You also must download the MAPI client libraries and CDO 1.2.1 from the Microsoft website, and install the libraries and CDO on each Exchange server with the Exchange GLR plug-in.

Backup requirements for GLR

The Exchange database backup that you use to perform GLR must meet the following requirements:

- Must be a full backup.
- Must not contain public folders.

Multi-streaming requirements

Multi-streaming places additional demands on computer hardware and resources beyond the base requirements for the Avamar Plug-in for Exchange VSS. In addition, there are several configuration recommendations for multi-streaming.

Multi-streaming hardware and software recommendations

The following table lists hardware and software recommendations for multi-streaming.

Table 7 Multi-streaming hardware and software recommendations

Hardware and Software	Recommendations
CPU	At least one processor core per stream
Memory (RAM)	48 GB or more
Hard disk	• 1 disk drive for operating system/Exchange installation • 1 to 2 disk drives or RAID drive group for each Exchange database • 7200 RPM or faster disk drives
Network adapter	1 GB
Operating system	Windows Server 2008 SP2 or later

Multi-streaming Exchange configuration requirements

Avamar consumes significantly more CPU during backups with multi-streaming. This additional CPU consumption on an active Exchange server can impact performance and affect end users. As a result, multi-streaming is recommended in DAG and cluster environments when you are backing up passive databases and nodes.

Ensure that the Exchange environment meets the following requirements for multi-streaming:

- DAG and Continuous Cluster Replication (CCR) environments must have a minimum of two Exchange servers with the Mailbox server role.
- Locate each database on a separate physical disk. If possible, locate the database file on one disk and the transaction logs on a separate disk for each database.
- Best results occur when each database or storage group is approximately the same size.
- Perform all backups by using passive database copies in a DAG environment or by using the passive node in an Exchange Server 2007 cluster.

When you specify multi-streaming options for a backup, specify a maximum of one backup stream for each disk in the backup set. For example:

- If you are backing up two databases, with each database on its own disk, specify a maximum of two streams.
- If you are backing up two databases, with each database and its logs on two disks (for a total of four disks), then specify a maximum of four streams.

VSS requirements

The Avamar Plug-in for Exchange VSS uses Microsoft Volume Shadow Copy Service (VSS) technology to perform backups. VSS is a framework that enables performance of volume backups while applications on a system continue to write to the volumes.

Supported VSS providers and writers

The Exchange VSS plug-in uses the Microsoft Software Shadow Copy Provider and the following VSS writers:

- Microsoft Exchange Store VSS Writer
- Microsoft Exchange Replication VSS Writer

The Exchange VSS plug-in does not support hardware providers.

VSS snapshot volume requirements

The Microsoft VSS framework supports as many as 64 volumes in a VSS snapshot. When you create a dataset or perform an on-demand backup, do not include more than 64 volumes. If you include more than 64 volumes in a snapshot, then backup fails and the Avamar event log lists the following error:

```
VSS_E_MAXIMUM_NUMBER_OF_VOLUMES_REACHED.
```

The VSS framework also limits the number of shadow copies to 64 per volume. If the number of shadow copies in a volume exceeds 64, then backup fails and the Avamar event log lists the following error:

```
VSS_E_MAXIMUM_NUMBER_OF_SNAPSHOTS_REACHED.
```

Checking the User Account Control setting on Microsoft Windows

The User Account Control (UAC) feature limits application software to standard user privileges. You must provide administrator privileges for certain tasks, such as installing software. UAC is enabled by default.

If you start an Avamar client or plug-in installer without administrator privileges on a computer with UAC enabled, then the software does not install correctly.

You can disable or bypass UAC. The installation procedures in this chapter provide one method to bypass UAC. Other methods and additional information are available in the Microsoft documentation.

Downloading the software

1. Log in to the Exchange server as an administrator.
2. Open a web browser and type the following URL:

   http://*Avamar_server*

   where *Avamar_server* is the DNS name or IP address of the Avamar server.

   The **EMC Avamar Web Restore** page appears.
3. Click **Downloads.**

   The **Downloads** list appears.
4. Click **+** next to the operating system headings until the applicable software installation packages appear.
5. Click the Avamar Client for Windows installation package, `AvamarClient-windows-x86_64-`*`version`*`.msi` (64-bit), where *version* is the Avamar client version.
6. Save the Windows client installation package to a temporary folder.
7. Click the Avamar Plug-in for Exchange VSS installation package, `AvamarExchangeVSS-windows-x86_64-`*`version`*`.msi`, where *version* is the Avamar plug-in version.
8. Save the Exchange VSS plug-in installation package to a temporary folder.
9. Click the Avamar Config Checker installation package, `Avamar_ConfigChecker_win_x64.zip` (64-bit).
10. Save the Config Checker installation package to a temporary folder.

Verifying the environment

Use the Avamar Config Checker for Microsoft Windows to verify that you correctly configured the Windows environment for Avamar backup and recovery.

The Config Checker checks the configuration for problems that can lead to installation, backup, or recovery failures. These failures can affect the operating system for the application host or Microsoft Exchange Server.

The Config Checker supports only English language operating systems.

To use the Avamar Config Checker to verify the environment before you install Avamar client software:

1. Unzip the Avamar Config Checker installation package, and run the setup program to install the software.
2. Start the Config Checker:
   - On Windows Server 2012, open the **Start** screen and select **Avamar Config Checker**.
   - On Windows Server 2008 or Windows Server 2003, open the **Start** menu and select **Program Files** › **EMC Config Checker** › **Avamar Config Checker**.
3. Click **Next** on the welcome page.

   The **Avamar Application and User Settings** page appears.
4. Select the version number from the **Avamar version** list.
5. In the application list, select the checkbox next to the applications on the client computer, and specify credentials, if required.
6. Click **Next**.
7. Review the summary information.
8. Click **Run Tests**.

   When the verification completes, the **Config Check Results** window appears.
9. Save or open the results in HTML format.

   NOTICE

   Save the test results before exiting the wizard. The wizard does not automatically save the results. If you do not save the results, then you must rerun the Config Checker to view them.
10. Click **Finish** to exit the wizard.
11. Review the HTML result file, and correct all the checks that are listed under Failure.
12. Rerun the Config Checker to ensure that all the checks are successful.

You also can run the Avamar Config Checker after you install Avamar software on the client computer.

The *EMC Avamar Config Checker for Microsoft Windows Technical Note*, available on EMC Online Support at https://support.EMC.com, provides troubleshooting information and details about the results that appear for each application.

Installing the Avamar client software

You can install the Avamar client software in stand-alone, DAG, and cluster environments. You must install the Windows client and the Exchange VSS plug-in, and then register the client with the Avamar server. In a DAG or cluster, use the Cluster Configuration Tool to configure the DAG or cluster client for backups of high availability databases and storage groups.

Installation road map

The steps to install the Avamar software for Microsoft Exchange depend on whether the Exchange server is on a stand-alone server or in a DAG or cluster environment.

Stand-alone installation road map

To install the Avamar client software on a stand-alone server:

1. Install the Avamar Client for Windows on the Microsoft Exchange server with the Mailbox server role. "Installing the Avamar Client for Windows" on page 45 provides instructions.
2. Install the Avamar Plug-in for Exchange VSS on the Microsoft Exchange server with the Mailbox server role. "Installing the Exchange VSS plug-in" on page 46 provides instructions.

   If you intend to perform granular level recovery, then select the options to install both the Exchange GLR plug-in and the Exchange VSS plug-in.

   Note: You must restart the Exchange server after you install the Exchange GLR plug-in.

3. Register the Exchange server as a client with the Avamar server. "Registering the client" on page 47 provides instructions.
4. Create and configure the AvamarBackupUser account. "Creating and configuring the AvamarBackupUser account" on page 48 provides instructions.

DAG and cluster installation road map

To install the Avamar software in a DAG or cluster environment:

1. Install the Avamar Client for Windows on each Microsoft Exchange server with the Mailbox server role. "Installing the Avamar Client for Windows" on page 45 provides instructions.
2. Install the Avamar Plug-in for Exchange VSS on each Microsoft Exchange server with the Mailbox server role. "Installing the Exchange VSS plug-in" on page 46 provides instructions.

   If you intend to use a server for granular level recovery, then select the options to install both the Exchange GLR plug-in and the Exchange VSS plug-in. In a DAG environment, you should configure at least one server for GLR. In an Exchange Server 2007 cluster environment, you should either configure a GLR proxy server outside the cluster or configure both nodes for GLR.

   Note: You must restart the Exchange server after you install the Exchange GLR plug-in.

3. Register each Exchange server as a client with the Avamar server. "Registering the client" on page 47 provides instructions.
4. Create and configure the AvamarBackupUser account. "Creating and configuring the AvamarBackupUser account" on page 48 provides instructions.
5. Use the Cluster Configuration Tool to configure the Exchange DAG client or the Avamar cluster client. The following topics provide more information:
   - "Configuring an Exchange DAG client" on page 53
   - "Configuring a cluster client in an Exchange Server 2007 cluster" on page 54

Installing the Avamar Client for Windows

1. Log in to the Exchange server with the Mailbox server role as an administrator.
2. Go to the temporary folder that contains the Avamar installation files that you downloaded in "Downloading the software" on page 42.
3. Start the installer by using the appropriate method:
   - If UAC is disabled, double-click the installation file to open it.
   - If UAC is enabled, perform the following steps:
     a. In Windows, right-click the **Command Prompt** icon and select **Run as administrator**.
     b. In the **Command Prompt** window, change the working directory to the location of the installation package by typing:

        cd *install_path*

        where *install_path* is the full path of the temporary folder that contains the installation package.
     c. Type the following command to start the installer:

        msiexec /i AvamarClient-windows-x86_64-*version***.msi**

        where *version* is the Avamar client version.

   "Checking the User Account Control setting on Microsoft Windows" on page 42 provides details on UAC.

   The installation wizard opens at the welcome page.
4. Click **Next**.

   The **End-User License Agreement** page appears.
5. Review the license agreement.
6. Select the checkbox to accept the terms in the license agreement, and click **Next**.

   The **Custom Setup** page appears.
7. Ensure that **Avamar Client User Interface** is selected for installation.
8. (Optional) Specify a folder for the Avamar client installation by clicking **Browse** and selecting a location.
9. Click **Next** on the **Custom Setup** page.

The **Ready to Install EMC Avamar for Windows** page appears.

10. Click **Install**.
11. When the installation completes, click **Finish**.

Installing the Exchange VSS plug-in

1. Log in to the Exchange server with the Mailbox server role as an administrator.
2. Go to the temporary folder that contains the Avamar installation files that you downloaded in "Downloading the software" on page 42.
3. Start the installer by using the appropriate method:
   - If UAC is disabled, double-click the installation file to open it.
   - If UAC is enabled, perform the following steps:
     a. In Windows, right-click the **Command Prompt** icon and select **Run as administrator**.
     b. In the **Command Prompt** window, change the working directory to the location of the installation package by typing:

        cd *install_path*

        where *install_path* is the full path of the temporary folder that contains the installation package.
     c. Type the following command to start the installer:

        msiexec /i AvamarExchangeVSS-windows-x86_64-*version***.msi**

        where *version* is the Avamar plug-in version.

   The installation wizard opens at the welcome page.

   NOTICE

   If a Windows Security dialog box appears during installation and indicates a possible security risk because of an unsigned driver or device, then click **Install** or **Install this driver software anyway**. The exact message varies, depending on the operating system, and may identify the software publisher EldoS Corporation.

4. Click **Next**.

   The **EMC Avamar Backup Plug-in for Exchange VSS Setup** page appears.
5. Select the option to install the **EMC Avamar Backup Plug-in for Exchange VSS**.

   Note: The Exchange VSS plug-in automatically installs to the same folder as the Avamar Client for Windows.
6. (Optional) Select the option to install the **Exchange GLR** plug-in if you plan to use the server for granular level recovery.
7. Click **Next**.

If you selected the option to install the Exchange GLR plug-in, then the **Exchange GLR WriteCache Folder** page appears. Go to the next step.

Otherwise, the **Ready to Install EMC Avamar Backup Plug-in for Exchange VSS** page appears. Go to step 9.

8. Specify the location for the WriteCache folder, which contains a log of changes that the Exchange server makes to a dataset when it mounts the dataset for granular level recovery.

   The WriteCache acts as a filter to store and interpret those changes and apply them in the viewing and use of the mounted dataset, without changing the original recovery dataset on the Avamar server. Generally, these log files are not very large, and they are temporary for the current granular level recovery session.

   IMPORTANT

   Do not specify a location on a Resilient File System (ReFS) volume on Windows Server 2012. Avamar does not support writing to the WriteCache folder on ReFS volumes.

9. Click **Install**.
10. When the installation completes, click **Finish**.
11. If you selected the option to install the Exchange GLR plug-in, then restart the server.

Registering the client

Before you can back up or restore Microsoft Exchange data, you must register the Microsoft Exchange server as a client with the Avamar server.

In a DAG or cluster environment, register each Microsoft Exchange server with the Mailbox server role as Avamar clients.

1. Log in to the Microsoft Exchange server.
2. Right-click the Avamar client system tray icon  .

   A menu appears.

3. Select **Manage** › **Activate Client**.

   The **Activate Client Setup** dialog box appears.

4. In the **Administrator Server Address** box, type the network hostname defined in DNS for the Avamar server.
5. In the **Administrator Server Port** box, specify the port on the Avamar server for client/server communication.
6. In the **Client Domain** box, type the name of the Avamar domain for the client.

   Do not use a slash (/) as the first character when you type a subdomain. If you use a slash, an error occurs and you cannot register the client.

7. Click **Activate**.

   A confirmation message appears.

8. Click **OK**.

Creating and configuring the AvamarBackupUser account

The AvamarBackupUser account provides Avamar services access to and privileges on Active Directory and Exchange servers with the Avamar Plug-in for Exchange VSS.

In earlier versions, the AvamarBackupUser account was necessary only for GLR. However, all Exchange VSS plug-in installations now require this account.

After you install the Avamar Client for Windows and the Avamar Plug-in for Exchange VSS, you must create the AvamarBackupUser account once on the Exchange domain. Then you configure the Avamar services on each Exchange server to log in as the AvamarBackupUser account.

In most environments, you can use the Avamar Exchange Backup User Configuration Tool to automatically create the account with the required permissions and configure Avamar services. You can also manually create the account and configure services in the following situations:

- You want to use an existing mailbox for the AvamarBackupUser account.
- Automatic creation of the account with the Avamar Exchange Backup User Configuration Tool failed.

Creating and configuring the account with the Avamar Exchange Backup User Configuration Tool

Run the Avamar Exchange Backup User Configuration Tool on one Exchange Server to perform the following tasks:

- Create the AvamarBackupUser account.
- Configure the Avamar Backup Agent and Exchange GLR services on the Exchange server to log in as the account.

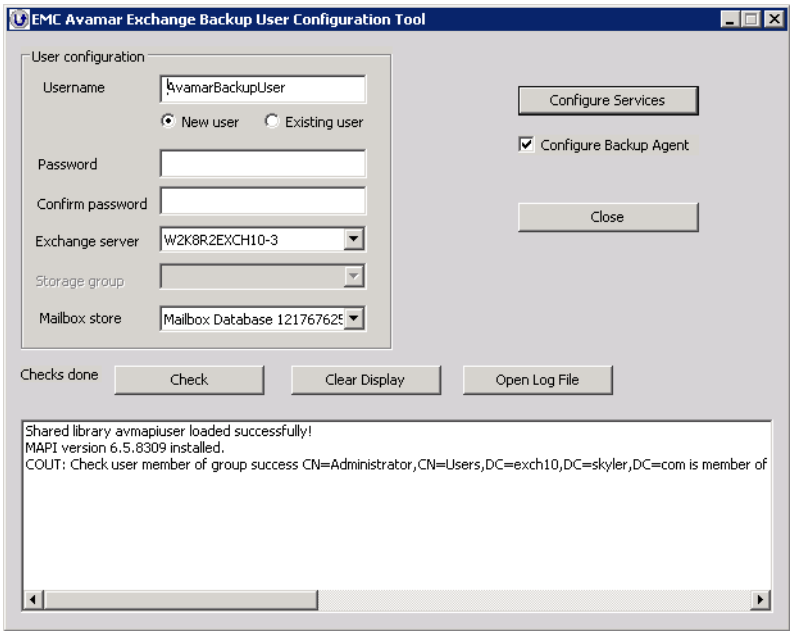
In an environment with multiple Exchange servers, a DAG environment, or a cluster environment, run the tool on the remaining Exchange servers and select the **Existing user** option to configure the services on each server.

1. If you plan to use an existing account for the AvamarBackupUser account, then ensure that the account is a member of the following Active Directory groups:
   - Exchange Server 2013 or 2010 — Backup Operators, Domain Users, Exchange Servers, Organization Management
   - Exchange Server 2007 — Backup Operators, Domain Admins, Exchange Organization Administrators, Exchange Servers
2. Log in to the Exchange server as a domain administrator.

   In an Exchange Server 2013 or 2010 DAG, log in to any server.

   In an Exchange Server 2007 cluster, log in to any node.
3. Start the Avamar Exchange Backup User Configuration Tool:
   - On Windows Server 2012, open the **Start** screen and select **Backup User Configuration Tool**.
   - On Windows Server 2008 or Windows Server 2003, open the **Start** menu and select **Program Files** › **EMC Avamar** › **Backup User Configuration Tool**.

The **EMC Avamar Exchange Backup User Configuration Tool** appears.



4. Specify whether to create a new account or use an existing account:
   - Select **New user** to create a new account.
   - Select **Existing user** to configure an existing account.
5. Specify the name for the account in the **Username** box.
6. In the **Password** box, type a password for the account.
7. Retype the password in the **Confirm Password** box.

   The password must comply with domain password policy settings. Otherwise, activation of the mailbox fails. Typically the domain administrator sets the password policy by using Group Policy at the domain level.
8. Select the Exchange server for the account from the **Exchange Server** list.
9. On Exchange Server 2007, select the storage group for the account from the **Storage group** list.
10. Select the mailbox store for the account from the **Mailbox store** lists.
11. Leave the **Configure Backup Agent** checkbox selected.

    This option automatically configures the Avamar Backup Agent service to log in as the AvamarBackupUser account.

    Note: Leave the checkbox selected unless you are configuring the account on a server where you perform backups with multiple Avamar plug-ins and one of the plug-ins requires that the Backup Agent service run as the local system account. When you perform backups of the server, you must specify the username and password for the AvamarBackupUser account in the plug-in options.

12. Click **Configure Services**.

    The tool performs the following tasks:

    - Creates, enables, and adds the AvamarBackupUser to the necessary domain groups.
    - Creates a mailbox for the user.
    - Configures the Backup Agent service to run as the AvamarBackupUser account (when you select the **Configure Backup Agent** checkbox).
    - On servers with the Exchange GLR plug-in, configures the GLR service to run as the AvamarBackupUser account.
    - Verifies that the user can successfully log in.

13. Click **Check** to test the user settings.

    The message log lists the test results.

14. If all of the tests are successful, click **Close**.

    If any of the tests fail, then you may need to manually configure the AvamarBackupUser account. "Manually creating and configuring the AvamarBackupUser account" on page 51 provides instructions.

15. In an environment with multiple Exchange servers, a DAG environment, or a cluster environment, run the tool on each of the remaining servers to configure the Avamar Backup Agent and Exchange GLR services:

    a. Log in to one of the other Exchange servers as a domain administrator.

    b. Start the Avamar Exchange Backup User Configuration Tool.

    c. Select **Existing user** to configure an existing account.

    d. Specify the name of the AvamarBackupUser account in the **Username** box.

    e. In the **Password** box, type the password for the account.

    f. Retype the password in the **Confirm Password** box.

    g. Select the Exchange server for the account from the **Exchange Server** list.

       Select the same Exchange server that you selected when you ran the tool the first time to create and configure the account.

    h. On Exchange Server 2007, select the storage group for the account from the **Storage group** list.

       Select the same storage that you selected when you ran the tool the first time to create and configure the account.

    i. Select the mailbox store for the account from the **Mailbox store** lists.

       Select the same mailbox store that you selected when you ran the tool the first time to create and configure the account.

    j. Leave the **Configure Backup Agent** checkbox selected.

    k. Click **Configure Services**.

The tool configures the Backup Agent and Exchange GLR services to log in as the AvamarBackupUser account.

l. Click **Check** to test the user settings.

The message log lists the test results.

m. If all of the tests are successful, click **Close**.

If any of the tests fail, then you may need to manually configure the services to log in as the AvamarBackupUser account. "Manually creating and configuring the AvamarBackupUser account" on page 51 provides instructions.

n. Repeat these steps on each of the remaining Exchange servers in the environment.

Manually creating and configuring the AvamarBackupUser account

1. Log in to the domain controller as an administrator, and create a user account with the following settings:
   - The recommended name for the account is `AvamarBackupUser`.
   - The password for the account must comply with domain password policy settings. Otherwise, activation of the mailbox fails. Typically the domain administrator sets the password policy by using Group Policy at the domain level.
   - The password for the account should never expire.
2. Add the account as a member of the following groups:
   - Exchange Server 2013 or 2010 — Backup Operators, Domain Users, Exchange Servers, Organization Management
   - Exchange Server 2007 — Backup Operators, Domain Admins, Exchange Organization Administrators, Exchange Servers
3. Log in to the Exchange server as an administrator.

   In an Exchange Server 2013 or 2010 DAG, log in to any server.

   In an Exchange Server 2007 cluster, log in to an active node.
4. From the Exchange Management Console, create an AvamarBackupUser mailbox that uses the default settings.

   The mailbox must not be hidden from Exchange address lists.
5. Add FullAccess permission to the AvamarBackupUser account in the Exchange Management Shell by typing the following command on a single command line:

   `get-exchangeserver -identity '`*`Exchange-server`***`'|add-adpermission -user avamarbackupuser -ExtendedRights Receive-As,Send-As`**

   where *Exchange-server* is the name of the Exchange server.
6. Activate the AvamarBackupUser Exchange server mailbox by using one of the following methods:
   - Access the AvamarBackupUser mailbox with an Outlook email client.
   - Send a test email message to the AvamarBackupUser email account.

7. On all servers in the environment with the Exchange VSS plug-in, configure the Backup Agent service to run as AvamarBackupUser:
   a. Log in to the Exchange server as AvamarBackupUser.
   b. Open the Windows **Services** console.
   c. Right-click the **Backup Agent** service and select **Properties**.

      The **Backup Agent Properties** dialog box appears.
   d. Click the **Logon** tab.
   e. Select **This account**.
   f. Type the **AvamarBackupUser** account name in the **This account** box.

      If there is more than one Active Directory domain, then type the username with the syntax `domain\account`, where *domain* is the Active Directory domain for the AvamarBackupUser user account, and *account* is the name of the AvamarBackupUser account.
   g. Type the password for the AvamarBackupUser account in the **Password** and **Confirm Password** text boxes.
   h. Click **OK**.
   i. Restart the **Backup Agent** service by right-clicking the service and selecting **Restart**.
8. On all servers in the environment with the Exchange GLR plug-in, configure the EMC Avamar Exchange GLR service to run as AvamarBackupUser:
   a. Log in to the Exchange server as AvamarBackupUser.
   b. Open the Windows **Services** console.
   c. Right-click the **EMC Avamar Exchange GLR** service and select **Properties**.

      The **EMC Avamar Exchange GLR Properties** dialog box appears.
   d. Click the **Logon** tab.
   e. Select **This account**.
   f. Type the **AvamarBackupUser** account name in the **This account** box.

      If there is more than one Active Directory domain, then type the username with the syntax `domain\account`, where *domain* is the Active Directory domain for the AvamarBackupUser user account, and *account* is the name of the AvamarBackupUser account.
   g. Type the password for the AvamarBackupUser account in the **Password** and **Confirm Password** text boxes.
   h. Click **OK**.
   i. If the EMC Avamar Exchange GLR service is started, then right-click the service and select **Stop**.

      If the service is already stopped, then do not start the service.

Configuring an Exchange DAG client

To configure an Exchange DAG client to perform federated backups of databases in an Exchange Server 2013 or 2010 DAG:

1. Log in to an Exchange server in the DAG with the AvamarBackupUser account.
2. Start the Cluster Configuration Tool:
   - On Windows Server 2012, open the **Start** screen and select **Cluster Configuration Tool**.
   - On Windows Server 2008, open the **Start** menu and select **Program Files** › **EMC Avamar** › **Cluster Configuration Tool**.

   The welcome page appears.
3. Click **Next**.

   The **Plug-Ins** page appears.
4. Select **Exchange DAG** and click **Next**.

   The **DAG Nodes** page appears with a list of DAG servers and their status.
5. Ensure that the environment meets the following requirements:
   - The status for each Exchange server is Up.
   - The installation status of the Windows client software for each server is Installed.
   - The installation status of the Exchange VSS plug-in on each server is Installed.
6. Click **Next**.

   The **Operations** page appears.
7. Select **Configure a new DAG client for all nodes** and click **Next**.

   The **Prerequisites** page appears. A check mark next to a prerequisite indicates that the environment meets the prerequisite.
8. Ensure that the environment meets all prerequisites on the **Prerequisites** page.

   If the environment does not meet a prerequisite, then exit the wizard, resolve the issue, and restart the wizard.
9. Select the Internet Protocol version that the environment uses, and then click **Next**.

   The **DAG Client Settings** page appears.
10. Specify the IP address and network mask for the cluster group for the DAG client:
    a. Select the network in the network list.
    b. Type the IP address for the DAG client cluster group in the **Exchange DAG client IPv4/IPv6 address** box. The IP address must be a unique, unused IP address. Do not use the IP address for the DAG.
    c. Type the network mask for the DAG client cluster group in the **Exchange DAG client IP subnet mask** box.
11. Click **Next**.

    The **Server Settings** page appears.

12. Specify the settings for the Avamar server:
    a. Type either the DNS name of the Avamar server in the **Name** box or the IP address in the **IPv4**/**IPv6** address box.
    b. Type the name of the Avamar domain for the Exchange DAG client in the **Avamar client domain for the DAG client** box.
    c. Type the data port for Avamar client/server communication in the **Port number** box.
    d. Type the path to the `var` folder for the cluster client in the **Cluster client's var directory** box, or click **Browse** to select a location.

       The `var` folder stores the Exchange DAG client configuration and log files. The AvamarBackupUser account and all nodes in the cluster must have write access to this location.

       NOTICE

       Select a volume that each server in the DAG can access.

13. Click **Next**.

    The **Summary** page appears.

14. Review the settings that you specified in the wizard, and click **Configure**.

    The **Progress** page provides the status of the configuration. When the configuration is complete, the **Results** page appears.

15. Click **Close**.

Configuring a cluster client in an Exchange Server 2007 cluster

1. Log in to the active node in the Exchange cluster with the AvamarBackupUser account.
2. Start the Cluster Configuration Tool by opening the **Start** menu and selecting **Program Files** › **EMC Avamar** › **Cluster Configuration Tool**.

   The welcome page appears.
3. Click **Next**.

   The **Plug-Ins** page appears.
4. Select **Exchange 2007** and click **Next**.

   The **Cluster Nodes** page appears with a list of nodes and their status.
5. Ensure that the environment meets the following requirements:
   - The status for each Exchange node is Up.
   - The installation status of the Windows client software for each node is Installed.
   - The installation status of the Exchange VSS plug-in on each node is Installed.
6. Click **Next**.

   The **Operations** page appears.
7. Select **Configure a new cluster client for all nodes** and click **Next**.

The **Prerequisites** page appears. A check mark next to a prerequisite indicates that the environment meets the prerequisite.

8. Ensure that the environment meets all prerequisites on the **Prerequisites** page.

   If the environment does not meet a prerequisite, then exit the wizard, resolve the issue, and restart the wizard.

9. Select the Internet Protocol version that the environment uses, and then click **Next**.

   The **Attach to Service** page appears.

10. Select the cluster service for the plug-in, and then click **Next**.

    The **Server Settings** page appears.

11. Specify the settings for the Avamar server:

    a. Type either the DNS name of the Avamar server in the **Name** box or the IP address in the **IPv4**/**IPv6** address box.

    b. Type the name of the Avamar domain for the cluster client in the **Avamar client domain for the cluster client** box.

    c. Type the data port for Avamar client/server communication in the **Port number** box.

    d. Type the path to the `var` folder for the cluster client in the **Cluster client's var directory** box, or click **Browse** to select a location.

       The `var` folder stores the cluster client configuration and log files. The AvamarBackupUser account and all nodes in the cluster must have write access to this location.

       NOTICE

       Select a volume that the cluster owns instead of a remote pathname on the network.

12. Click **Next**.

    The **Summary** page appears.

13. Review the settings that you specified in the wizard, and click **Configure**.

    The **Progress** page provides the status of the configuration. When the configuration is complete, the **Results** page appears.

14. Click **Close**.

Adding servers to a DAG configuration

You can add servers to the Exchange DAG client configuration after you configure the client with the Cluster Configuration Tool. The servers that you add might be new servers in the DAG, or they might have been offline when you configured the Exchange DAG client.

To add a server to an Exchange DAG client configuration:

1. Log in to the new server with the AvamarBackupUser account.
2. Install the Avamar Client for Windows on the new server.
3. Install the Avamar Plug-in for Exchange VSS on the new server.

4. Set the Backup Agent service to run as the AvamarBackupUser account.
5. If you install the Exchange GLR plug-in on the server, then set the Exchange GLR service to run as the AvamarBackupUser account.
6. Open the Cluster ConfigurationTool:
   - On Windows Server 2012, open the **Start** screen and select **Cluster Configuration Tool**.
   - On Windows Server 2008, open the **Start** menu and select **Program Files** › **EMC Avamar** › **Cluster Configuration Tool**.

   The wizard opens at the **Welcome to Avamar Windows Cluster Configuration** page.
7. Click **Next**.

   The **Plug-Ins** page appears.
8. Select **Exchange DAG** and click **Next**.

   The **DAG Nodes** page appears with a list of servers and their status.
9. Ensure that the environment meets the following requirements:
   - The status for each Exchange server is Up.
   - The installation status of the Windows client software for each server is Installed.
   - The installation status of the Exchange VSS plug-in on each server is Installed.
10. Click **Next**.

    The **Operations** page appears.
11. Select **Configure new nodes with the existing DAG client configuration** and click **Next**.

    The **Prerequisites** page appears. A check mark next to a prerequisite indicates that the environment meets the prerequisite.
12. Ensure that the environment meets all prerequisites on the **Prerequisites** page.

    If the environment does not meet a prerequisite, then exit the wizard, resolve the issue, and restart the wizard.
13. Click **Next**.

    The **Summary** page appears.
14. Review the settings that you specified in the wizard, and click **Configure**.

    The **Progress** page provides the status of the configuration. When the configuration is complete, the **Results** page appears.
15. Click **Close**.

Upgrading the Avamar client software

The steps to upgrade Avamar client and plug-in software on a Microsoft Exchange server depend on whether the installation is on a stand-alone server, in a DAG, or in a cluster.

Note: If you upgrade the Avamar server to version 7.0 but the Exchange VSS and Exchange GLR plug-ins on the Exchange server are version 6.1, then configure command files with encryption flags. Otherwise, you cannot browse a database backup for mailboxes, folders, and messages for GLR.

Upgrading on a stand-alone server

To upgrade Avamar client and plug-in software on a stand-alone server:

1. Ensure that the environment meets all system requirements for the new version. "Preparing to install the Avamar Plug-in for Exchange VSS" on page 36 provides information.
2. Uninstall the current version of the Avamar client and plug-in:
   a. Uninstall the earlier version of the Exchange VSS plug-in.

      The Exchange GLR plug-in uninstalls automatically when you uninstall the Exchange VSS plug-in. You must restart the computer after you uninstall the Exchange GLR plug-in.

   b. Uninstall the earlier version of the Avamar Client for Windows.

   The plug-in guide for the earlier version provides instructions for each of these steps.
3. Install and configure the new version of the Avamar client and plug-in:
   a. Install the new version of the Avamar Client for Windows. "Installing the Avamar Client for Windows" on page 45 provides instructions.
   b. Install the new version of the Exchange VSS plug-in, and optionally the Exchange GLR plug-in. "Installing the Exchange VSS plug-in" on page 46 provides instructions. If you install the Exchange GLR plug-in, you must restart the server after installation.
   c. Register the Exchange server as a client with the Avamar server. "Registering the client" on page 47 provides instructions.
   d. Create the AvamarBackupUser account, if the account does not already exist. "Creating and configuring the AvamarBackupUser account" on page 48 provides instructions.

      If the account already exists, ensure that the Backup Agent service on each server with the Exchange VSS plug-in and the Exchange GLR service on each server with the Exchange GLR plug-in use the AvamarBackupUser account. "Manually creating and configuring the AvamarBackupUser account" on page 51 provides instructions.

Upgrading in a DAG or cluster

1. Ensure that the environment meets all system requirements for the new version. "Preparing to install the Avamar Plug-in for Exchange VSS" on page 36 provides information.
2. Uninstall the current version of the Avamar client and plug-in:
   a. Use the Cluster Configuration Tool to uninstall the Exchange DAG client or the Avamar cluster client.
   b. Uninstall the earlier version of the Avamar Plug-in for Exchange VSS.

      The Exchange GLR plug-in uninstalls automatically when you uninstall the Exchange VSS plug-in. You must restart the computer after you uninstall the Exchange GLR plug-in.
   c. Uninstall the earlier version of the Avamar Client for Windows.

   The user guide for the earlier version provides instructions for each of these steps.
3. Install and configure the new version of the Avamar client and plug-in:
   a. Install the new version of the Avamar Client for Windows on each Exchange server with the Mailbox server role. "Installing the Avamar Client for Windows" on page 45 provides instructions.
   b. Install the new version of the Exchange VSS plug-in, and optionally the Exchange GLR plug-in, on each Exchange server with the Mailbox server role. "Installing the Avamar Client for Windows" on page 45 provides instructions. If you install the Exchange GLR plug-in, you must restart the server after installation.
   c. Register each Exchange server as a client with the Avamar server. "Registering the client" on page 47 provides instructions.
   d. Create the AvamarBackupUser account, if the account does not already exist. "Creating and configuring the AvamarBackupUser account" on page 48 provides instructions.

      If the account already exists, ensure that the Backup Agent service on each server with the Exchange VSS plug-in and the Exchange GLR service on each server with the Exchange GLR plug-in use the AvamarBackupUser account. "Manually creating and configuring the AvamarBackupUser account" on page 51 provides instructions.
   e. Use the Cluster Configuration Tool to configure the Exchange DAG client or Avamar cluster client. The following topics provide instructions:
      - "Configuring an Exchange DAG client" on page 53
      - "Configuring a cluster client in an Exchange Server 2007 cluster" on page 54

Uninstalling the Avamar client software

You can uninstall Avamar client and plug-in software on a stand-alone server, a DAG environment, or a cluster environment.

Uninstall road map

To uninstall Avamar client and plug-in software from a stand-alone server, a DAG environment, or a cluster:

1. (DAG or cluster only) Uninstall the Exchange DAG client or the Avamar cluster client. "Uninstalling the Exchange DAG client or Avamar cluster client" on page 59 provides instructions.
2. Uninstall the Exchange VSS plug-in. "Uninstalling the Exchange VSS plug-in" on page 60 provides instructions.

   The Exchange GLR plug-in uninstalls automatically when you install the Exchange VSS plug-in. You must restart the computer after you uninstall the Exchange GLR plug-in.
3. Uninstall the Avamar Client for Windows. "Uninstalling the Avamar Client for Windows" on page 60 provides instructions.
4. (DAG and cluster only) Repeat step 2 and step 3 on each server or node.

Uninstalling the Exchange DAG client or Avamar cluster client

1. Log in to a DAG server or an active cluster node with the AvamarBackupUser account.
2. Start the Cluster Configuration Tool:
   - On Windows Server 2012, open the **Start** screen and select **Cluster Configuration Tool**.
   - On Windows Server 2008 or Windows Server 2003, open the **Start** menu and select **Program Files** › **EMC Avamar** › **Cluster Configuration Tool**.

   The welcome page appears.
3. Click **Next**.

   The **Plug-Ins** page appears.
4. Select **Exchange DAG** or **Exchange 2007** and click **Next**.

   If you select **Exchange DAG**, then the **DAG Nodes** page appears with a list of servers and their status.

   If you select **Exchange 2007**, then the **Cluster Nodes** page appears with a list of nodes and their status.
5. Ensure that the status of each server or node is Up. Otherwise, the Cluster Configuration Tool cannot uninstall the Exchange DAG client from the server.
6. Click **Next**.

   The **Operations** page appears.
7. Select **Remove the DAG client from all nodes** or **Remove the cluster client from all nodes,** and then click **Next**.

The **Prerequisites** page appears.

8. Ensure that the environment meets all prerequisites on the page, and click **Next**.

   The **Select Service** page appears.

9. Select the service you want to remove the DAG or cluster client from, and then click **Next**.

   The **Summary** page appears.

10. Review the settings that you specified in the wizard, and click **Uninstall**.

    The **Progress** page provides the status of the uninstall. When the uninstall is complete, the **Results** page appears.

11. Click **Close**.

Uninstalling the Exchange VSS plug-in

To uninstall the Exchange VSS plug-in:

- On Windows Server 2012 or 2008, use **Programs and Features**.
- On Windows Server 2003, use **Add/Remove Programs**.

The Exchange GLR plug-in uninstalls automatically when you install the Exchange VSS plug-in. You must restart the computer after you uninstall the Exchange GLR plug-in.

Uninstalling the Avamar Client for Windows

To uninstall the Avamar Client for Windows:

- On Windows Server 2012 or 2008, use **Programs and Features**.
- On Windows Server 2003, use **Add/Remove Programs**.

CHAPTER 3
Backup

The following topics describe how to use the Exchange VSS plug-in to perform on-demand and scheduled backups of a Microsoft Exchange environment:

Performing on-demand backups

The following topics describe how to use the Exchange VSS plug-in to perform an on-demand backup in a Microsoft Exchange environment.

Backing up a stand-alone environment

You can back up the entire Exchange server, or a specific database or storage group.

To perform an on-demand backup in a stand-alone Exchange environment:

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.

2. In the domain tree, select the domain for the client.

3. From the list of clients, select the Exchange server.

   You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.

4. Click the **Backup** tab.

   A list of plug-ins on the client appears in the left pane of the **Backup** tab.

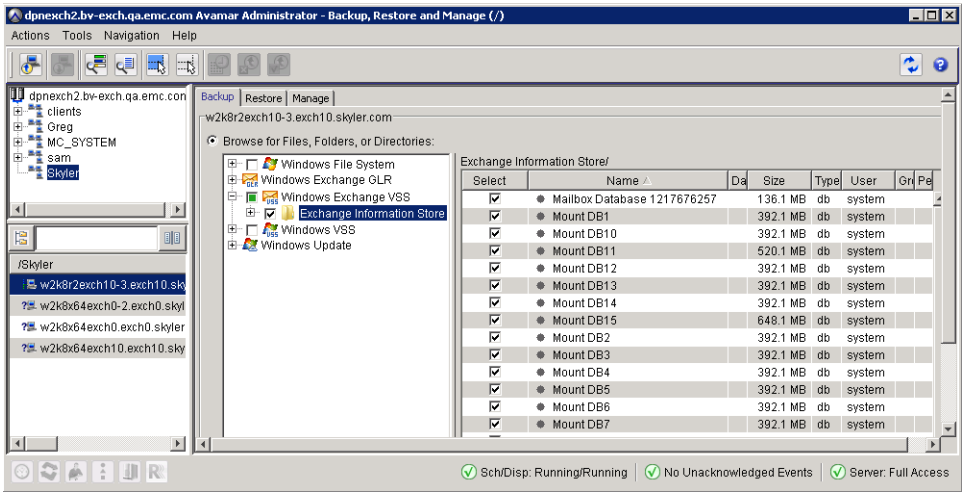
   NOTICE

   When you install the Avamar Plug-in for Exchange GLR, Windows Exchange GLR appears in the list of plug-ins when you browse for backups. However, the Exchange GLR plug-in is for recovery only. When you perform granular level recovery, it uses backups created with the Exchange VSS plug-in.

5. Select the **Windows Exchange VSS** plug-in.

6. Select the data to back up:

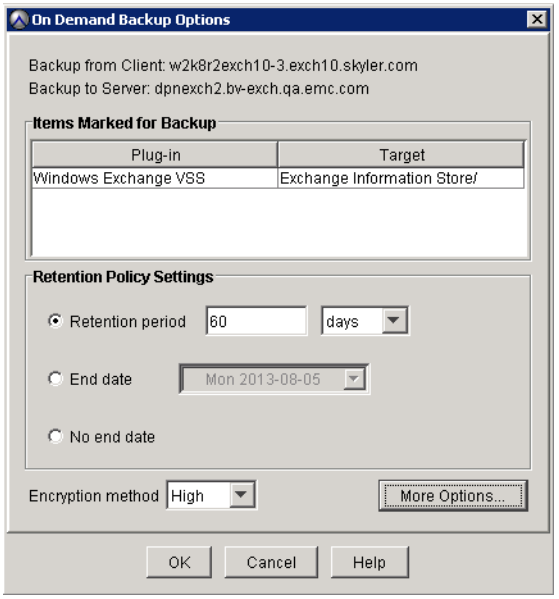
   - To back up the entire Exchange server, select the checkbox next to **Exchange Information Store**.



- To back up specific databases or storage groups, select **Exchange Information Store** in the left pane and then select the checkbox next to the databases or storage groups in the right pane.

7. Select **Actions › Back Up Now**.

   The **On Demand Backup Options** dialog box appears.



8. Select the backup retention setting:

   - To automatically delete this backup from the Avamar server after a specific amount of time, select **Retention period** and then specify the number of days, weeks, months, or years for the retention period.
   - To automatically delete this backup from the Avamar server on a specific calendar date, select **End date** and browse to that date on the calendar.
   - To keep this backup for as long as this client remains active in the Avamar server, select **No end date**.

9. Select the encryption method to use for client/server data transfer during this backup.

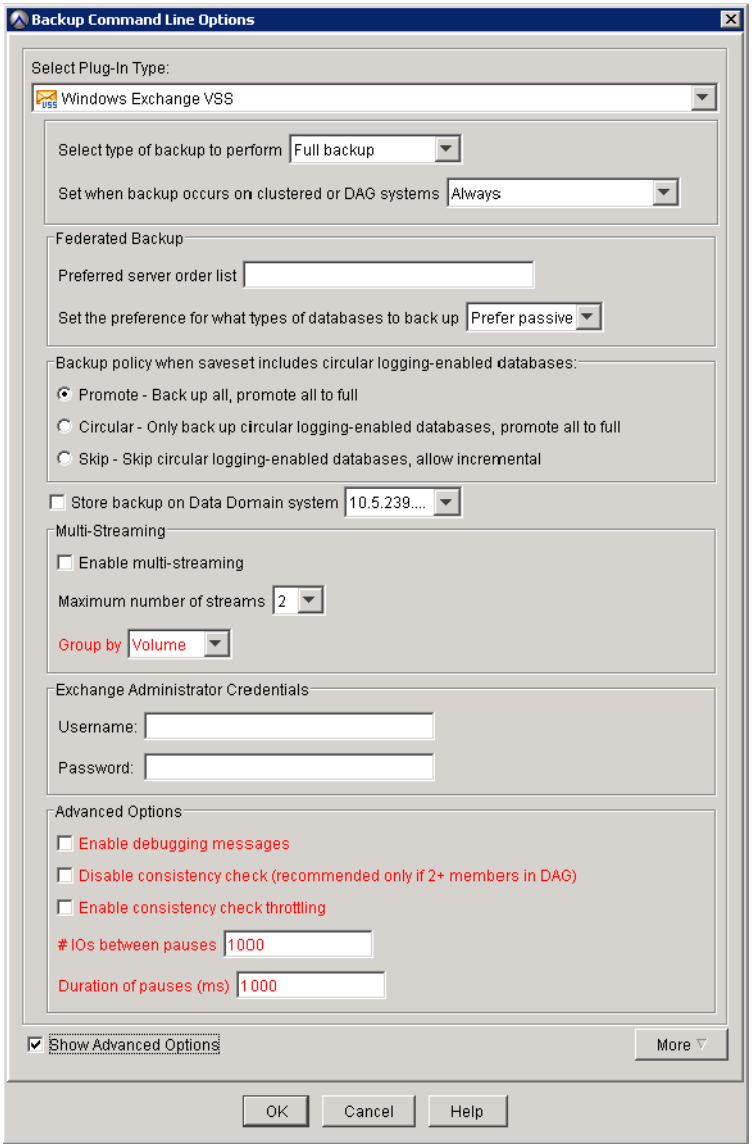
   The encryption technology and bit strength for a client/server connection depends on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.

10. Click **More Options**.

    The **Backup Command Line Options** dialog box appears.

11. Select the **Show Advanced Options** checkbox.

    Additional options appear in red.



12. Set the plug-in options:

    a. From the **Select type of backup to perform** list, select whether to perform a full or incremental backup.

    Note: You can use only full backups for granular level recovery.

    b. Disregard the following options, which do not apply to backups of a stand-alone server:

    - **Set when backup occurs on clustered or DAG systems**
    - **Preferred server order list**
    - **Set the preference for what types of databases to back up**

c. If you are performing an incremental backup and you enabled circular logging on any of the selected databases, select the backup behavior:

   – To perform a full backup of all databases if any of the databases use circular logging, select **Promote: back up all databases, promoting incrementals to full if any database in the saveset has circular logging enabled**.

   – To perform a full backup of databases with circular logging and skip other databases, select **Circular: back up only those databases with circular logging enabled, promoting them to full**.

   – To skip databases with circular logging and perform an incremental backup of other databases, select **Skip: skip backup of databases with circular logging enabled, allowing incremental backups**.

d. To store the backup on a Data Domain system instead of the Avamar server, select **Store backup on Data Domain system** and select the Data Domain system from the list.

e. To enable multi-streaming, which enables you to simultaneously back up multiple databases or volumes to reduce backup time, select the **Enable multi-streaming** checkbox and then set the following options:

   – Select the maximum number of streams to use for the backup from the **Maximum number of streams** list.

   – From the **Group by** list, select how to group the streams. Select **Database** to create one stream for each database, or **Volume** to create one stream for each volume.

   "Multi-streaming" on page 27 provides guidelines for multi-streaming.

f. If you did not configure an AvamarBackupUser account, then specify the **Username** and **Password** for an account that has sufficient permissions to perform the backup. "Creating and configuring the AvamarBackupUser account" on page 48 provides more information.

g. To write maximum information to log files for debugging, select **Enable debugging messages**. Selecting this option creates large log files.

h. Disregard the consistency check options unless EMC Customer Support instructs otherwise.

"Exchange VSS plug-in backup options" on page 142 provides additional information on all backup plug-in options.

13. Click **OK** on the **Backup Command Line Options** dialog box.
14. Click **OK** on the **On Demand Backup Options** dialog box.

    The **On Demand Backup Request** dialog box indicates that the backup started.
15. Click **Close**.

Performing a federated backup in a DAG environment

To perform an on-demand federated backup of databases in an Exchange Server 2013 or 2010 DAG environment:

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.

2. In the domain tree, select the domain for the client.

3. From the list of clients, select the Exchange DAG client that you configured with the Avamar Cluster Configuration Tool.

   You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.

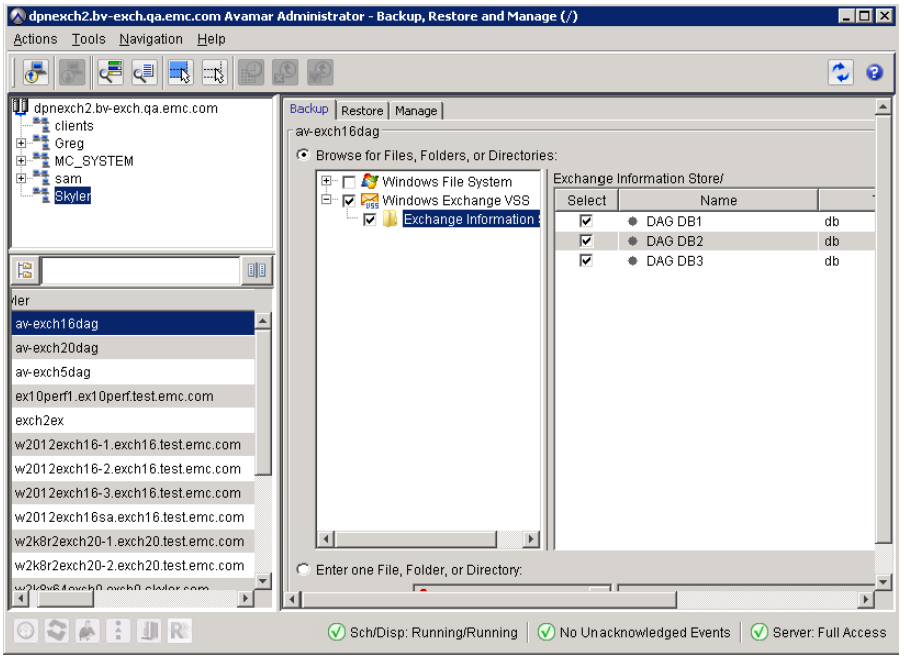
4. Click the **Backup** tab.

   A list of plug-ins on the client appears in the left pane of the **Backup** tab.

5. Select the **Windows Exchange VSS** plug-in.

6. Select the data to back up:

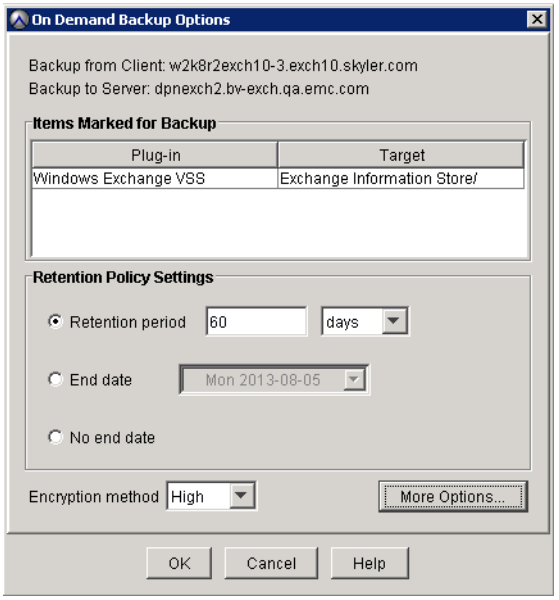
   - To back up all databases in the DAG, select the checkbox next to **Exchange Information Store**. You can select whether to back up only active or passive copies of the databases later in this procedure.



   - To back up specific databases, select **Exchange Information Store** in the left pane and then select the checkbox next to the databases in the right pane.

7. Select **Actions > Back Up Now**.

   The **On Demand Backup Options** dialog box appears.



8. Select the backup retention setting:

   - To automatically delete this backup from the Avamar server after a specific amount of time, select **Retention period** and then specify the number of days, weeks, months, or years for the retention period.
   - To automatically delete this backup from the Avamar server on a specific calendar date, select **End date** and browse to that date on the calendar.
   - To keep this backup for as long as this client remains active in the Avamar server, select **No end date**.

9. Select the encryption method to use for client/server data transfer during this backup.

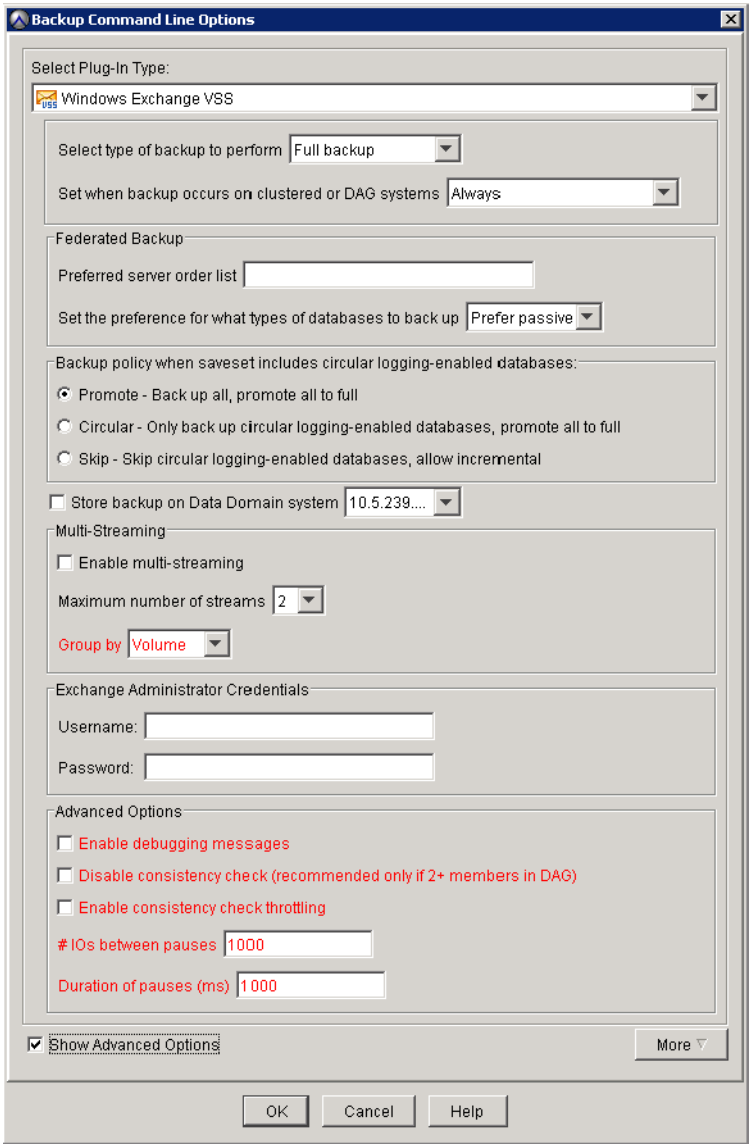
   The encryption technology and bit strength for a client/server connection depends on several factors, including the client platform and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.

10. Click **More Options**.

    The **Backup Command Line Options** dialog box appears.

11. Select the **Show Advanced Options** checkbox.

    Additional options appear in red.



12. Set the plug-in options:

    a. From the **Select type of backup to perform** list, select whether to perform a full or incremental backup.

    Note: You can use only full backups for granular level recovery.

    b. Disregard the **Set when backup occurs on clustered or DAG systems** list. This option does not apply to federated backups.

    c. In the **Preferred server order list** box, specify the priority of servers to use to back up the Exchange databases. Specify the server name, not the FQDN. Separate multiple entries with commas.

If you do not specify a list, then the Exchange VSS plug-in adds all servers in the DAG to the list in alphabetical order.

d. From the **Set the preference for what types of databases to back up** list, select the type of database to back up:

   – Select **Prefer passive** to back up a passive copy of each database, if a healthy passive copy is available. If a healthy passive copy is not available, then Avamar backs up the active copy.

   – Select **Passive only** to back up only the passive copy of each database. If a healthy passive copy is not available, then the backup does not include the database.

   Note: Backup of active only databases will fail.

e. If you are performing an incremental backup and you enabled circular logging on any of the selected databases, select the backup behavior:

   – To perform a full backup of all databases if any of the databases use circular logging, select **Promote: back up all databases, promoting incrementals to full if any database in the saveset has circular logging enabled**.

   – To perform a full backup of databases with circular logging and skip other databases, select **Circular: back up only those databases with circular logging enabled, promoting them to full**.

   – To skip databases with circular logging and perform an incremental backup of other databases, select **Skip: skip backup of databases with circular logging enabled, allowing incremental backups**.

f. To store the backup on a Data Domain system instead of the Avamar server, select **Store backup on Data Domain system** and select the Data Domain system from the list.

g. To enable multi-streaming, which enables you to simultaneously back up multiple databases or volumes to reduce backup time, select the **Enable multi-streaming** checkbox and then set the following options:

   – Select the maximum number of streams to use for the backup from the **Maximum number of streams** list.

   – From the **Group by** list, select how to group the streams. Select **Database** to create one stream for each database, or **Volume** to create one stream for each volume.

   "Multi-streaming" on page 27 provides guidelines for multi-streaming.

h. Specify the **Username** and **Password** for the AvamarBackupUser account.

   "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.

i. To write maximum information to log files for debugging, select **Enable debugging messages**. Selecting this option creates large log files.

j. Select whether to disable the consistency check by selecting or clearing the **Disable consistency check (recommended only if 2+ members in DAG)** checkbox.

A consistency check can cause severe performance issues or fail during a backup, especially in environments with many transaction logs.

k. (Optional) If you leave consistency check enabled, throttle the utility by pausing the consistency check after a specified number of I/Os:

   - Select the **Enable consistency check throttling** checkbox.
   - Specify the number of I/Os between pauses when throttling in the **#I/Os between pauses** box. The value must be between 100 and 10000.
   - Specify the duration of the pause in milliseconds in the **Duration of pauses (ms)** box. The value must be between 1000 and 60000.

"Exchange VSS plug-in backup options" on page 142 provides additional information on the backup plug-in options.

13. Click **OK** on the **Backup Command Line Options** dialog box.
14. Click **OK** on the **On Demand Backup Options** dialog box.

    The **On Demand Backup Options** dialog box closes and the following status message appears: Backup initiated.

15. Click **OK**.

Backing up a specific server in a DAG environment

To perform an on-demand backup of a specific server in an Exchange Server 2013 or 2010 DAG environment:

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.

2. In the domain tree, select the domain for the client.
3. From the list of clients, select the Exchange server.

   You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.

4. Click the **Backup** tab.

   A list of plug-ins on the client appears in the left pane of the **Backup** tab.

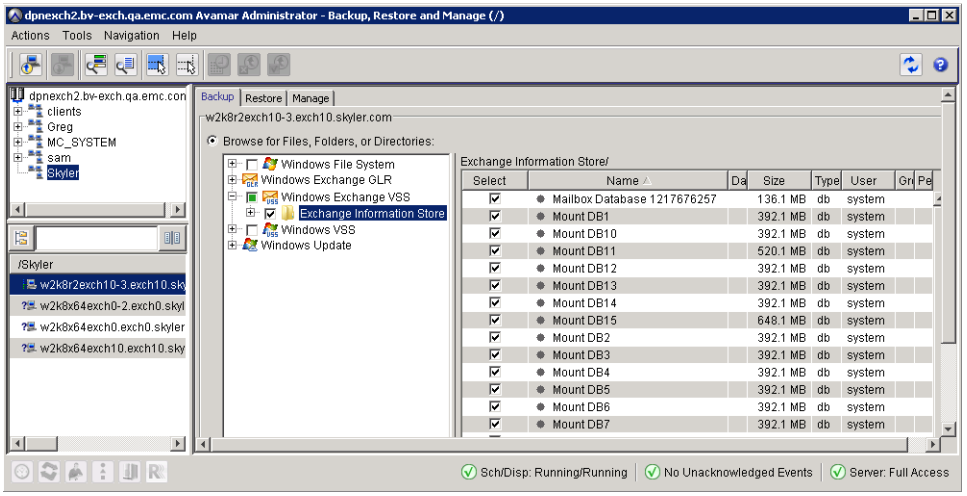
   NOTICE

   When you install the Avamar Plug-in for Exchange GLR, Windows Exchange GLR appears in the list of plug-ins when you browse for backups. However, the Exchange GLR plug-in is for recovery only. When you perform granular level recovery, it uses backups created with the Exchange VSS plug-in.

5. Select the **Windows Exchange VSS** plug-in.

6. Select the data to back up:

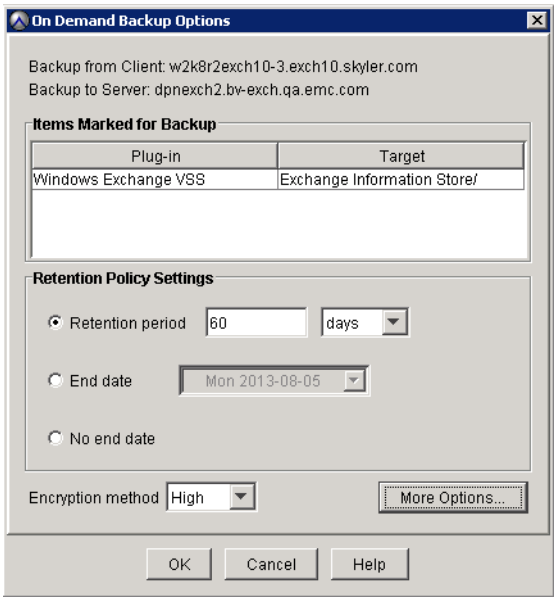
   - To back up all databases, select the checkbox next to **Exchange Information Store**. You can select whether to back up only active databases, passive databases, or both later in this procedure.



   - To back up specific databases, select **Exchange Information Store** in the left pane and then select the checkbox next to the databases in the right pane.

7. Select **Actions › Back Up Now**.

   The **On Demand Backup Options** dialog box appears.



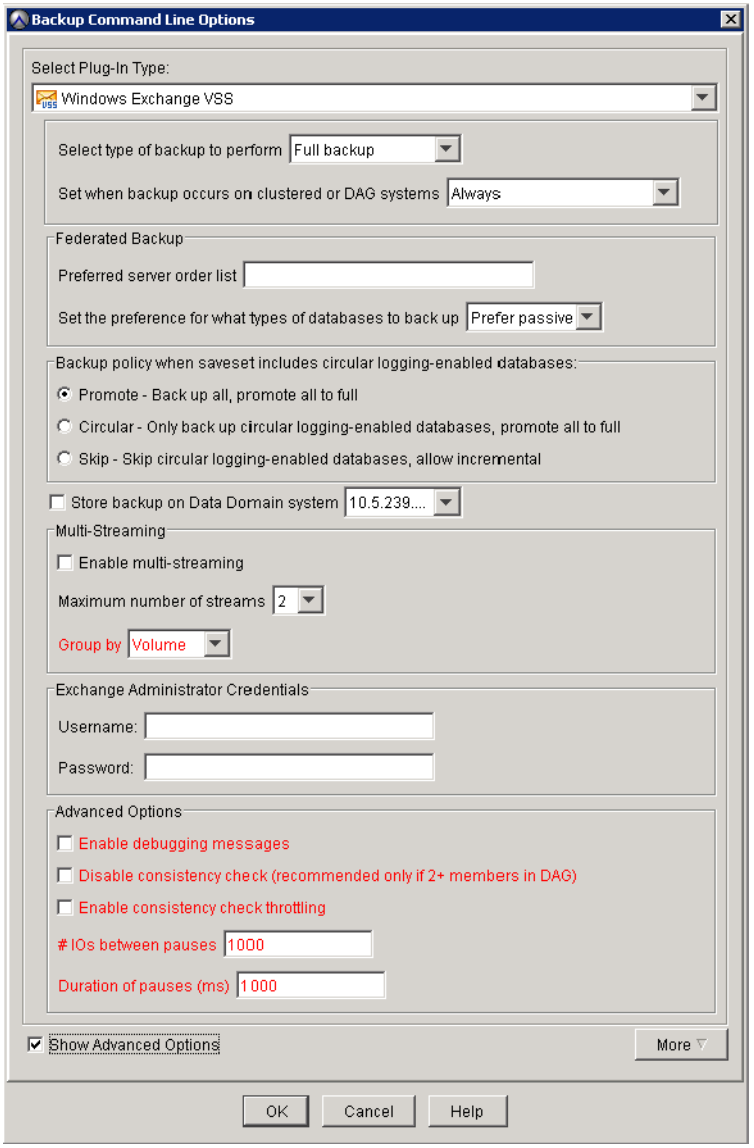
8. Select the backup retention setting:
   - To automatically delete this backup from the Avamar server after a specific amount of time, select **Retention period** and then specify the number of days, weeks, months, or years for the retention period.
   - To automatically delete this backup from the Avamar server on a specific calendar date, select **End date** and browse to that date on the calendar.
   - To keep this backup for as long as this client remains active in the Avamar server, select **No end date**.
9. Select the encryption method to use for client/server data transfer during this backup.

   The encryption technology and bit strength for a client/server connection depends on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.
10. Click **More Options**.

    The **Backup Command Line Options** dialog box appears.

11. Select the **Show Advanced Options** checkbox.

    Additional options appear in red.



12. Set the plug-in options:

    a. From the **Select type of backup to perform** list, select whether to perform a full or incremental backup.

    Note: You can use only full backups for granular level recovery.

    b. From the **Set when backup occurs on clustered or DAG systems** list, select whether to back up passive databases, active databases, or both:

    - Select **Replica (passive) writer only** to back up only passive databases.
    - Select **Store (active) writer only** to back up only active databases.
    - Select **Always** to back up both passive and active databases.

c. Disregard the **Preferred server order list** and **Set the preference for what types of databases to back up** options. These options do not apply when you back up a single server in a DAG environment.

d. If you are performing an incremental backup and you enabled circular logging on any of the selected databases, select the backup behavior:

   – To perform a full backup of all databases if any of the databases use circular logging, select **Promote: back up all databases, promoting incrementals to full if any database in the saveset has circular logging enabled**.

   – To perform a full backup of databases with circular logging and skip other databases, select **Circular: back up only those databases with circular logging enabled, promoting them to full**.

   – To skip databases with circular logging and perform an incremental backup of other databases, select **Skip: skip backup of databases with circular logging enabled, allowing incremental backups**.

e. To store the backup on a Data Domain system instead of the Avamar server, select **Store backup on Data Domain system** and select the Data Domain system from the list.

f. To enable multi-streaming, which enables you to simultaneously back up multiple databases or volumes to reduce backup time, select the **Enable multi-streaming** checkbox and then set the following options:

   – Select the maximum number of streams to use for the backup from the **Maximum number of streams** list.

   – From the **Group by** list, select how to group the streams. Select **Database** to create one stream for each database, or **Volume** to create one stream for each volume.

   "Multi-streaming" on page 27 provides guidelines for multi-streaming.

g. If you did not configure an AvamarBackupUser account, then specify the **Username** and **Password** for an account that has sufficient permissions to perform the backup. "Creating and configuring the AvamarBackupUser account" on page 48 provides more information.

h. To write maximum information to log files for debugging, select **Enable debugging messages**. Selecting this option creates large log files.

i. Select whether to disable the consistency check by selecting or clearing the **Disable consistency check (recommended only if 2+ members in DAG)** checkbox.

   A consistency check can cause severe performance issues or fail during a backup, especially in environments with many transaction logs.

j. (Optional) If you leave consistency check enabled, throttle the utility by pausing the consistency check after a specified number of I/Os:

   - Select the **Enable consistency check throttling** checkbox.
   - Specify the number of I/Os between pauses when throttling in the **#I/Os between pauses** box. The value must be between 100 and 10000.
   - Specify the duration of the pause in milliseconds in the **Duration of pauses (ms)** box. The value must be between 1000 and 60000.

"Exchange VSS plug-in backup options" on page 142 provides additional information on the backup plug-in options.

13. Click **OK** on the **Backup Command Line Options** dialog box.
14. Click **OK** on the **On Demand Backup Options** dialog box.

    The **On Demand Backup Options** dialog box closes and the following status message appears: Backup initiated.
15. Click **OK**.

Backing up a passive node in an Exchange Server 2007 cluster

To perform an on-demand backup of a passive node in an Exchange Server 2007 cluster:

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.
2. In the domain tree, select the domain for the client.
3. From the list of clients, select the Exchange server that contains passive database copies.

   You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.
4. Click the **Backup** tab.

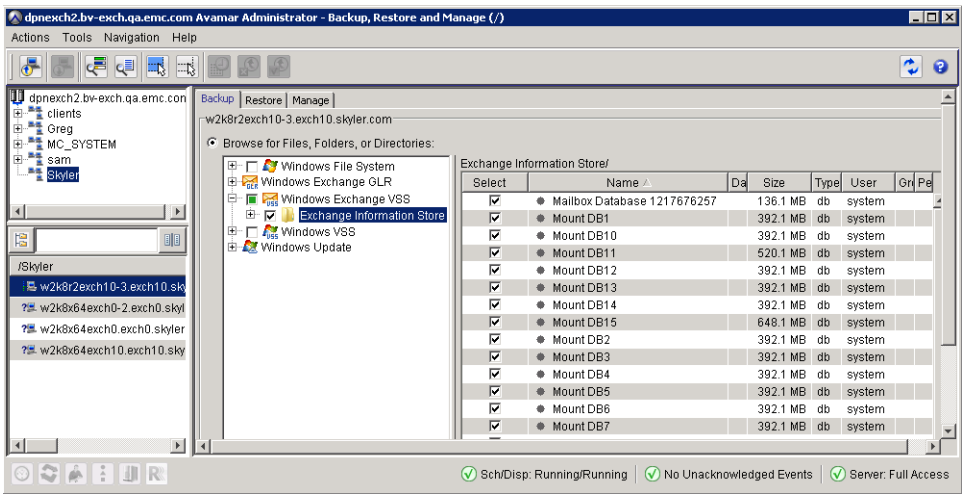
   A list of plug-ins on the client appears in the left pane of the **Backup** tab.

   NOTICE

   When you install the Avamar Plug-in for Exchange GLR, Windows Exchange GLR appears in the list of plug-ins when you browse for backups. However, the Exchange GLR plug-in is for recovery only. When you perform granular level recovery, it uses backups created with the Exchange VSS plug-in.
5. Select the **Windows Exchange VSS** plug-in.

6. Select the data to back up:

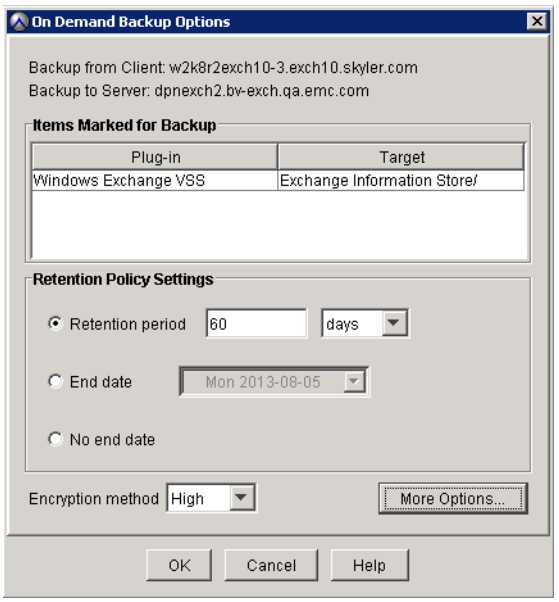
   - To back up all storage groups, select the checkbox next to **Exchange Information Store**.



   - To back up specific storage groups, select **Exchange Information Store** in the left pane and then select the checkbox next to the storage groups in the right pane.

7. Select **Actions › Back Up Now**.

   The **On Demand Backup Options** dialog box appears.



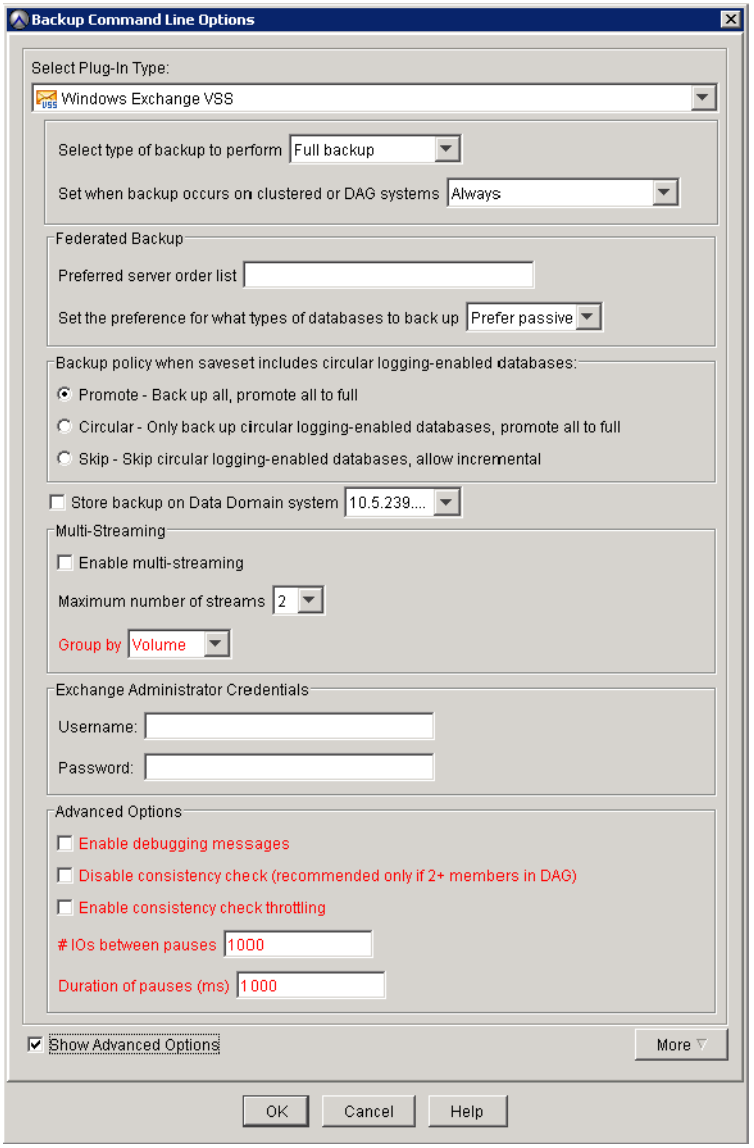
8. Select the backup retention setting:
   - To automatically delete this backup from the Avamar server after a specific amount of time, select **Retention period** and then specify the number of days, weeks, months, or years for the retention period.
   - To automatically delete this backup from the Avamar server on a specific calendar date, select **End date** and browse to that date on the calendar.
   - To keep this backup for as long as this client remains active in the Avamar server, select **No end date**.
9. Select the encryption method to use for client/server data transfer during this backup.

   The encryption technology and bit strength for a client/server connection depends on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.
10. Click **More Options**.

    The **Backup Command Line Options** dialog box appears.

11. Select the **Show Advanced Options** checkbox.

    Additional options appear in red.



12. Set the plug-in options:

    a. From the **Select type of backup to perform** list, select whether to perform a full or incremental backup.

    Note: You can use only full backups for granular level recovery.

    b. From the **Set when backup occurs on clustered or DAG systems** list, select **Replica (passive) writer only** to back up only passive databases.

    c. Disregard the **Preferred server order list** and **Set the preference for what types of databases to back up** options. These options do not apply to backups in an Exchange Server 2007 cluster.

d. If you are performing an incremental backup and you enabled circular logging on any of the selected databases, select the backup behavior:

   – To perform a full backup of all databases if any of the databases use circular logging, select **Promote: back up all databases, promoting incrementals to full if any database in the saveset has circular logging enabled**.

   – To perform a full backup of databases with circular logging and skip other databases, select **Circular: back up only those databases with circular logging enabled, promoting them to full**.

   – To skip databases with circular logging and perform an incremental backup of other databases, select **Skip: skip backup of databases with circular logging enabled, allowing incremental backups**.

e. To store the backup on a Data Domain system instead of the Avamar server, select **Store backup on Data Domain system** and select the Data Domain system from the list.

f. To enable multi-streaming, which enables you to simultaneously back up multiple databases or volumes to reduce backup time, select the **Enable multi-streaming** checkbox and then set the following options:

   – Select the maximum number of streams to use for the backup from the **Maximum number of streams** list.

   – From the **Group by** list, select how to group the streams. Select **Database** to create one stream for each database, or **Volume** to create one stream for each volume.

   "Multi-streaming" on page 27 provides guidelines for multi-streaming.

g. If you did not configure an AvamarBackupUser account, then specify the **Username** and **Password** for an account that has sufficient permissions to perform the backup. "Creating and configuring the AvamarBackupUser account" on page 48 provides more information.

h. To write maximum information to log files for debugging, select **Enable debugging messages**. Selecting this option creates large log files.

i. Select whether to disable the consistency check by selecting or clearing the **Disable consistency check (recommended only if 2+ members in DAG)** checkbox.

   A consistency check can cause severe performance issues or fail during a backup, especially in environments with many transaction logs.

j. (Optional) If you leave consistency check enabled, throttle the utility by pausing the consistency check after a specified number of I/Os:

   – Select the **Enable consistency check throttling** checkbox.

   – Specify the number of I/Os between pauses when throttling in the **#I/Os between pauses** box. The value must be between 100 and 10000.

   – Specify the duration of the pause in milliseconds in the **Duration of pauses (ms)** box. The value must be between 1000 and 60000.

"Exchange VSS plug-in backup options" on page 142 provides additional information on the backup plug-in options.

13. Click **OK** on the **Backup Command Line Options** dialog box.
14. Click **OK** on the **On Demand Backup Options** dialog box.

    The **On Demand Backup Options** dialog box closes and the following status message appears: Backup initiated.
15. Click **OK**.

Backing up an active node in an Exchange Server 2007 cluster

To perform an on-demand backup of an active node in an Exchange Server 2007 cluster:

1. In Avamar Administrator, click the **Backup & Restore** tab.

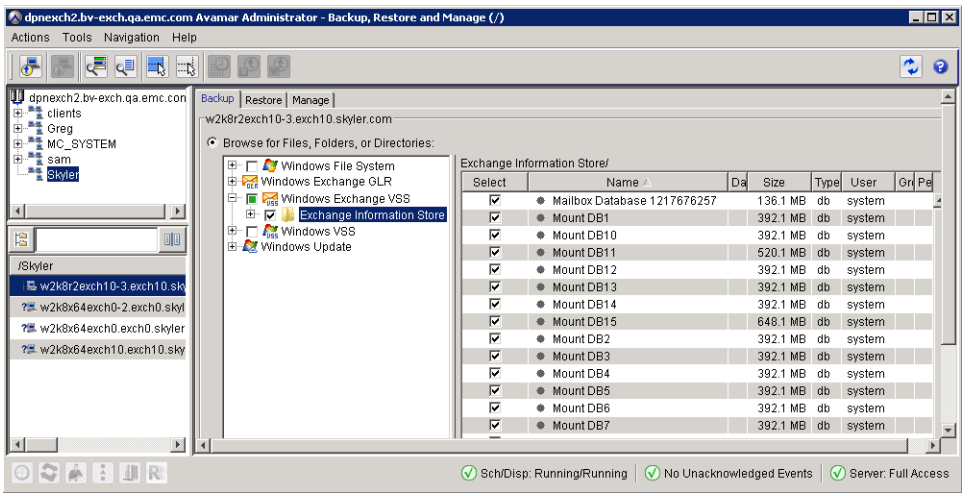
   The **Backup, Restore and Manage** window appears.
2. In the domain tree, select the domain for the client.
3. From the list of clients, select the Avamar cluster client that you configured with the Avamar Cluster Configuration Tool. The cluster client automatically passes backup jobs to the currently active node.

   You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.
4. Click the **Backup** tab.

   A list of plug-ins on the client appears in the left pane of the **Backup** tab.

   NOTICE

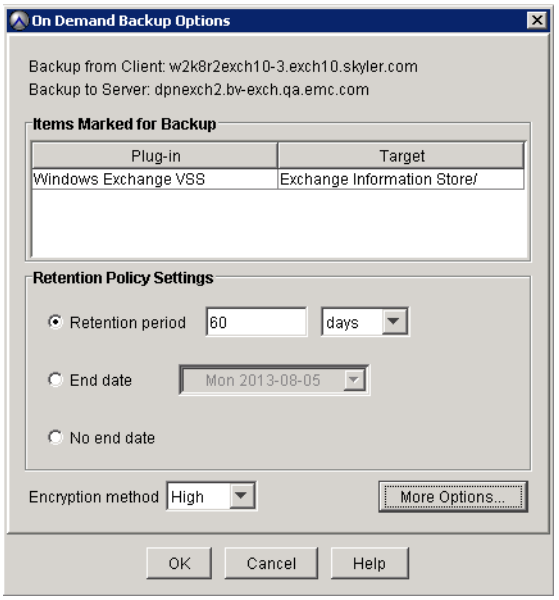
   When you install the Avamar Plug-in for Exchange GLR, Windows Exchange GLR appears in the list of plug-ins when you browse for backups. However, the Exchange GLR plug-in is for recovery only. When you perform granular level recovery, it uses backups created with the Exchange VSS plug-in.
5. Select the **Windows Exchange VSS** plug-in.
6. Select the data to back up:
   - To back up all storage groups, select the checkbox next to **Exchange Information Store**.



- To back up specific storage groups, select **Exchange Information Store** in the left pane and then select the checkbox next to the storage groups in the right pane.

7. Select **Actions** › **Back Up Now**.

   The **On Demand Backup Options** dialog box appears.



8. Select the backup retention setting:

   - To automatically delete this backup from the Avamar server after a specific amount of time, select **Retention period** and then specify the number of days, weeks, months, or years for the retention period.
   - To automatically delete this backup from the Avamar server on a specific calendar date, select **End date** and browse to that date on the calendar.
   - To keep this backup for as long as this client remains active in the Avamar server, select **No end date**.

9. Select the encryption method to use for client/server data transfer during this backup.

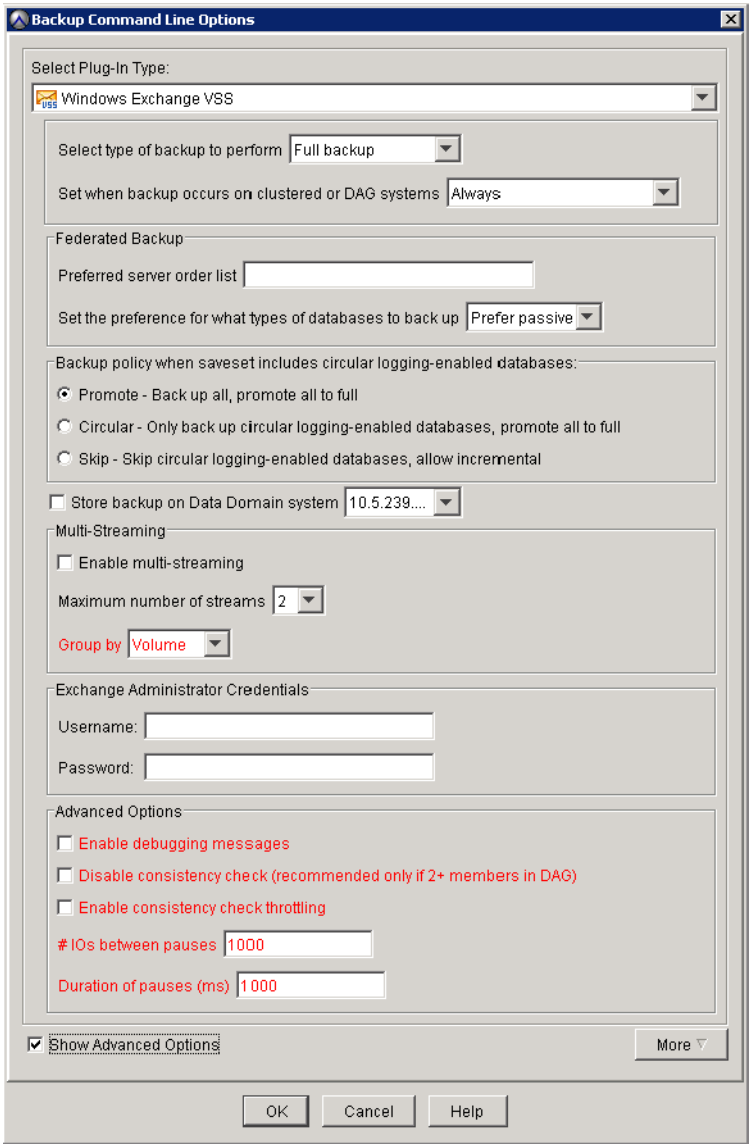
   The encryption technology and bit strength for a client/server connection depends on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.

10. Click **More Options**.

    The **Backup Command Line Options** dialog box appears.

11. Select the **Show Advanced Options** checkbox.

    Additional options appear in red.



12. Set the plug-in options:

    a. From the **Select type of backup to perform** list, select whether to perform a full or incremental backup.

    Note: You can use only full backups for granular level recovery.

    b. From the **Set when backup occurs on clustered or DAG systems** list, select **Store (active) writer only** to back up only active databases.

    c. Disregard the **Preferred server order list** and **Set the preference for what types of databases to back up** options. These options do not apply to backups in an Exchange Server 2007 cluster.

d. If you are performing an incremental backup and you enabled circular logging on any of the selected databases, select the backup behavior:

   – To perform a full backup of all databases if any of the databases use circular logging, select **Promote: back up all databases, promoting incrementals to full if any database in the saveset has circular logging enabled**.

   – To perform a full backup of databases with circular logging and skip other databases, select **Circular: back up only those databases with circular logging enabled, promoting them to full**.

   – To skip databases with circular logging and perform an incremental backup of other databases, select **Skip: skip backup of databases with circular logging enabled, allowing incremental backups**.

e. To store the backup on a Data Domain system instead of the Avamar server, select **Store backup on Data Domain system** and select the Data Domain system from the list.

f. To enable multi-streaming, which enables you to simultaneously back up multiple databases or volumes to reduce backup time, select the **Enable multi-streaming** checkbox and then set the following options:

   – Select the maximum number of streams to use for the backup from the **Maximum number of streams** list.

   – From the **Group by** list, select how to group the streams. Select **Database** to create one stream for each database, or **Volume** to create one stream for each volume.

   "Multi-streaming" on page 27 provides guidelines for multi-streaming.

g. Specify the **Username** and **Password** for the AvamarBackupUser account.

   "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.

h. To write maximum information to log files for debugging, select **Enable debugging messages**. Selecting this option creates large log files.

i. Select whether to disable the consistency check by selecting or clearing the **Disable consistency check (recommended only if 2+ members in DAG)** checkbox.

   A consistency check can cause severe performance issues or fail during a backup, especially in environments with many transaction logs.

j. (Optional) If you leave consistency check enabled, throttle the utility by pausing the consistency check after a specified number of I/Os:

   – Select the **Enable consistency check throttling** checkbox.

   – Specify the number of I/Os between pauses when throttling in the **#I/Os between pauses** box. The value must be between 100 and 10000.

   – Specify the duration of the pause in milliseconds in the **Duration of pauses (ms)** box. The value must be between 1000 and 60000.

"Exchange VSS plug-in backup options" on page 142 provides additional information on the backup plug-in options.

13. Click **OK** on the **Backup Command Line Options** dialog box.
14. Click **OK** on the **On Demand Backup Options** dialog box.

    The **On Demand Backup Options** dialog box closes and the following status message appears: Backup initiated.
15. Click **OK**.

Performing scheduled backups

To perform scheduled backups of an Exchange environment:

1. Create datasets for the backups:
   - On a stand-alone server, you can create a dataset to back up all data or a dataset to back up specific databases or storage groups.
   - In an Exchange Server 2013 or 2010 DAG environment, you can create a dataset for federated backups of databases in the DAG or a dataset to back up databases on a specific server.
   - In an Exchange Server 2007 cluster environment, you can create the following datasets:
     - One dataset for active node backups with the Avamar cluster client. The Avamar cluster client automatically forwards backup requests to the node that is active at the time of the backup.
     - One dataset for passive node backups of the node that is currently passive.
     - One dataset for passive node backups of the node that is currently active. The passive node backup of the active node fails. However, scheduling passive node backups of an active node ensures that a passive node backup occurs if the node changes from active to passive.

   "Creating a dataset" on page 85 provides instructions.
2. Create a group for the backups. "Creating a group" on page 89 provides instructions. During the group creation process, you:
   a. Assign the new dataset to the new group.
   b. Assign a schedule to the new group.
   c. Assign a retention policy to the new group.
   d. Add the Exchange server to the new group.
3. Enable scheduling for the group. "Enabling scheduled backups" on page 90 provides instructions.

The *EMC Avamar Administration Guide* provides more information about groups, group policy, datasets, schedules, and retention policies.

Creating a dataset

To create a dataset for scheduled backups of an Exchange environment:

1. In Avamar Administrator, select **Tools › Manage Datasets.**

   The **Manage All Datasets** window appears.

2. Click **New**.

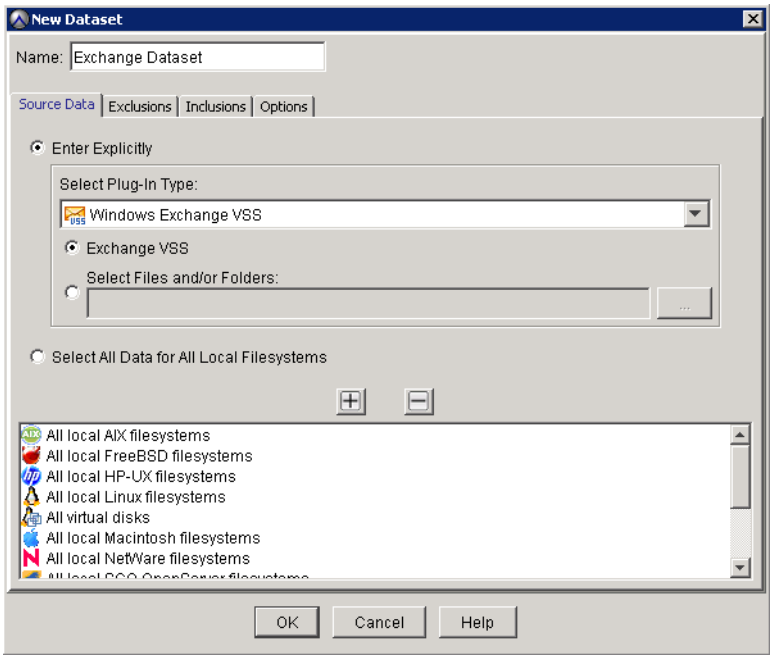
   The **New Dataset** dialog box appears.

3. In the **Name** box, type a name for the dataset.

   The name can include alphanumeric characters (A-Z, a-z, 0-9) and the following special characters: period (.), hyphen (-), underscore (_). Do not use Unicode characters or any of the following characters: ` ~ ! @ # $ % ^ & * ( ) = + [ ] { } | \ / ; : ’ ” ‹ › , ?

4. On the **Source Data** tab, select **Enter Explicitly**.

5. Select **Windows Exchange VSS** from the **Select Plug-In Type** list.



6. Select the data to back up:

   - Select **Exchange VSS** to back up all databases or storage groups.
   - Select specific databases or storage groups:

     a. Select **Select Files and/or Folders**.

     b. Click **... (Browse for files and/or folders)**.

     c. In the **Select Files And/Or Folders** dialog box, expand the domain and then select the client for the Exchange server in the left pane.

        To select databases in a DAG environment for a federated backup, select the DAG client that you configured with the Avamar Cluster Configuration Tool.

To select databases on a single server in a DAG environment, select the name of the Exchange server.

To select databases for a passive node backup in an Exchange Server 2007 cluster environment, select the server name of the passive node.

To select databases for an active node backup in an Exchange Server 2007 cluster environment, select the Avamar cluster client that you configured with the Avamar Cluster Configuration Tool.

d. Select the **Windows Exchange VSS** plug-in in the middle pane.

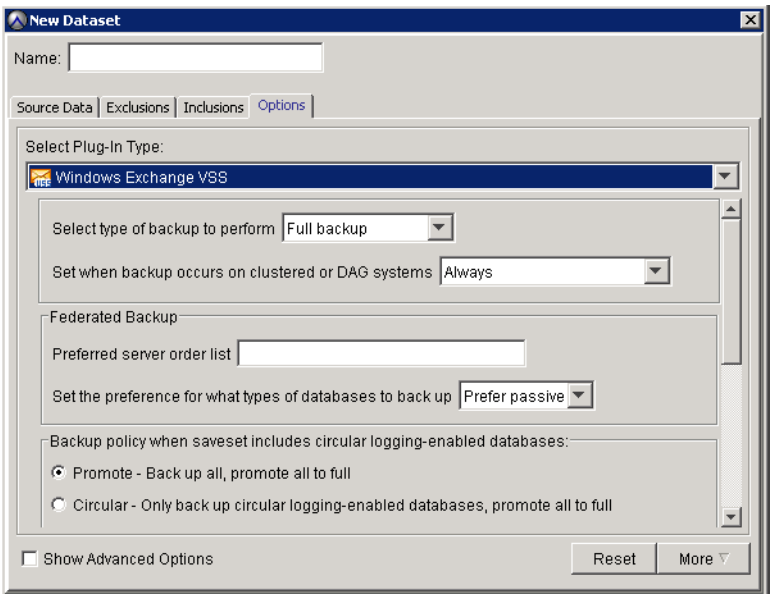
e. Select the checkbox next to the database or storage group in the right pane.

f. Click **OK**.

7. Disregard the **Exclusions** and **Inclusions** tabs. The Exchange VSS plug-in does not support include or exclude lists in datasets.

8. Click the **Options** tab and set the plug-in options:

   a. Select the **Windows Exchange VSS** plug-in from the **Select Plug-In Type** list.



   b. From the **Select type of backup to perform** list, select whether to perform a full or incremental backup.

Note: You can use only full backups for granular level recovery.

c. Select an option from the **Set when backup occurs on clustered or DAG systems** list:

   – Disregard this option for scheduled backups of a stand-alone server or federated backups in a DAG environment.

   – For scheduled backups of a specific server in a DAG environment, select **Replica (passive) writer only** to back up only passive databases, **Store (active) writer only** to back up only active databases, or **Always** to back up both passive and active databases.

   – For passive node backups in an Exchange Server 2007 cluster, select **Replica (passive) writer only to back up only passive databases**.

   – For active node backups in an Exchange Server 2007 cluster, select **Store (active) writer only** to back up only active databases.

d. If you are performing a federated backup in a DAG environment, specify the priority of servers to use to back up the Exchange databases in the **Preferred server order list** box. Specify the server name, not the FQDN. Separate multiple entries with commas.

   If you do not specify a list, then the Exchange VSS plug-in adds all servers in the DAG to the list in alphabetical order.

   For all other backup types, disregard this option.

e. If you are performing a federated backup in a DAG environment, select the type of database to back up from the **Set the preference for what types of databases to back up** list:

   – Select **Prefer passive** to back up a passive copy of each database, if a healthy passive copy is available. If a healthy passive copy is not available, then Avamar backs up the active copy.

   – Select **Passive only** to back up only the passive copy of each database. If a healthy passive copy is not available, then the backup does not include the database.

   Note: Backup of active only databases will fail.

   For all other backup types, disregard this option.

f. If you are performing an incremental backup and you enabled circular logging on any of the selected databases, select the backup behavior:

   – To perform a full backup of all databases if any of the databases use circular logging, select **Promote: back up all databases, promoting incrementals to full if any database in the saveset has circular logging enabled**.

   – To perform a full backup of databases with circular logging and skip other databases, select **Circular: back up only those databases with circular logging enabled, promoting them to full**.

   – To skip databases with circular logging and perform an incremental backup of other databases, select **Skip: skip backup of databases with circular logging enabled, allowing incremental backups**.

g. To store the backup on a Data Domain system instead of the Avamar server, select **Store backup on Data Domain system** and select the Data Domain system from the list.

h. To enable multi-streaming, which enables you to simultaneously back up multiple databases or volumes to reduce backup time, select the **Enable multi-streaming** checkbox and then set the following options:

   – Select the maximum number of streams to use for the backup from the **Maximum number of streams** list.

   – From the **Group by** list, select how to group the streams. Select **Database** to create one stream for each database, or **Volume** to create one stream for each volume.

   "Multi-streaming" on page 27 provides guidelines for multi-streaming.

i. Specify the **Username** and **Password** for the AvamarBackupUser account if you are performing a federated backup in a DAG environment or an active node backup in an Exchange Server 2007 cluster.

   For other backup types, specify the username and password for an account that has sufficient permissions to perform the backup only if you did not configure an AvamarBackupUser account.

   "Creating and configuring the AvamarBackupUser account" on page 48 provides more information.

j. To write maximum information to log files for debugging, select **Enable debugging messages**. Selecting this option creates large log files.

k. Select whether to disable the consistency check by selecting or clearing the **Disable consistency check (recommended only if 2+ members in DAG)** checkbox.

   A consistency check can cause severe performance issues or fail during a backup, especially in environments with many transaction logs.

l. (Optional) If you leave consistency check enabled, throttle the utility by pausing the consistency check after a specified number of I/Os:

   – Select the **Enable consistency check throttling** checkbox.

   – Specify the number of I/Os between pauses when throttling in the **#I/Os between pauses** box. The value must be between 100 and 10000.

   – Specify the duration of the pause in milliseconds in the **Duration of pauses (ms)** box. The value must be between 1000 and 60000.

"Exchange VSS plug-in backup options" on page 142 provides additional information on the backup plug-in options.

9. Click **OK** on the **New Dataset** dialog box.
10. Click **OK** on the **Manage All Datasets** dialog box.

Creating a group

To create a group for scheduled backups of an Exchange environment:

1. In Avamar Administrator, click the **Policy** tab.

   The **Policy** window appears.

2. On the **Policy Management** tab, select the **Groups** tab.

3. In the left pane, select the Avamar domain for the group.

4. Select **Actions › New Group**.

   The **New Group** wizard appears.

5. Type a name for the new group In the **Name** box.

   The name can include alphanumeric characters (A-Z, a-z, 0-9) and the following special characters: period (.), hyphen (-), and underscore (_). Do not use Unicode characters or the following special characters: ` ~ ! @ # $ % ^ & * ( ) = + [ ] { } | \ / ; : ' " ‹ › , ?

6. Clear the **Disabled** checkbox to use this group to perform scheduled client backups.

   Selecting the checkbox disables backups for the group.

7. From the **Encryption method** list, select an encryption method to use for client/server data transfer during the backup. All clients in the group use this encryption method unless you override the method at the client level.

   The encryption technology and bit strength for client/server connection depend on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.

8. Select whether to use the assigned schedule for the group or override the assigned schedule:

   - To use the assigned schedule, leave the **Override Schedule** checkbox clear.
   - To override the schedule, select **Override Schedule**, and then specify whether to skip the next scheduled backup entirely or to perform the next scheduled backup one time only by selecting **Skip Next Backup** or **Run Next Backup Once**.

9. Click **Next**.

   The next **New Group** wizard page appears with dataset information.

10. From the **Select An Existing Dataset** list, select the dataset that you defined in "Creating a dataset" on page 85.

11. Click **Next**.

    The next **New Group** wizard page appears with schedule information.

12. From the **Select An Existing Schedule** list, select a schedule for the group.

    You cannot edit the schedules on this page. The *EMC Avamar Administration Guide* provides information about editing schedule properties.

13. Click **Next**.

    The next **New Group** wizard page appears with retention policy information.

14. From the **Select An Existing Retention Policy** list, select a retention policy for the group.

    You cannot edit retention policies on this page. The *EMC Avamar Administration Guide* provides information about editing retention policy properties.

15. Click **Next**.

    The final **New Group** wizard page appears with a tree of domains and clients.

16. In the **Choose Domain** list, select the domain for the client.

    A list of clients in the domain appears in the lower-left list.

17. Select the clients to include in the scheduled backup:

    - In a stand-alone environment, select the Exchange server.
    - For DAG federated backups, select the Exchange DAG client that you configured with the Avamar Cluster Configuration Tool.
    - For backups of a single server in a DAG environment, select the server.
    - For a passive node backup in an Exchange Server 2007 cluster environment, select the server name of the passive node.
    - For an active node backup in an Exchange Server 2007 cluster environment, select the Avamar cluster client that you configured with the Avamar Cluster Configuration Tool.

18. Click **Finish**.

Enabling scheduled backups

To ensure that the group is enabled for scheduled backups of an Exchange environment:

1. In Avamar Administrator, click the **Policy** tab.

   The **Policy** window appears.

2. On the **Policy Management** tab, select the **Groups** tab.
3. Select the group that you created in "Creating a group" on page 89.
4. Select **Actions > Group > Disable Group** to clear the **Disable Group** option on the **Actions > Group** menu.

   A confirmation message appears.

5. Click **Yes** to enable this group.

Monitoring backups

You can monitor backups to ensure that the backups complete successfully and to troubleshoot if a failure occurs. The Activity Monitor in Avamar Administrator enables you to monitor both on-demand and scheduled backups.

1. In Avamar Administrator, click the **Activity** tab.

   The **Activity** window appears.

2. Select the **Activity Monitor** tab.

   A list of all activities appears.

3. To filter the results to display only backup activity, select **Actions** › **Filter**.

   The **Filter Activity** dialog box appears.

4. In the **Filter Activity** dialog box, select **All Backups** from the **Type** list.

5. Click **OK**.

Canceling backups

You can cancel a backup any time before it completes. The cancellation may take five minutes or more. The backup may complete before the cancellation finishes.

1. In Avamar Administrator, click the **Activity** tab.

   The **Activity** window appears.

2. Select the **Activity Monitor** tab.

   A list of all activities appears.

3. From the list of activities, click the backup to highlight it.

4. Select **Actions** › **Cancel Activity**.

   A confirmation message appears.

5. Click **Yes**.

Troubleshooting backups

The following topics explain issues that may occur during the backup process for an Exchange environment, and steps to resolve or work around the issues.

Unmounted or offline databases are skipped

If a database is unmounted or offline when a backup is performed, the backup skips that database. Generally, this is not an issue because databases that are not mounted are not in production.

System Writer failure event in the Application log

A successful backup using the Exchange VSS plug-in may log an event in the Application log indicating a System Writer failure. The Exchange VSS plug-in does not use the System Writer, so you can safely ignore the error.

Backups may fail when drive letters and volumes are mixed

If you configure Exchange to point to the same database files through different paths, such as volume `G:\` and `C:\mountpoint`, then backup may fail.

To avoid this backup failure, configure Exchange databases to point to the database files using the same path. For example, if you have three databases, DB1, DB2, and DB3, that are at the same location as either drive `G:\` or on `C:\mountpoint`, then use one—but not both—of the following example paths:

- `G:\DB1, G:\DB2, G:\DB3`
- `C:\mountpoint\DB1,C:\mountpoint\DB2,C:\mountpoint\DB3`

Event log error: Microsoft Exchange Replication service VSS Writer failed

A failed or canceled backup of a passive copy may produce an error in the event log that the Microsoft Exchange Replication service VSS Writer failed. However, this condition may be temporary. If this backup failure and error occur, there are two solutions:

- If you need to perform an immediate backup, stop and then restart the Microsoft Exchange Replication Service writer.
- If you wait about 15 minutes, the Exchange server automatically corrects this condition.

Backups fail when database and log files are available through symlinks or directory junctions

Backups with the Exchange VSS plug-in fail if the path to database, transaction log, or checkpoint files includes symbolic links (symlinks) or directory junctions. Exclude databases with files available through symlinks or directory junctions from backups with the Exchange VSS plug-in.

Backups time out for large Exchange databases

Backups fail if the VSS writer cannot create the snapshot for the backup after five minutes. You can increase the amount of time for snapshot creation by using the `--vss-snapshot-timeout` flag:

- To specify the flag during an on-demand backup, type **`--vss-snapshot-timeout`** in the **Enter Attribute** box and the new number of minutes in the **Enter Attribute Value** box on the **Backup Command Line Options** dialog box.
- To specify the flag for scheduled backups, type **`--vss-snapshot-timeout`** in the **Enter Attribute** box and the new number of minutes in the **Enter Attribute Value** box on the **Options** tab of the **New Dataset** dialog box.
- To specify the flag for all backups of an Exchange server:

  1. Create a file called `avexvss.cmd` in the *`C:\Program Files\avs\var`* folder of the Exchange server, where *C:\Program Files\avs* is the Avamar installation folder.
  2. Add the following line to the file:

     `--vss-snapshot-timeout=`*`n`*

     where *n* is the number of minutes to wait for snapshot creation to complete.

3. Save and close the file.
4. In a cluster or DAG environment, copy the file to the *C:\Program Files\avs*\var folder on each server.

CHAPTER 4
Exchange Database Restore

The following topics explain how to restore Microsoft Exchange Server databases:

Restore requirements

To ensure a successful database restore, ensure that the environment meets the necessary requirements.

Exchange server version requirements

The target Exchange server for a restored database must have the same Exchange version and service pack as the Exchange server on which the backup occurred. Otherwise, restore fails.

Suspending replication in a DAG or cluster

Avamar automatically suspends replication from active databases or storage groups to passive databases or storage groups during a restore when you select the **Automate replication suspension** checkbox during a restore.

You also can manually suspend replication to the passive databases or storage groups by using the Exchange Management Shell before you perform the restore.

To manually suspend replication to passive databases or storage groups before a restore:

- In Exchange Server 2013 or 2010, type the following command in the Exchange Management Shell on any server in the DAG:

  `suspend-MailboxDatabaseCopy -Identity` *`database\server`*

  where *database* is the name of the database and *server* is the name of the DAG server with the passive copy.

- In Exchange Server 2007, type the following command in the Exchange Management Shell on either cluster node:

  `suspend-StorageGroupCopy -Identity` *`server\storage_group`*

  where *server* is the virtual server name for the cluster and *storage_group* is the name of the storage group.

Finding a backup

You can find Avamar client backups for a restore by searching either for a certain date or for a specific database or storage group.

When to find a backup by date

Locate backups by date when:

- All databases or storage groups that you want to restore are included in a single backup set.
- The exact path or name of the databases or storage groups that you want to restore are unknown.
- The content from a backup you want to restore precedes a specific date or event. For example, you know approximately when a database was lost or corrupted, and you need to find the last backup before that date.

How to find a backup by date

To find backups for a restore by date:

1. In Avamar Administrator, click the **Backup & Restore** tab.

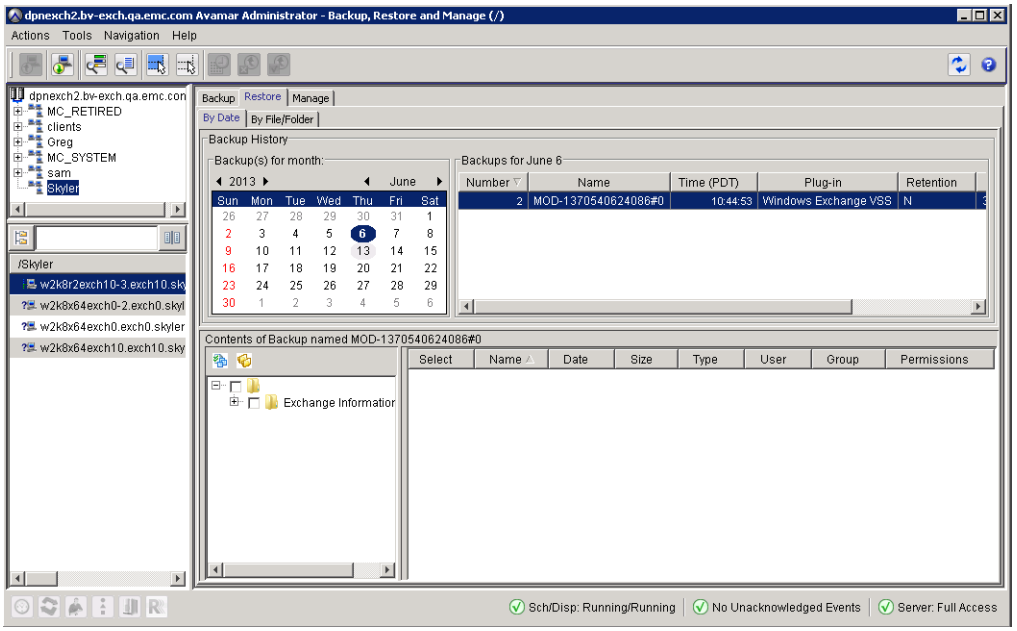
   The **Backup, Restore and Manage** window appears.

2. In the domain tree, select the domain for the client.
3. From the list of clients, select the client on which the backup was performed:
   - In a stand-alone environment, select the Exchange server.
   - To restore from a federated backup in a DAG environment, select the Exchange DAG client that you configured with the Avamar Cluster Configuration Tool.
   - To restore from a backup of a specific server in a DAG environment, select the server.
   - To restore from a passive node backup in an Exchange Server 2007 cluster, select the Exchange server with the passive database copies at the time of the backup. Keep in mind that the Exchange server may currently host active database copies.
   - To restore from an active node backup in an Exchange Server 2007 cluster, select the Avamar cluster client that you configured with the Avamar Cluster Configuration Tool.

   You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.
4. Click the **Restore** tab.
5. Click the **By Date** tab.
6. Select the backup date from the calendar. Valid backups occurred on dates with a yellow highlight.

   A list of backups on that date appears in the **Backups** table next to the calendar.

7. Select the backup to restore from the **Backups** table.



8. Select the data to restore, and perform the restore. The following topics provide more information:

   - "Restoring to a stand-alone server" on page 100
   - "Restoring to a DAG" on page 103
   - "Restoring to an Exchange Server 2007 cluster" on page 107
   - "Restoring to a file" on page 111
   - "Restoring to an RDB or RSG" on page 123

When to find a backup for a specific database or storage group

Locate backups for a specific database or storage group when:

- You back up each database or storage group in a separate backup set.
- You want to see multiple versions of the same database or storage group.

How to find a backup for a specific database or storage group

To find a backup for a specific database or storage group:

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.

2. In the domain tree, select the domain for the client.
3. From the list of clients, select the client on which the backup was performed:

   - In a stand-alone environment, select the Exchange server.
   - To restore from a federated backup in a DAG environment, select the Exchange DAG client that you configured with the Avamar Cluster Configuration Tool.
   - To restore from a backup of a specific server in a DAG environment, select the server.

- To restore from a passive node backup in an Exchange Server 2007 cluster, select the Exchange server with the passive database copies at the time of the backup. Keep in mind that the Exchange server may currently host active database copies.
- To restore from an active node backup in an Exchange Server 2007 cluster, select the Avamar cluster client that you configured with the Avamar Cluster Configuration Tool.

You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.

4. Click the **Restore** tab.
5. Click the **By File/Folder** tab.
6. Specify the data to restore by using one of the following methods:
   - Type the value in the **Enter path to retrieve history for** box:
     - To restore all databases or storage groups on the client, type `Exchange Information Store`.
     - To restore a specific database or storage group, type `Exchange Information Store/`*`name`*, where *name* is the name of the database or storage group.
   - Browse to the data:
     a. Click **Browse**.

        The **Select File or Folder** dialog box appears.

     b. Select the client in the left pane.

     c. Expand the Windows Exchange VSS plug-in in the middle pane.

     d. Select **Exchange Information Store** in the middle pane.

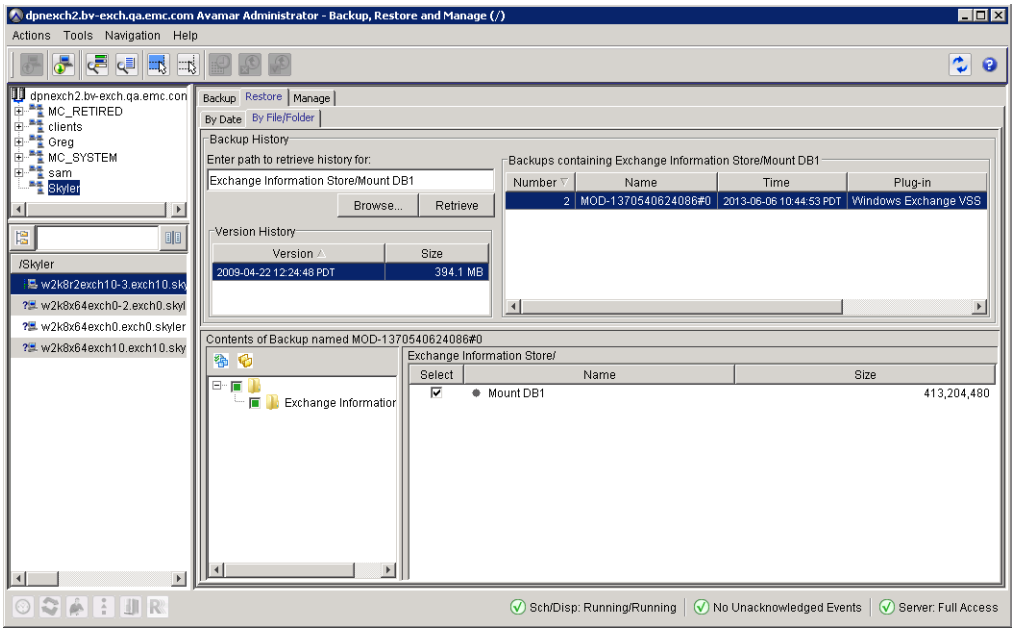
     e. To find backups of the Exchange Information Store, select the checkbox next to **Exchange Information Store**. To find backups of a specific database or storage group, select the checkbox next to the database or storage group.

     f. Click **OK**.
7. Click **Retrieve**.
8. Select a version in the **Version History** table.

   Note: The **Version History** table does not provide the correct date and time for Microsoft Exchange data. However, you can select any version in the list to view all backups for the selected data.

   All backups for the specified Exchange Information Store, database, or storage group appear in the **Backups** table next to the **Version History** table.

9. Select the backup to restore from the **Backups** table.



10. Select the data to restore, and perform the restore. The following topics provide more information:

    - "Restoring to a stand-alone server" on page 100
    - "Restoring to a DAG" on page 103
    - "Restoring to an Exchange Server 2007 cluster" on page 107
    - "Restoring to a file" on page 111
    - "Restoring to an RDB or RSG" on page 123

Restoring to a stand-alone server

You can restore databases, storage groups, or the entire Exchange Information Store to a stand-alone server.

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.

2. Find the backup to restore:

   - "How to find a backup by date" on page 97
   - "How to find a backup for a specific database or storage group" on page 98

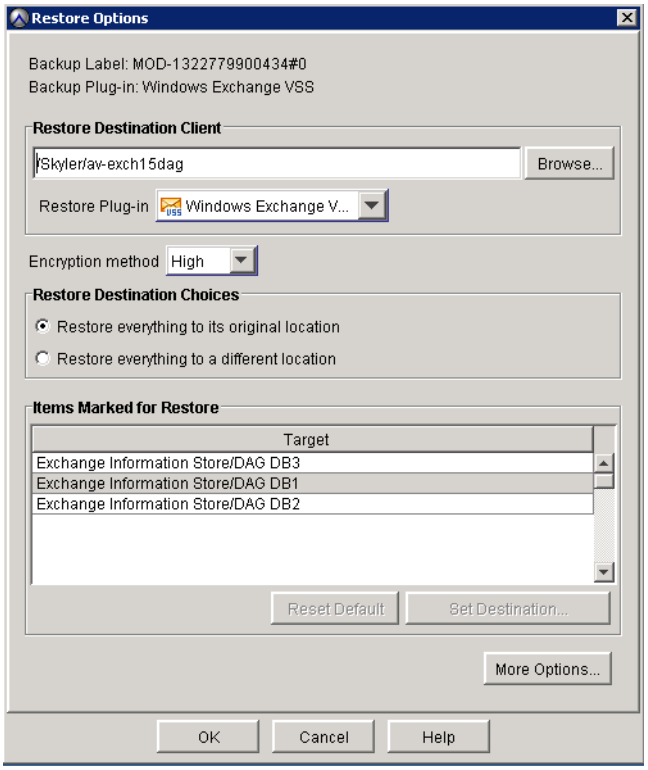
   The backup to restore from is selected in the **Backups** table.

3. Select the data to restore:

   - To restore the entire Exchange Information Store, select the **Exchange Information Store** checkbox in the lower-left pane.
   - To restore a specific database or storage group, select **Exchange Information Store** in the lower-left pane, and then select the checkbox next to the database or storage group in the lower-right pane.

4. Select **Actions › Restore Now**.

   The **Restore Options** dialog box appears.

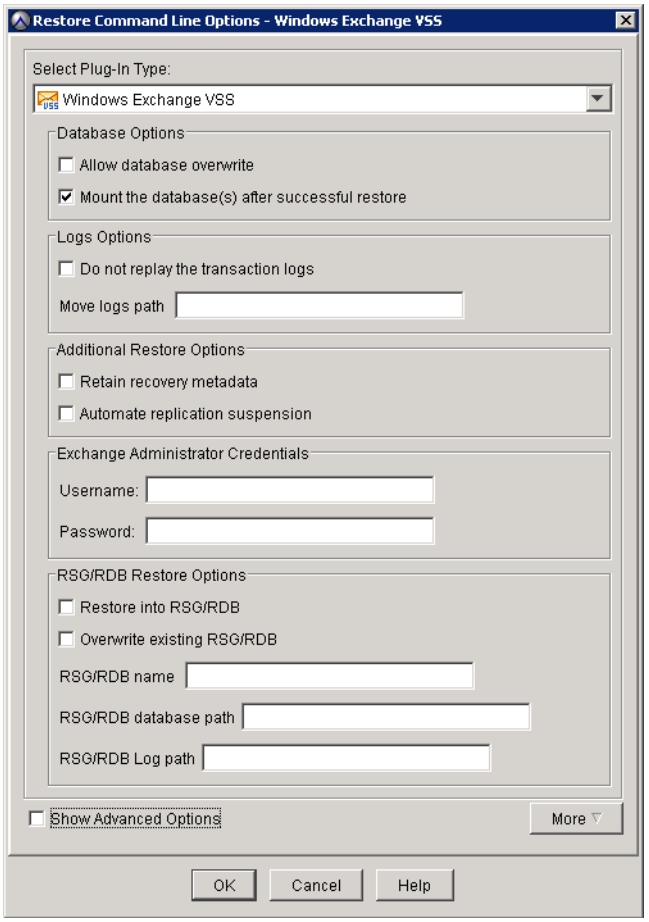


5. Leave the default selection of the original client in the **Restore Destination Client** box.
6. Ensure that **Windows Exchange VSS** appears in the **Restore Plug-in** list.
7. From the **Encryption method** list, select the encryption method to use for client/server data transfer during the restore.

   The encryption technology and bit strength for a client/server connection depend on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.
8. Leave the default selection of **Restore everything to its original location**.

9. Click **More Options**.

   The **Restore Command Line Options** dialog box appears.



10. Specify whether to overwrite all databases or only specific databases during the restore:

    - To enable the overwrite of all databases when you perform a restore, in the **Restore Command Line Options** dialog box, select the **Allow database overwrite** checkbox.
    - To enable the overwrite of only specific databases, leave the **Allow database overwrite** checkbox clear. Then select the **This database can be overwritten by a restore** option in the recovery options for the databases in the **Exchange Management Console**.

    Note: The restore fails if you do not enable overwrite by using one of these methods, even if the database you are restoring was deleted on the target server.

11. Select whether to automatically mount the databases after a successful restore by selecting or clearing the **Mount the database(s) after successful restore** checkbox.
12. Select whether to restore but not replay transaction logs by selecting or clearing the **Do not replay the transaction logs** checkbox.

    If you select this option, then you can manually copy additional transaction logs before you mount the database.

13. If log file conflicts may occur during the restore, then use the **Move logs path** box to specify a location to which to move the existing log files before the restore.

    If you do not specify a path for the log files and there is a gap in the transaction log, then the restore process automatically moves the current transaction logs to a subfolder named `logs_time_date`. The *time* and *date* values are the time and date of the restore. The subfolder is in the transaction log folder for the database or storage group. You can use these logs to analyze the restore operation, if necessary, or apply those logs up to where the failure occurred.

14. Choose whether to retain or delete metadata files that are used during the restore:

    - Select the **Retain recovery metadata** checkbox to retain the files.
    - Clear the checkbox to automatically delete the files after the restore completes.

    You can use these metadata files to investigate any restore issues that occur. The files are in the `C:\Program Files\avs\var\avexvss_restore` folder, where *C:\Program Files\avs* is the Avamar installation folder.

15. Disregard the **Automate replication suspension** checkbox. This option does not apply when you restore to a stand-alone server.

16. If you did not configure the AvamarBackupUser account, then specify the **Username** and **Password** for an Exchange administrator account that has permissions to perform the restore. "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.

17. Disregard the options in the **RSG/RDB Restore Options** section. These options do not apply unless you are restoring to an RSG or RDB. "Restoring to an RDB or RSG" on page 123 provides more information.

18. Click **OK** on the **Restore Command Line Options** dialog box.

19. Click **OK** on the **Restore Options** dialog box.

    The **Restore Request** dialog box indicates that the restore started.

20. Click **Close**.

Restoring to a DAG

You can restore databases in a DAG from the following types of backups:

- Federated backup with the Exchange DAG client of either an active copy or a passive copy of the database.
- Backup of either an active copy or a passive copy of the database on a specific server in a DAG.

When you restore databases from a federated backup in a DAG, you select the Exchange DAG client as the target client for the restore. The Exchange DAG client automatically determines the server with the active copy of the database, and restores to the active copy.

When you restore databases from a backup of a specific server in a DAG, you select the DAG server with the active database copies as the target client for the restore.

To restore databases in a DAG:

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.

2. Find the backup to restore:

   - "How to find a backup by date" on page 97
   - "How to find a backup for a specific database or storage group" on page 98

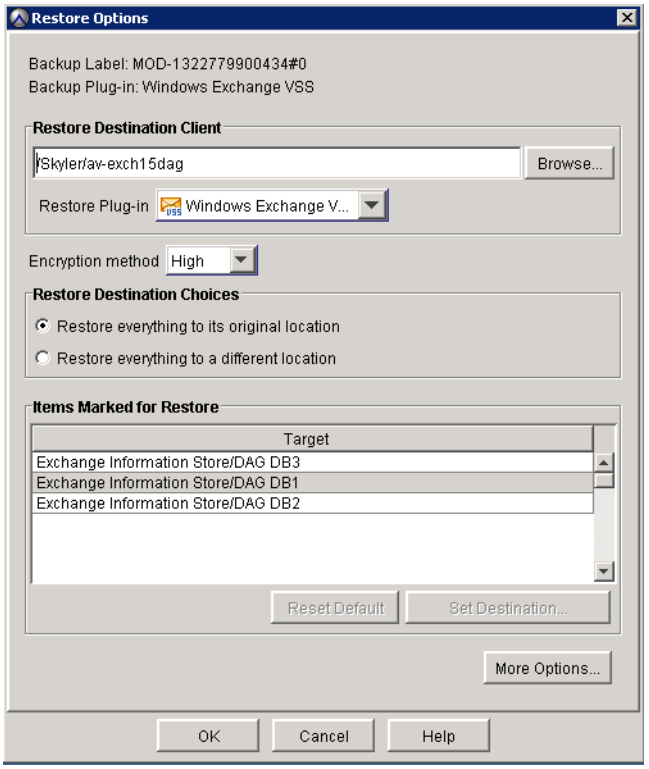
   The backup to restore from is selected in the **Backups** table.

3. Select the data to restore:

   - To restore the entire Exchange Information Store, select the **Exchange Information Store** checkbox in the lower-left pane.
   - To restore a specific database, select **Exchange Information Store** in the lower-left pane, and then select the checkbox next to the database or storage group in the lower-right pane.

4. Select **Actions** › **Restore Now**.

   The **Restore Options** dialog box appears.



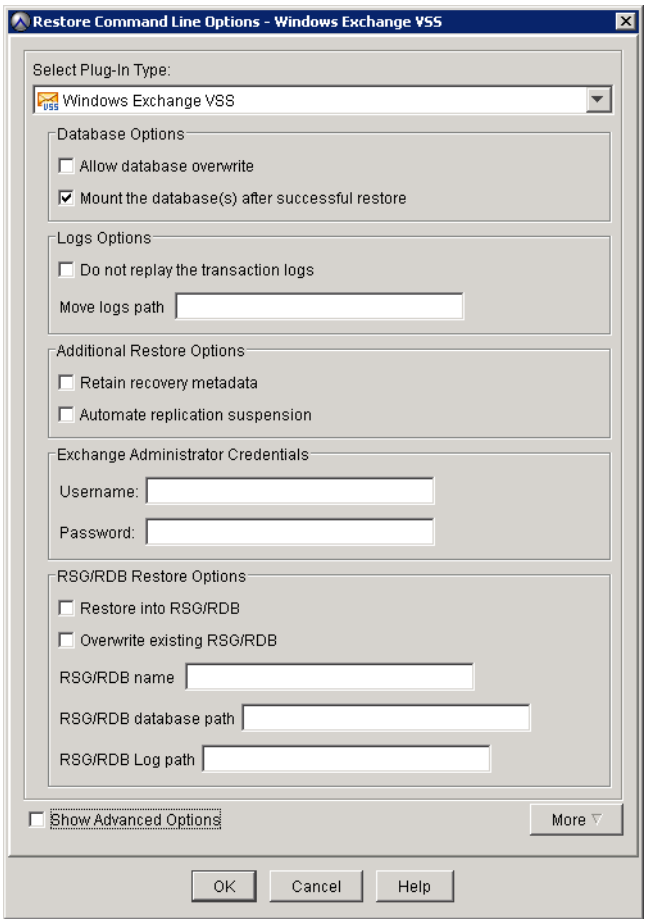
5. Specify the target client for the restore:

   - If you are restoring from a federated backup, then leave the default selection of the Exchange DAG client in the **Restore Destination Client** box.
   - If you are restoring from a backup of a specific server in a DAG, then either type the name of the DAG server with the active database copies, or click **Browse** to browse to the server.

6. Ensure that **Windows Exchange VSS** appears in the **Restore Plug-in** list.
7. From the **Encryption method** list, select the encryption method to use for client/server data transfer during the restore.

   The encryption technology and bit strength for a client/server connection depend on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.
8. Leave the default selection of **Restore everything to its original location**.
9. Click **More Options**.

   The **Restore Command Line Options** dialog box appears.



10. Specify whether to overwrite all databases or only specific databases during the restore:
    - To enable the overwrite of all databases when you perform a restore, in the **Restore Command Line Options** dialog box, select the **Allow database overwrite** checkbox.
    - To enable the overwrite of only specific databases, leave the **Allow database overwrite** checkbox clear. Then select the **This database can be overwritten by a restore** option in the recovery options for the databases in the **Exchange Management Console**.

Note: The restore fails if you do not enable overwrite by using one of these methods, even if the database you are restoring was deleted on the target server.

11. Select whether to automatically mount the databases after a successful restore by selecting or clearing the **Mount the database(s) after successful restore** checkbox.
12. Select whether to restore but not replay transaction logs by selecting or clearing the **Do not replay the transaction logs** checkbox.

    If you select this option, then you can manually copy additional transaction logs before you mount the database.
13. If log file conflicts may occur during the restore, then use the **Move logs path** box to specify a location to which to move the existing log files before the restore.

    If you do not specify a path for the log files and there is a gap in the transaction log, then the restore process automatically moves the current transaction logs to a subfolder named `logs_time_date`. The *time* and *date* values are the time and date of the restore. The subfolder is in the transaction log folder for the database or storage group. You can use these logs to analyze the restore operation, if necessary, or apply those logs up to where the failure occurred.
14. Choose whether to retain or delete metadata files that are used during the restore:
    - Select the **Retain recovery metadata** checkbox to retain the files.
    - Clear the checkbox to automatically delete the files after the restore completes.

    You can use these metadata files to investigate any restore issues that occur. The files are in the `C:\Program Files\avs\var\avexvss_restore` folder, where *C:\Program Files\avs* is the Avamar installation folder.
15. Select the **Automate replication suspension** checkbox to suspend replication to the passive nodes during the restore.

    If you do not select this option, you must manually suspend replication before you perform the restore. "Suspending replication in a DAG or cluster" on page 96 provides more information.
16. If you are restoring from a federated backup, specify the **Username** and **Password** for the AvamarBackupUser account.

    If you are restoring from a backup of a specific server in the DAG, then you only need to specify the username and password for an Exchange administrator account with permissions to perform the restore if you did not configure the AvamarBackupUser account.

    "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.
17. Disregard the options in the **RSG/RDB Restore Options** section. These options do not apply unless you are restoring to an RSG or RDB. "Restoring to an RDB or RSG" on page 123 provides more information.
18. Click **OK** on the **Restore Command Line Options** dialog box.
19. Click **OK** on the **Restore Options** dialog box.

    The **Restore Request** dialog box indicates that the restore started.

20. Click **Close**.
21. After the restore completes, manually resume replication:
    a. Review the steps to resume and update a database copy in following articles on the Microsoft TechNet website at http://technet.microsoft.com:
       – "Suspend or Resume a Mailbox Database Copy"
       – "Update a Mailbox Database Copy"
    b. Use the `Resume-MailboxDatabaseCopy` command to resume replication for all passive copies of the restored database.

       Replication sometimes fails because you must reseed the database on the current passive node.
    c. If replication fails, run the `Update-MailboxDatabaseCopy` command for all passive copies of the restored database.

Restoring to an Exchange Server 2007 cluster

You can restore a database or storage group on the active node in an Exchange Server 2007 cluster from either an active node backup or a passive node backup.

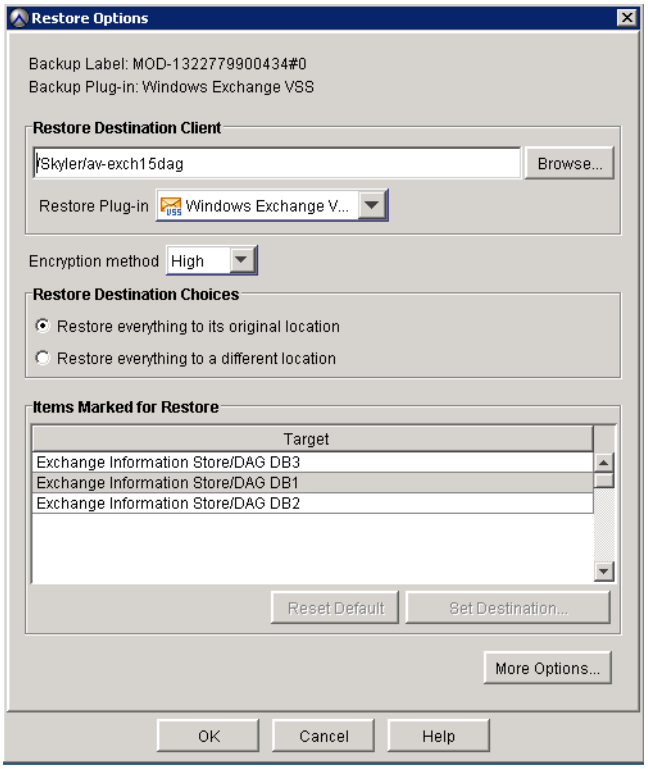
Select the Avamar cluster client as the target client for the restore. The Avamar cluster client automatically restores to the current active node.

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.
2. Find the backup to restore:
   - "How to find a backup by date" on page 97
   - "How to find a backup for a specific database or storage group" on page 98

   The backup to restore from is selected in the **Backups** table.
3. Select the data to restore:
   - To restore the entire Exchange Information Store, select the **Exchange Information Store** checkbox in the lower-left pane.
   - To restore a specific database or storage group, select **Exchange Information Store** in the lower-left pane, and then select the checkbox next to the database or storage group in the lower-right pane.
4. Select **Actions** › **Restore Now**.

The **Restore Options** dialog box appears.

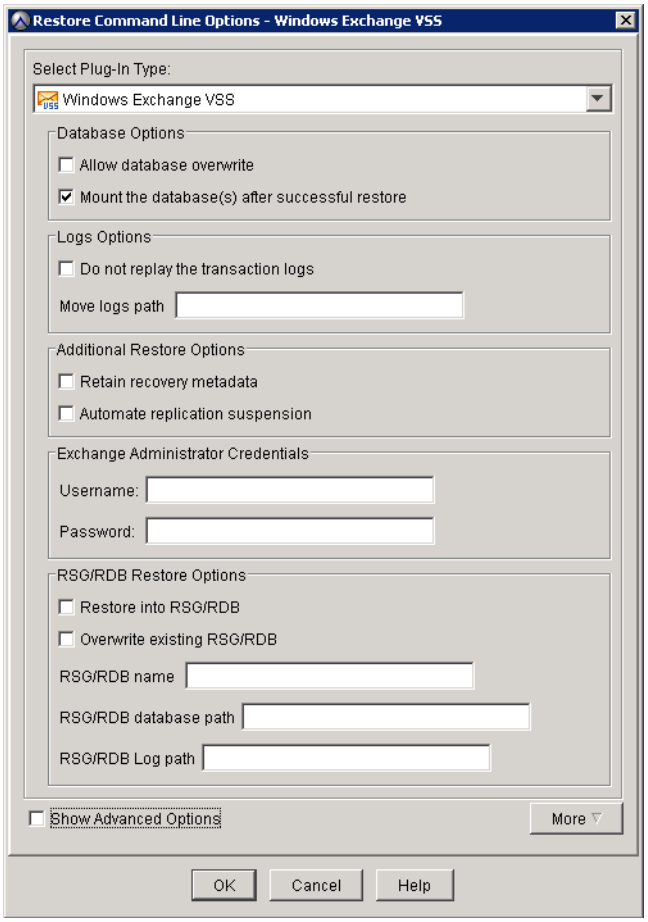


5. Specify the Avamar cluster client as the target client for the restore:
   - If you are restoring from an active node backup, then leave the default selection of the Avamar cluster client in the **Restore Destination Client** box.
   - If you are restoring from a passive node backup, then either type the name of the Avamar cluster client or click **Browse** to browse to the Avamar cluster client.
6. Ensure that **Windows Exchange VSS** appears in the **Restore Plug-in** list.
7. From the **Encryption method** list, select the encryption method to use for client/server data transfer during the restore.

   The encryption technology and bit strength for a client/server connection depend on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.
8. Leave the default selection of **Restore everything to its original location**.

9. Click **More Options**.

   The **Restore Command Line Options** dialog box appears.



10. Specify whether to overwrite all databases or only specific databases during the restore:

    - To enable the overwrite of all databases when you perform a restore, in the **Restore Command Line Options** dialog box, select the **Allow database overwrite** checkbox.
    - To enable the overwrite of only specific databases, leave the **Allow database overwrite** checkbox clear. Then select the **This database can be overwritten by a restore** option in the recovery options for the databases in the **Exchange Management Console**.

    Note: The restore fails if you do not enable overwrite by using one of these methods, even if the database you are restoring was deleted on the target server.

11. Select whether to automatically mount the databases after a successful restore by selecting or clearing the **Mount the database(s) after successful restore** checkbox.
12. Select whether to restore but not replay transaction logs by selecting or clearing the **Do not replay the transaction logs** checkbox.

    If you select this option, then you can manually copy additional transaction logs before you mount the database.

13. If log file conflicts may occur during the restore, then use the **Move logs path** box to specify a location to which to move the existing log files before the restore.

    If you do not specify a path for the log files and there is a gap in the transaction log, then the restore process automatically moves the current transaction logs to a subfolder named `logs_time_date`. The *time* and *date* values are the time and date of the restore. The subfolder is in the transaction log folder for the database or storage group. You can use these logs to analyze the restore operation, if necessary, or apply those logs up to where the failure occurred.

14. Choose whether to retain or delete metadata files that are used during the restore:

    - Select the **Retain recovery metadata** checkbox to retain the files.
    - Clear the checkbox to automatically delete the files after the restore completes.

    You can use these metadata files to investigate any restore issues that occur. The files are in the `C:\Program Files\avs\var\avexvss_restore` folder, where *C:\Program Files\avs* is the Avamar installation folder.

15. Select the **Automate replication suspension** checkbox to suspend replication to the passive nodes during the restore.

    If you do not select this option, you must manually suspend replication before you perform the restore. "Suspending replication in a DAG or cluster" on page 96 provides more information.

16. Specify the **Username** and **Password** for the AvamarBackupUser account.

    "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.

17. Disregard the options in the **RSG/RDB Restore Options** section. These options do not apply unless you are restoring to an RSG or RDB. "Restoring to an RDB or RSG" on page 123 provides more information.

18. Click **OK** on the **Restore Command Line Options** dialog box.

19. Click **OK** on the **Restore Options** dialog box.

    The **Restore Request** dialog box indicates that the restore started.

20. Click **Close**.

21. After the restore completes, manually resume replication:

    a. Review the steps to reseed the database copy in the "How to Seed a Cluster Continuous Replication Copy" article on the Microsoft TechNet website at http://technet.microsoft.com.

    b. Use the `Resume-StorageGroupCopy` command in the Exchange Management Shell to resume replication.

       Replication sometimes fails because you must reseed the database on the current passive node.

    c. If replication fails, run the `Update-StorageGroupCopy` command in the Exchange Management Shell on the passive node.

22. Restart the cluster resource for the restored database.

Restoring to a file

You can restore databases to a file either on the original server or on a different server. After the restore, you can configure the Exchange server to use the databases at the new location. You can also use third party tools such as Kroll OnTrack PowerControls to perform data mining and advanced data recovery.

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore and Manage** window appears.

2. Find the backup to restore:

   - "How to find a backup by date" on page 97
   - "How to find a backup for a specific database or storage group" on page 98

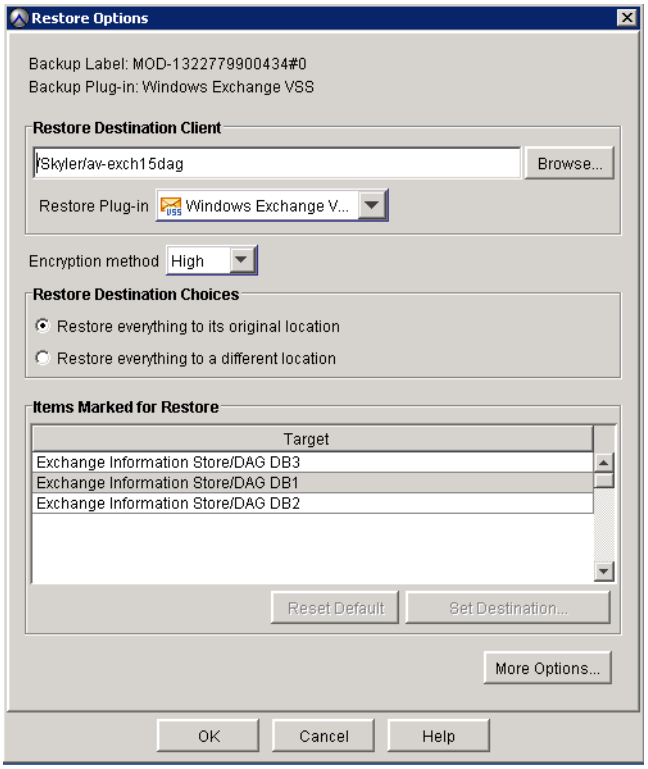
   The backup to restore from is selected in the **Backups** table.

3. Select the data to restore:

   - To restore the entire Exchange Information Store, select the **Exchange Information Store** checkbox in the lower-left pane.
   - To restore a specific database or storage group, select **Exchange Information Store** in the lower-left pane, and then select the checkbox next to the database or storage group in the lower-right pane.

4. Select **Actions** › **Restore Now**.

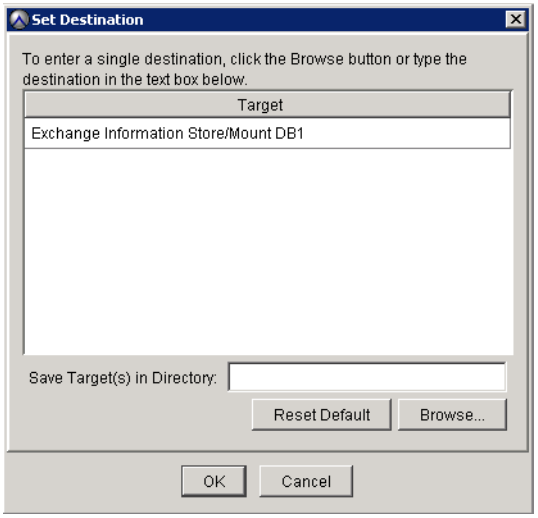
   The **Restore Options** dialog box appears.



5. Specify the target client for the restore:
   - To restore to a file system location on the original server, leave the default selection of the original server in the **Restore Destination Client** box.
   - To restore to a file system location on a different server, either type the name of the server or click **Browse** to browse to the server.
6. Ensure that **Windows Exchange VSS** appears in the **Restore Plug-in** list.
7. From the **Encryption method** list, select the encryption method to use for client/server data transfer during the restore.

   The encryption technology and bit strength for a client/server connection depend on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.
8. Select **Restore everything to a different location**.
9. Click **Set Destination**.

   The **Set Destination** dialog box appears.

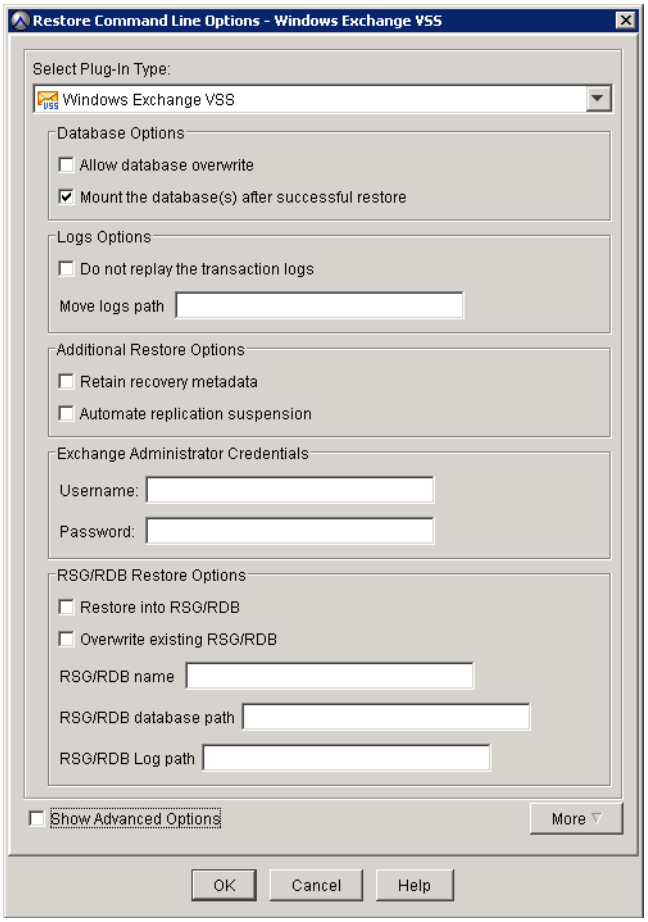


10. Specify the file system location for the restored files:
    a. Click **Browse**.

       The **Browse for File, Folder, or Directory** dialog box appears.
    b. Expand the **Windows File System** item in the left pane, and browse the file system.
    c. In the right pane, select the checkbox next to the target folder for the restored files.
    d. Click **OK**.
11. Click **OK** on the **Set Destination** dialog box.

12. Click **More Options**.

    The **Restore Command Line Options** dialog box appears.



13. Select whether to restore but not replay transaction logs by selecting or clearing the **Do not replay the transaction logs** checkbox.

    If you select this option, then you can manually copy additional transaction logs before you mount the database.

14. Choose whether to retain or delete metadata files that are used during the restore:

    - Select the **Retain recovery metadata** checkbox to retain the files.
    - Clear the checkbox to automatically delete the files after the restore completes.

    You can use these metadata files to investigate any restore issues that occur. The files are in the `C:\Program Files\avs\var\avexvss_restore` folder, where *C:\Program Files\avs* is the Avamar installation folder.

15. If you did not configure the AvamarBackupUser account, then specify the **Username** and **Password** for an Exchange administrator account that has permissions to perform the restore. "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.

16. Disregard the remaining options in the **Restore Command Line Options** dialog box. These options do not apply when you restore to a file.

17. Click **OK** on the **Restore Command Line Options** dialog box.

18. Click **OK** on the **Restore Options** dialog box.

    The **Restore Request** dialog box indicates that the restore started.

19. Click **Close**.

Monitoring database restores

The Activity Monitor in Avamar Administrator enables you to monitor restores to ensure that the restores complete successfully and to troubleshoot if a failure occurs.

1. In Avamar Administrator, click the **Activity** tab.

   The **Activity** window appears.

2. Select the **Activity Monitor** tab.

   A list of all activities appears.

3. To filter the results to display only restore activity, select **Actions** › **Filter**.

   The **Filter Activity** dialog box appears.

4. In the **Filter Activity** dialog box, select **Restore** from the **Type** list.

5. Click **OK**.

Canceling database restores

You can cancel a restore any time before the restore completes. The cancellation may take five minutes or more. The restore may complete before the cancellation finishes.

1. In Avamar Administrator, click the **Activity** tab.

   The **Activity** window appears.

2. Select the **Activity Monitor** tab.

   A list of all activities appears.

3. From the list of activities, click the restore to highlight it.

4. Select **Actions** › **Cancel Activity**.

   A confirmation message appears.

5. Click **Yes**.

Troubleshooting database restores

The following topics explain issues that may occur during the restore process for an Exchange environment, and steps to resolve or work around the issues.

Restore moves the current log files if gaps are detected

If you do not specify a path for the log files in the **Move logs path** box on the **Restore Command Line Options** dialog box and there is a gap in the transaction log, then the restore process automatically moves the current transaction logs to a subfolder named `logs_time_date`. The *time* and *date* values are the time and date of the restore. The subfolder is in the transaction log folder for the database or storage group. You can use these logs to analyze the restore operation, if necessary, or apply those logs up to where the failure occurred.

"Range of log files is missing" error in the Event Log

An error message that there is a gap in the transaction log files may appear in the Exchange VSS plug-in log file and the Event Log when you restore a database in a DAG. This error may appear when the backup of the active copy occurred simultaneously with the backup of the passive copy. The backups succeed but the log files may not match.

If this error occurs, you may still be able to recover that backup by using the Exchange Server Database Utilities tool, `eseutil`. The "Eseutil" article on the Microsoft TechNet website describes how to use this tool.

Missing or inaccessible log files

The Exchange VSS plug-in restore process writes status and messages to the `MOD-XXX-3018-Exchange_VSS_Writer_2007.log` file. You can view this log file in the `C:\Program Files\avs\var` folder on the Exchange server.

You must use the AvamarBackupUser account to perform the restore. The AvamarBackupUser account has the required restore privileges and write permissions to the `C:\Program Files\avs\var` folder on the Exchange server. Otherwise, the restore process cannot create or write to the log file, and restore fails.

If you perform the restore with a user that does not have the required restore privileges, but has write permissions to the `C:\Program Files\avs\var` folder on the Exchange server, then the restore process writes messages and failure information to the `avexvss.log` file in the `var` folder.

"Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the AvamarBackupUser account and required privileges for restore.

All Exchange Server 2007 databases mount after restore

Avamar dismounts all databases in a storage group before a database restore starts, even if you restore only selected databases. When the restore completes, Avamar attempts to mount all existing databases in the storage group, even if the databases were not previously mounted. Avamar does not attempt to mount databases that do not exist on disk, even if they exist in Active Directory.

Selective restore of databases from an older backup may fail

If you attempt to restore selected databases from an older backup when newer backups exist, then the restore may fail. To work around this issue, move the transaction log files during the restore by specifying a path in the **Move logs path** box on the **Restore Command Line Options** dialog box.

Check the event logs in the Event Viewer if one or more databases fail to mount.

Restore to RDB fails or results in an unusable RDB

Avamar uses wait times that Microsoft recommends for RDB stabilization in Exchange Server 2013 before the restore starts. The restore either fails or results in an unusable RDB if the stabilization exceeds the wait time. You can increase the wait time to allow more time for the RDB to stabilize.

To increase the RDB stabilization wait time:

1. Use a text editor to create an `avexchglr.cmd` file in the *`C:\Program Files\avs\var`* folder, where *C:\Program Files\avs* is the Avamar installation folder.
2. Type the following text in the command file:

   `--rdb_stabilize_wait=`*`n`*

   where *n* is the wait time in seconds. The default value is 60 seconds.
3. Save and close the file.

CHAPTER 5
Granular Level Recovery

The following topics explain how to perform granular level recovery (GLR) of user mailboxes, mailbox folders, and messages from database backups:

Requirements to perform GLR

The environment must meet the following requirements to successfully perform GLR:

- To perform GLR with the Exchange GLR plug-in, the plug-in must be installed on the target server for the restored items.

  If you are planning to restore to an RDB or RSG and then perform GLR with Exchange Management Shell commands, then only the Exchange VSS plug-in is required on the target server for the restored items.

- You must restore from a full backup when you perform GLR with the Exchange GLR plug-in. You can restore a database to an RDB or RSG from either a full or incremental backup.
- You cannot restore public folder database backups to RDBs or RSGs, and you cannot perform GLR of items in public folder databases. Microsoft does not support public folder databases in RDBs or RSGs.
- You cannot restore individual items from archive and disconnected mailboxes. You must restore the entire mailbox to a different live mailbox.

Performing GLR with the Exchange GLR plug-in

You can use the Exchange GLR plug-in to restore mailboxes, folders, and messages from a database backup to the original location. You can also restore to a different mailbox.

1. Delete all RDBs on the target Exchange server with the Exchange GLR plug-in. You cannot browse a backup for mailboxes, folders, or messages to restore when there is an RDB on the server.

   The GLR process automatically deletes RSGs on target Exchange Server 2007 servers.

2. In Avamar Administrator, click the **Backup & Restore** tab.

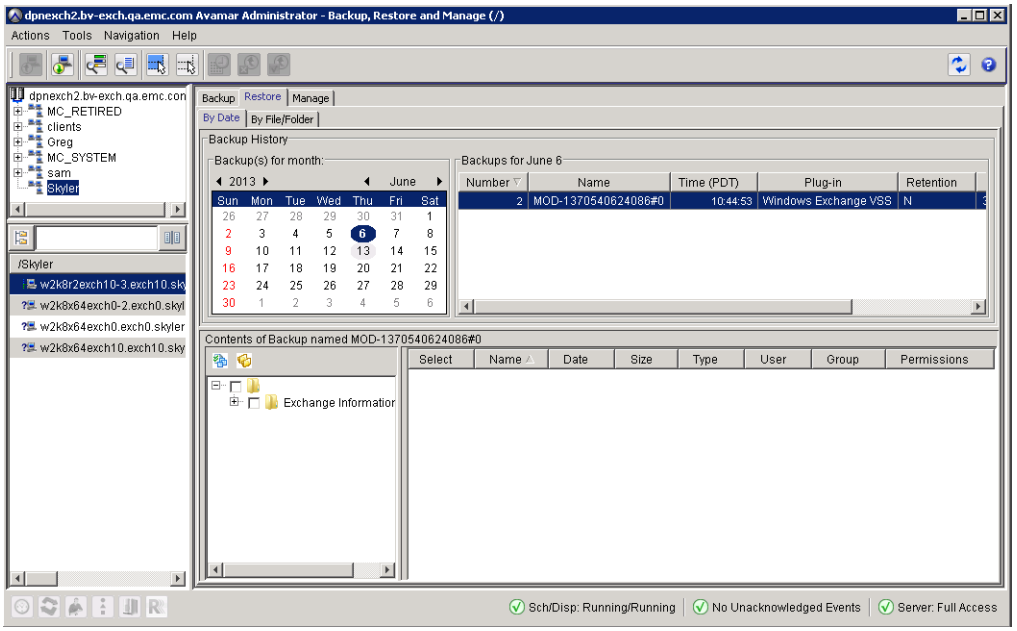
   The **Backup, Restore, and Manage** window appears.

3. Find a full backup that contains the items to restore:

   - "How to find a backup by date" on page 97
   - "How to find a backup for a specific database or storage group" on page 98

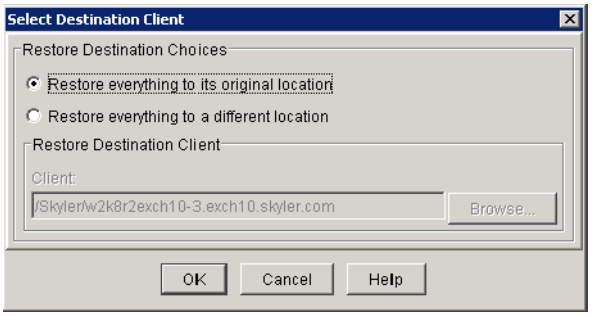
   Note: When you move a user mailbox from one database to another, you may be able to find backups for the mailbox in both the original and current databases. Backups of the original database contain the contents of the mailbox from before you moved the mailbox to the new database. To restore recent data for the mailbox, restore from backups of the current database. To restore items from before you moved the mailbox to the new database, restore from backups of the original database.

The backup to restore from is selected in the **Backups** table.



4. Select the **Browse for Granular Restore** icon in the lower-left pane of the **Restore** tab.

   The **Select Destination Client** dialog box appears.



5. Select the target server for GLR. The Exchange GLR plug-in must be installed on the target server.
   - If you configured a GLR proxy server, select **Restore everything to a different location**, and then browse to the GLR proxy server.
   - On a stand-alone server with the Exchange GLR plug-in, select **Restore everything to its original location**.
   - In a DAG environment, select **Restore everything to a different location**, and then browse to a DAG server with the GLR plug-in.
   - In an Exchange Server 2007 cluster environment, select **Restore everything to a different location**, and then browse to the current active node.
6. Click **OK**.

   If a dialog box prompts you for Exchange credentials, type the AvamarBackupUser name and password, and then click **OK**.

The **Browse Progress** message box displays the progress of the operation as the Exchange GLR plug-in retrieves the contents of the backup and mounts the backup to a virtual drive. The virtual drive provides only a view of the contents of the backup. The GLR plug-in does not restore data at this point.

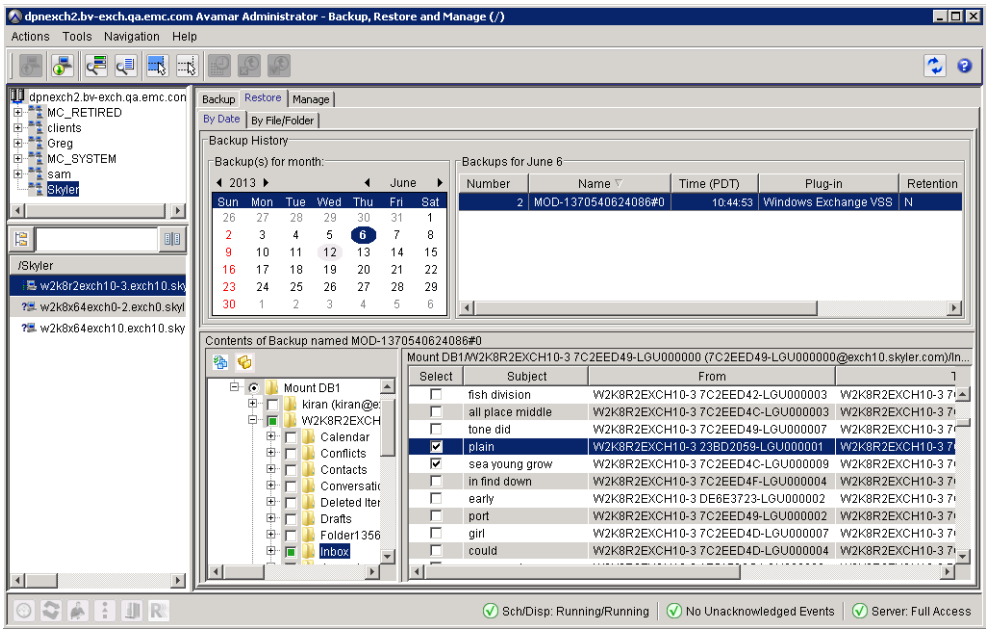
7. In the lower-left pane of the **Restore** tab, select the database or storage group that contains the mailbox, folder, or messages to recover.

   A message box informs you that the database mount may take a long time and that any existing RDB or RSG will be deleted.

8. Click **OK**.

   The contents of the selected database or storage group appear in the lower right pane.

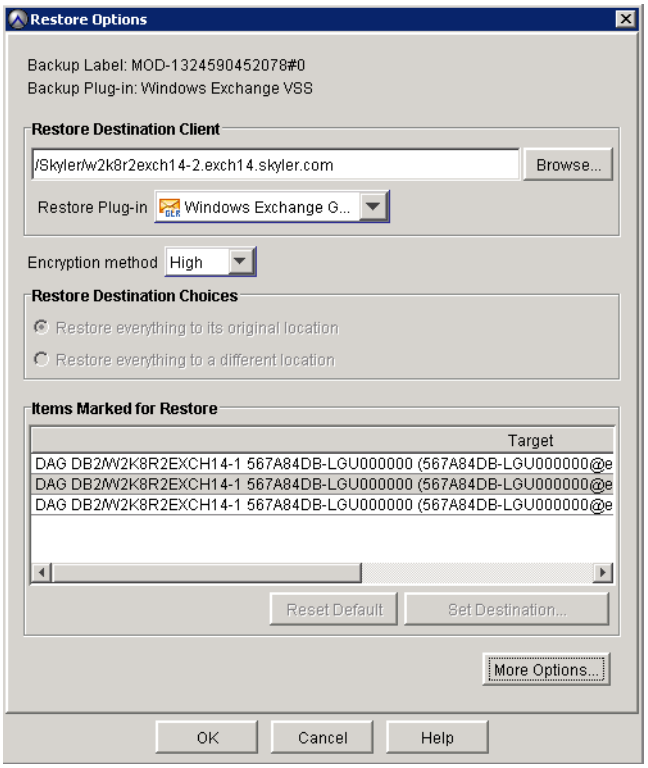
9. Browse to and select the checkbox next to the mailbox, folder, or message to recover.



You cannot perform GLR of items in public folder databases, and you cannot restore individual items from archive and disconnected mailboxes. You must restore the entire archive or disconnected mailbox to a different live mailbox.

10. Select **Actions** › **Restore Now**.

    The **Restore Options** dialog box appears.



Note: When you restore from a federated backup and you click **Cancel** in the **Restore Options** window, Avamar resets the destination client for GLR to the Exchange DAG client instead of the Exchange client that you selected in the **Select Destination Client** dialog box. If you try to perform the restore again, reset the destination client to the client with the Exchange GLR plug-in. Otherwise, the restore fails.

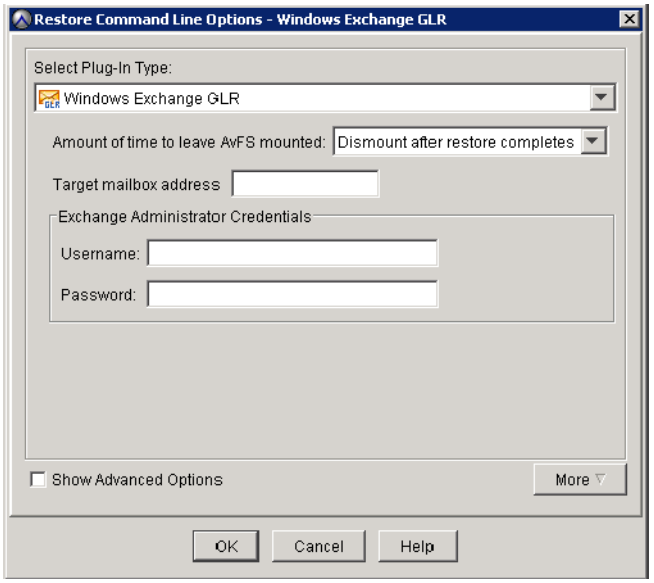
---

11. Leave the default selections in the **Restore Destination Client** box and the **Restore Plug-in** list.
12. From the **Encryption method** list, select the encryption method to use for client/server data transfer during this restore.

    The exact encryption technology and bit strength used for a client/server connection depends on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.

13. Click **More Options**.

    The **Restore Command Line Options** dialog box appears.



14. From the **Amount of time to leave AvFS mounted** list, select when to automatically dismount the temporary file system from the Exchange server that you are using for GLR:

    - **Dismount after restore completes**
    - **Dismount after 1 hour of inactivity**
    - **Dismount after 2 hours of inactivity**

    The drive dismounts even if the drive is in use.

15. (Optional) Redirect the restore to a different mailbox than the original mailbox by specifying the target mailbox address in the **Target mailbox address** box with the format *name@domain.subdomain.suffix*.

16. If you did not configure the AvamarBackupUser account, then specify the **Username** and **Password** for an Exchange administrator account that has permissions to perform the restore. "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.

17. Click **OK** on the **Restore Command Line Options** dialog box.

18. Click **OK** on the **Restore Options** dialog box.

    The **Restore Request** dialog box indicates that the restore started.

19. Click **Close**.

Performing GLR from an existing RDB or RSG

You can restore a database backup to an RDB or RSG, and then perform GLR from the RDB or RSG. You can only restore to a single RDB or RSG at a time.

After you restore to an RDB or RSG, you can use either Exchange Management Shell commands or the Avamar Plug-in for Exchange GLR to perform GLR of mailboxes, folders, or messages from the RDB or RSG.

Restoring to an RDB or RSG

1. If an RDB is mounted on the target server, then unmount or delete the RDB. If an RSG is mounted on the target server, then delete the RSG.
2. In Avamar Administrator, click the **Backup & Restore** tab.

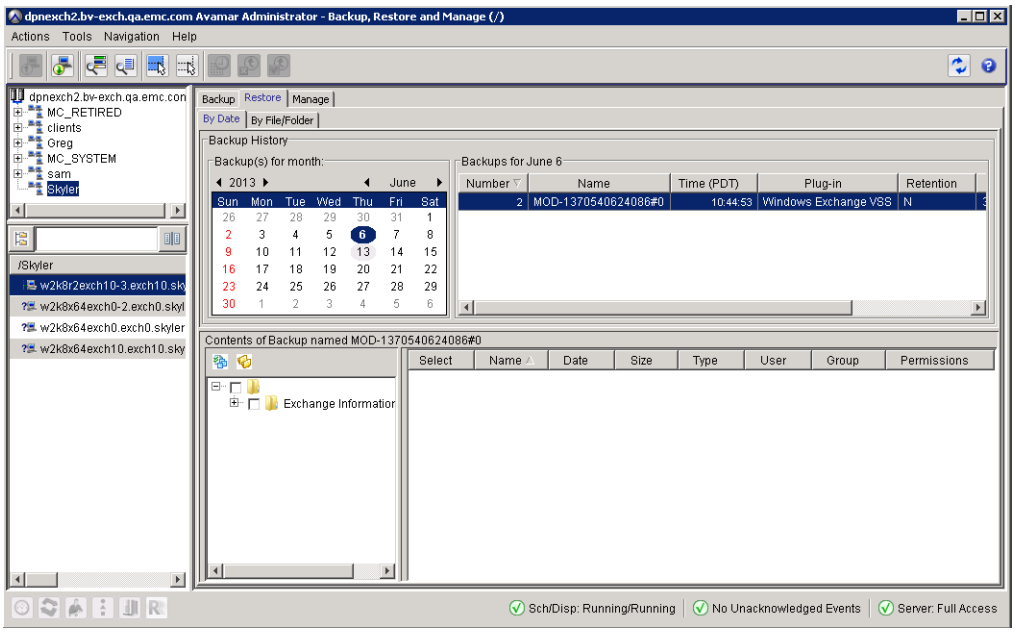
   The **Backup, Restore, and Manage** window appears.
3. Find the backup to restore:

   - "How to find a backup by date" on page 97
   - "How to find a backup for a specific database or storage group" on page 98

   You can restore a database to an RDB or RSG from either a full backup or an incremental backup.

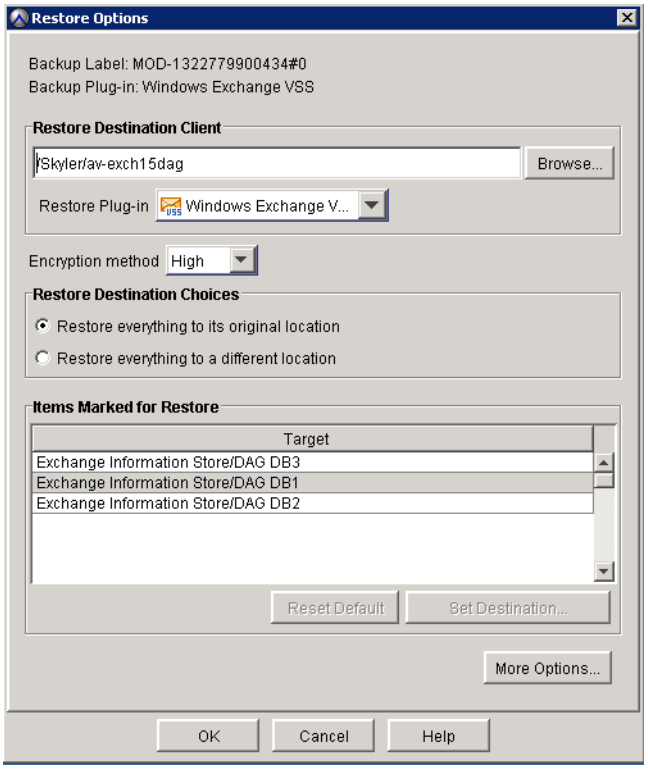
   Note: When you move a user mailbox from one database to another, you may be able to find backups for the mailbox in both the original and current databases. Backups of the original database contain the contents of the mailbox from before you moved the mailbox to the new database. To restore recent data for the mailbox, restore from backups of the current database. To restore items from before you moved the mailbox to the new database, restore from backups of the original database.

   The backup to restore from is selected in the **Backups** table.



4. Select **Exchange Information Store** in the lower-left pane of the **Restore** tab.
5. In the lower-right pane of the **Restore** tab, select the checkbox next to the database or storage group to restore to an RDB or RSG, respectively.
6. Select **Actions** › **Restore Now**.

   The **Restore Options** dialog box appears.



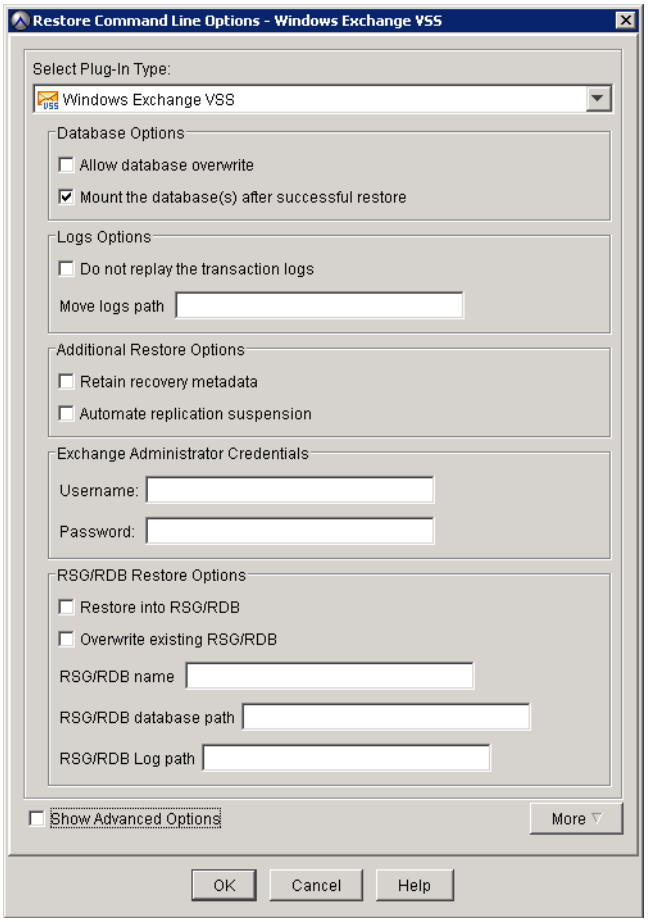
7. In the **Restore Destination Client** box, type the name of the target client for the RDB or RSG, or click **Browse** to browse to the target client.

   The Exchange GLR plug-in must be installed on the target client if you plan to perform GLR from the RDB or RSG with the Exchange GLR plug-in.
8. Ensure that **Windows Exchange VSS** appears in the **Restore Plug-in** list.
9. From the **Encryption method** list, select the encryption method to use for client/server data transfer during the restore.

   The encryption technology and bit strength for a client/server connection depend on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.
10. Leave the default selection of **Restore everything to its original location**.

11. Click **More Options**.

    The **Restore Command Line Options** dialog box appears.



12. Disregard the **Allow database overwrite** checkbox. This option does not apply when you restore to an RDB or RSG.
13. Select whether to automatically mount the RDB or RSG after a successful restore by selecting or clearing the **Mount the database(s) after successful restore** checkbox.
14. Select whether to restore but not replay transaction logs by selecting or clearing the **Do not replay the transaction logs** checkbox.

    If you select this option, then you can manually copy additional transaction logs before you mount the database.
15. Disregard the **Move logs path** box. This option does not apply when you restore to an RDB or RSG.
16. Choose whether to retain or delete metadata files that are used during the restore:
    - Select the **Retain recovery metadata** checkbox to retain the files.
    - Clear the checkbox to automatically delete the files after the restore completes.

    You can use these metadata files to investigate any restore issues that occur. The files are in the `C:\Program Files\avs\var\avexvss_restore` folder, where *C:\Program Files\avs* is the Avamar installation folder.

17. Disregard the **Automate replication suspension** checkbox. This option does not apply when you restore to an RDB or RSG.
18. If you did not configure the AvamarBackupUser account, then specify the **Username** and **Password** for an Exchange administrator account that has permissions to perform the restore. "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.
19. Select the **Restore into RSG/RDB** checkbox.
20. In the **RSG/RDB** name box, type the name for the restored RSG or RDB.

    The restore process creates the RDB or RSG if the RDB or RSG does not already exist.

    If you do not specify a name, then the restore uses the following naming convention:

    - Exchange Server 2013 or 2010 — `database_rdb`, where *database* is the original name of the database
    - Exchange Server 2007 — `storage-group_rsg`, where *storage-group* is the original name of the storage group
21. If an RDB or RSG with the same name already exists on the target server, select the **Overwrite existing RSG/RDB** checkbox to overwrite the RDB or RSG.

    If you select the checkbox, do not specify a new location for the RDB or RSG database and log files. The restore process ignores the values that you specify in the **RSG/RDB database path** and **RSG/RDB Log path** boxes and restores the files to the Exchange server DataPath, which is the default location for new databases.
22. Specify the location for the RDB or RSG database files in the **RSG/RDB database path** box.

    If you do not specify a location, then the files restore to the Exchange server DataPath, which is the default location for new databases.
23. Specify the location for the RDB or RSG log files in the **RSG/RDB Log path** box.

    If you do not specify a location, then the files restore to the Exchange server DataPath, which is the default location for new databases.
24. Click **OK** on the **Restore Command Line Options** dialog box.
25. Click **OK** on the **Restore Options** dialog box.

    The **Restore Request** dialog box indicates that the restore started.
26. Click **Close**.

Performing GLR from an RDB or RSG with Exchange Management Shell commands

After you restore a database from a backup to an RDB or RSG, you can use Exchange Management Shell commands to perform GLR of specific mailboxes.

1. Ensure that the RDB or RSG is mounted on the Exchange server.
2. Perform the steps in the following Microsoft TechNet articles to restore specific mailboxes from the RDB or RSG by using Exchange Management Shell commands:
   - Exchange 2013 and 2010: "Restore Data Using a Recovery Database" at http://technet.microsoft.com/en-us/library/ee332351.aspx
   - Exchange 2007: "How to Recover a Mailbox by Using a Recovery Storage Group" at http://technet.microsoft.com/en-us/library/aa997694.aspx

Performing GLR from an existing RDB or RSG with the Exchange GLR plug-in

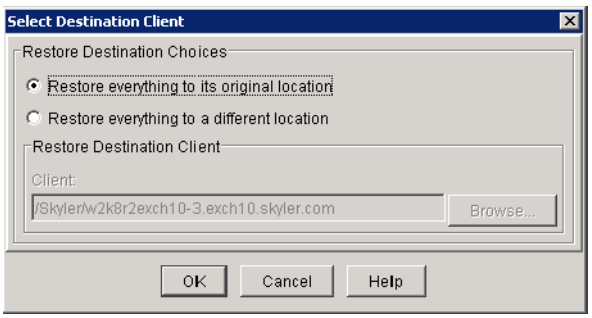
You can browse a restored RDB or RSG on an Exchange server with the Exchange GLR plug-in and perform GLR of specific mailboxes, folders, and messages.

1. In Avamar Administrator, click the **Backup & Restore** tab.

   The **Backup, Restore, and Manage** window appears.
2. Find the original backup with the database that you restored to an RDB or RSG:
   - "How to find a backup by date" on page 97
   - "How to find a backup for a specific database or storage group" on page 98

   The backup to restore from is selected in the **Backups** table.
3. Select the **Browse for Granular Restore** icon  in the lower-left pane of the **Restore** tab.

   The **Select Destination Client** dialog box appears.



4. Select the target server for GLR. The Exchange GLR plug-in must be installed on the target server.

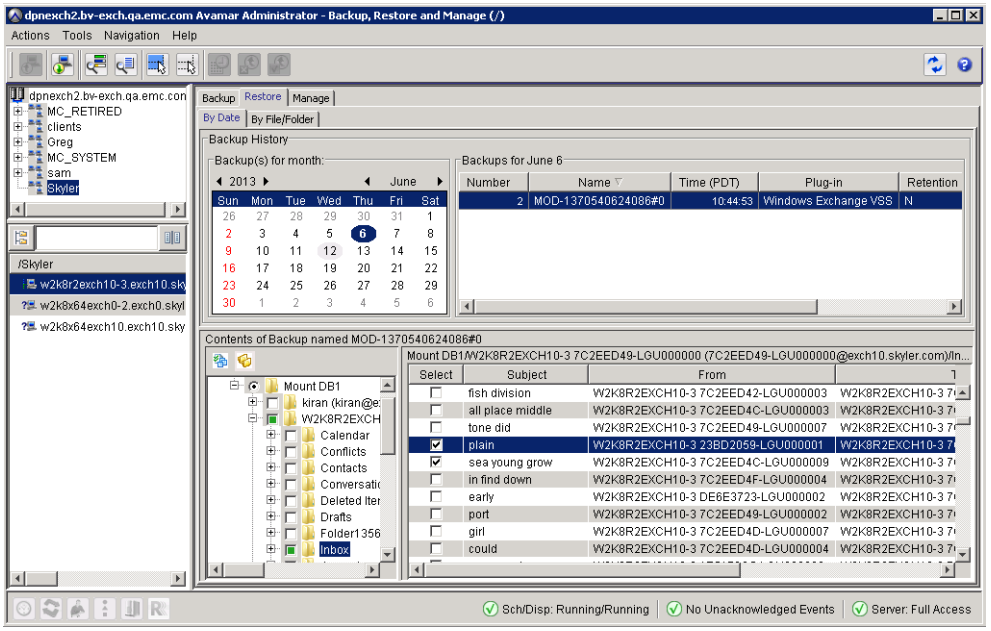
   If you know that the target server for GLR is the same server that you used for the backup, then select **Restore everything to its original location**.

   Otherwise, select **Restore everything to a different location**, and then browse to the server with the restored RDB or RSG. The Exchange GLR plug-in must be installed on the target server.
5. Click **OK**.

If a dialog box prompts you for Exchange credentials, type the AvamarBackupUser name and password, and then click **OK**.

The **Browse Progress** message box displays the progress of the operation.

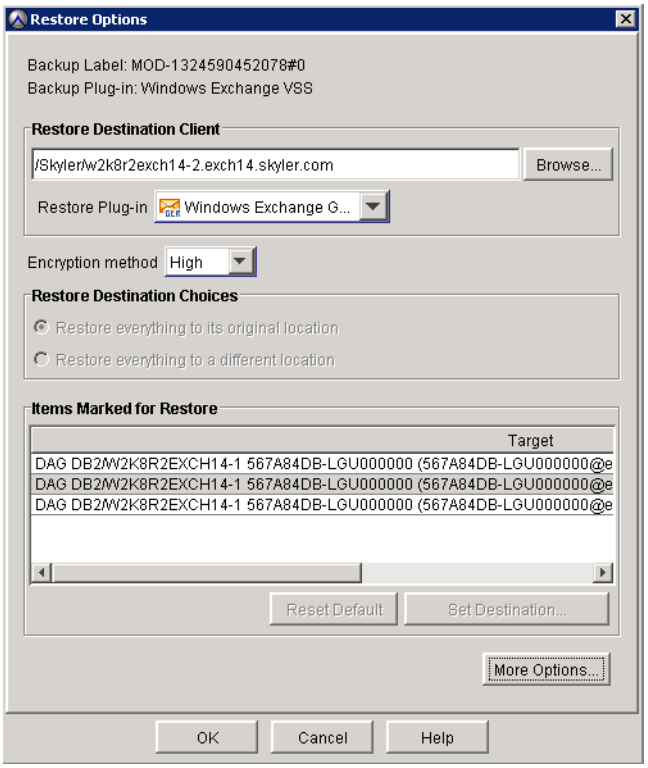
6. In the lower-left pane of the **Restore** tab, select the restored RDB or RSG. The RDB or RSG appears with `(existing)` appended to the name.
7. Browse to and select the checkbox next to the mailbox, folder, or message to recover.



You cannot restore individual items from archive and disconnected mailboxes. You must restore the entire archive or disconnected mailbox to a different live mailbox.

8. Select **Actions › Restore Now**.

   The **Restore Options** dialog box appears.

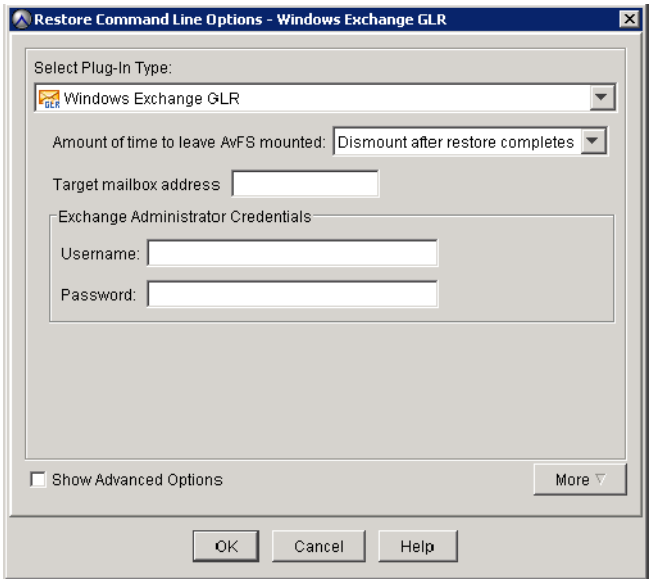


9. Leave the default selections in the **Restore Destination Client** box and the **Restore Plug-in** list.
10. From the **Encryption method** list, select the encryption method to use for client/server data transfer during this restore.

    The exact encryption technology and bit strength used for a client/server connection depends on several factors, including the client operating system and Avamar server version. The *EMC Avamar Product Security Guide* provides additional information.

11. Click **More Options**.

    The **Restore Command Line Options** dialog box appears.



12. Disregard the **Amount of time to leave AvFS mounted** list. This option does not apply when you restore from an existing RDB or RSG.
13. (Optional) Redirect the restore to a different mailbox than the original mailbox by specifying the target mailbox address in the **Target mailbox address** box using the format *name@domain.subdomain.suffix*.
14. If you did not configure the AvamarBackupUser account, then specify the **Username** and **Password** for an Exchange administrator account that has permissions to perform the restore. "Creating and configuring the AvamarBackupUser account" on page 48 provides more information on the account.
15. Click **OK** on the **Restore Command Line Options** dialog box.
16. Click **OK** on the **Restore Options** dialog box.

    The **Restore Request** dialog box indicates that the restore started.
17. Click **Close**.

Monitoring GLR

You can monitor GLR activity to ensure that the restores complete successfully and to troubleshoot if a failure occurs. Information about GLR activity is available in the Activity Monitor in Avamar Administrator, Avamar log files, and the Windows Application Event log.

Monitoring GLR in Avamar Administrator

The Activity Monitor in Avamar Administrator enables you to monitor GLR and restores to an RDB or RSG.

1. In Avamar Administrator, click the **Activity** tab.

   The **Activity** window appears.

2. Select the **Activity Monitor** tab.

   A list of all activities appears.

3. To filter the results to display only restore activity, select **Actions** › **Filter**.

   The **Filter Activity** dialog box appears.

4. In the **Filter Activity** dialog box, select **Restore** from the **Type** list. GLR appears as a restore activity.

5. Click **OK**.

The **Progress Bytes** and **New Bytes** columns in the Activity Monitor contain a value of `0` (zero) for GLR activity with the Exchange GLR plug-in. The Exchange GLR plug-in does not report restore size to Avamar Administrator.

Enabling GLR log files

The following table lists the Avamar log files that you can enable to trace and debug GLR, and the flags and command files that you use to enable the logging.

Table 8 Avamar log files for troubleshooting GLR

Log file	Contents	Flag to enable debugging	Command file for flags
`Axionfs.log`	Trace and debugging information for AvFS file system calls.	`--debug` `--x19=327680`	`axionfs.cmd`
`avmapi.log`	Trace and debugging information for MAPI calls.	`--debug`	`avmapi.cmd`
`avexglr_plugin.log`	Trace and debugging information for RDB and RSG creation, mount, browse, and restore.	`--debug`	`avexchglr.cmd`
`Avexchglrsvc.log`	Trace and debugging information for RDB and RSG creation, mount, browse, and restore.	`--debug`	`avexchglrsvc.cmd`
`ps_exec.log`	Trace and debugging information for execution of PowerShell commands on the Exchange client.	`--debug`	`ps_exec.cmd`

To enable the GLR log files before you perform GLR:

1. Use a text editor to create the command file in the `C:\Program Files\avs\var` folder, where *C:\Program Files\avs* is the Avamar installation folder.
2. Open the command file in the text editor, and add the flags to enable debugging.
3. Save and close the command file.

Monitoring Exchange events in the Windows Application Event log

The Windows Application Event log contains Exchange events for I/O activity, restores to an RDB or RSG, and GLR from an RDB or RSG. The Microsoft Windows documentation provides more information on viewing the Windows Application Event log.

Canceling GLR

You can cancel a browse operation with the Exchange GLR plug-in by clicking **Cancel** on the **Browse Progress** dialog box.

You can cancel GLR or a restore to an RDB or RSG any time before the restore completes. The cancellation may take five minutes or more. The GLR may complete before the cancellation finishes.

1. In Avamar Administrator, click the **Activity** tab.

   The **Activity** window appears.
2. Select the **Activity Monitor** tab.

   A list of all activities appears.
3. From the list of activities, click the restore to highlight it.
4. Select **Actions** › **Cancel Activity**.

   A confirmation message appears.
5. Click **Yes**.

Troubleshooting GLR

The following topics explain browse issues and restore failures that may occur during Exchange GLR, and steps to resolve or work around the issues.

Troubleshooting GLR browse issues

The following issues may occur when you browse database backups for GLR.

Mailboxes do not appear when browsing

If mailboxes do not appear when you browse for items to restore during granular level recovery, then check the `avmapi.log` file, which is available in the `C:\Program Files\avs\var` folder.

If an `"Unable to create MAPI profile due to a network issue"` error appears in the log file and the network is a pure IPv4 network, then disable IPv6 support on all Exchange servers with Mailbox or Client Access Server roles installed.

The Microsoft Support article "How to disable certain Internet Protocol version 6 (IPv6) components in Windows Vista, Windows 7 and Windows Server 2008," at http://support.microsoft.com/kb/929852 provides more information.

Browsing fails for an Avamar 6.1 client with an Avamar 7.0 server

If you upgrade the Avamar server to version 7.0 but the Exchange VSS and Exchange GLR plug-ins on the Exchange server are version 6.1, then configure command files with encryption flags. Otherwise, you cannot browse a database backup for mailboxes, folders, and messages for GLR.

1. Use a text editor to create the following command files in the *`C:\Program Files\avs\var`* folder, where *C:\Program Files\avs* is the Avamar installation folder:

   - `avexchglr.cmd`
   - `avtar.cmd`
   - `axionfs.cmd`

2. Add the following lines to each file:

   ```
   --encrypt=tls
   --encrypt-strength=high
   ```

3. Save and close the files.

Browsing fails when you specify or change the Exchange Client Access service

You may not be able to browse a database backup for GLR if you recently specified or changed the Exchange Client Access Server. Changes that can cause this issue include moving the Client Access Server role to a different server, or changing the server name or IP address of the server.

To resolve this issue, stop and restart the Exchange Client Access service on the Exchange Mailbox server to resolve the issue.

Browsing fails when you dismount the database with the AvamarBackupUser

An "Error MAPI_E_FAILONEPROVIDER" error message appears when you perform GLR from a backup of an Exchange Server 2007 database and you dismounted the database with the AvamarBackupUser mailbox. To resolve this issue, mount the database with the AvamarBackupUser mailbox.

Browsing fails when a mailbox folder contains a large number of items

You may not be able to browse a mail folder with a large number of items for GLR. The number of items that causes the failure is typically in the tens of thousands, although the exact number varies.

If the number of messages in the folder exceeds the maximum that Avamar Administrator can display, then a `"Backup Mailbox Browse result is empty"` error message appears.

To work around this issue, use one of the following methods:

- Restore the entire folder, and then copy individual messages from the `Recovered Items` folder to the target mailbox folders.
- Specify a maximum number of mailbox items to display in Avamar Administrator in the `avexchglr.cmd file`:
  1. Use a text editor to create a command file named `avexchglr.cmd` in the *`C:\Program Files\avs\var`* folder, where *C:\Program Files\avs* is the Avamar installation folder.
  2. Add the following line to the file:

     `--max_browse_entries=`*n*

     where *n* is the maximum number of entries. The value should be less than `40000` (40,000).
  3. Save and close the file.
  4. Close the **Backup, Restore and Manage** window in Avamar Administrator, and then reopen the window and retry the GLR operation.

Browsing fails for user mailbox names with mismatched parentheses

You may not be able to browse mailboxes that have mismatched parentheses in the mailbox name. `Test mailbox (accounting` is an example of a mailbox name that can cause this problem.

Troubleshooting GLR restore failures

The following issues may occur when you restore individual mailboxes, folders, or messages with the Exchange GLR plug-in.

GLR fails with the error “The semaphore timeout period has expired”

Exchange GLR may fail with the error “The semaphore timeout period has expired.” This error occurs most often when you store backups on a Data Domain system. To work around this issue, you can add flags to the `axionfs.cmd` file to either extend or disable the timeout period.

1. Use a text editor to create a command file named `axionfs.cmd` in the *`C:\Program Files\avs\var`* folder, where *C:\Program Files\avs* is the Avamar installation folder.
2. Add the following line to the file, which extends the timeout period to 130 seconds:

   ```
   --largecallbacktimeout
   ```

3. Save and close the file.
4. If GLR still fails with the extended timeout period, then remove the `--largecallbacktimeout` value from the `axionfs.cmd` file and add the following value to disable the timeout period:

   ```
   --disablecallbacktimeout
   ```

5. Save and close the file.

GLR fails with the error “Failed to mount database. Please check exchange GLR logs for more details”

Exchange GLR may fail with the error “Failed to mount database. Please check exchange GLR logs for more details.” The `exchglr_plugin.log` file includes the following entries:

```
avexchglr Warning <9072>: PowerShell: Error Couldn't mount the
   database that you specified. ..
Error: Couldn't find the specified mailbox database with GUID…
```

To resolve this issue, specify a mount retry time in the `avexchglr.cmd` file.

1. Use a text editor to create a command file named `avexchglr.cmd` in the *`C:\Program Files\avs\var`* folder, where *C:\Program Files\avs* is the Avamar installation folder.
2. Add the following line to the file:

   ```
   --mount_retry_time=seconds
   ```

   where *seconds* is the number of seconds to wait before retrying the database mount. A recommended value is `120`.
3. Save and close the file.
4. If the error message continues to appear, then increase the value for the `--mount_retry_time` option.

GLR fails with the error “Failed to configure MAPI profile due to a network error”

Exchange GLR may fail with the error “Failed to configure MAPI profile due to a network error.” When the following error appears in the `avmapi.log`, you may need to specify an Exchange Legacy Distinguished Name for the AvamarBackupUser account:

```
Failed to configure MAPI profile due to a network error. If the network
   is not correctly configured to use IPv6, be sure to completely
   disable all IPv6 services as described in
   http://support.microsoft.com/kb/929852
```

The following error also appears a few lines later:

```
Error MAPI_E_LOGON_FAILED. (code: 0X80040111),…
```

To specify an Exchange Legacy Distinguished Name for the AvamarBackupUser account:

1. Find the Exchange Legacy Distinguished Name by typing the following command in the Exchange Management Shell:

   `Get-Mailbox “AvamarBackupUser” | fl LegacyExchangeDN`

2. Use a text editor to create a command file named `avexchglr.cmd` in the *`C:\Program Files\avs\var`* folder, where *C:\Program Files\avs* is the Avamar installation folder.

3. Add the following line to the `avexchglr.cmd` file:

   `--legacy_exch_dn=`*`name`*

   where *name* is the Exchange Legacy Distinguished Name for the AvamarBackupUser account.

   For example:

   ```
   --legacy_exch_dn="/o=First Organization/ou=Exchange Administrative
   Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=Administrator"
   ```

4. Save and close the file.

GLR browsing fails with “Backup Browse Result Empty” or “GLR Failed in Multiple Child Domains”error

In Exchange Server 2013 and 2010, if a mailbox server does not have Remote PowerShell enabled, the Avamar Exchange GLR plug-in cannot browse the backups of that server. As a result, GLR will fail and a “Backup Browse Result Empty” message appears. To work around this issue, add a flag to the `avmapi.cmd` file to specify another mailbox server that has Remote PowerShell enabled.

If a “GLR Failed in Multiple Child Domains” error is displayed, you will also need to add an additional flag, for troubleshooting GLR browse or restore errors.

For both errors add the first flag listed to specify a mailbox server that has Remote PowerShell enabled, and add the second flag for the “GLR Failed in Multiple Child Domains” error:

1. Use a text editor to create a command file named `avmapi.cmd` in the *`C:\Program Files\avs\var`* folder, where *C:\Program Files\avs* is the Avamar installation folder.
2. Add the following line to the file:

   ```
   --remote-ps-server=<FQDN EXCHANGE SERVER>
   ```

   Where ‹FQDN EXCHANGE SERVER› is a mailbox server that has Remote PowerShell enabled.
3. If you are troubleshooting the “GLR Failed in Multiple Child Domains” error , also add the following line to the avmapi.cmd file:

   ```
   --use-ps-displayname
   ```

   This flag specifies to use PowerShell to get the mailbox display name, rather than use LDAP queries.
4. Save and close the file.

CHAPTER 6
Disaster Recovery

The following topics explain how to prepare for and perform disaster recovery of a Microsoft Exchange Server environment:

Preparing for disaster recovery

To prepare for disaster recovery of a Microsoft Exchange Server environment:

1. Ensure that you have onsite and offsite copies of the installation disks for the operating system, Exchange Server, and any software updates.
2. Perform full Windows server backups by using the Avamar Client for Windows. Include System State and all critical and noncritical disks in the backups. The *EMC Avamar for Windows Server User Guide* provides full backup instructions.
3. Back up all Exchange databases by using the Avamar Plug-in for Exchange VSS. Chapter 3, "Backup," provides backup instructions.

NOTICE

If you perform the full Windows server backup and the database backups at different times, then perform the full Windows server backup first.

Performing disaster recovery

To recover a Microsoft Exchange Server environment after a disaster:

1. Restore the server from the Windows client backup as described in the *EMC Avamar for Windows Server User Guide.*
2. Complete the recommended Microsoft Exchange Server disaster recovery procedure by using the steps in one of the following articles on the Microsoft TechNet website:
   - Exchange Server 2013 and 2010 — "Recover an Exchange Server" at http://technet.microsoft.com/en-us/library/dd876880.aspx
   - Exchange Server 2007 — "Disaster Recovery" at http://technet.microsoft.com/en-us/library/aa998848(EXCHG.80).aspx
3. Complete the steps in "Installing the Exchange VSS plug-in" on page 46.

   If the replacement server is part of a DAG, complete the steps in "Adding servers to a DAG configuration" on page 55.
4. Restore the Exchange databases by using one of the following methods, depending on the environment:
   - Restore the databases from the Exchange VSS plug-in backups.
   - Bring the Exchange server back online in the DAG or cluster, and allow the mailbox databases to synchronize from the current versions on the other servers in the DAG or cluster.
   - Use a combination of both methods. Reseed the mailbox databases with the Exchange VSS plug-in backups, and then synchronize the newly restored Exchange server with the current version on the other servers in the DAG or cluster.
5. When you are sure that the restore of the environment is correct and complete, perform a full backup of the newly restored environment.

APPENDIX A
Plug-in Options

The following topics provide information about backup and restore plug-in options for the Avamar Plug-in for Exchange VSS and the Avamar Plug-in for Exchange GLR:

How to set plug-in options

Plug-in options enable you to control specific actions for on-demand backups, restores, and scheduled backups. The plug-in options that are available depend on the operation type and client plug-in type.

You specify plug-in options in Avamar Administrator for on-demand backup or restore operations, or when you create a dataset for a scheduled backup. You can set plug-in options with the graphical user interface (GUI) controls (text boxes, checkboxes, radio buttons, and so forth). In addition to using the GUI controls for the options, you can type an option and its value in the **Enter Attribute** and **Enter Attribute Value** fields in special circumstances.

NOTICE

The Avamar software does not check or validate the information that you type in the **Enter Attribute** and **Enter Attribute Value** fields. In addition, the values in the **Enter Attribute** and **Enter Attribute Value** fields override settings that you specify with the GUI controls for the options.

Detailed instructions on how to access and set plug-in options during a backup or restore are available in Chapter 3, “Backup,” Chapter 4, “Exchange Database Restore,” and Chapter 5, “Granular Level Recovery.”

Exchange VSS plug-in backup options

The following plug-in options are available for the Avamar Plug-in for Exchange VSS when you perform an on-demand backup or when you configure a dataset for scheduled backups.

Table 9 Backup options for the Exchange VSS plug-in (page 1 of 3)

Option	Description
Select type of backup to perform	Specifies whether to perform a full or incremental backup. Incremental backups automatically promote to full backups when no previous full backup can be found. You can use only full backups for granular level recovery.
Set when backup occurs on clustered or DAG systems	Specifies whether to back up passive databases, active databases, or both in an Exchange 2007 cluster environment or when you back up a specific server in an Exchange Server 2013 or 2010 DAG environment. Select one of the following values: • Select **Replica (passive) writer only** to back up only passive databases. • Select **Store (active) writer only** to back up only active databases. • Select **Always** to back up both passive and active databases.
Federated Backup	
Preferred server order list	Sets the priority of the Exchange servers to use for a federated backup of an Exchange Server 2013 or 2010 DAG environment. Type the server name, not the FQDN. Separate multiple entries with commas. If you do not specify a list, then the Exchange VSS plug-in adds all servers in the DAG to the list in alphabetical order.

Table 9 Backup options for the Exchange VSS plug-in (page 2 of 3)

Option	Description
Set the preference for what types of databases to back up	Specifies the type of database to back up in a federated backup of an Exchange Server 2013 or 2010 DAG environment. Select one of the following values: • **Prefer passive** — Avamar backs up a passive copy of each database, if a healthy passive copy is available. If a healthy passive copy is not available, then Avamar backs up the active copy. • **Passive only** — Avamar backs up only the passive copy of each database. If a healthy passive copy is not available, then the backup does not include the database. **Note:** Backup of active only databases will fail.
Backup policy when saveset includes circular logging-enabled databases	
Promote - Back up all, promote all to full	If there are databases with circular logging enabled in the backup set and you select the option to perform an incremental backup, then this option backs up all databases but promotes the backup to a full backup. When you enable circular logging for a database, Exchange overwrites transaction log files after the data in the log files is committed to the database. Circular logging enables you to save disk space by reducing the number of log files, but you can recover data only up until the last full backup. As a result, Avamar does not support incremental backups of databases with circular logging.
Circular - Only back up circular logging-enabled databases, promote all to full	If there are databases with circular logging enabled in the backup set and you select the option to perform an incremental backup, then this option performs a full backup of only databases with circular logging enabled. The backup skips databases where circular logging is not enabled.
Skip - Skip circular logging-enabled databases, allow incremental	If there are databases with circular logging enabled in the backup set and you select the option to perform an incremental backup, then this option performs an incremental backup of only databases where circular logging is not enabled. The backup skips databases where circular logging is enabled.
Data Domain system	
Store backup on Data Domain system	To store the backup on a Data Domain system instead of the Avamar server, select the checkbox and then select the Data Domain system from the list.
Multi-Streaming	
Enable multi-streaming	Select the checkbox to enable multi-streaming, which enables you to simultaneously back up multiple databases or volumes to reduce backup time. "Multi-streaming" on page 27 provides guidelines for multi-streaming.
Maximum number of streams	When you enable multi-streaming, this option specifies the maximum number of streams to use for the backup. Each stream requires one processor and one spindle.

Table 9 Backup options for the Exchange VSS plug-in (page 3 of 3)

Option	Description
Group by	When you enable multi-streaming, select the method that Avamar uses to group data for multi-streaming: • Select **Database** to create one stream for each database. • Select **Volume** to create one stream for each volume.
Exchange Administrator Credentials	
Username	Specifies the username of an Exchange administrator account, such as the AvamarBackupUser account, that has permissions to perform the backup. "Creating and configuring the AvamarBackupUser account" on page 48 provides details on the required permissions. You only need to specify an account if you did not configure the AvamarBackupUser account or if you are performing one of the following backups: • Federated backup in an Exchange Server 2013 or 2010 DAG environment • Active node backup with the Avamar cluster client in an Exchange 2007 cluster environment The Exchange VSS plug-in uses a different Avamar agent for the DAG or cluster when you perform backups with the Exchange DAG client or the Avamar cluster client. The Avamar agent for the DAG or cluster requires Exchange administrator credentials to perform backups. Therefore, you must manually specify the username and password for the AvamarBackupUser account when you perform a backup with the Exchange DAG client or Avamar cluster client.
Password	Specifies the password for the Exchange administrator account.
Advanced options	
Enable debugging messages	Select the checkbox to write maximum information to the log files for debugging. Use caution when you select this option. The backup process creates large log files.
Disable consistency check (recommended only if 2+ members in DAG)	Select the checkbox to disable consistency checks with the Exchange `eseutil` utility during the backup. A consistency check can cause severe performance issues or fail during a backup, especially in environments with many transaction logs.
Enable consistency check throttling	Select the checkbox to throttle consistency checks with the Exchange `eseutil` utility during the backup by pausing the consistency check after a specified number of I/Os. Then specify the number of I/Os by using the **#IOs between pauses** option and the length of the pauses by using the **Duration of pauses (ms)** option.
#IOs between pauses	Specifies the number of I/Os between pauses when you enable throttling of the consistency check. The value must be between `100` and `10000` (10,000). The default value is `1000` (1,000).
Duration of pauses (ms)	Specifies the duration of the pause in milliseconds when you enable throttling of the consistency check. The value must be between `1000` (1,000) and `60000` (60,000). The default value is `1000` (1,000).

Exchange VSS plug-in restore options

The following plug-in options are available when you perform a restore with the Avamar Plug-in for Exchange VSS.

Table 10 Restore options for the Exchange VSS plug-in (page 1 of 3)

Option	Description
Database Options	
Allow database overwrite	Select the checkbox to enable the overwrite of all target databases during the restore. To enable the overwrite of a specific database instead of all target databases: 1. Leave the **Allow database overwrite** checkbox clear. 2. In the Exchange Management Console, select **This database can be overwritten by a restore** in the recovery options for the database.
Mount the database(s) after successful restore	Select the checkbox to automatically mount databases after a successful restore.
Logs Options	
Do not replay the transaction logs	Select the checkbox to restore but not replay transaction logs. This option enables you to manually copy additional transaction logs before you mount the database.
Move logs path	Specifies the location that the restore process moves existing log files to before restoring log files from the backup. Moving existing log files prevents log file conflicts during the restore. If you do not specify a path for the log files and there is a gap in the transaction log, then the restore process automatically moves the current transaction logs to a subfolder named `logs_time_date`. The *time* and *date* values are the time and date of the restore. The subfolder is in the transaction log folder for the database or storage group. You can use these logs to analyze the restore operation, if necessary, or apply those logs up to where the failure occurred.
Additional Restore Options	
Retain recovery metadata	Select the checkbox to retain the restore metadata files after the restore completes. Otherwise, the restore process automatically deletes the metadata files. You can use these metadata files to investigate any restore issues that occur. The files are in the `C:\Program Files\avs\var\avexvss_restore` folder, where *C:\Program Files\avs* is the Avamar installation folder.
Automate replication suspension	Select the checkbox to automatically suspend replication to the passive nodes before the restore. If you leave the checkbox clear, then you must manually suspend replication before the restore. "Suspending replication in a DAG or cluster" on page 96 provides more information. **Note:** You must manually resume replication after the restore whether you automatically or manually suspend replication before the restore.

Table 10 Restore options for the Exchange VSS plug-in (page 2 of 3)

Option	Description
Exchange Administrator Credentials	
Username	Specifies the username of an Exchange administrator account, such as the AvamarBackupUser account, that has permissions to perform the restore. "Creating and configuring the AvamarBackupUser account" on page 48 provides details on the required permissions. You only need to specify an account if you did not configure the AvamarBackupUser account or if you are performing a restore with either the Exchange DAG client or the Avamar cluster client. The Exchange VSS plug-in uses a different Avamar agent for the DAG or cluster when you perform restores with the Exchange DAG client or the Avamar cluster client. The Avamar agent for the DAG or cluster requires Exchange administrator credentials to perform restores. Therefore, you must manually specify the username and password for the AvamarBackupUser account when you perform a restore with the Exchange DAG client or Avamar cluster client.
Password	Specifies the password for the Exchange administrator account.
RSG/RDB Restore Options	
Restore into RSG/RDB	Select the checkbox to restore the selected database or storage group to a recovery database (RDB) or recovery storage group (RSG), respectively. When you restore to an RDB or RSG, you can browse the RDB or RSG to select individual mailboxes, folders, or messages to restore by using either the Exchange management tools or the Avamar Plug-in for Exchange GLR.
Overwrite existing RSG/RDB	Select the checkbox to overwrite an RDB or RSG with the same name as the restored RDB or RSG. If you select the checkbox, do not specify a new location for the RDB or RSG database and log files. The restore process ignores the values that you specify in the **RSG/RDB database path** and **RSG/RDB Log path** boxes and restores the files to the Exchange server DataPath, which is the default location for new databases.
RSG/RDB name	Specifies the name for the RDB or RSG. If you do not specify a name, then the restore uses the following naming convention: • Exchange Server 2013 or 2010 — `database_rdb`, where *database* is the original name of the database • Exchange Server 2007 — `storage-group_rsg`, where *storage-group* is the original name of the storage group
RSG/RDB database path	Specifies the location for the RDB or RSG database files. If you do not specify a location, then the files restore to the Exchange server DataPath, which is the default location for new databases.

Table 10 Restore options for the Exchange VSS plug-in (page 3 of 3)

Option	Description
RSG/RDB Log path	Specifies the location for the RDB or RSG log files. If you do not specify a location, then the files restore to the Exchange server DataPath, which is the default location for new databases.
Advanced options	
Enable debugging messages	Select the checkbox to write maximum information to the log files for debugging. Use caution when you select this option. The backup process creates large log files.

Exchange GLR plug-in restore options

The following plug-in options are available when you perform granular level recovery with the Avamar Plug-in for Exchange GLR.

Table 11 Restore options for the Exchange GLR plug-in

Option	Description
Amount of time to leave AvFS mounted	Select when to automatically dismount the temporary file system from the Exchange server that you are using for GLR: • **Dismount after restore completes** • **Dismount after 1 hour of inactivity** • **Dismount after 2 hours of inactivity** The drive dismounts even if the drive is in use.
Target mailbox address	Specifies the name of a different target mailbox for the restore. The target mailbox address must use the form *name@domain.subdomain.suffix*.
Exchange Administrator Credentials	
Username	Specifies the username of an Exchange administrator account, such as the AvamarBackupUser account, that has permissions to perform GLR. "Creating and configuring the AvamarBackupUser account" on page 48 provides details on the required permissions. You only need to specify the account if you did not configure the AvamarBackupUser account.
Password	Specifies the password for the Exchange administrator account.
Advanced Options	
Enable debugging messages	Select the checkbox to write maximum information to the log files for debugging. Use caution when you select this option. The backup process creates large log files.

APPENDIX B
Command Line Interface

The following topics explain how to use the command line interface (CLI) for the Avamar Plug-in for Exchange VSS to back up or restore Exchange databases or storage groups:

Understanding the Exchange VSS plug-in CLI

The following topics provide an overview of the Exchange VSS plug-in CLI.

CLI architecture

When you use the CLI to begin a backup or restore, you specify the options for the Exchange VSS plug-in binary at the command prompt. The plug-in interacts with the `avtar` process to write backup data to or read backup data from the Avamar server.

When you use Avamar Administrator instead, the Management Console Server (MCS) service on the Avamar server gives the `avagent` process on the client a workorder with the options that you specify through Avamar Administrator. The `avagent` process then starts the Exchange VSS plug-in, which then interacts with `avtar` for the backup or restore.

With the CLI, the MCS and `avagent` process are not involved in the backup or restore.

Launching the CLI

The `avexvss` binary is located in `C:\Program Files\avs\bin`, where *C:\Program Files\avs* is the Avamar client installation folder. To launch the CLI, open a command prompt and change directory to the `bin` folder of the Avamar client installation folder. "Command reference" on page 153 provides a complete list of available commands and options.

NOTICE

If User Account Control is enabled, in Windows, right-click the **Command Prompt** icon and select **Run as administrator**.

Available operations

The following topics provide an overview of the operations that are available with the `avexvss` command.

To specify the operation, use `--operation={browse | backup | restore}` on the `avexvss` command line.

Browse

The `browse` operation returns a list of Exchange objects available to back up. The command results appear as standard output in the command window. The following information appears for each entry:

- Database name (Exchange Server 2013 or 2010)
- Storage group name (Exchange Server 2007)
- Size
- FStype (for example, db)
- User

The data sorts alphabetically by name.

Backup

The `backup` operation performs an on-demand backup of the specified data.

You can specify plug-in options for the backup. Many of these plug-in options are the same options that you specify when you perform an on-demand backup or configure a scheduled backup in Avamar Administrator.

Restore

The `restore` operation restores the specified data from either the Avamar server or a Data Domain system, depending on where the backup is stored.

You can specify plug-in options for the restore. Many of these plug-in options are the same options that you specify when you perform a restore in Avamar Administrator.

Options

You can specify options for `avexvss` to control backup or restore behavior.

There are several ways to specify options for the `avexvss` command:

- Type the individual options at the command prompt.
- List the options in the `avexvss.cmd` file, which is located in the *`C:\Program Files\avs\var`* folder, where *C:\Program Files\avs* is the Avamar client installation folder. List each option on its own line, as shown in the following example:

  ```
  --debug
  --logfile=avamarclient.log
  --verbose=5
  ```

- Create an option file as a text file, and then specify the option file on the command line by using the `--flagfile=`*`pathname`* option, where *pathname* is the full path and file name of the option file.
- You can pass certain options to the CLI as environment variables. For example, if you set `Database1=Database1Name` in the environment variables, then you can perform a full backup of `Database1Name` by typing the following command:

  ```
  avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
  --ap=password --account=/clients/Exchange1 --brtype=full
  "%Database1%"
  ```

Password encoding

You can use `avtar` to encode passwords that you type on the command line or store in script files, and then use the encoded string with the `--password`, `--ap`, or `--pswd` option.

To encode passwords:

1. Type the following command on the command line on the Exchange VSS client:

   avtar --encodepassword=*password*

   where *password* is the password to encode.

   An encoded string is returned on the command line.

2. Use the encoded string on the `avexvss` command line as the password with the `--password`, `--ap`, or `--pswd` option.

Help

To view command line help output, use the `--help` option. The following command shows a complete list of available operations and options, with a description for each one:

avexvss --help

To view only the options for a specific operation, use the `--help` and `--operation=`*operation* options together. The following command provides a list of options for the backup command:

avexvss --help --operation=backup

When you include the **-**`--debug` option in the `avexvss.cmd` file, the `avexvss --help` command displays debug messages. To prevent debug messages from appearing in online help content, use the following command:

avexvss --help --debug=false

Command reference

The avexvss command enables you to browse for Exchange data to back up or restore, perform the backup, or perform the restore.

Synopsis

```
avexvss --operation={browse | backup | restore} [options]
```

Operations

Supply one and only one of the following operations for avexvss by using the --operation option.

Table 12 Operations for the avexvss command

Operation	Description
browse	Returns a list of data on the client that is available for backup.
backup	Performs an on-demand backup of the specified data.
restore	Restores the specified data.

Options

The following topics list the options that are available for avexvss.

Common options

The following common options are available for avexvss.

Table 13 Common avexvss options

Option	Description
--federated	Performs a federated browse, backup, or restore in an Exchange Server 2013 or 2010 DAG environment.
--version	Displays the build version of the Avamar Plug-in for Exchange VSS.

Account options

The following account options are available for `avexvss`.

Table 14 Account options for the `avexvss` command

Option	Description
`--account=`*`domain/client`* | `--path=`*`domain/client`* | `--acnt=`*`domain/client`*	Required for all backup and restore operations. Specifies the client to back up or restore from using the following format: *domain/client* where *domain* is the Avamar domain to which the client belongs and *client* is the name of the client computer.
`--id=`*`user@domain/client`*	Required for all backup and restore operations. Specifies the Avamar username for authentication. **Note:** You can specify the values for the `--id` and `--account` options simultaneously by specifying `--id=`*`user@domain/client`*.
`--password=`*`password`* | `--ap=`*`password`* | `--pswd=`*`password`*	Required for all backup and restore operations. Specifies the password for the Avamar account.
`--server=`*`Avamar_server`* | `--hfsaddr=`*`Avamar_server`*	Required for all backup and restore operations. Specifies the hostname or IP address of the Avamar server.

Logging options

The following logging options are available for `avexvss`.

Table 15 Logging options for the `avexvss` command

Option	Description
`--informationals=`*`n`*	Sets the information level for status messages, where *n* is a number such as 0, 1, 2, and so on.
`--log=`*`file`* | `--logfile=`*`file`*	Specifies the full path and file name of the `avexvss` plug-in log file. **Notice:** The Activity Monitor in Avamar Administrator displays only `avtar` logs for backups with the command line interface. To create a plug-in log for CLI activities, you must specify the `--log` or `--logfile` option on the command line.
`--noinformationals`	Disables all status messages.
`--nostdout`	Disables output to STDOUT. However, if you supply `--log` and `--logfile=`*`file`*, then output still goes to the log file.
`--nowarnings`	Disables warning messages.
`--quiet`	Suppresses all debugging messages.
`--verbose` | `-v`	Enables all messages, including status and warning messages.

Browse options

There are no browse options for `avexvss`.

Backup options

The following backup options are available for `avexvss`.

Table 16 Backup options for the `avexvss` command (page 1 of 4)

Option	Description
`--backup_exchangepassword=password`	Specifies the password for the Exchange administrator account.
`--backup_exchangeuser=domain\username`	Specifies the username of an Exchange administrator account, such as the AvamarBackupUser account, that has permissions to perform the backup. "Creating and configuring the AvamarBackupUser account" on page 48 provides details on the required permissions. You only need to specify an account if you did not configure the AvamarBackupUser account or if you are performing one of the following backups: • Federated backup in an Exchange Server 2013 or 2010 DAG environment • Active node backup with the Avamar cluster client in an Exchange 2007 cluster environment
`--backup-type=type`	Specifies whether to back up passive databases, active databases, or both in an Exchange 2007 cluster environment or when you back up a specific server in an Exchange Server 2013 or 2010 DAG environment. Specify one of the following values for *type*: • `active` — Backs up only active databases. • `passive` — Backs up only passive databases. • `always` — Backs up both active and passive databases.
`--brtype=level`	Specifies whether to perform a full or incremental backup. Specify one of the following values for *level*: • `full` — Performs a full backup. • `incremental` — Performs an incremental backup. Incremental backups automatically promote to full backups when no previous full backup can be found. You can use only full backups for granular level recovery.
`--circular_only`	If there are databases with circular logging enabled in the backup set and you select the option to perform an incremental backup, then this option performs a full backup of only databases with circular logging enabled. The backup skips databases where circular logging is not enabled. If you specify `--circular_only`, do not specify `--circular_promote` or `--circular_skip`.
`--circular_promote`	If there are databases with circular logging enabled in the backup set and you select the option to perform an incremental backup, then this option backs up all databases but promotes the backup to a full backup. If you specify `--circular_promote`, do not specify `--circular_only` or `--circular_skip`.

Table 16 Backup options for the `avexvss` command (page 2 of 4)

Option	Description
`--circular_skip`	If there are databases with circular logging enabled in the backup set and you select the option to perform an incremental backup, then this option performs an incremental backup of only databases where circular logging is not enabled. The backup skips databases where circular logging is enabled. If you specify `--circular_skip`, do not specify `--circular_only` or `--circular_promote`.
`--ddr={true | false}`	Specifies whether to store the backup on a Data Domain system instead of the Avamar server. To store the backup on a Data Domain system, specify `true`, and then specify the Data Domain system by using `--ddr-index=`*n*.
`--ddr-index=`*n*	Specifies the index number (1, 2, 3, and so forth) of the Data Domain system on which to store the backup. The index number is assigned to the Data Domain system when you add it to the Avamar server configuration.
`--disable_cc`	Disables consistency checks with the Exchange `eseutil` utility during the backup. A consistency check can cause severe performance issues or fail during a backup, especially in environments with many transaction logs.

`--excludelist=`*string*	Specifies a *string* of database names (Exchange Server 2013 or 2010) or storage group names (Exchange Server 2007) to exclude from the backup. Separate multiple entries with a comma.
	Exchange Server 2013 and 2010 example:
	`--excludelist=Exchange Information Store/My2010Db`
	
	Exchange Server 2007 example:
	`--excludelist=Exchange Information Store/First Storage Group,Exchange Information Store/Third Storage Group`

`--expires={`*days* | *timestamp*`}`	Specifies backup expiration as a number of days from today (*days*) or an absolute *timestamp*. Specify timestamp by using 24-hour local time zone values conforming to the following syntax: *yyyy-mm-dd hh:mm:ss* You can specify partial date strings. For example, 2014-02 is equivalent to 2014-02-01 00:00:00.

Table 16 Backup options for the `avexvss` command (page 3 of 4)

Option	Description
`--federated_backup_policy=`*type*	Specifies the type of database to back up in a federated backup of an Exchange Server 2013 or 2010 DAG environment. Specify one of the following values for *type*: • `prefer-passive` — Avamar backs up a passive copy of each database, if a healthy passive copy is available. If a healthy passive copy is not available, then Avamar backs up the active copy. This is the default value. • `passive-only` — Avamar backs up only the passive copy of each database. If a healthy passive copy is not available, then the backup does not include the database. **Note:** Backup of active only databases will fail.

`--includelist=`*string*	Specifies a *string* of database names (Exchange Server 2013 or 2010) or storage group names (Exchange Server 2007) to include in the backup that would otherwise be excluded based on the values you type in the `--excludelist` option. Separate multiple entries with a comma.
	Exchange Server 2013 and 2010 example:
	`--includelist=Exchange Information Store/My2010Db`
	Exchange Server 2007 example:
	`--includelist= Exchange Information Store/First Storage Group,Exchange Information Store/Third Storage Group`

`--num_ios=`*n*	Specifies the number of I/Os between pauses when throttling the consistency check, where *n* is a value between 100 and 10000. The default value is 1000.
`--parallel={true | false}`	Specifies whether to use multi-streaming, which enables you to simultaneously back up multiple databases or volumes to reduce backup time. To use multi-streaming, specify `true`, and then specify values for the `--parallel-pool` and `--parallel-type` options. "Multi-streaming" on page 27 provides guidelines for multi-streaming.
`--parallel-pool=`*n*	Specifies the maximum number of streams, where *n* is a value between 2 and 10. Each stream requires one processor and one spindle.
`--parallel-type={by-target | by-volume}`	Specifies how to group streams: • Specify `by-target` to create one stream for each database. • Specify `by-volume` to create one stream for each volume.
`--pause_duration=`*ms*	Specifies the duration of the pause in milliseconds when throttling the consistency check utility, where *ms* is a value between 1000 and 60000. The default value is 1000.

Table 16 Backup options for the `avexvss` command (page 4 of 4)

Option	Description
`--retention-type=`*`type`* | `--retentiontype=`*`type`*	Assigns advanced retention to the backup. One of the following values: • `none` — Do not explicitly assign any retention type to this backup. That is, treat the backup as a normal on-demand backup. • `daily` — Explicitly designate this backup as a daily backup. • `weekly` — Explicitly designate this backup as a weekly backup. • `monthly` — Explicitly designate this backup as a monthly backup. • `yearly` — Explicitly designate this backup as a yearly backup.
`--serverorderlist=`*`server`*	Sets the priority of the Exchange servers to use for a federated backup in an Exchange Server 2013 or 2010 DAG environment. Type the server name, not the FQDN. Separate multiple entries with commas. If you do not specify a list, then the Exchange VSS plug-in adds all servers in the DAG to the list in alphabetical order.
`--throttle_cc`	Throttle consistency checks with the Exchange `eseutil` utility during the backup by pausing the consistency check after a specified number of I/Os. Specify the number of I/Os by using the `--num_ios` option and the length of the pauses by using the `--pause_duration` option.
`--vss-snapshot-timeout=`*`minutes`*	Specifies the number of *minutes* to wait for snapshot creation to complete before failing the backup. The default value is 5 minutes. Use this flag when VSS snapshot creation takes longer than 5 minutes, which may occur with large Exchange servers or databases. "Backups time out for large Exchange databases" on page 92 provides more information about using this command.

Restore options

The following restore options are available for `avexvss`.

Table 17 Restore options for the `avexvss` command (page 1 of 2)

Option	Description
`--allowoverwrite={true | false}`	Specifies whether to enable the overwrite of all target databases during the restore: • Specify `true` to enable the overwrite of all target databases. • Specify `false` to enable the overwrite of a specific database, and then select the **This database can be overwritten by a restore** option in the recovery options for the database in the Exchange Management Console.
`--attachdb={true | false}, --fAttachDBs={true | false}`	Specifies whether to automatically mount databases after a successful restore. The default value is `true`.
`--autosuspend`	Automatically suspends replication to the passive nodes before the restore. If you do not specify this option, then you must manually suspend replication before the restore. "Suspending replication in a DAG or cluster" on page 96 provides more information. **Note:** You must manually resume replication after the restore whether you automatically or manually suspend replication before the restore.
`--dbpath=`*`name`*	Specifies the path for the database files when you restore to an RDB or RSG.
`--deleteexistingrsgrdb`	Overwrites an RDB or RSG with the same name as the restored RDB or RSG. If you specify this option, do not specify the `--logpath` or `--dbpath` options. The restore process ignores the values that you specify for the `--logpath` or `--dbpath` options, and restores the files to the Exchange server DataPath, which is the default location for new databases.
`--labelnum=`*`n`*	Specifies the label number of the backup to restore. "Finding a backup" on page 96 provides instructions to find a backup in Avamar Administrator. The label appears in the **Backups** table in the **Backup, Restore and Manage** window. You can also use the `mccli backup show` command in the Avamar Management Console Command Line Interface (MCCLI). The *EMC Avamar Management Console Command Line Interface (MCCLI) Programmer Guide* provides more information.
`--logpath=`*`path`*	Specifies the location for the log files when you restore to an RDB or RSG.

Table 17 Restore options for the `avexvss` command (page 2 of 2)

Option	Description
`--movelogspath=`*`path`*`,` `--MoveLogsPath=`*`path`*	Specifies the location that the restore process moves existing log files to before restoring log files from the backup. Moving existing log files prevents log file conflicts during the restore. If you do not specify a path for the log files and there is a gap in the transaction log, then the restore process automatically moves the current transaction logs to a subfolder named `logs_`*`time`*`_`*`date`*. The *time* and *date* values are the time and date of the restore. The subfolder is in the transaction log folder for the database or storage group. You can use these logs to analyze the restore operation, if necessary, or apply those logs up to where the failure occurred.
`--nologreplay`	Prevents the replay of the transaction logs during the restore. If you specify this option, then you can manually copy additional transaction logs before you mount the database.
`--restore_exchangepassword=` `password`	Specifies the password for the Exchange administrator account.
`--restore_exchangeuser=` *`domain\username`*	Specifies the username of an Exchange administrator account, such as the AvamarBackupUser account, that has permissions to perform the restore. "Creating and configuring the AvamarBackupUser account" on page 48 provides details on the required permissions. You only need to specify the username and password if you did not configure the AvamarBackupUser account or if you are performing a restore with either the Exchange DAG client or the Avamar cluster client.
`--retainmetadata`	Retains the restore metadata files after the restore completes. Otherwise, the restore process automatically deletes the metadata files. You can use these metadata files to investigate any restore issues that occur. The files are in the *`C:\Program Files\avs\var\avexvss_restore`* folder, where *C:\Program Files\avs* is the Avamar installation folder.
`--rsgname=`*`name`*	Specifies the name for the RDB or RSG when you restore to an RDB or RSG.
`--rsgrestore`	Restores the selected database or storage group to an RDB or RSG, respectively. When you restore to an RDB or RSG, you can browse the RDB or RSG to select individual mailboxes, folders, or messages to restore by using either the Exchange management tools or the Avamar Plug-in for Exchange GLR.
`--target=`*`path`*	Specifies the *path* to the folder for database and log files when you restore to a file on the file system.

CLI examples

The following topics provide examples of `avexvss` commands.

Example browse commands

The following command returns a list of Exchange databases or storage groups on the Exchange Server:

```
avexvss --operation=browse "Exchange Information Store"
```

The following command returns a list of databases in an Exchange Server 2013 or 2010 DAG:

```
avexvss --operation=browse --federated "Exchange Information Store"
```

Example backup commands

When you perform a backup, run the command on the server that you are backing up. In a federated backup of an Exchange Server 2013 or 2010 DAG, run the command on any server in the DAG. In an active node backup in an Exchange Server 2007 cluster, run the command on an active node.

All backup commands require the following options:

- `--operation=backup`
- `--server=`*`Avamar_server`*
- `--id=`*`Avamar_user`*
- `--ap=`*`password`*
- `--account=`*`domain/client`*

You also must specify a target in quotation marks (“ ”).

The following topics provide example backup commands with the additional options that each scenario requires.

Performing a full backup of a stand-alone server

To perform a full backup, use the `--brtype=full` option and specify `“Exchange Information Store”` as the target.

The following command performs a full backup of all databases on a stand-alone server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --brtype=full
   “Exchange Information Store”
```

Performing an incremental backup of a stand-alone server

To perform an incremental backup, use the `--brtype=incremental` option. If the backup set includes databases with circular logging enabled, specify either the `--circular_only`, `--circular_promote`, or `--circular_skip` option.

The following command performs an incremental backup of all databases on a stand-alone server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`. If there are databases with circular logging enabled, then the backup skips those databases.

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --brtype=incremental
   --circular_skip "Exchange Information Store"
```

Backing up a specific database or storage group on a stand-alone server

To back up a specific database or storage group, specify the database or storage group name in quotation marks ("") in the format "`Exchange Information Store/`*name*", where *name* is the name of the database or storage group.

The following command performs a full backup of the `DB1` database on a stand-alone server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --brtype=full
   "Exchange Information Store/DB1"
```

Backing up multiple databases or storage groups on a stand-alone server

To back up multiple databases or storage groups, specify each database or storage group name in quotation marks (" ") in the format "`Exchange Information Store/`*name*", where *name* is the name of the database or storage group.

The following command performs a full backup of the `DB1` and `DB2` databases on a stand-alone server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --brtype=full
   "Exchange Information Store/DB1" "Exchange Information Store/DB2"
```

Performing a federated backup in a DAG environment

To perform a federated backup in a DAG environment, use the following options:

- `--account` to specify the Exchange DAG client that you configured with the Avamar Cluster Configuration Tool.
- `--federated` to perform a federated backup.
- `--backup_exchangeuser` and `--backup_exchangepassword` to specify the AvamarBackupUser account.
- `--federated_backup_policy` to specify whether to back up passive database copies or active database copies.
- `--serverorderlist` to specify the priority of Exchange servers to use for the backup.

The following command performs a full backup of healthy passive database copies (or active database copies, if a healthy passive database is not available) by using the Exchange DAG client named `ExchDAG1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/ExchDAG1 --federated
   --backup_exchangeuser=Domain1\AvamarBackupUser
   --backup_exchangepassword=password --brtype=full
   --federated_backup_policy=prefer-passive
   --serverorderlist=Exchange6,Exchange2,Exchange1
   "Exchange Information Store"
```

Backing up a specific server in a DAG environment

To back up a specific server in an Exchange Server 2013 or 2010 DAG environment, use the following options:

- `--account` to specify the Exchange server name.
- `--backup-type` to specify whether to back up passive database copies, active database copies, or both.

The following command performs an incremental backup of all passive database copies on a DAG server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --brtype=incremental
   --backup-type=passive "Exchange Information Store"
```

Backing up a passive node in an Exchange Server 2007 cluster

To back up an active node in an Exchange Server 2007 cluster, use the following options:

- `--account` to specify the server name of the passive node.
- `--backup-type=passive` to back up only passive database copies.

The following command performs a full backup of the passive databases on the passive node named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --brtype=full
   --backuptype=passive "Exchange Information Store"
```

Backing up an active node in an Exchange Server 2007 cluster

To back up an active node in an Exchange Server 2007 cluster, use the following options:

- `--account` to specify the Avamar cluster client that you configured with the Avamar Cluster Configuration Tool.
- `--backup_exchangeuser` and `--backup_exchangepassword` to specify the AvamarBackupUser account.
- `--backup-type=active` to back up only active database copies.

The following command performs an incremental backup of the active node by using the Avamar cluster client named `Exch1Cluster` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exch1Cluster
   --backup_exchangeuser=Domain1\AvamarBackupUser
   --backup_exchangepassword=password --brtype=incremental
   --backup-type=active "Exchange Information Store"
```

Backing up to a Data Domain system

To store a backup on a Data Domain system instead of on the Avamar server, use the `--ddr` and `--ddr-index` options.

The following command performs a full backup of all databases on a stand-alone server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`. The command stores the backup on the first Data Domain system that you added to the Avamar configuration.

```
avexvss --operation=backup --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --brtype=full --ddr=true
   --ddr-index=1 "Exchange Information Store"
```

Example restore commands

When you perform a restore, run the command on the target server for the restored data.

All restore commands require the following options:

- `--operation=restore`
- `--server=`*`Avamar_server`*
- `--id=`*`Avamar_user`*
- `--ap=`*`password`*
- `--account=`*`domain/client`*
- `--labelnum=`*`n`*

You also must specify the data to restore in quotation marks (“ ”).

The following topics provide example restore commands with the additional options that each scenario requires.

Restoring to a stand-alone server

To restore a backup to a stand-alone server, run the CLI on the server and use the `--labelnum` option to specify the label number of the backup to restore.

You should also specify `--allowoverwrite=true` unless you want to enable overwrite for the database in the Exchange Management Console instead.

The restore process automatically mounts the restored databases after the restore unless you specify `--attachdb=false`.

Restoring the entire Exchange Information Store

To restore the entire Exchange Information Store, specify `"Exchange Information Store"` as the data to restore. Specify `--allowoverwrite=true` to enable overwrite of all databases. The restore process automatically mounts the restored databases after the restore unless you specify `--attachdb=false`.

The following command restores the entire Exchange Information Store from a backup with a label number of `684` to a stand-alone server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=restore --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --labelnum=684
   --allowoverwrite=true “Exchange Information Store”
```

Restoring a specific database or storage group

To restore a specific database or storage group, specify the database or storage group name in quotation marks (“ ”) in the format “`Exchange Information Store/`*`name`*”, where *name* is the name of the database or storage group.

The following command restores the `DB1` database from a backup with a label number of `684` to a stand-alone server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=restore --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --labelnum=684
   --allowoverwrite=true “Exchange Information Store/DB1”
```

Restoring multiple databases or storage groups

To back up multiple databases or storage groups, specify each database or storage group name in quotation marks (“ ”) in the format “`Exchange Information Store/`*name*”, where *name* is the name of the database or storage group.

The following command restores the `DB1` and `DB2` databases from a backup with a label number of `684` to a stand-alone server named `Exchange1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=restore --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --labelnum=684
   --allowoverwrite=true “Exchange Information Store/DB1”
   “Exchange Information Store/DB2”
```

Restoring to a DAG

The command options when you restore to a DAG depend on whether you are restoring from a federated backup or a backup of a specific server in the DAG.

Restoring to a DAG from a federated backup

To restore from a federated backup in a DAG environment, run the CLI on any server in the DAG and use the following options:

- `--account` to specify the Exchange DAG client that you configured with the Avamar Cluster Configuration Tool.
- `--federated` to perform a federated restore.
- `--backup_exchangeuser` and `--backup_exchangepassword` to specify the AvamarBackupUser account.
- `--allowoverwrite=true` to enable the restored databases to overwrite the active database copies.
- `--autosuspend` to automatically suspend replication to the passive database copies before the restore.

The restore process automatically mounts the restored databases after the restore unless you specify `--attachdb=false`.

The following command restores the `DB1` database from a federated backup with a label number of `684` by using the Exchange DAG client named `ExchDAG1` in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=restore --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/ExchDAG1 --federated
   --labelnum=684 --backup_exchangeuser=Domain1\AvamarBackupUser
   --backup_exchangepassword=password --allowoverwrite=true
   --autosuspend “Exchange Information Store/DB1”
```

Manually resume replication after the restore. “Restoring to a DAG” on page 103 provides instructions.

Restoring to a DAG from a backup of a specific server

To restore from a backup of either active database copies or passive database copies on a specific server in a DAG environment, run the CLI on the DAG server that currently hosts the active copy of the database that you are restoring, and use the following options:

- `--account` to specify the DAG server that you used for the backup.
- `--allowoverwrite=true` to enable the restored databases to overwrite the active database copies.
- `--autosuspend` to automatically suspend replication to the passive database copies before the restore.

You may also want to specify `--attachdb=true` to automatically mount the restored databases after the restore.

The following command restores the `DB1` database from a backup with a label number of `684` from the `Exchange1` server in the `clients` domain on the Avamar server with an IP address of `12.34.56.78`:

```
avexvss --operation=restore --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --labelnum=684
   --allowoverwrite=true --autosuspend
   "Exchange Information Store/DB1"
```

Manually resume replication after the restore. "Restoring to a DAG" on page 103 provides instructions.

Restoring to an Exchange Server 2007 cluster

To restore from a backup of either active database copies or passive database copies on a specific server in a DAG environment, run the CLI on the active node and use the following options:

- `--account` to specify the client that you used for the backup:
  - Specify the Avamar cluster client to restore from an active node backup.
  - Specify the passive node to restore from a passive node backup.
- `--backup_exchangeuser` and `--backup_exchangepassword` to specify the AvamarBackupUser account.
- `--allowoverwrite=true` to enable the restored databases to overwrite the databases on the active node.
- `--autosuspend` to automatically suspend replication to the databases on the passive node.

The restore process automatically mounts the restored databases after the restore unless you specify `--attachdb=false`.

The following command restores the DB1 database from an active node backup with a label number of 684 by using the Avamar cluster client named ExchCluster1 in the clients domain on the Avamar server with an IP address of 12.34.56.78:

```
avexvss --operation=restore --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/ExchCluster1 --labelnum=684
   --backup_exchangeuser=Domain1\AvamarBackupUser
   --backup_exchangepassword=password --allowoverwrite=true
   --autosuspend "Exchange Information Store/DB1"
```

Manually resume replication after the restore. "Restoring to a DAG" on page 103 provides instructions.

Restoring to a file

To restore a database from a backup to a file, run the command on the target server for the restored files and use the following options:

- --account to specify the Exchange client that you used for the backup.
- --target to specify the file system location for the restored files.

The following command restores the DB1 database from a backup with a label number of 684 from the Exchange1 client in the clients domain on the Avamar server with an IP address of 12.34.56.78 to the C:\RestoredFiles folder:

```
avexvss --operation=restore --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --labelnum=684
   --target=C:\RestoredFiles "Exchange Information Store/DB1"
```

Restoring to an RDB or RSG

To restore a database to an RDB or RSG, run the command on the target server for the RDB or RSG and use the following options:

- --account to specify the Exchange client that you used for the backup.
- --rsgrestore to restore the database or storage group to an RDB or RSG, respectively.

You may also want to specify the following options:

- --rsgname to specify the name for the RDB or RSG.
- --deleteexistingrsgrdb to overwrite an RDB or RSG with the same name as the restored RDB or RSG.

  If you specify this option, do not specify the --logpath or --dbpath options. The restore process ignores the values that you specify for the --logpath or --dbpath options, and restores the files to the Exchange server DataPath, which is the default location for new databases.
- --dbpath and --logpath to specify a path for the database and log files for the RDB or RSG.

The restore process automatically mounts the RDB or RSG after the restore unless you specify --attachdb=false.

Unmount or delete any existing RDBs on the target server before the restore. If an RSG is mounted on the target server, then delete the RSG.

The following command restores the DB1 database from a backup with a label number of 684 from the Exchange1 client in the clients domain on the Avamar server with an IP address of 12.34.56.78 to an RDB named RDB8:

```
avexvss --operation=restore --server=12.34.56.78 --id=AvamarAdmin
   --ap=password --account=/clients/Exchange1 --labelnum=684
   --rsgrestore --rsgname=RDB8 "Exchange Information Store/DB1"
```

GLOSSARY

This glossary provides definitions of terms used in this guide.

A

activation See "client activation".

Active Directory A directory service for network administration and security in Microsoft Windows domain networks.

active database copy The copy of an Exchange database that is currently serving user requests in a high availability environment such as a *Database Availability Group (DAG)* or *cluster*. See also "passive database copy".

active node The node in an Exchange Server 2007 cluster that manages the active copy of each database.

active node backup A backup of the databases on the active node in an Exchange Server 2007 cluster.

administrator Person who normally installs, configures, and maintains software on network computers, and who adds users and defines user privileges.

archive mailbox A type of mailbox on an Exchange server that contains archived data for a user.

Avamar Administrator A graphical management console software application that is used to remotely administer an Avamar system from a supported Windows or client computer.

Avamar client A computer or workstation that runs Avamar software and accesses the Avamar server over a network connection. Avamar client software comprises a *client agent* and one or more *plug-ins*.

Avamar cluster client A virtual client that enables you to perform backups of Exchange data on the active node of an Exchange Server 2007 cluster, regardless of which node is currently the active node.

Avamar server The server component of the Avamar client/server system. Avamar server is a fault-tolerant, high-availability system that efficiently stores the backups from all protected clients. It also provides essential processes and services required for data restores, client access, and remote system administration. Avamar server runs as a distributed application across multiple networked storage nodes.

AvamarBackupUser account An Exchange administrator account that provides Avamar services access to and privileges on Active Directory and Exchange servers.

avagent The name of the *client agent* process.

avexvss The application executable and command line interface for the Avamar Plug-in for Exchange VSS. You can use `avexvss` to perform on-demand backups and restores of Microsoft Exchange Server data.

avtar The Avamar process that performs backups and restores.

B

backup A point-in-time copy of client data that can be restored as individual files, selected data, or as an entire backup.

bare metal recovery (BMR) The process of restoring data from a backup to recover a computer system from "bare metal," or without previously installed software or operating system.

browse The process of viewing data that is available for backup on a client computer or restore from the Avamar server.

C

checkpoint file A file that contains information about successful operations for an Exchange database when the operations are committed to the database.

circular logging A Microsoft Exchange feature that overwrites transaction log files after the data in the log files is committed to a database. Circular logging enables you to save disk space by reducing the number of log files, but you can recover data only up until the last full backup.

client activation The process of passing the client ID (CID) back to the client, where it is stored in an encrypted file on the client file system.

client agent A platform-specific software process that runs on the client and communicates with the MCS and with any plug-ins installed on that client.

client registration The process of establishing an identity with the Avamar server. When Avamar recognizes the client, it assigns a unique client ID (CID), which it passes back to the client during activation.

cluster Two or more independent network servers, usually with exact copies of the same software and data, that operate and appear to clients as if they are a single unit. A cluster configuration enables work to be shifted from one server to another, providing high availability, which allows application services to continue despite most hardware or software failures.

Cluster Configuration Tool Avamar configuration wizard to configure the cluster client.

cluster continuous replication (CCR) A clustered solution for Exchange Server 2007 that uses built-in asynchronous log shipping technology to create and maintain a copy of each storage group on a second server in a failover cluster.

consistency check A Microsoft Exchange process through the `eseutil` utility that verifies the integrity of a database.

D

Data Domain system Disk-based deduplication appliances and gateways that provide data protection and disaster recovery (DR) in the enterprise environment.

database A collection of data arranged for ease and speed of update, search, and retrieval by computer software. Exchange data is stored in databases.

Database Availability Group (DAG) A group of as many as 16 mailbox servers that host a set of databases and provide automatic database-level recovery from failures that affect individual servers or databases. Databases on a DAG server can be either active or passive, but each server can host only a single copy of each database.

dataset A policy that defines a set of files, directories, and file systems for each supported platform that are included or excluded in backups across a group of clients. A dataset is a persistent and reusable Avamar policy that can be named and attached to multiple groups.

disaster recovery Recovery from any disruptive situation, such as hardware failure or software corruption, in which ordinary data recovery procedures are not sufficient to restore a system and its data to normal day-to-day operations. A disaster recovery may or may not be a *bare metal recovery*.

DNS Domain Name Server. A dynamic and distributed directory service for assigning domain names to specific IP addresses.

domain A feature in Avamar Administrator that is used to organize large numbers of clients into named areas of control and management.

E

Exchange DAG client A virtual client that enables you to perform federated backups of the databases in a DAG.

Exchange Information Store A collection of the database files, transaction log files, and checkpoint files for an Exchange server or DAG.

Exchange Management Shell A command line interface, built on Windows PowerShell technology, for performing administrative tasks in Microsoft Exchange Server.

F

federated backup A backup in a DAG environment that can include a copy of each database in the DAG from any server in the DAG. You perform federated backups with the Exchange DAG client.

file system Software interface used to save, retrieve, and manage files on storage media by providing directory structures, data transfer methods, and file association.

full backup A type of backup that includes database files, transaction log files, and checkpoint files. Full backups are also called *normal backups*.

G

granular level recovery (GLR) The ability to restore individual mailboxes, mail folders, or messages from a database backup.

group A level of organization in Avamar Administrator for one or more Avamar clients. All clients in an Avamar group use the same group policies, which include the *dataset*, *schedule*, and *retention policy*.

group policy The *dataset*, *schedule*, and *retention policy* for all clients in an Avamar group.

I

incremental backup A type of backup that includes only the transaction log and checkpoint files for a database.

L

LAN Local Area Network.

Local Continuous Replication (LCR) A single-server high availability solution for Exchange Server 2007 that uses built-in asynchronous log shipping technology to create and maintain a copy of a storage group on a second set of disks that are connected to the same server as the production storage group. LCR provides log shipping, log replay, and a quick manual switch to a secondary copy of the data.

M

Management Console Server (MCS) The component that provides centralized administration (scheduling, monitoring, and management) for the Avamar server. The MCS also runs the server-side processes used by *Avamar Administrator*.

metadata Data about the backup, including information about the original database files, the backup types, the date and time of the backup, and other information necessary for restore.

multi-streaming The process of backing up or restoring Microsoft Exchange data using multiple parallel data streams. Multi-streaming enables you to improve backup performance in most environments.

N

normal backup See “full backup”.

P

passive database copy The copy of a database that is not currently serving user requests in a high availability environment such as a *Database Availability Group (DAG)* or *cluster*. The copy is updated with changes from the active database copy through replication. The passive database copy becomes an active database copy if a failure occurs on the original active database copy.

passive node The node in an Exchange Server 2007 cluster that manages the passive copy of each database.

passive node backup A backup of the databases on the passive node in an Exchange Server 2007 cluster.

plug-in An Avamar software process that recognizes a particular kind of data resident on that client.

plug-in options Options that you specify during backup or restore to control backup or restore functionality.

policy A set of rules for client backups that can be named and applied to multiple groups. Groups have dataset, schedule, and retention policies.

preferred server order list (PSOL) A prioritized list of servers in a DAG that the Exchange DAG client uses for federated backups.

proxy server A separate Exchange mailbox server that you use as a target server for GLR.

public folder A database or mailbox, depending on the Exchange Server version, that contains shared content for users on an Exchange server.

R

recovery database (RDB) A special kind of mailbox database that enables you to mount a restored mailbox database and extract data from the restored database as part of a recovery operation.

recovery storage group (RSG) A special administrative storage group that enables you to mount a mailbox database, extract data from the mounted database, and then either copy the extracted data to a folder in an existing mailbox or merge the extracted data with an existing mailbox.

registration See “client registration”.

replication The process of copying changes on the active database copy to one or more passive database copies so that the copies remain synchronized.

restore An operation that retrieves one or more file systems, directories, files, or data objects from a backup and writes the data to a designated location.

retention The time setting to automatically delete backups on an Avamar server. Retention can be set to permanent for backups that should not be deleted from an Avamar server. Retention is a persistent and reusable Avamar policy that can be named and attached to multiple groups.

S

schedule The ability to control the frequency and the start and end time each day for backups of clients in a group. A schedule is a persistent and reusable Avamar policy that can be named and attached to multiple groups.

single copy cluster (SCC) A shared storage failover cluster solution in Exchange Server 2007 that uses a single copy of a storage group on storage that is shared between the nodes in the cluster.

stand-alone environment An Exchange environment with a single stand-alone server. All mailbox databases, log files, and checkpoint files reside on the server.

standby continuous replication (SCR) A high availability solution for Exchange Server 2007 SP1 and later that uses the same log shipping and replay technology used by LCR and CCR to replicate data from stand-alone and clustered mailbox servers.

storage group A group of databases in Exchange Server 2007.

T

transaction log A log file that contains a history of database transactions.

V

virtual drive A temporary drive on the target server for GLR. A database or storage group restores from a backup to an RDB or RSG on the virtual drive, and you browse the data in the RDB or RSG for GLR.

virtual machine (VM) A computer that is a software implementation of a computer. Virtual machines are used to run different operating systems at the same time on one physical computer. Each operating system runs in its own isolated execution environment.

Volume Shadow Copy Service (VSS) A technology in Microsoft Windows that enables manual or automatic backup copies or snapshots of data, even if there is a lock on the data, on a specific volume at a specific point in time over regular intervals. VSS is implemented as a Windows service called the Volume Shadow Copy service.

VSS provider A software or hardware-based process that links the VSS service to the storage hardware and creates a snapshot for backup on the storage hardware. Avamar supports only software providers.

VSS requestor A backup application that uses the VSS API to request the services of VSS to create and manage shadow copy volumes. The Avamar Plug-in for Windows VSS is a VSS requestor.

VSS writer A process that provides metadata about application data for backup, and specific methods for correctly handling components and applications during backup and restore. A VSS writer also identifies the type of application or service in the backup, such as System Boot or System Services. A VSS writer does not play a role in backing up the file system.