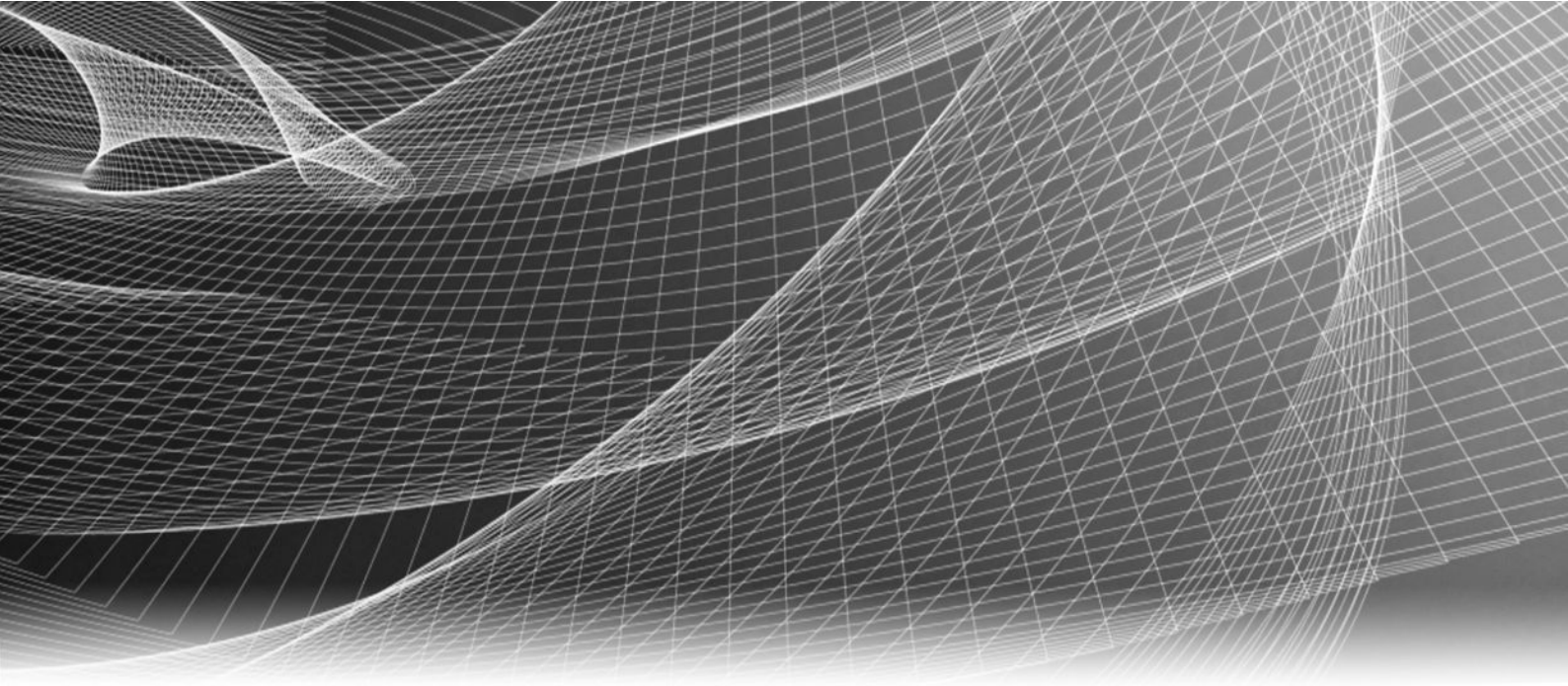

EMC® Avamar® 7.2 for SharePoint VSS

User Guide

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REV 01

EMC²

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PREFACE

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 the Avamar Plug-in for SharePoint VSS, and how to back up and restore data on a Windows server in both stand-alone and cluster environments

Audience

This document is intended primarily for:

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

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

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

Revision history

The following table presents the revision history of this document.

Revision	Date	Description
01	June, 2015	Initial release of Avamar 7.2.

Related documentation

The following EMC publications provide additional information:

- *EMC Avamar Administration Guide*
- *EMC Avamar Backup Clients User Guide*
- *EMC Avamar Operational Best Practices*
- *EMC Avamar Product Security Guide*
- *EMC Avamar Release Notes*

Special notice conventions used in this document

EMC uses the following conventions for special notices:

NOTICE

Addresses practices not related to personal injury.

Note

Presents information that is important, but not hazard-related.

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 code • System output, such as an error message or script • Pathnames, file names, 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 will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to DPAD.Doc.Feedback@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

This chapter includes the following topics:

Architecture

Architecture describes how EMC Avamar works with various versions of SharePoint in stand-alone and distributed farms.

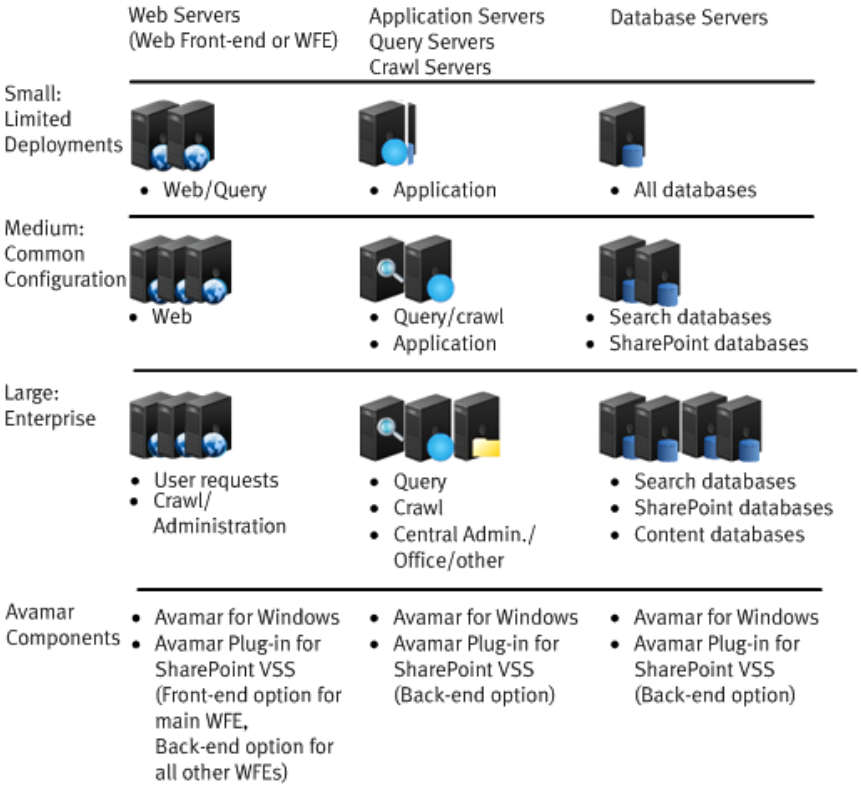
You can use EMC® Avamar® backup and restore data in SharePoint Server 2013, 2010, and Microsoft Office SharePoint Server 2007 Service Pack 1(SP1) environments.

SharePoint topology

SharePoint servers are organized as farms. The topology of the farm determines which Avamar components are installed on each server.

In a stand-alone farm, all SharePoint roles and components reside on one server. In a distributed farm, these components and roles are spread across multiple servers. Avamar SharePoint backup and recovery capabilities scale to all farm sizes. The following figure shows the topologies of small, medium, and large distributed farms and the Avamar components installed on each server by SharePoint server roles.

Figure 1 SharePoint topologies for small, medium, and large farms



SharePoint server roles

Each server in a SharePoint farm can assume one or more roles. Roles are not assigned directly to a server. A server assumes a specific role, depending on the components installed and the services it runs

The following table describes the different types of SharePoint server roles.

Table 1 SharePoint server roles

Server type	Role
Web server	Hosts all web pages, web parts, and web services required by the server farm. Also called a Web front-end (WFE).
Application server	Hosts the service applications running in the farm, such as Visio services, Forms service, Excel calculations services, and more.
Query server	Responsible for querying the index, finding the matching content, and returning content back to the Web servers for presentation to users.
Crawl or index server	Crawls the content sources, writes the results to the database, and then the database is propagated to the query servers. The crawl server uses a crawl database in a Microsoft SQL Server to store the URLs of all sources crawled.
Database server	An SQL Server that stores most of the data associated with a SharePoint 2010 implementation, including configuration settings, administration information, service applications data, and user content.

SQL Server in SharePoint

Microsoft SQL Server provides storage for all content, data, and configuration information in a SharePoint environment.

The following table lists the SQL Server databases in a SharePoint environment.

Table 2 Microsoft SQL Server databases in a SharePoint environment

Database	Functions
Configuration	Stores all configuration information for the farm, including topology information and content database information.
Content	Stores: • Windows SharePoint Services (WSS) site details • Structure details • User content • Files • Security information
Shared Service Provider (SharePoint 2007) Service Applications (SharePoint 2010)	Stores: • User profiles • Audience data • Business application data • Excel services functions • Site usage data • InfoPath forms • Services session state information
Search	Stores:

Table 2 Microsoft SQL Server databases in a SharePoint environment (continued)

Database	Functions
	• Search data • History log • Search log • Calculation tables for crawl statistics • Links tables • Statistical tables
Custom	Separate databases that store third-party application data.
Search indexes	Stores search indexes on the file system.

How Avamar works in a SharePoint environment

Avamar provides complete protection for a SharePoint farm using several plug-ins: Avamar Client for Windows, Avamar Plug-in for SharePoint VSS, and Avamar Plug-in for SharePoint GLR.

- Avamar Client for Windows protects the operating system, system state, and Windows Server.
- Avamar Plug-in for SharePoint VSS protects the SharePoint farm structure and content.
- Avamar Plug-in for SharePoint GLR provides granular level recovery when used with optional third-party recovery tools, such as Ontrack PowerControls, purchased separately.

Note

You can also use the Avamar Plug-in for SQL Server to independently back up the SQL Server databases in the farm. Avamar Plug-in for SQL Server (optional) on page 20 describes the limitations and disadvantages of this approach.

Avamar provides protection for all scales of SharePoint deployment, from stand-alone farms that contain all SharePoint roles on a single server, to small, medium, or large enterprise distributed farms.

Avamar Administrator

Avamar Administrator is a graphical management console software application for remote administration of an Avamar system from a supported Windows or client computer.

Logging in to the Avamar Administrator program provides access to a specific Avamar server. Backups and restores are configured and run through Avamar Administrator. The *EMC Avamar Administration Guide* provides complete instructions for installing and using Avamar Administrator.

Avamar clients and plug-ins

All servers in a SharePoint farm require both the Avamar Client for Windows and Avamar Plug-in for SharePoint VSS.

The configuration on each server varies, depending on the SharePoint farm role and whether you will be setting up the farm for granular level recovery. In addition, you can optionally use the Avamar Plug-in for SQL Server to back up just the SQL databases, and the Avamar Plug-in for SharePoint GLR for granular level recovery of SharePoint items when used with a supported third-party recovery tool.

Avamar Client for Windows

You must install the Avamar Client for Windows on every server in the SharePoint environment.

The SharePoint VSS plug-in requires the Windows client. In addition, you can use the Windows client to back up operating system and SharePoint binary files, which are required for disaster recovery.

Avamar Plug-in for SharePoint VSS

The Avamar Plug-in for SharePoint VSS provides Volume Shadow Copy Service (VSS) backup of SharePoint at the SharePoint farm level; and recovery at the farm level, at the discovered components level, or at the web application level.

The plug-in uses the SharePoint Foundation VSS Writer (SPF-VSS Writer), to determine what content and information from the SharePoint farm to back up. Microsoft describes the features and capabilities of the SPF-VSS Writer in the MSDN article “SharePoint Foundation VSS Writer.”

The VSS-based backup is the foundation for scheduled full backups, and are used to perform disaster recovery or recovery of entire databases, components, or applications.

The Avamar Plug-in for SharePoint VSS can back up and restore a SharePoint farm, or WSS 3.0 components including:

- Website collections
- Content databases
- Web applications
- Content publishing web services
- Search Windows service, including databases and indexes

Some listed components cannot be selected for backup or restore but are automatically included by Avamar, based on their dependency on other components that you select.

In addition, the Avamar Plug-in for SharePoint VSS can back up and restore the additional functionality provided by Microsoft Office SharePoint Server 2007 SP1 and 2010, including Shared Service Providers.

The Avamar Plug-in for SharePoint VSS includes in backups and restores, any third-party databases built on a SharePoint foundation registered within the configuration database.

Install the Avamar Plug-in for SharePoint VSS on all machines in the farm. During installation, select whether the server is a front-end or back-end server:

- Front-end server — A front-end server is the main WFE server in a distributed farm or the sole SharePoint server in a stand-alone farm. The Avamar Plug-in for SharePoint VSS coordinates the farm backups through the WFE server. If there is no SharePoint data on a WFE server, then the SharePoint VSS writer skips that WFE server during backups. However, you still must install the Avamar Plug-in for SharePoint VSS on the WFE server.

- Back-end server — Back-end servers are all other servers in the SharePoint farm. On a sole SharePoint server in a stand-alone farm, you do not configure any back-end servers. SQL Server 2012 AlwaysOn nodes are configured as back-end servers, and only the primary node can be used for backup and restore with the Avamar SharePoint plug-in.

Avamar Plug-in for SQL Server (optional)

You can optionally use the Avamar Plug-in for SQL Server to back up SQL Server databases on a SharePoint database server separate form the SharePoint backups. The search database is not included in the backup.

The Avamar Plug-in for SQL Server can back up and restore databases on either the primary replica or a secondary replica in SQL Server AlwaysOn availability groups.

To use the Avamar Plug-in for SQL Server, install the plug-in on the SharePoint farm database servers with SQL Server. You can perform full, differential, and incremental backups of the databases, and restore individual databases. The *EMC Avamar for SQL Server User Guide* provides details on installing the Avamar Plug-in for SQL Server and performing backups and restores.

Note

A backup with the Avamar Plug-in for SQL Server does not include the search index file. Synchronize the backup with the search index file in the search database backup, and restore the backups together.

Microsoft does not recommend using any separate SQL backup tool for SharePoint data protection. The Microsoft white paper, "Data protection and recovery for Microsoft Office SharePoint Server 2007," which is available on the Microsoft website, describes the benefits and disadvantages of using a separate SQL Server backup tool, such as the Avamar Plug-in for SQL Server.

Benefits of using a separate SQL Server backup tool

The benefits of using a separate SQL Server backup tool include:

- You can reuse existing SQL Server disaster recovery strategies.
- You can configure full and differential backups with added verification.
- The backup tool provides a complete data backup.
- Backups with the tool can be faster than Office SharePoint Server backups.

Disadvantages of using a separate SQL Server backup tool

The disadvantages of using a separate SQL Server backup tool include:

- The backup tool does not replace the need for a full backup with the Avamar Plug-in for SharePoint VSS.
- You cannot use the backup tool for a full farm restore.
- Microsoft does not formally support the backup tool.
- The backup tool does not include front-end web server custom solutions.
- The backup tool can back up the configuration database and Central Administration content database, but does not support restore. The Avamar Plug-in for SharePoint VSS supports restoring of the configuration and Central administration content database as part of a full farm restore.
- The backup tool does not back up Internet Information Services (IIS) settings set outside of Office SharePoint Server, including host headers, dedicated IP addresses, and Secure Sockets Layer (SSL) certificates.

- When using search, you must re-crawl after restoring content because SQL Server does not back up indexes.
- Backups of the search database made with the backup tool cannot be synchronized with the search database.
- You must manually attach the databases to the web applications after a recovery.

In an environment with Avamar, the following disadvantages also apply:

- You cannot use backups with the SQL Server plug-in for granular level recovery or SharePoint disaster recovery. You must have the full backup provided by the SharePoint VSS plug-in.
- Backups with the SQL Server plug-in require extra storage and resources because the databases are included in backups for both the SQL Server and SharePoint VSS plug-in.
- You cannot use SQL Server plug-in backups for restore of the configuration database and Central Administration content database.
- You cannot include the SQL Server databases used by SharePoint in an existing backup schedule for other SQL Server databases outside of SharePoint.

Avamar Plug-in for SharePoint GLR (optional)

You can optionally use the Avamar Plug-in for SharePoint GLR for granular level recovery of SharePoint items when used with a supported third-party recovery tool.

The Avamar Plug-in for SharePoint GLR can display SharePoint content and database backups in the Avamar Virtual Drive, allowing browsing and selection of items for recovery with a third-party tool, such as the Kroll Ontrack PowerControls software. The Ontrack PowerControls software must be purchased separately and is not included in the Avamar Plug-in for SharePoint VSS installation package.

Installing Ontrack PowerControls on page 48 provides more detailed information about purchasing and installing the software.

If you intend to perform granular level recovery, install the Avamar Plug-in for SharePoint GLR and Ontrack PowerControls software on the SharePoint Administrator console computer. The console computer is the computer to which you initially restore data before you browse and select data for granular level recovery.

Avamar configurations for SharePoint farms

You must install the Avamar Client for Windows and the Avamar Plug-in for SharePoint VSS on all servers in the SharePoint farm. The installation process depends on the roles of each server, the scale of the farm, and whether you plan to perform granular level recovery.

Note

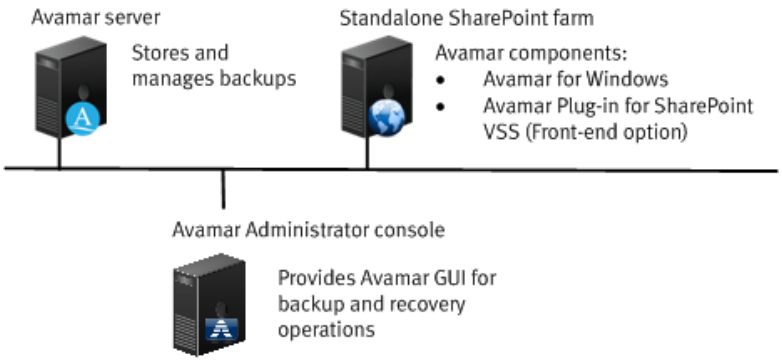
Distributed farms can contain multiple web front end (WFE) servers. WFE servers provide access to SharePoint content on the other SharePoint farm servers, but the WFE servers do not always contain SharePoint content of their own. When you run a backup of a SharePoint farm, Avamar skips WFE servers that do not contain SharePoint data. As part of a SharePoint farm backup plan, back up all SharePoint servers with the Avamar Client for Windows. This protects the server file system, noncritical volumes, and System State. The Avamar Client for Windows backups are required for disaster recovery of each Windows server.

Stand-alone SharePoint farm

In a stand-alone SharePoint farm, one server handles all SharePoint roles, including the WFE, Search data, and all SharePoint databases.

The following figure illustrates the relationship of the Avamar server, Avamar Administrator console, and the Avamar software installed on the SharePoint stand-alone server.

Figure 2 Architecture of a stand-alone farm with Avamar

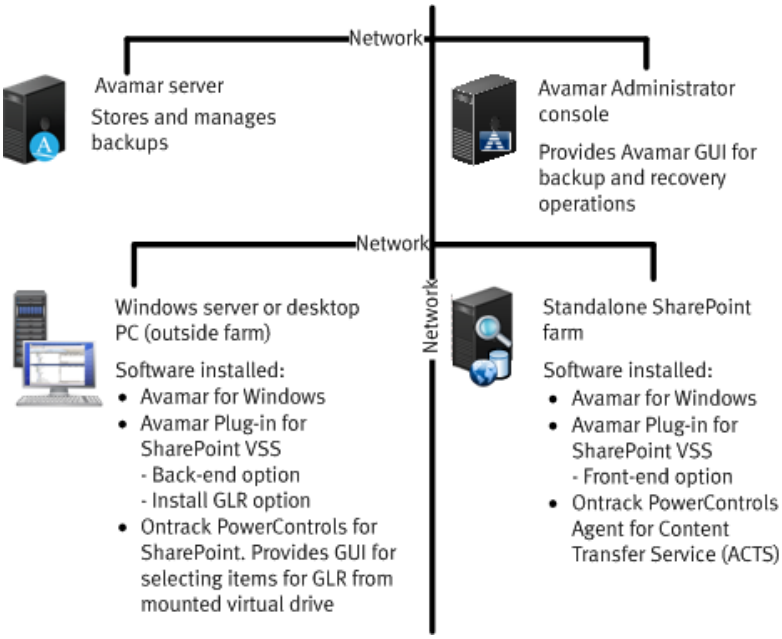


Stand-alone SharePoint farm with optional granular level recovery

In a stand-alone SharePoint farm, one server handles all SharePoint roles, including the WFE, Search data, and all SharePoint databases. For GLR, additional GLR and Ontrack PowerControls components are installed.

The following figure illustrates the additional installation requirements for GLR support.

Figure 3 Architecture of a stand-alone farm with Avamar and optional GLR

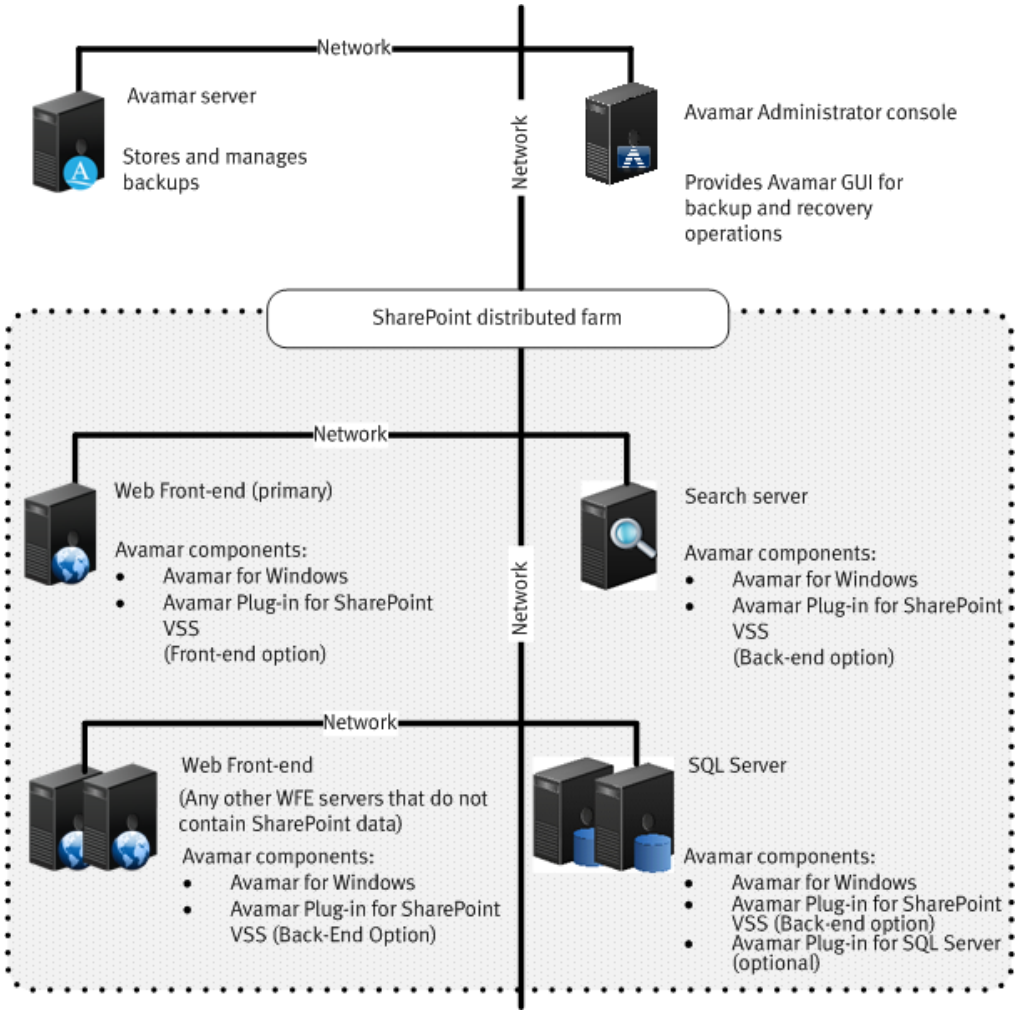


Distributed SharePoint farm

In a distributed SharePoint farm, the SharePoint roles reside on multiple servers.

The following figure illustrates the Avamar software installed on multiple SharePoint servers in a distributed farm.

Figure 4 Architecture of a distributed farm with Avamar

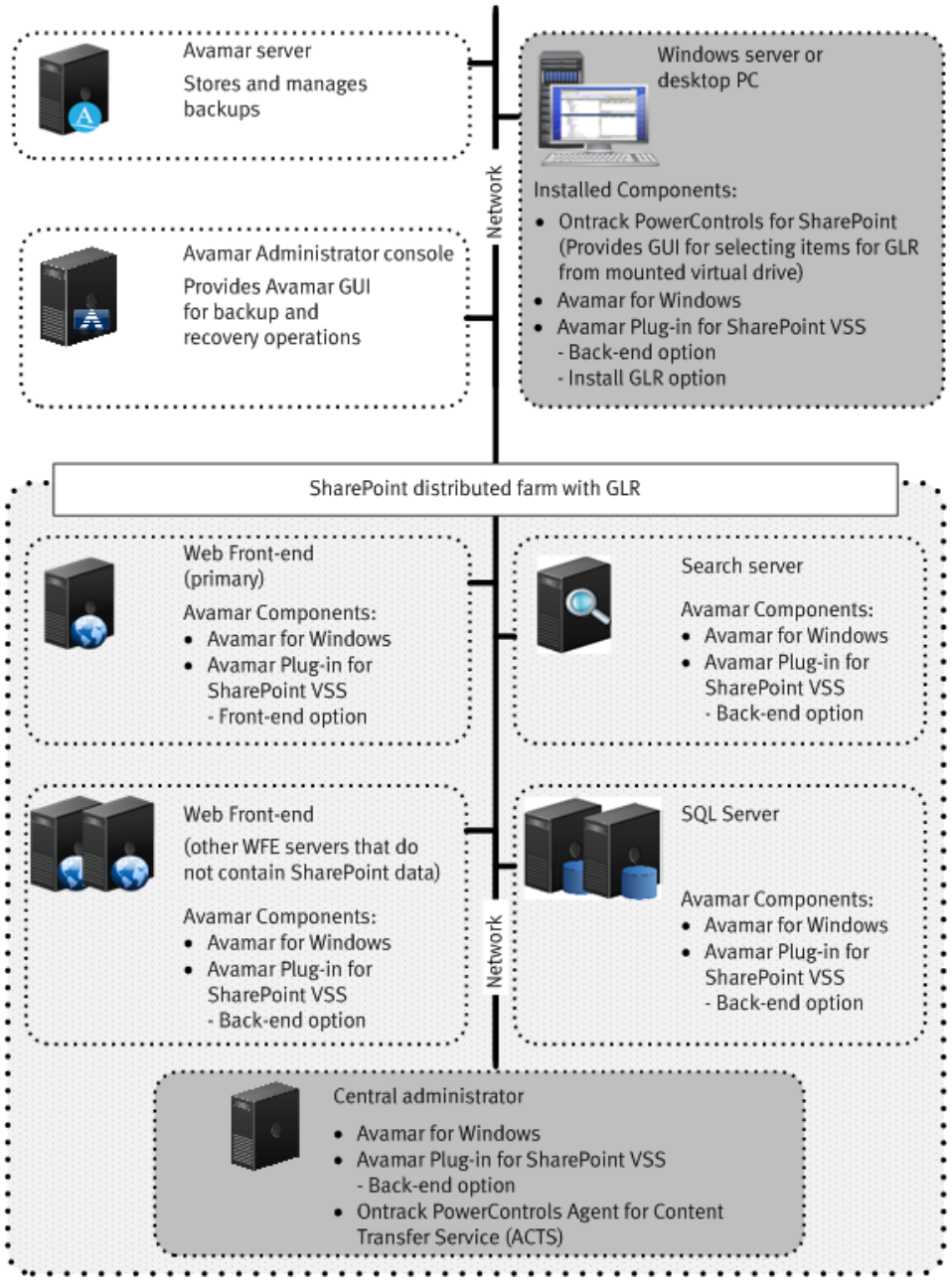


Distributed SharePoint farm with optional granular level recovery

For GLR, additional GLR and Ontrack PowerControls components are installed.

The following figure illustrates the additional computers and software required to support granular level recovery in a distributed farm.

Figure 5 Architecture of a distributed farm with Avamar and optional GLR



Data Domain system support

You can store backups with the Avamar Plug-in for SharePoint VSS or the Avamar Plug-in for SQL Server on either the Avamar server or on an EMC Data Domain® system. Avamar stores backups on the Avamar server by default.

To store backups on a Data Domain system, use Avamar Administrator to configure the Data Domain system for use. Then select the Data Domain system during an on-demand backup or when configuring the dataset for a scheduled backup. The *EMC Avamar Administration Guide* provides details on how to configure the Data Domain system in Avamar Administrator. The individual backup procedures in this guide provide the steps for selecting the Data Domain system to use.

Note

The Data Domain system must have Data Domain Operating System (DDOS) 5.3 or later to support Remote BLOB Storage.

Backup

A SharePoint farm backup strategy must include the backup of the entire farm and the backup of the operating system.

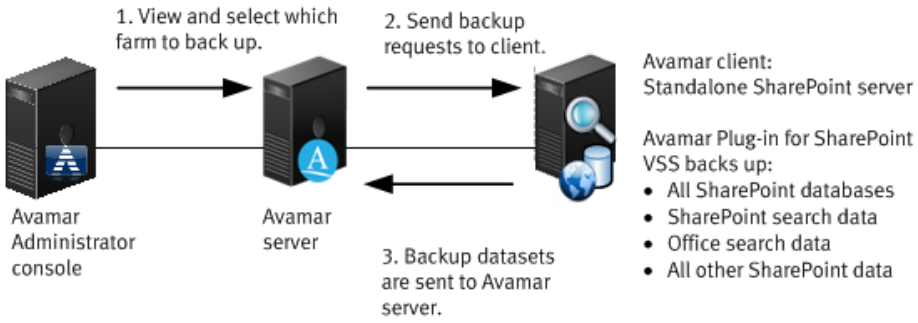
The SharePoint VSS plug-in discovers the topology of the entire farm. This enables you to perform a unified or federated backup and recovery, through the main WFE server.

Backup workflow for stand-alone farms

In a stand-alone farm, the SharePoint server is also the WFE server.

The backup workflow is shown in the following figure.

Figure 6 Backup workflow for stand-alone farms



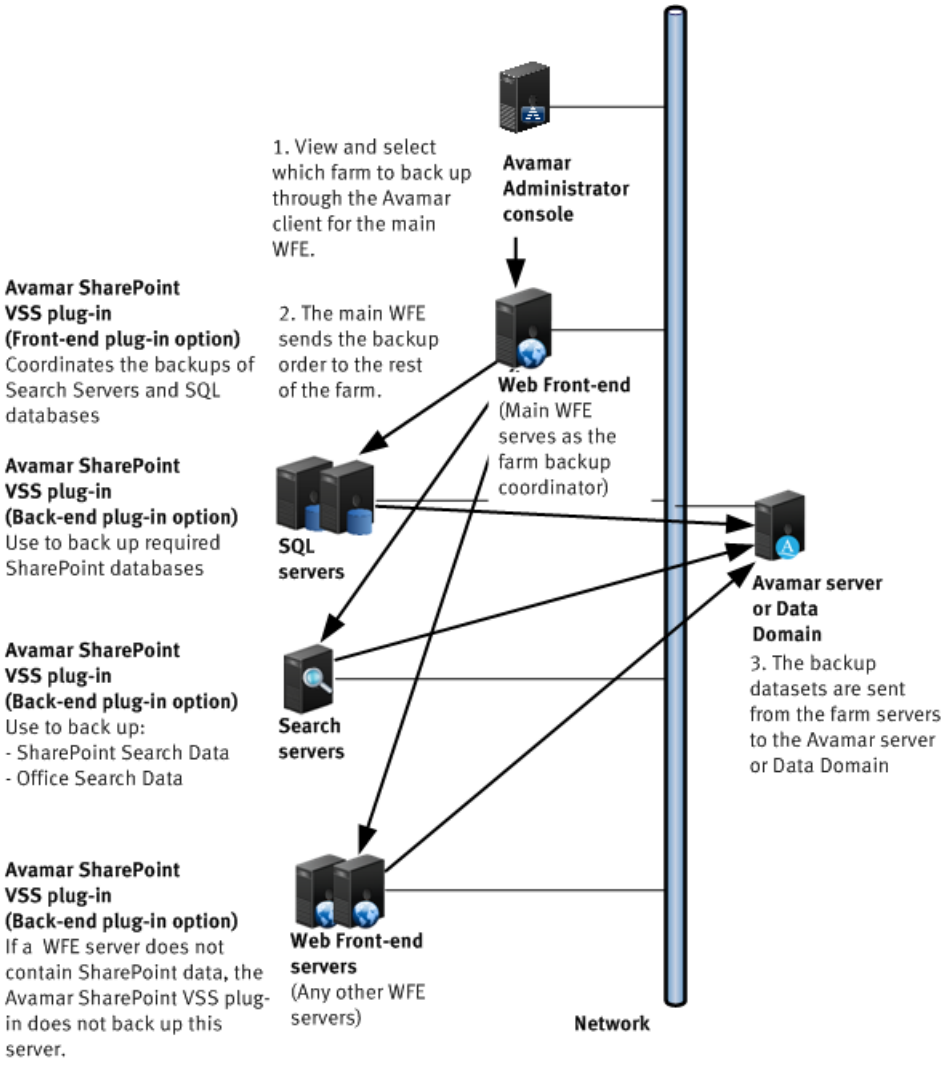
Backup workflow for distributed farms

In a distributed farm, the WFE server can reside on one computer, or several computers.

The SharePoint administrator designates one computer as the main WFE server.

Use the main WFE server for backups and recoveries, as illustrated in the following figure.

Figure 7 Backup workflow for distributed farms



Backup of SharePoint databases in an AlwaysOn availability group

The Avamar Plug-in for SharePoint VSS supports backup of SharePoint databases in a SQL Server AlwaysOn availability group.

You must install the Avamar Client for Windows and the Avamar Plug-in for SharePoint VSS on each node in the cluster. Install the SharePoint VSS plug-in with the **Back-end plug-in** option. Then run the Cluster Configuration Tool on the primary replica to configure the AlwaysOn availability group.

When you back up SharePoint data with the SharePoint VSS plug-in, the backup of the databases in the availability group runs on the primary replica.

Operating system backups

Prepare for disaster recovery by using the Avamar Client for Windows to back up each Windows server in the farm, including System State, critical volumes, and Active Directory.

In a farm with more than one WFE, use the Avamar Client for Windows to protect IIS on each WFE.

The *EMC Avamar for Windows Server User Guide* provides details on performing backups and restores with Avamar Client for Windows.

Multi-streaming

Multi-streaming enables parallel processing of backup jobs by using multiple processors.

You can use as many as 10 streams for backups and four streams for restores. Each stream requires a separate processor. By taking advantage of multi-processors and multi-core processors, you can improve performance when storing backups on an Avamar server or on a Data Domain system.

Configure multi-streaming for group backups by volume or by database. When volumes have varying database sizes, it takes longer for the streams to release the volumes with bigger sizes. For example, consider an environment with 500 GB on volume `G:\`, 100 GB on volume `H:\`, and 100 GB on volume `Z:\`. To balance multi-stream backup performance, configure multi-streaming by volumes when all volumes are similar in overall size, or configure multi-streaming by database when all databases are similar in size.

Note

Do not use multi-streaming for the first full backup of a SharePoint farm. The first full backup ingests all data for the first time, and then scans it for deduplication. Because the process is resource intensive, multi-streaming can adversely impact performance. After the first full backup is complete, subsequent backups can take advantage of multi-streaming because those backups include only new data and incremental changes that have not been deduplicated.

Multi-streaming places demands on computer hardware and resources beyond the base requirements for the Avamar Plug-in for SharePoint VSS. Multi-streaming requirements on page 36 provides details.

Restore

When you perform backups with the Avamar Plug-in for SharePoint VSS, you can restore the entire SharePoint farm or individual components to the original location or a different location. You can also perform granular level recovery.

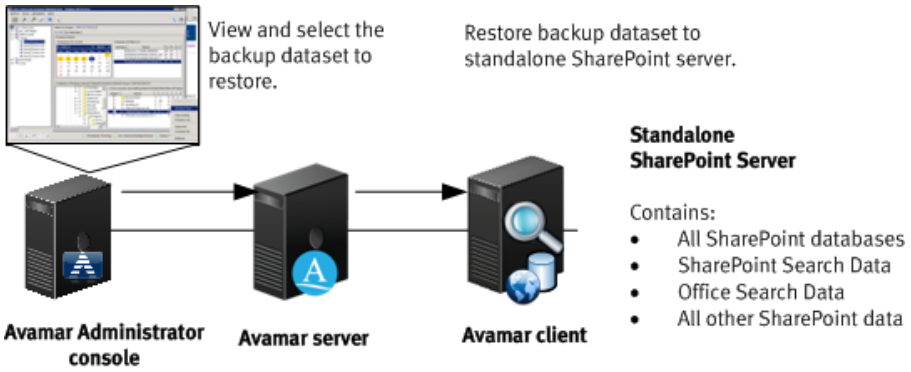
Restore to the original location

You can restore an entire SharePoint farm, or one or more components, directly to the original location.

After backing up a SharePoint farm using the Avamar Plug-in for SharePoint VSS, you can restore the entire farm, or one or more of its components, directly to the original location.

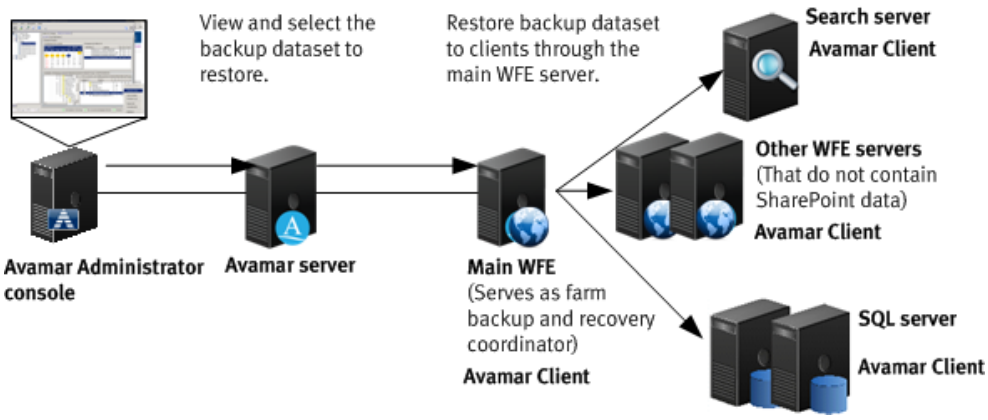
The following figure illustrates the restore of a stand-alone SharePoint farm.

Figure 8 Restore workflow for stand-alone farms



The following figure illustrates a federated restore of a distributed SharePoint farm.

Figure 9 Restore workflow for distributed farms



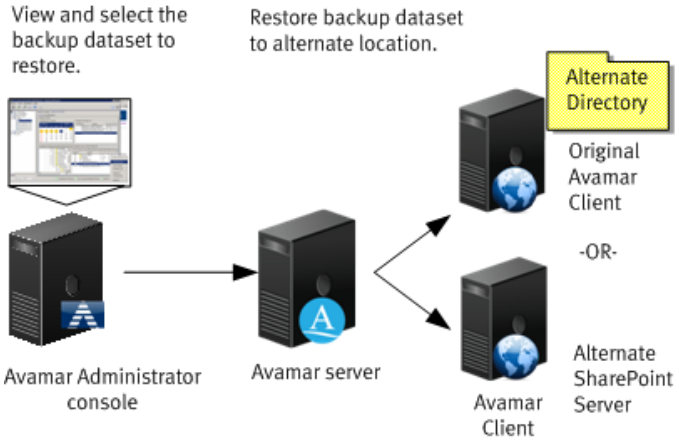
Restore to a different location

You can restore an entire SharePoint farm, or one or more components, to a different server or a different directory on the original server.

Restoring to a different location enables you to use the Avamar Plug-in for SharePoint VSS to restore content without overwriting existing content in the production SharePoint server databases.

You can restore an entire SharePoint farm, or one or more of its components, to another server, or to a different directory on the same server, as shown in the following figure.

Figure 10 Workflow for restore to a different location



Restore of SharePoint databases in an AlwaysOn availability group

You can use the Avamar Plug-in for SharePoint VSS to restore SharePoint databases in a SQL Server AlwaysOn availability group.

Before the restore, ensure that the environment meets the following requirements:

- The Avamar Client for Windows is installed on each node in the cluster.
- The Avamar Plug-in for SharePoint VSS is installed with the **Back-end plug-in** option on each cluster node with an availability group replica.
- The AlwaysOn availability group is configured in Avamar with the Cluster Configuration Tool.

When you perform the restore with the Avamar Plug-in for SharePoint VSS, the restore process automatically removes all SharePoint databases from the availability group. After the restore completes, the SharePoint VSS plug-in rejoins the databases to the availability group on only the primary replica.

The databases on the secondary replicas remain in an unsynchronized state. You must manually join the databases to the availability group on each secondary replica by using SQL Server Management Studio, Transact-SQL, or PowerShell. The SQL Server documentation on the Microsoft TechNet website provides instructions.

Granular level recovery

Granular level recovery (GLR) enables you to browse to and recover individual SharePoint items to avoid the additional time, network bandwidth, and disk space requirements of restoring an entire farm or database.

When you perform GLR, you use the Avamar Plug-in for SharePoint GLR to mount a backup to the Avamar Virtual Drive. Then you use a third-party recovery tool, such as Ontrack PowerControls, to locate and select the items to restore. Ontrack PowerControls sends the restore request to the Avamar server, and then the Avamar server restores the data to the specified location.

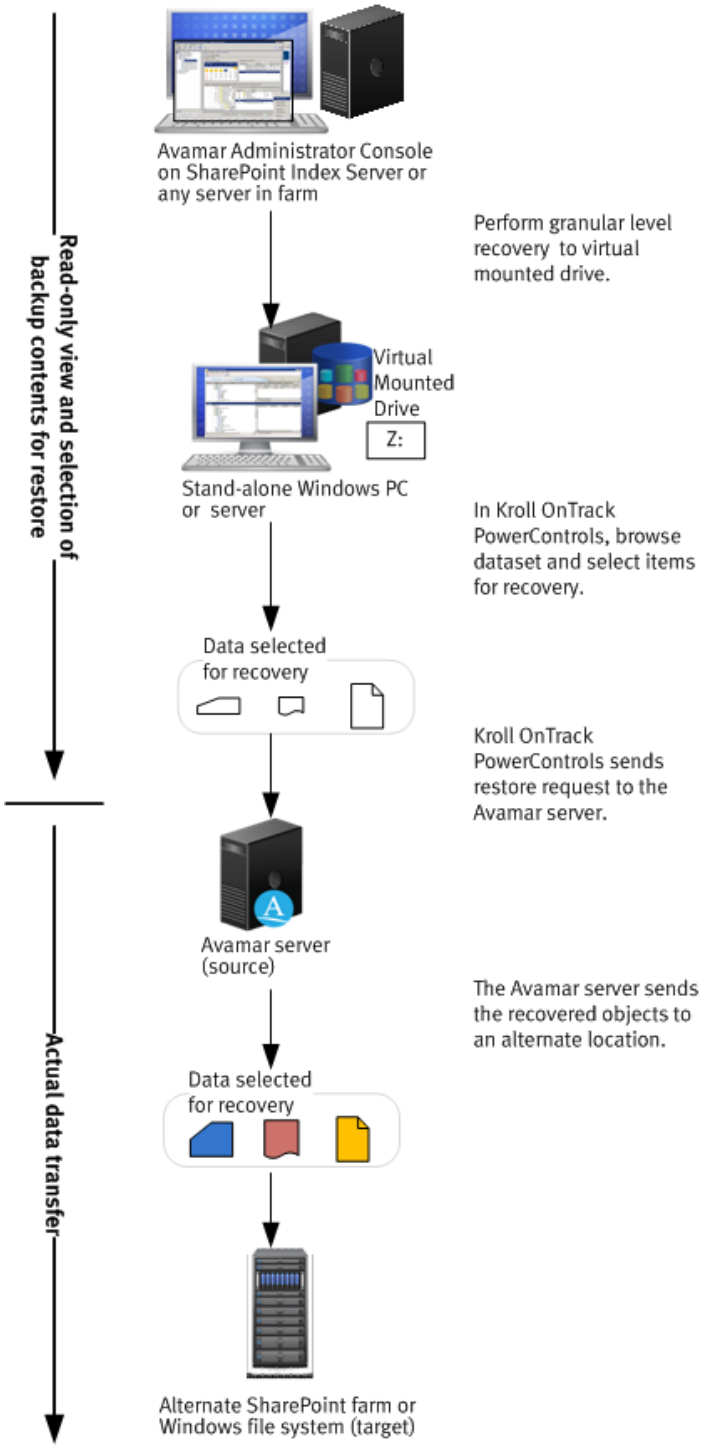
The Avamar Virtual Drive is created specifically for GLR and is temporary. The Avamar Plug-in for SharePoint GLR unmounts the drive after a time limit that you specify, when you stop the GLR service, or when the computer restarts.

Sharing the virtual drive is not supported. When you perform GLR and mount the Avamar Virtual Drive, do not mount the drive to a public share, or share the folder publicly. The

virtual drive may appear in the file system, but you can only access it from the computer that controls the mount point. You cannot map to the virtual drive from other machines.

The following figure illustrates the granular level recovery process.

Figure 11 Granular level recovery workflow



Disaster recovery

Disaster recovery is required when a catastrophic physical or software event damages a SharePoint farm.

A SharePoint disaster recovery requires the following tasks:

- Rebuild servers
- Reinstall SharePoint
- Configure each server for its farm role
- Restore the SharePoint data, configuration, or databases on each server

The recommendations in the following topics are intended to enhance, not replace, a good disaster recovery plan.

Note

SharePoint disaster recovery requires extensive knowledge of SharePoint installation and configuration. Microsoft provides information about SharePoint backup and recovery in the TechNet white paper "Data protection and recovery for Microsoft Office SharePoint Server 2007," which is available on the Microsoft website.

SharePoint updates

Keep up-to-date with SharePoint technology, and the software versions, the service packs, and the update levels installed on the SharePoint farms. SharePoint backup and recovery require adherence to specific sequences and synchronization.

Comprehensive backup plan

Ensure that you have the necessary backups, and the information needed to perform a complete disaster recovery of a SharePoint environment. Develop a comprehensive backup strategy to protect each component in the environment and the entire farm structure. A disaster plan can include:

- Plans for alternate physical sites, and equipment for rebuilding the servers, farms, or sites
- Identification of key people, with the required skills and knowledge, and sufficient permissions to complete all recovery tasks
- Documentation of physical hardware requirements, network configurations, and software versions
- A location to protect all installation media required for reinstalling the operating systems and applications

Standard full operating system and SharePoint farm backups

The Avamar Client for Windows and Avamar Plug-in for SharePoint VSS play an integral part in disaster recovery. The client and plug-in provide backups of:

- Operating system
- System State
- System volumes
- Applications

Preparing for disaster recovery on page 78 describes how to use Avamar software as part of a comprehensive backup strategy.

CHAPTER 2

Installation

This chapter contains the following topics:

Preparing to install the Avamar Plug-in for SharePoint VSS

Preparation includes reviewing system and environment requirements, and downloading, installing, and registering the file system client.

Review the system requirements for the Avamar Plug-in for SharePoint VSS, and ensure that the environment meets the requirements before you install the plug-in. You also must download the Avamar file system client and Avamar Plug-in for SharePoint VSS installation package from the Avamar server, install the file system client, and register the client with the Avamar server.

System requirements

The environment must meet client compatibility requirements before you install Avamar client software.

Client compatibility requirements are available 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 file system client and the plug-ins that you install on the host must have the same version number.

Note

Unless specified otherwise, use of the term Windows in this document refers to all supported versions of Microsoft Windows. Unless specified otherwise, use of the term SharePoint in this document refers to all supported versions of Microsoft SharePoint.

Hardware requirements

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

Table 3 Hardware requirements

Requirement	Minimum
Memory (RAM)	2 GB
File systems	NTFS
Network interface	10BaseT minimum; 100BaseT or higher recommended, configured with latest drivers for the operating system.

Unsupported configurations

Avamar does not support the following configurations in a SharePoint environment.

Windows Small Business Server
The Avamar software does not support backup and recovery of Windows Small Business Server.

Microsoft Exchange and Microsoft SharePoint Server installations on the same computer
The Avamar software does not support Microsoft Exchange Server and Microsoft SharePoint Server installed on the same computer. Microsoft does not support this

configuration and Microsoft best practices advise to install these roles on separate computers.

Hardware providers

All Avamar VSS-based backup operations use the Microsoft Software Shadow Copy provider, also known as the Microsoft system provider. Hardware providers are not supported.

Search Service Application requirements

When Search Service Applications in the farm are hosted on separate physical servers, each Search Service Application must include an index component from every other Search Service Application in the farm. Otherwise, backups fail to complete. This is a known SharePoint VSS Writer limitation.

Granular level recovery requirements

The Avamar Plug-in for SharePoint GLR places additional demands on computer hardware and resources beyond the requirements of the Avamar Plug-in for SharePoint VSS.

Memory

The Avamar Plug-in for SharePoint GLR may require additional memory (RAM). The amount of additional memory required depends on the current system performance with the existing memory:

- When performance is slow during normal operations of the Avamar Plug-in for SharePoint VSS, then add significantly more memory to support SharePoint granular level recovery operations.
- When performance is adequate during normal operations of the Avamar Plug-in for SharePoint VSS, then SharePoint granular level recovery operations may not require additional memory.
- Third-party recovery tools may require additional memory. Consult the documentation for the tool for specific memory requirements.

Database size

SharePoint 2010 SP1 supports Content Databases as large as 4 TB. The Avamar software supports databases up to the maximum size allowed by SharePoint. However, the maximum database sizes recommended by Microsoft for rapid backup and recovery are 200 GB for SharePoint 2010 and 100 GB for SharePoint 2007. The Microsoft TechNet articles, “Capacity Management for SharePoint Server 2010” and “Database maintenance (Office SharePoint Server 2007)” provide more information about sizing databases for best performance.

Third-party recovery tool

A third-party recovery tool, such as Ontrack PowerControls, is required to browse and restore individual items from the data that the Avamar Plug-in for SharePoint GLR mounts to the Avamar Virtual Drive.

The Ontrack PowerControls software must be purchased separately and is not included in the Avamar Plug-in for SharePoint VSS installation package. Installing Ontrack PowerControls on page 48 provides more detailed information about purchasing and installing the software.

The *EMC Avamar Compatibility and Interoperability Matrix*, available on EMC Online Support, provides the most up-to-date and accurate listing of supported third-party recovery tools.

Mapped network drive

Granular level recovery requires the creation of an Avamar Virtual Drive, which appears as a local drive in folder windows, such as Windows Explorer. During granular level recovery,

do not select a drive letter for the Avamar Virtual Drive that is also assigned to a mapped network drive. When the Avamar Virtual Drive is assigned the same drive letter as a mapped network drive, the Avamar Virtual Drive is hidden in folder windows.

To prevent this from occurring, use an unused drive letter when you specify the drive letter for the Avamar Virtual Drive. If the `Z:\` drive is already mapped to a network drive, do not use the default value of slash (/) because that causes the Avamar Virtual Drive to map to the `Z:\` drive.

If you notice the drive mapping issue, then disconnect the conflicting network mapping during the granular level recovery sessions.

Multi-streaming requirements

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

Multi-streaming hardware and software recommendations

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

Table 4 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 disks	• 1 disk drive for operating system/SharePoint common files • Separate disk drive or RAID drive group for each large SharePoint content database • 7200 RPM or faster disk drives
Network adapter	1 GB
Operating system	Windows Server 2008 64-bit w/SP2 or later (SharePoint 2010 requirement)
SharePoint database	Microsoft SQL Server 2008 SP2 or later (SharePoint 2010 requirement)

Multi-streaming SharePoint configuration requirements

When you configure multi-streaming for a backup, you can group by database or by volume.

Note

Regardless of whether you group by database or by volume, do not use multi-streaming for the first full backup of a SharePoint farm.

Multi-streaming requirements when grouping by database

When you group by database, adhere to the following guidelines to optimize the SharePoint configuration for multi-streaming:

- Split large databases so that all databases are relatively close in size. For example, if you have a 200 GB database, then move some site collections to new databases, and create four 50 GB databases instead.
- Distribute larger databases to separate disks. For example, if there are six 50 GB databases on the same disk drive, then redistribute each database to a separate disk drive.

Multi-streaming requirements when grouping by volume

When you group by volume, adhere to the following guidelines to optimize the SharePoint configuration for multi-streaming:

- Ensure that each volume is on its own disk drive spindle.
- Balance the total database size on each volume to be as equal as possible. In the following example the total database sizes on each drive are similar in size and balanced:
  - Drive 1 is 110 GB and holds Application and Administrative databases.
  - Drive 2 is 105 GB and holds Content_Database_01.
  - Drive 3 is 115 GB and holds Content_Database_02a.
  - Drive 4 is 108 GB and holds Content_Database_02b.

Multi-streaming Avamar configuration requirements

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 back up two databases with each database on its own disk, you can specify a maximum of two streams.
- If you back up two databases with each database and its logs on two disks (totaling four disks), you can specify a maximum of four streams.

Database requirements

There are additional requirements and recommendations for backing up the SQL Server databases when using the Avamar Plug-in for SharePoint VSS or Avamar Plug-in for SQL Server.

The Microsoft SharePoint documentation provides a list of SQL Server versions that SharePoint supports. The Avamar Plug-in for SharePoint VSS supports all SQL Server versions that SharePoint supports.

Full farm recovery, and disaster recovery, require a full backup from the Avamar Plug-in for SharePoint VSS. You cannot use a backup from the Avamar Plug-in for SQL Server. Avamar Plug-in for SQL Server (optional) on page 20 provides more information about the advantages and disadvantages of using the Avamar Plug-in for SQL Server for SharePoint database backups.

You can use the Avamar Plug-in for SQL Server to back up all databases in the environment except the search database. The Avamar Plug-in for SQL Server backup does not include the search index file, which must be synchronized with the search database backup so that they can both be restored together. Also, the Avamar Plug-in for SharePoint VSS only performs full backups of SharePoint content databases. A full backup does not manage SQL log file truncation. To work around this limitation, set the SQL databases to Simple Recovery Model so that log truncation is not necessary.

SQL Server AlwaysOn availability group requirements

To back up and restore SharePoint databases on the primary replica in a SQL Server AlwaysOn availability group, Windows PowerShell version 3.0 is required on the database server.

Version 3.0 is included in Windows Server 2012 and Windows Server 2012 R2. On Windows Server 2008 SP2 and Windows Server 2008 R2 SP1, you must download and install it by downloading and installing Windows Management Framework 3.0 from the Microsoft Download Center.

Required account privileges

Avamar Plug-in for SharePoint VSS requires specific administrator rights, and the Avamar Backup Agent Service must run as LocalSystem.

Avamar Plug-in for SharePoint VSS agent service account privilege requirements
The Avamar Plug-in for SharePoint VSS agent service and the SharePoint administrator must run with the same domain account.

Also, domain-level administrator rights are required to perform a backup or federated farm restore (a full farm restore of a distributed farm). The SharePoint administrator account for installation and configuration of the SharePoint farm is typically a member of the Administrators group on each server, and can be used for the federated restore.

To use an administrator account other than the one used to install SharePoint:

- Add the SharePoint administrator account to the domain administrators group.
- Assign the "Log on as a service" right to the SharePoint administrator account on each server that runs any of the SharePoint services.

  Specify this setting in **Local Computer Policy › Computer Configuration › Windows Settings › Security Settings › Local Policies › User Rights Assignment › Log on as a service**.

SharePoint 2013 farm administrator account requirements
Backup and restore of a SharePoint 2013 requires that the specified farm administrator account has Shell Admin Privileges. Use the `Add-SPShellAdmin` PowerShell command to provide these credentials. Consult Microsoft documentation for information about using PowerShell commands.

Avamar Backup Agent service requirements
The Avamar Backup Agent service must be running as LocalSystem on all machines.

VSS snapshot volume requirements

The Microsoft VSS framework limits the number of volumes in a VSS snapshot, and number of shadow copies in a volume.

Microsoft VSS framework allows up to 64 volumes in a VSS snapshot. When creating a dataset, do not include more than 64 volumes. If the number of volumes in a snapshot exceeds 64, 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, the backup fails and the Avamar event log lists the following error:

`VSS_E_MAXIMUM_NUMBER_OF_SNAPSHOTS_REACHED.`

Services and writers

The Avamar Plug-in for SharePoint VSS relies on several services and writers to complete backup and recovery operations.

Usually, when the SharePoint farm is running normal operations, all the needed services and writers are running. However, if a required writer or service is not running, backup or recovery operations may fail. The writer or service may have stopped because a server was taken offline, crashed, or is undergoing maintenance operations.

The Avamar Plug-in for SharePoint VSS requires the services and writers shown in the following table. In a federated environment, each of these may be on a different computer.

Table 5 Required services and writers

Microsoft application	Service or writer name
SharePoint 2013	• OSearch15 VSS Writer (OPSearch15) • SharePoint Services Writer (SPWriterV4)
SharePoint 2010	• SharePoint 2010 Administration (SPAdminV4) • SharePoint 2010 Timer (SPTimerV4) • SharePoint Foundation Search V4 (SPSearch4) • SharePoint Server Search 14 (OSearch14) • SharePoint 2010 VSS Writer (SPWriterV4)
SharePoint 2007	• Windows SharePoint Services Administration (SPAdmin) • Windows SharePoint Services Timer (SPTimerV3) • Windows SharePoint Services Search (SPSearch) • Office SharePoint Server Search (OSearch) • Windows SharePoint Services VSS Writer (SPWriter)
SQL Server	• SQL Server (MSSQLSERVER) • SQL Server VSS Writer (SQLWriter)

Downloading the software

Download the installation packages for the Avamar Client for Windows, the Avamar Plug-in for SharePoint VSS, and the Config Checker from the Avamar server. Then save the packages to a temporary directory.

Procedure

1. Log in to the server where the plug-in will be installed 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`

   where *version* is the Avamar client version.

6. Save the installation package to a temporary folder.
7. Click the Avamar Plug-in for SharePoint VSS package:

   `AvamarMossVSS-windows-x86_64-`*`version`*`.msi`

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

8. Save the installation package to a temporary folder.
9. Click the **Avamar Config Checker** installation package:

   `Avamar_ConfigChecker_win_x64.zip` (64-bit)

10. Save the 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 SharePoint. The Config Checker supports only English language operating systems.

Procedure

1. Unzip the Config Checker installation package, and run the setup program to install the software.
2. Open the Config Checker:
   - On Windows Server 2012, open the Start screen and select **Avamar Config Checker**.
   - On Windows Server 2008 R2, open the Start menu and select **Programs › EMC Config Checker › Avamar Config Checker**.
3. Click **Next.**

   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.

Note

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 appear under **Failure.**
12. Rerun the Config Checker to ensure that all the checks are successful.

    You can also 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, 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 on a stand-alone SharePoint farm or on a distributed SharePoint farm.

Installation road map

The installation and configuration of Avamar software in a SharePoint environment depends on the type of farm, and whether the granular level recovery feature and optional third-party recovery tool are installed.

Procedure

1. Install the Avamar Client for Windows on every server in the SharePoint farm.
2. Install the Avamar Plug-in for SharePoint VSS on every server in the SharePoint farm.

   If you intend to perform granular level recovery, install the Avamar Plug-in for SharePoint VSS on the SharePoint Administrator Console, and select the option to install the Avamar Plug-in for SharePoint GLR.

   Note

   You must install the Avamar Client for Windows and Avamar Plug-in for SharePoint VSS on each computer that is the target of a restore.

3. Register the SharePoint server as a client with the Avamar server.
4. (Optional) Install the Avamar Plug-in for SQL Server on the database servers to back up SQL Server databases in the SharePoint farm.

   Installation instructions are provided in the *EMC Avamar for SQL Server User Guide*.
5. If the database servers are in a cluster, use the Cluster Configuration Tool to configure the Avamar cluster client.
6. If you intend to perform granular level recovery, install the third-party recovery tool, such as Ontrack PowerControls, on the Administrator Console.

After you finish

In some stand-alone installations, the SQL Server VSS Writer service might be in a disabled or stopped state after you install the Avamar Plug-in for SQL Server. Without this

service running, backups and recoveries can fail. Before you perform a backup, check `Services.msc` to verify that the SQL Server VSS Writer service is enabled and set to automatic.

Installing the Avamar Client for Windows

The Avamar Client for Windows includes the Avamar agent and the Avamar Plug-in for Windows File System. The Avamar agent is required for backups and restores with application plug-ins. You can use the Windows File System plug-in to back up operating system and application binary files, which are required for disaster recovery.

A setup wizard leads you through the steps to install the Windows client. If the User Account Control (UAC) feature is enabled on the client computer, then you must start the setup wizard by using administrator privileges. Otherwise, the software does not install correctly. This procedure provides one method to bypass UAC. The Microsoft documentation provides other methods and additional information.

Procedure

1. Log in to the SharePoint server as an administrator.
2. Go to the temporary folder that contains the Avamar installation files that you downloaded.
3. Start the installer:
   - If UAC is disabled, double-click the installation file to open it.
   - If UAC is enabled, open a command prompt as an administrator, change directory to the location of the installation package, and then type the following command:

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

     where *version* is the Avamar client version.

   The installation wizard welcome page appears.
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) To specify a folder for the Avamar client installation, click **Browse** and select 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.**
12. Review the license agreement.
13. Select the checkbox to accept the terms in the license agreement, and click **Next**.

    The **Custom Setup** page appears.
14. Ensure that **Avamar Client User Interface** is selected for installation.
15. (Optional) To specify a folder for the Avamar client installation, click **Browse** and select a location.

16. Click **Next** on the **Custom Setup** page.

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

17. Click **Install**.

Installing the Avamar Plug-in for SharePoint VSS

A setup wizard leads you through the steps to install the plug-in. If UAC is enabled on the client computer, then you must start the setup wizard by using administrator privileges. Otherwise, the software does not install correctly. This procedure provides one method to bypass UAC. The Microsoft documentation provides one method to bypass UAC. The Microsoft documentation provides other methods and additional information.

The plug-in automatically installs in the same folder as the Avamar Client for Windows.

Procedure

1. Log in to the client computer with the SharePoint administrator domain account.

   This account is used for the Avamar Plug-in for SharePoint VSS agent service and must be the same domain account as the SharePoint administrator account.

2. Go to the temporary folder that contains the Avamar installation files that you downloaded.
   - If UAC is disabled, double-click the file to open it.
   - If UAC is enabled, open a command prompt as an administrator, change directory to the location of the installation package, and then type the following command:

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

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

   The welcome page appears.

3. Click **Next**.

   The **Ready to Install EMC Avamar Backup Plug-in for SharePoint VSS** page appears.

4. (Optional) For granular level recovery, and only when installing on the Administrator Console, select the **SharePoint GLR** plug-in, and then select **Will be installed on local hard drive** from the menu.

   A Windows security dialog box might appear during installation, indicating a possible security risk because of an unsigned driver or device. The exact message can vary, depending on the Windows version. If this message appears, click **Install** or **Install this driver software anyway**.

5. When the **Select the type of installation page** appears, select the type of SharePoint server on which you are installing the plug-in:
   - When the server is the main WFE server in a distributed farm, or the sole SharePoint server in a stand-alone farm, select **Front-end plug-in**. Select this option for only one WFE in the farm.
   - When the server is an application server, database server, or another WFE, select **Back-end plug-in**.

6. Click **Finish**.

Microsoft SharePoint VSS Writer error

During the installation of the Avamar Plug-in for SharePoint VSS, an error message may appear to notify you that the Microsoft SharePoint VSS Writer failed to register.

This error can occur when a computer has been unregistered from the farm before the installation. After you install the Avamar Plug-in for SharePoint VSS, use the Microsoft

`Stsadm` tool to fix this error. The tool is located on the drive where SharePoint is installed. The default location for the tool depends on the SharePoint version:

- SharePoint 2007
  `%COMMONPROGRAMFILES%\microsoft shared\web server extensions \12\bin`
- SharePoint 2010
  `%COMMONPROGRAMFILES%\microsoft shared\web server extensions \14\bin`
- SharePoint 2013
  `%COMMONPROGRAMFILES%\microsoft shared\web server extensions \15\bin`

To use the tool, log in as an administrator on the local computer, and type the following command at the command prompt:

```
stsadm.exe -o registerwsswriter
```

Microsoft TechNet provides details on using this tool in "Stsadm command-line tool (Office SharePoint Server)."

Registering the client

Procedure

1. Log in to the SharePoint server.
2. Right-click the Avamar client system tray icon and Select **Manage** › **Activate Client**.

   The **Activate Client Setup** dialog box appears.
3. In the **Administrator Server Address** box, type the DNS name of the Avamar server.
4. In the **Administrator Server Port** box, specify the port on the Avamar server for client/server communication.
5. In the **Client Domain** box, type the name of the Avamar domain for the client.

   The default location is `clients`. 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.
6. Click **Activate**.

   A confirmation message appears.
7. Click **OK**.

Configuring the cluster client for the SharePoint VSS plug-in

The Avamar cluster client enables you to back up and restore SharePoint data on shared storage in a cluster, regardless of which node is managing the data at the time of the backup or restore.

The Cluster Configuration Tool walks you through the steps to configure the Avamar cluster client for the Avamar Plug-in for SharePoint VSS.

Procedure

1. Log in to the host of the SQL Instance Shared Volume as a domain administrator.

   The account must also be a member of the local Administrators group on each cluster node.

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 **SharePoint**, 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 SharePoint node is Up.
   - The installation status of the Windows client software for each node is **Installed**.
   - The Avamar Plug-in for SharePoint VSS installation status on each SQL Server 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 prerequisite is not met, 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 **SharePoint 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 **Client domain for cluster** box.

       The default domain is "clients." Consult the Avamar system administrator for the appropriate domain or subdomain to use.

       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.
    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 shared network directory or volume stores the cluster client configuration and log files. All nodes in the cluster must have write permission for this directory or volume.

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.**

Configuring the cluster client for an AlwaysOn availability group

To use the Avamar Plug-in for SharePoint VSS to back up and restore databases in AlwaysOn availability groups, you must configure the Avamar cluster client on the cluster node with the primary replica.

The Avamar Cluster Configuration Tool walks you through the steps to configure the cluster client.

Procedure

1. Log in to the cluster node with the primary replica as a domain administrator. The account must also be a member of the local Administrators group on each cluster node.
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 **SharePoint AlwaysOn**, 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 cluster node is Up.
   - The installation status of the Windows client software for each node is Installed.
   - The Avamar Plug-in for SharePoint VSS installation status on each SQL Server 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 prerequisite is not met, 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 **SQL AlwaysOn Settings** page appears.

10. In the **Select service for cluster client**, select the availability group name, and then click **Next.**

    The **SharePoint 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 **Client domain for cluster** box.

       The default domain is "clients." Consult the Avamar system administrator for the appropriate domain or subdomain to use.

       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.

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

       Note

       Port 28001 is the default port that the Avamar client uses to communicate with the Avamar server.

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

       The `\var` directory stores the cluster client configuration and log files. If you select a location on the node with the primary replica, ensure that the folder is shared with other nodes.

12. Click **Next.**

    The **Summary** page appears.

13. Review the configuration settings, and then click **Configure.**

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

14. Click **Close.**

Changing the SharePoint mode

After you install the Avamar Plug-in for SharePoint VSS, you can change the mode of a SharePoint computer from front-end to back-end or back-end to front-end. You might

need to change the mode if you change which server is the main WFE or you specified the wrong mode for a server during installation.

Procedure

1. On the server for which you want to change the installation type, open the Windows Control Panel.
2. Click **Programs and Features**.
3. Select the **Avamar Plug-in for SharePoint VSS**, and then click **Change**.

   The setup wizard appears.
4. Click **Next**.

   The **Change, repair, or remove installation** page appears.
5. Click **Change**.
6. Select **Front-end** plug-in or **Back-end** plug-in, and click **Next**.
7. Complete the remaining steps in the wizard.

Installing Ontrack PowerControls

The Avamar Plug-in for SharePoint GLR enables you to recover a backup to the Avamar Virtual Drive using Ontrack PowerControls.

Ontrack PowerControls is a third-party tool that enables you to browse the Avamar Virtual Drive to select items and restore them to any of the following target computers:

- A server in the farm where the backup was performed.
- A server outside of the farm where the backup was performed.
- A server that does not host SharePoint or SQL services.

Note

The Avamar Client for Windows, the Avamar Plug-in for SharePoint VSS, and Avamar Plug-in for SharePoint GLR must be installed on the target computer.

Ontrack PowerControls must be purchased separately and is not included in the Avamar SharePoint VSS client installation package.

Ontrack PowerControls is available for resale through the EMC Select program. It can be ordered through the EMC ordering system. The Avamar ordering flow on Direct Express and Channel Express provides the option of selecting PowerControls. For details on the software, go to the EMC online support website at http:// Powerlink.EMC.com, and select **Home › Products › EMC Select › Kroll Ontrack** to view the Ontrack landing page.

The *EMC Avamar Compatibility and Interoperability Matrix*, available on the EMC Online Support website (https://support.emc.com), provides the most up-to-date and accurate listing of supported third-party recovery tools.

Ontrack PowerControls installation requirements

The computer on which you install Ontrack PowerControls must meet the following requirements:

- Windows Server 2008 or later (required by the Avamar Plug-in for SharePoint GLR)
- Compatible with Hyper-V or VMware environments
- Intel Pentium compatible processor, 64-bit (required by theAvamar Plug-in for SharePoint GLR)

- 1,024 MB of RAM
- Microsoft .NET Framework 3.5

The Ontrack PowerControls computer must have twice the amount of space as the data that you restore. The space is temporary space for the file data and all associated metadata fields, and is not used continuously.

For the most up-to-date requirements and instructions for installing Ontrack PowerControls software:

- Go to the Kroll website at www.krollontrack.com.
- Call 800-866-7176.
- Email Techsupport@krollontrack.com.

Ontrack PowerControls components

Before you perform GLR, install Ontrack PowerControls and the Ontrack PowerControls Agent for Content Transfer Services (ACTS) on separate servers.

The following table describes installation requirements depending on the type of SharePoint farm.

Table 6 Ontrack PowerControls component installation by farm type

On this type of farm	Perform these installations
Stand-alone farm	• Install the PowerControls software on a server outside of the stand-alone farm. • Install ACTS on the stand-alone server. Stand-alone SharePoint farm with optional granular level recovery on page 22 illustrates a stand-alone SharePoint farm with the PowerControls installed.
Distributed farm	• Install the PowerControls software on a server outside of the distributed farm. • Install ACTS on the SharePoint server, typically on a central administration computer Distributed SharePoint farm with optional granular level recovery on page 23 illustrates a small distributed farm with the PowerControls installed.

The ACTS installation process verifies that the installation is occurring on the correct computer.

Ontrack PowerControls installation settings

Specify the correct port, firewall exceptions, path, and configuration file name for Ontrack PowerControls before you perform GLR.

The following settings are required:

- The default port is 49175. You can change the port if the default port is already in use.
- An exception within the firewall is allowed, no matter which port you choose.
- The install path is `C:\Program Files (x86)\Kroll Ontrack\Ontrack PowerControls Agent for Content Transfer Service`.

- The configuration file name is `PC.SharePoint.Service.exe.config`.
- The location for the temporary path is `<appSettings> <add key="TempPath" value="C:\Windows\Temp\PC".`

The Ontrack PowerControls documentation on the Kroll website provides information about installing and using Ontrack PowerControls.

Upgrading the Avamar Plug-in for SharePoint VSS

To upgrade the Avamar Plug-in for SharePoint VSS to version 7.1, run the installation wizard for version 7.1.

You do not need to uninstall earlier versions of the plug-in before you install a new version.

Restore from backups created with previous versions of Avamar

EMC recommends performing a new backup immediately after upgrading an Avamar server or an Avamar client. In some cases, restoring backups created with previous versions of Avamar may fail.

Performing a new backup immediately after upgrading an Avamar server or an Avamar client provides a new baseline backup and reduces incompatibility issues that may occur from significant version changes between the backup software and restore software.

Restore of SharePoint 2013 backups created with Avamar 6.1 may fail

You can perform full restores of most SharePoint 2013 backups created with Avamar 6.1. However, sometimes a restore fails. Avamar 6.1 does not support backup and restore of Search Service Applications (SSA). Avamar 7.1 supports backup and restore of SSA but cannot restore SSA from an Avamar 6.1 backup. Restore fails with the warning `Failed to open SSA meta datafile '….\ssa_topology.xml' for reading.`, the error `Failed to parse Search Service Applications metadata file.`, and `Vss exception code 0x19930520 has been thrown by PostRestore()….`

If this error occurs, follow the steps in Restoring the SharePoint farm from the Avamar backup on page 81.

Restore of SharePoint 2007 backups created with Avamar 6.0 may fail

Restoring backups of SharePoint 2007 created with Avamar 6.0 may fail after the Avamar SharePoint plug-in or the Avamar server is upgraded to Avamar 7.1. The following combinations of backups and restore will fail:

- SharePoint 2007 farm backed up with Avamar 6.0, restore of farm with Avamar 7.1.
- SharePoint 2007 farm backed up with Avamar 6.0, redirected restore of individual Content Databases to file system path with Avamar 7.1.

The backups will fail with the following error:

```
"GetMetaDataFileFromSnapup: avtar Error 5195>:
Path".system_info\view-plugin.xml" not found in backup.
(Element 'view-plugin.xml' not found)."
```

Uninstalling the Avamar client software

The following topics explain how to uninstall Avamar client and plug-in software from a SharePoint client.

Uninstall road map

To uninstall Avamar client and plug-in software from a SharePoint client on either a stand-alone server or in a cluster:

Procedure

1. (Cluster only) Uninstall the Avamar Cluster Client.
2. Uninstall the Avamar Plug-in for SharePoint VSS by using **Programs and Features**.
3. Uninstall the Avamar Client for Windows by using **Programs and Features**.
4. (Cluster only) Repeat step 2 and step 3 on each node.

Uninstalling the cluster client for an AlwaysOn availability group

To uninstall the Avamar cluster client from an AlwaysOn availability group with SharePoint databases, run the Cluster Configuration Tool on the primary replica, and select the removal option.

Procedure

1. Log in to the cluster node with the primary replica as a domain administrator.

   The account must also be a member of the local Administrators group on each cluster node.

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 **SharePoint AlwaysOn** and click **Next**.

   The **Cluster Nodes** page appears with a list of nodes and their status.
5. Ensure that the status of each node is **Up**, and click **Next**.

   The **Operations** page appears.
6. Select the option to remove the cluster client from all nodes, and then click **Next**.

   The **Prerequisites** page appears. A check mark next to a prerequisite indicates that the prerequisite has been met.
7. Ensure that the environment meets all prerequisites on the page, and then click **Next**.

   The **Uninstall Settings** page appears.
8. Select the cluster role or service that contains the cluster client from the **Cluster role/service for cluster client** list, and then click **Next**.

   The **Summary** page appears.
9. Review the settings, and then click **Uninstall**.

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

10. Click **Close.**

CHAPTER 3

Backup

This chapter includes the following topics:

Performing on-demand backups

An on-demand backup is a user-initiated backup of an entire SharePoint farm, including the web front-end (WFE) server and all back-end servers. You can perform an on-demand backup for the first backup of the SharePoint farm immediately after you install the Avamar client software. You should also perform an on-demand backup before system maintenance, software installations, or software upgrades. If the SharePoint databases are in an AlwaysOn availability group, then the backup occurs on the primary replica.

Before you begin

Ensure that the "Log on as a service" right is assigned to the SharePoint administrator account on each server that runs any of the SharePoint services.

Procedure

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

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

2. In the clients tree, select the SharePoint server.

   The clients tree shows only the clients in the same domain as the account used to log in. To view all clients, log in to the root domain.

3. When prompted to provide farm administrator credentials, type the SharePoint administrator credentials.

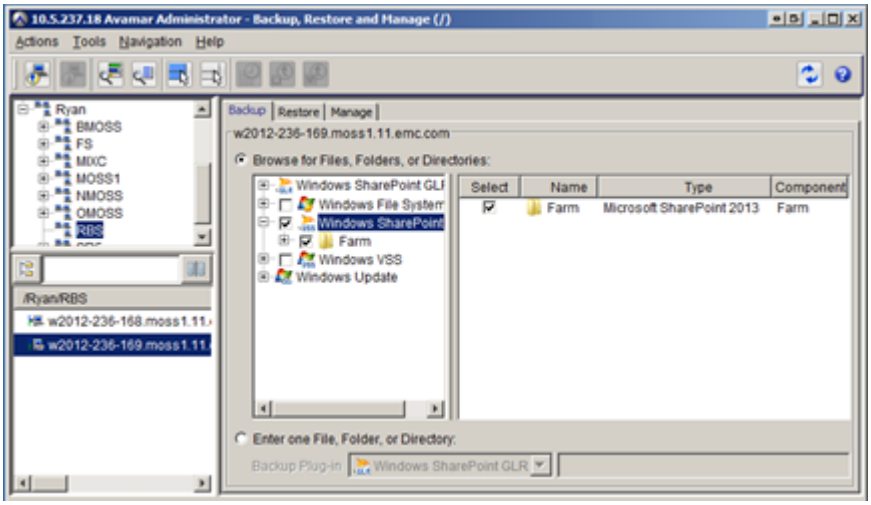
   Use the format *domain**username* for credentials in a domain, or *computer**username* for credentials on a computer.

   If you do not specify any credentials, or you specify non-SharePoint administrator credentials, the names of the components in the browse tree remain as the lengthy SharePoint-assigned GUIDs that SharePoint displays when you use the `stsadm` command or SharePoint Central Administration.

4. Click **OK**.
5. In the **Backup, Restore and Manage** window, click the **Backup** tab.

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

6. Under the **Windows SharePoint VSS** plug-in node, select the checkbox next to the farm to back up, as shown in the following figure.



Note

Do not clear individual components of the farm. You must back up the entire farm, or the backup fails.

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. From the **Avamar encryption method** list, select the encryption method to use for data transfer between the client and the Avamar server during the 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 on the **Backup Command Line Options** dialog box.

12. To write maximum information to log files, select **Enable debugging messages**.

    Selecting this option creates very large log files.

13. Review the SharePoint farm administrator credentials.

    This should already be autofilled by the credentials check earlier in this procedure. These credentials are required for SharePoint 2013 backups.

14. To store the backups for this dataset 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.

15. If you store the backup on a Data Domain system, select the encryption method for data transfer between the client and the Data Domain system during the backup from the **Encryption method to Data Domain system** list.
16. To use multi-streaming:
    a. Select the **Enable multi-streaming** checkbox.
    b. In **Maximum number of streams**, select the maximum number of streams to use for the 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, then specify a maximum of two streams. If you are backing up two databases with each database and its logs on two disks (totaling four disks), then specify a maximum of four streams.
    c. In **Group by**, select **Database**, or **Volume**.

       NOTICE

       When grouping by volume, performance degrades when the number of streams does not match the number of volumes.
17. Click **OK**.
18. On the **On Demand Backup Options** dialog box, click **OK**.

    The following status message appears: `Backup initiated.`
19. Click **OK**.

Scheduling backups

Scheduled backups run automatically to ensure that backups occur on an ongoing basis. You can schedule backups to run daily, weekly, or monthly. The scheduled backup can include multiple clients or a single server.

Procedure

1. Create a dataset for the backups.
2. Create a group for the backups.

   During the group creation process:
   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 SharePoint server to the new group.

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

Creating a dataset

A dataset specifies the data to include in a scheduled backup and the options to use for the backup. Create at least one dataset for scheduled backups on a client or group of clients. Create multiple datasets to segregate client data.

Procedure

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 (-), and underscore (_). Do not use any of the following characters in the dataset name: ~!@$^%(){}[]|,`;#\/:*?‹›'"&.

4. Select **Enter Explicitly**, and then select the **Windows SharePoint VSS** plug-in from the **Select Plug-In Type** list.

   If you select the **Windows SharePoint VSS** plug-in, then the **All SharePoint VSS Data** option is selected by default and cannot be changed. This option indicates that all SharePoint data in the farm is included in the backup with this plug-in.

5. Customize the dataset as needed by including a subset of the installed plug-ins:

   - To remove a plug-in from the dataset, select the plug-in from the list in the bottom portion of the **New Dataset** dialog box, and then click - (**Remove From List**). Repeat this step as necessary.
   - To add a plug-in to the dataset, select the plug-in from the **Select Plug-In Type** list, and then click + (**Add to List**). Repeat this step as necessary.

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

7. Select the **Windows SharePoint VSS** plug-in from the **Select Plug-In Type** list.

   The Windows SharePoint VSS plug-in options appear on the **Options** tab.

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

9. If you store the backups on a Data Domain system, select the encryption method for data transfer between the client and the Avamar server from the **Encryption method to Data Domain system** list.

10. (Optional) Specify multi-streaming settings to use multiple processors to back up multiple targets in parallel:

    a. Select **Enable multi-streaming**.

    b. In **Maximum number of streams**, select the maximum number of streams to use for the backup. Specify a maximum of one backup stream for each disk in the backup set.

11. To specify advanced backup options, select the **Show Advanced Options** checkbox.

    Additional options appear in red.

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

b. If you enabled multi-streaming, choose whether to group the backups by **Database** or by **Volume** using the **Group by** list.

Note

When using multi-streams by volume, performance degrades when backing up with a stream number that does not match the volume number.

12. Click **OK**.

    The **New Dataset** dialog box closes.

13. Click **OK**.

Creating a group

When you create a group, you define the dataset, schedule, and retention policy, which together comprise the group policy for scheduled backups of all members of the group.

A group must contain at least one Avamar client. If the group contains two or more clients, then the clients must belong to the same Avamar domain. You can override group policy settings at the client level.

You cannot edit schedules or retention policies when you use the New Group wizard to create a group. Review existing schedules and retention policies. If required, create new ones before you create the group. The *EMC Avamar Administration Guide* provides information about schedules and retention policies.

Procedure

1. In **Avamar Administrator**, click the **Policy** launcher button.

   The **Policy** window appears.

2. Select the **Groups** tab.
3. In the left pane, select an Avamar domain for the group.
4. Select **Actions** › **Group** › **New** › **Backup Group**.

   The New Group wizard appears.

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

   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 permit scheduled backups for the group.

   Selecting the checkbox disables backups for the group.

7. From the **Avamar encryption method** list, select the encryption method data transfer between the client and the Avamar server during the 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.

8. (Optional) Select **Override Schedule** to override the assigned schedule for this group:

   - To skip the next scheduled backup, select **Skip Next Backup**.
   - To perform the next scheduled backup one time only, select **Run Next Backup Once**.

9. Click **Next**.

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

10. From the **Select An Existing Dataset** list, select the dataset that you created, and then click **Next.**

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

11. Select a schedule from the **Select An Existing Schedule** list, and then click **Next**.

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

12. Select a retention policy from the **Select An Existing Retention Policy** list, and then click **Next**.

    The final **New Group** wizard screen appears. A list of domains appears in the **Choose Domain** pane.

13. Select the SharePoint server from the client list.

14. Click **Finish**.

    The **New Group** wizard closes and the new group appears in the **Policy** window.

Enabling scheduled backups

Scheduled backups occur only for enabled groups. Groups are disabled by default unless you select the **Enabled** checkbox on the first page of the **New Group** wizard. If you did not enable the group when you created it, use the menu options in the **Policy** window to enable backups.

Procedure

1. In Avamar Administrator, click the **Policy** launcher button.

   The **Policy** window appears.

2. Click the **Policy Management** tab.

3. Click the **Groups** tab.

4. Select the group that you created.

5. Enable the group by selecting **Actions** › **Group** › **Disable Group**.

   Perform this step only if a check mark appears next to the **Disable Group** menu option.

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

Monitoring backups

You can monitor backups to ensure that the backups complete successfully and to troubleshoot issues. The Activity Monitor in Avamar Administrator enables you to view status information for both on-demand and scheduled backups.

Procedure

1. In Avamar Administrator, click the **Activity** launcher button.

   The **Activity** window appears.

2. Click 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. Select **All Backups** from the **Type** list.
5. Click **OK**.

Canceling backups

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

Procedure

1. In Avamar Administrator, click the **Activity** launcher button.

   The **Activity** window appears.
2. Click the **Activity Monitor** tab.

   A list of all activities appears.
3. Select the backup from the list.
4. Select **Actions** › **Cancel Activity**.

   A confirmation message appears.
5. Click **Yes**.

CHAPTER 4

Restore

This chapter includes the following topics:

Tasks required to restore specific components

When you restore certain individual SharePoint components, additional steps are required to prepare the environment before the restore. The following topics explain how to prepare to restore a deleted web application or search database.

Restore of a deleted web application

The tasks to restore a deleted web application depend on whether you need to restore just the web application data, the data and the web application configuration, or the entire web application and other critical components.

Note

To correctly restore a search component, the search index flat files and associated search databases must be restored together.

If you are restoring only selected web applications or other components, then shut down the web applications or components during the restore.

The following table describes the tasks required to restore a deleted web application.

Table 7 Tasks required when restoring a deleted web application

Web application and other SharePoint component status	Restore tasks
The web application with attributes still exists, and you want to restore only the web application data.	Restore the deleted web application database using the steps in Restoring a content database to its original location on page 68. You do not need to stop SharePoint or any services.
The web application has been deleted, but the IIS website and content database still exist.	Perform the steps in Restoring a deleted web application to an existing IIS website and content database on page 62.
The web application, the IIS website, and the content database were all deleted.	Perform the steps in Restoring the SharePoint farm from the Avamar backup on page 81.

Restoring a deleted web application to an existing IIS website and content database

Before you begin

Re-create the deleted web application and attach it to the content database.

Procedure

1. Open the SharePoint **Central Administration** page.
2. On the **Applications Management** tab, manually re-create the deleted web application.

   Ensure that all configuration attributes match the original web application environment. You can only restore data to an environment that matches the environment in which the backup was performed.

3. Attach the re-created web application to the content database.

4. Restore the deleted web application using the steps in Restoring a content database to its original location on page 68.

Restore of a deleted search database

The tasks to restore a deleted search database depend on whether you need to restore just the database, the database and the Search Web application, or the database and other critical components.

If you are restoring only selected web applications or other components, then shut down the web applications or components during the restore.

The following table describes the processes to restore a deleted search database.

Table 8 Tasks required when restoring a deleted search database

Search database and other SharePoint component status	Restore tasks
The Search web application with attributes still exists, and you want to restore only the search database.	Restore the deleted Search Web application database using the steps in Restoring a content database to its original location on page 68. You do not need to stop SharePoint or any services.
The Search Web application has been deleted, but the IIS website and search database still exist.	Perform the steps in Restoring a deleted web application to an existing IIS website and content database on page 62.
The Search Web application, the IIS website, and the search database were all deleted.	Perform the steps in Restoring the SharePoint farm from the Avamar backup on page 81.

Restoring a deleted Search Web application to an existing IIS website and content database

Before you begin

Re-create the deleted Search Web application and attach it to the content database.

Procedure

1. Open the SharePoint **Central Administration** page.
2. On the **Applications Management** tab, create the **Search Service** in **Manage Search Services**.

   Ensure that all configuration attributes match the original search database environment. You can only restore data to an environment that matches the environment in which the backup was performed.

3. On the **Applications Management** tab, verify that the **Office SharePoint Server Search** service is running in **Manage Search Services**.
4. Restore the deleted search database using the steps in Restoring a content database to its original location on page 68.

Restoring databases in an AlwaysOn availability group

When you restore SharePoint databases in an AlwaysOn availability group with the Avamar Plug-in for SharePoint VSS, the restore process automatically removes all

SharePoint databases from the availability group. After the restore completes, the SharePoint VSS plug-in rejoins the databases to the availability group on only the primary replica.

The databases on the secondary replicas remain in an unsynchronized state. You must manually join the databases to the availability group on each secondary replica by using SQL Server Management Studio, Transact-SQL, or PowerShell. The SQL Server documentation on the Microsoft TechNet website provides instructions.

Finding a backup

The first step to restore data is to find the backup with the data that you want to restore. You can find Avamar client backups by searching either for a specific date or for specific content.

Locate backups by date when one or more of the following situations apply:

- You save all data for the client in a single backup set.
- The exact pathname or name of the data to restore is unknown.
- The backup you want to restore is before a specific date or event. For example, you know the approximate date when data was lost or corrupted. You can search for a backup before that date.
- The specific types of backups are known. For example, you run scheduled disaster recovery backups every Wednesday and Saturday night, and you run full volume backups daily. When you need to rebuild a server, select the disaster recovery backup with the date closest to the event that caused the loss of data.

Locate backups by the content of the backup when one or more of the following situations apply:

- You back up data on the client in separate backup sets.
- You want to view multiple versions of the same file so that you can decide the version to restore.
- The date of the backup or the content of a backup is unknown, but you know the name of the data to restore.
- You need to restore a SharePoint database that is no longer in the SharePoint farm, but you know the farm path to the SQL server, computer name, or database to recover.

Finding a backup by date

Procedure

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

   The **Backup, Restore and Manage** window appears.
2. In the clients tree, select the SharePoint server.

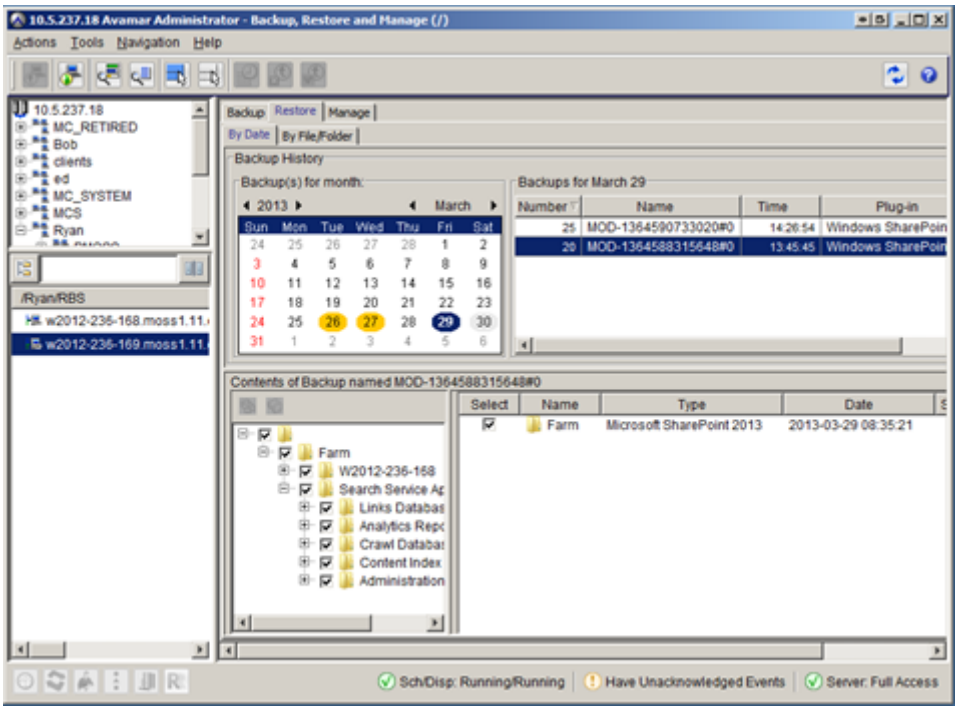
   The clients tree shows only the clients in the same domain as the account used to log in. To view all clients, log in to the root domain.
3. Click the **Restore** tab.
4. Click the **By Date** tab.
5. Select a backup from the calendar:

   a. Use the year and month navigational arrows to browse to a backup.

      Dates highlighted by yellow indicate a valid backup exists for that date.

b. Click a date highlighted by yellow.

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



6. Select the data to restore from the **Contents of Backup** pane at the bottom of the **Restore** tab, as described in the following topics:
   - Restoring an entire farm to its original location on page 66
   - Restoring a content database to its original location on page 68
   - Restoring to a different location on page 69

Finding a backup by content

Procedure

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

   The **Backup, Restore and Manage** window appears.
2. In the clients tree, select the SharePoint server.

   The clients tree shows only the clients in the same domain as the account used to log in. To view all clients, log in to the root domain.
3. Click the **Restore** tab.
4. Click the **By File/Folder** tab.
5. In **Enter path to retrieve history for**, specify the path by one of the following methods in the following table.

Option	Description
Type the path	Type the full path to the client folder or file in the **Enter path to retrieve history for text** box.
Browse	a. Click **Browse**.

Option	Description
	The **Select File or Folder** window appears. b. Select the client. c. Select the plug-in. A list of folders appears in a table to the right of the plug-ins pane. d. Select the file or folder to restore. e. Click **OK**. The selected file or folder appears in the **Enter path to retrieve history for** box.

6. Click **Retrieve**.

   The **Version History** table lists all versions and sizes for that folder or file that have been backed up from the selected client.

7. Select the folder or file version in the **Version History** table.

   All backups for the selected client that contain the selected version appear in the **Backups** table next to the **Version History** table.

8. Select the backup to restore from the **Backups** table.
9. Select the data to restore from the **Contents of Backup** pane at the bottom of the **Restore** tab, as described in the following topics:
   - Restoring an entire farm to its original location on page 66
   - Restoring a content database to its original location on page 68
   - Restoring to a different location on page 69

Restoring to the original location

When you perform backups of a SharePoint farm using the Avamar Plug-in for SharePoint VSS, you can restore the entire farm or just the content database to the original location.

Restoring an entire farm to its original location

Use a backup created with Avamar Plug-in for SharePoint VSS to restore all of the SharePoint servers and data to the original location.

Before you begin

Ensure that the “Log on as a service” right is assigned to the SharePoint administrator account on each server that runs any of the SharePoint services.

Procedure

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

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

2. Find the backup to restore. Finding a backup by date on page 64 describes this in detail.

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

3. In the bottom left pane, select the farm to restore.

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

   The **Restore Options** dialog box appears. The client that you selected for recovery appears in **Restore Destination Client**.

5. In **Restore Plug-In**, select **Windows SharePoint VSS**.

6. From the **Avamar encryption method** list, select the encryption method to use for data transfer between the client and the Avamar server 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.

7. Select **Restore everything to its original location**.

8. If restoring to a distributed SharePoint farm, specify an account for the restore that has administrator rights on all SharePoint clients in the farm:

   a. Click **More Options**.

      The **Restore Command Line Options** dialog box appears with Windows SharePoint VSS plug-in options.

   b. In the **User name** box type the username for an account for the restore that has administrator rights on all SharePoint clients in the farm.

   c. In the **Password** box type the password for the account that has SharePoint administrator rights.

   d. From the **Encryption method from Data Domain system** list, select the encryption method for data transfer between the Data Domain system and the client during the restore.

9. (Optional) To specify command line flags, such as those listed in Restore options for the Avamar Plug-in for SharePoint VSS on page 85:

   a. Click **More**.

   b. In **Enter Attribute**, type the flag.

   c. In **Enter Attribute value**, type the value, if applicable.

   d. Click the **+** button.

   e. Click **OK**.

10. On the **Restore Options** dialog box, click **OK**.

11. If a confirmation dialog box appears, click **OK** again.

    The following status message appears: `Restore initiated.`

12. Click **OK**.

After you finish

- Restart IIS.
- If the restore included databases in an AlwaysOn availability group, the databases on the secondary replicas remain in an unsynchronized state. Manually join the databases to the availability group on each secondary replica by using SQL Server Management Studio, Transact-SQL, or PowerShell. The SQL Server documentation on the Microsoft TechNet website provides instructions.

Restoring a content database to its original location

Use a backup created with Avamar Plug-in for SharePoint VSS to restore a SharePoint content database to its original location.

Procedure

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

   The **Backup, Restore and Manage** window appears.
2. Find the backup to restore. Finding a backup by date on page 64 describes this in detail.

   The backup to restore from is selected in the **Backups** pane.
3. In the bottom left pane, expand the node for the farm.
4. Expand the SQL Server farm host to display either the SQL instance folder or databases.
5. Select the content database to restore.
6. Select **Actions** › **Restore Now**.

   The **Restore Options** dialog box appears. The client that you selected for recovery appears in **Restore Destination Client**.
7. In **Restore Plug-In**, select **Windows SharePoint VSS**.
8. From the **Avamar encryption method** list, select the encryption method to use for data transfer between the client and the Avamar server 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.
9. Select **Restore everything to its original location**.
10. If restoring to a distributed SharePoint farm, specify an account for the restore that has administrator rights on all SharePoint clients in the farm:
    a. Click **More Options**.

       The **Restore Command Line Options** dialog box appears with Windows SharePoint VSS plug-in options.
    b. In the **User name** box type the username for an account for the restore that has administrator rights on all SharePoint clients in the farm.
    c. In the **Password** box type the password for the account that has SharePoint administrator rights.
    d. From the **Encryption method from Data Domain system** list, select the encryption method for data transfer between the Data Domain system and the client during the restore.
11. (Optional) To specify command line flags, such as those listed in Restore options for the Avamar Plug-in for SharePoint VSS on page 85:
    a. Click **More**.
    b. In **Enter Attribute**, type the flag.
    c. In **Enter Attribute value**, type the value, if applicable.
    d. Click the **+** button.

e. Click **OK**.

12. On the **Restore Options** dialog box, click **OK**.
13. If a confirmation dialog box appears, click **OK** again.

    The following status message appears: `Restore initiated.`
14. Click **OK**.
15. If a confirmation dialog box appears, click **OK** again.

    The following status message appears: `Restore initiated.`
16. Click **OK**.

After you finish

If the content database is in an AlwaysOn availability group, the database on the secondary replicas remains in an unsynchronized state. Manually join the database to the availability group on each secondary replica by using SQL Server Management Studio, Transact-SQL, or PowerShell. The SQL Server documentation on the Microsoft TechNet website provides instructions.

Restoring to a different location

Use a backup created with Avamar Plug-in for SharePoint VSS to restore an entire farm or just a content database to a new location. Restoring to a different location enables you to restore content without directly overwriting existing content in the production SharePoint server databases.

Before you begin

- Ensure that the "Log on as a service" right is assigned to the SharePoint administrator account on each server that runs any of the SharePoint services.
- Install the Avamar Client for Windows and Avamar Plug-in for SharePoint VSS on the destination servers, and register .

Procedure

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

   The **Backup, Restore and Manage** window appears.
2. Find the backup to restore. Finding a backup by date on page 64 describes this in detail.

   The backup to restore from is selected in the **Backups** pane.
3. Select the data to restore.

Data to restore	Selection steps
Entire farm	In the bottom left pane, select the farm to restore.
Content database	a. In the bottom left pane, expand the node for the farm. b. Expand the SQL Server farm host to display either the SQL instance folder or databases. c. Select the content database to restore.

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

The **Restore Options** dialog box appears. The client that you selected for recovery appears in **Restore Destination Client**.

5. In **Restore Plug-In**, select **Windows SharePoint VSS**.
6. From the **Avamar encryption method** list, select the encryption method to use for data transfer between the client and the Avamar server 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.
7. Select **Restore everything to a different location**.

   The **Reset Default** and **Edit Destination** buttons become available.
8. In the **Items Marked for Restore** box, click **Set Destination** to specify the target drive for the restore.

   The **Set Destination** dialog box appears.
9. Click **Browse**.
10. In the **Browse for File, Folder, or Directory** dialog box, expand **Windows File System**, select the volume or location, and then click **OK**.
11. On the **Set Destination** dialog box, click **OK**.
12. Click **OK** on the **Restore Options** dialog box.

    The following status message appears: `Restore initiated`
13. Click **OK**.

Monitoring restores

You can monitor restores to ensure that the restores complete successfully and to troubleshoot issues. The Activity Monitor in Avamar Administrator enables you to view status information for restores.

Procedure

1. In Avamar Administrator, click the **Activity** launcher button.

   The **Activity** window appears.
2. Click 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. Select **Restore** from the **Type** list.
5. Click **OK.**

Canceling restores

You can cancel a restore any time before the restore completes. The cancellation might take five minutes or longer. The restore may complete before the cancellation finishes.

Procedure

1. In Avamar Administrator, click the **Activity** launcher button.

   The **Activity** window appears.

2. Click the **Activity Monitor** tab.

   A list of all activities appears.
3. Select the restore from the list.
4. Select **Actions** › **Cancel Activity**.

   A confirmation message appears.
5. Click **Yes**.

CHAPTER 5

Granular Level Recovery

This chapter contains the following topics:

Performing granular level recovery

Granular level recovery (GLR) enables you to browse to and recover individual SharePoint items to avoid the additional time, network bandwidth, and disk space requirements of restoring an entire farm or database.

Procedure

1. Use the Avamar Plug-in for SharePoint GLR to mount a backup to the Avamar Virtual Drive. Restoring the Avamar backup and mounting the Avamar Virtual Drive on page 74 provides instructions.
2. Use a third-party recovery tool, such as Ontrack PowerControls, to locate and select the items to restore. Restoring items from the Avamar Virtual Drive on page 75.

   Ontrack PowerControls sends the restore request to the Avamar server, and then the Avamar server restores the data to the specified location.

Mounting a backup to the Avamar Virtual Drive

Use the Avamar Plug-in for SharePoint GLR to mount a backup the Avamar Virtual Drive for granular level recovery.

Before you begin

- Ensure that the "Log on as a service" right is assigned to the SharePoint Administrator account on each server that runs any of the SharePoint services.
- Ensure that the Avamar Client for Windows and the Avamar Plug-in for SharePoint VSS are installed on the target computer.

Procedure

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

   The **Backup, Restore and Manage** window appears.
2. Find the backup with the data to restore. Finding a backup by date on page 64 describes this in detail.

   The backup to restore from is selected in the **Backups** pane.
3. Select the **GLR** button  in the lower-left pane of the **Restore** tab.

   The **Select Destination Client** dialog box appears.
4. Select **Restore everything to a different location**, and then specify the **Restore Destination Client** using one of the following methods:
   - Type the path and name of the destination client.
   - Browse and select the destination client.
5. Click **OK**.

   The **Restore Browse Options** dialog box appears.
6. In **Drive letter or mount path**, specify the drive to mount the Avamar virtual drive to for browsing:
   - Type a forward (/) or backward (\) slash to let the Avamar software detect and select an available drive.

The system starts with the letter Z and works its way backward until an available drive is located. If you specify a drive letter, ensure that the drive letter is not already in use on the target server.

- Type a valid path name to a folder, such as `F:\folder_name`.

If another user or user session has mapped a network drive within a user session on the client computer, the Avamar software cannot detect those drive mappings when assigning a drive letter for the Avamar Virtual Drive. If you regularly use network drive mapping, then specify a drive letter that you know is not in use instead of specifying a forward or backward slash.

7. In **Amount of time to leave AvFS mounted**, select the amount of time to leave the Avamar Virtual Drive mounted.

   The drive disconnects when the specified time has passed, even if the drive is in use. Select a length of time that enables you to complete the granular level recovery.

8. Click **OK** on the **Restore Browse Options** dialog box.

   The following status message appears: `Restore initiated.`

9. Click **OK**.

Restoring items from the Avamar Virtual Drive

After you mount the backup to the Avamar Virtual Drive, use a third-party recovery tool, such as Ontrack PowerControls, to recover specific items to the SharePoint farm.

Before you begin

Ensure that the Ontrack PowerControls Agent For Content Transfer (ACTF) service is running.

Procedure

1. On the target computer where the Avamar Virtual Drive is mounted, open the recovery program by clicking **Start** › **Program Files** › **Kroll Ontrack PowerControls** › **Ontrack PowerControls for SharePoint**

   The **Ontrack PowerControls** software appears, and displays the **Data Wizard** to gather information about the source and target locations.

2. When prompted, provide the following information:

   - The full local path to the Avamar Virtual Drive, such as `Z:\`.
   - The site collection URL in **SharePoint Server Site URL**.
   - The default value of 49175 in **Agent for Content Transfer Service Port Number**.
   - The credentials required to access the site collection URL in **Authentication Information**. The Ontrack PowerControls administrator must have full access control permissions.

3. Click **Finish**.

   Ontrack PowerControls connects to the source and the target. The **Ontrack PowerControls** window appears as a split directory window.

4. Browse the source directory tree and select the items to restore.
5. Initiate the restore by using one of the following methods:

   - Drag and drop from the source to the target.

- Right-click to copy items in the source tree, and then right-click to paste the items to the destination.

A **Copy Progress** window displays the details of the file transfer. When the copy is complete, you can print or save a file copy of the completion report.

CHAPTER 6

Disaster Recovery

This chapter contains the following topics:

Preparing for disaster recovery

Avamar enables you to back up all of the data, settings, and roles in a SharePoint farm to prepare for disaster recovery. This chapter describes the overall process for using these tools. However, you may need to modify the steps for an environment.

Common reasons to perform disaster recovery of a SharePoint farm include:

- To move an entire farm from a physical environment to a virtual environment.
- To move the farm to new or upgraded hardware.
- To replace an entire farm destroyed by a disaster such as a fire, flood, earthquake, and so on.

If the farm is intact and you are replacing or restoring a machine, Bare Metal Recovery (BMR) enables you to restore a server offline without having to rebuild from the operating system on a bare machine.

Procedure

1. Create a formal plan that includes the following information:
   - Machine names
   - IP addresses
   - Network settings
   - Backup server locations
   - Mirror site server names and settings
   - Hardware and configuration
2. Ensure that you have onsite and offsite copies of the installation disks for the following items:
   - Operating system
   - SharePoint software
   - SQL Server software
   - Any updates for the software
   - Hardware drivers, including NICs.
3. Review Microsoft disaster recovery and backup guidelines for SharePoint, such as the “Data protection and recovery for Microsoft Office SharePoint Server 2007” white paper.
4. Review disaster recovery and BMR information in the *EMC Avamar for Windows Server User Guide*. All disaster recoveries for any member of the SharePoint farm must start with a BMR of the operating system with the Avamar Client for Windows.
5. Use the Avamar Plug-in for SharePoint VSS plug-in to perform regular backups of the entire SharePoint farm.

   The backups include the main WFE server and all back-end servers, such as application servers, other WFE servers, the search server, and database servers.

Note

The SharePoint VSS plug-in backs up only SharePoint farm databases. Other databases on the same server, such as SQL Server system databases, are not included in backups with the SharePoint VSS plug-in.

6. On the main WFE server and each back-end server, use the Windows File System plug-in to perform file system backups and the Windows VSS plug-in to perform BMR backups as described in the *EMC Avamar for Windows Server User Guide*.
7. Use the Avamar Plug-in for SQL Server to perform regular backups of databases that are not included in SharePoint VSS plug-in backups, such as SQL Server system databases. The *EMC Avamar for SQL Server User Guide* provides details.
8. (Optional) Practice disaster recovery of the farm to a virtual environment.

   If the SharePoint farm is too large for the amount of extra storage required for the test environment, practice with a small farm or stand-alone farm. Starting small also enables you to test proof of concept if you are considering migrating from a physical to a virtual environment.

Performing disaster recovery

Procedure

1. Rebuild the SharePoint environment.
2. Reinstall the Avamar software in the SharePoint environment.
3. Restore the SharePoint farm from the Avamar backups.
4. Bring the restored SharePoint servers back online or into production.

Rebuilding the SharePoint environment

Rebuild the SharePoint environment as part of disaster recovery by rebuilding the SharePoint servers that comprise the farm.

Procedure

1. Rebuild the database servers:
   a. Perform BMR to recover the operating system, System State, and critical volumes. BMR does not recover noncritical volumes.

      If the SQL Server software is not installed to the critical volume (typically `C:\`), databases may not be restored. Ensure that the Windows File System plug-in has backed up all SQL Server system databases.

   b. Re-create the original volume hierarchy where SQL Server files and databases are installed.

   c. Reinstall the Avamar software on the new machine if any of the following apply:

      - Avamar was installed on a non-critical volume
      - The BMR backup was performed with an older version of Avamar than you are currently using
      - The BMR backup was performed with an older version of Windows than you are currently using

To reinstall the Avamar software, complete the steps in Reinstalling the Avamar software on page 80 to install the Avamar Client for Windows and the Avamar Plug-in for SharePoint VSS.

d. If the SQL System databases were installed on a non-critical volume, you will need to use the Windows File System plug-in to restore SQL Server installation directories, as well as system databases to their original volumes. Use the option to overwrite all existing files.

e. Complete the steps in Restoring the SharePoint farm from the Avamar backup on page 81.

2. Ensure that all SQL Servers with SharePoint databases are up and running.
3. Rebuild the SharePoint application and WFE servers:

a. Perform BMR to recover the operating system, System State, and critical volumes. BMR does not recover noncritical volumes.

If SharePoint or index files are not installed on the critical `C:\` volume, files will not be restored. Ensure that the Windows File System plug-in has backed up all SharePoint directories not installed on the critical `C:\` volume.

b. Complete the steps in Reinstalling the Avamar software on page 80 to install theAvamar Client for Windows and the Avamar Plug-in for SharePoint VSS.

c. Restore the file system and volumes with the Windows File System plug-in.

d. Restore SharePoint installation and index files that are located on the critical and noncritical volumes.

e. Complete the steps in Restoring the SharePoint farm from the Avamar backup on page 81.

Reinstalling the Avamar software

Reinstall the Avamar software in the SharePoint environment after you rebuild the farm.

Procedure

1. Install the Avamar Client for Windows on every server in the SharePoint farm.
2. Install the Avamar Plug-in for SharePoint VSS on every server in the SharePoint farm.

If you intend to perform granular level recovery from the SharePoint Administrator Console, then select the option to install the Avamar Plug-in for SharePoint GLR as well as the Avamar Plug-in for SharePoint VSS on the SharePoint Administrator Console.

Note

Performing granular level recovery from any other machine prevents you from having to reboot the SharePoint Administrator Console after installation.

3. If you perform granular level recovery, then install the third-party recovery tool, such as Ontrack PowerControls on the Administrator Console or another computer you plan to use for GLR.
4. If you use the Avamar Plug-in for SQL Server to back up SQL Server databases in the environment, then install the plug-in on the database servers.
5. Check `Services.msc` to verify that the SQL Server VSS Writer service is enabled and set to automatic. In some stand-alone installations, the SQL Server VSS Writer service

might be in a disabled or stopped state after you install the Avamar Plug-in for SharePoint VSS. Without this service running, backups and recoveries can fail.

6. Deactivate the Avamar clients on each server in the SharePoint farm by clearing the **Activate it** checkbox on the **Client Properties** dialog box, and then invite the clients. The *EMC Avamar Administration Guide* provides details.

Restoring the SharePoint farm from the Avamar backup

Procedure

1. Ensure that the following services are running:
   - Volume Shadow Copy
   - SharePoint VSS Writer
   - SharePoint Timer
2. Use the Avamar Plug-in for SharePoint VSS to restore the entire farm from a backup.

   The restore process automatically stops the following services:
   - SharePoint Administration
   - SharePoint Search
   - SharePoint Search Services
   - SharePoint Timer
   - SharePoint Server Search (If SharePoint Server is installed)

Bringing restored servers back online

Bring the SharePoint servers back online after you restore the farm.

Procedure

1. Reconfigure IIS settings to accommodate any changes made between the time of the backup and the disaster. Otherwise, IIS settings should not need to be changed.
2. (Optional) Reconfigure alternate access mappings.
3. (Optional) On all WFE servers, redeploy solutions and reactivate features. For SharePoint Server 2007 only, restore the 12 hive by using the Avamar Client for Windows.

APPENDIX A

Plug-in Options

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 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 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.

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.

Backup options

Backup plug-in options enable you to control backup functionality that is specific to the Avamar Plug-in for SharePoint VSS. You can specify plug-in options for on-demand and scheduled backups.

Table 9 Backup options for the SharePoint VSS plug-in

Option	Description
Store backup on Data Domain	Specifies 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.
Encryption method to Data Domain system	Specifies the encryption method for data transfer from the client to the Data Domain system during the backup.
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.
Maximum number of streams	Specifies the maximum number of streams to use for the backup. The default is 2, and the maximum value is 10. Each stream requires a separate processor.
Advanced options	
Enable debugging messages	Writes maximum information to log files. This creates large log files.
Group by	For multi-streaming, specifies whether to group the backups by **Database** or by **Volume**.
Command line flags	

Table 9 Backup options for the SharePoint VSS plug-in (continued)

Option	Description
`--debugvss`	Excludes noncritical dynamic disks from backup. According to Microsoft best practices, if any dynamic disk is critical, then the entire dynamic disk pack should be treated as critical and included in the backup. Set this flag to `true` to exclude noncritical dynamic disks from the backup. If you use this option, it may be necessary to use `–exclude_non_critical_disks` during the offline disaster recovery. You can specify this option in the **Backup Command Line Options** dialog box, in a scheduled backup dataset definition, or in the `avvss.cmd` file.
`--vss-ignore-missing-windows-files`	When set to `true`, allows the backup to ignore any missing VSS writer files. The backup fails if VSS writers contain files that do not exist on the computer. You can specify this option in the **Backup Command Line Options** dialog box, in a scheduled backup dataset definition, or in the `avvss.cmd` file.

Restore options

Restore plug-in options enable you to control restore functionality specific to performing a standard restore by using the Avamar Plug-in for SharePoint VSS or a granular level recovery by using the Avamar Plug-in for SharePoint GLR.

Restore options for the Avamar Plug-in for SharePoint VSS

The following options are available when you perform a restore using the Avamar Plug-in for SharePoint VSS.

Table 10 Restore options for the SharePoint VSS plug-in

Option	Description
Farm administrator credentials	
Username	Username for an account for the restore that has administrator rights on all SharePoint clients in the farm.
Password	Password for the account that has SharePoint administrator rights.
Multi-Streaming	
Enable multi-streaming	Specifies to simultaneously restore multiple databases or volumes to reduce restore time.
Maximum number of streams	Specifies the maximum number of streams to use for the restore. The default is 2, and the maximum value is 4. Each stream requires a separate processor.

Table 10 Restore options for the SharePoint VSS plug-in (continued)

Option	Description
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.
Group by	Specifies the method to group data for multi-streaming: • Select **Database** to create one stream for each database. • Select **Volume** to create one stream for each volume.
Command line flags	
`target=`*name*	Specifies the restore target. Required for directed restores.
`farm-password=`*password*	Specifies the farm administrator password. Required for restores.
`farm-username=`*domain*`\`*username*	Specifies the farm administrator domain and username. Required for restores.

Restore options for the Avamar Plug-in for SharePoint GLR

The following options are available when you perform granular level recovery by using the Avamar Plug-in for SharePoint GLR.

Table 11 Options for the Avamar Plug-in for SharePoint GLR

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. Select a length of time that enables you to perform the granular level recovery.

APPENDIX B

Command Line Interface

Overview of the SharePoint VSS plug-in CLI

The Avamar Plug-in for SharePoint VSS enables you to use a command line interface (CLI) with the `avmossvss` command instead of Avamar Administrator to back up and restore SharePoint data.

When you use the CLI command to perform a backup or restore, you specify the command options for the SharePoint 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 or Data Domain system.

The `avmossvss` binary is available in the Avamar client installation directory, which is typically `C:\Program Files\avs\bin`.

To use the CLI, open a command prompt and change directory to the `bin` folder. Then type the command at the command prompt.

Command reference

The `avmossvss` command enables you to browse the SharePoint VSS plug-in data to backup or restore, perform the backup, or perform the restore.

Synopsis

```
avmossvss [--operation={browse | backup | restore}] [options]
```

Operations

The operation that you specify with the `avmossvss` command controls the task that `avmossvss` performs. Available operations include `browse`, `backup`, and `restore`.

Supply one of the operations in the following table for `avmossvss` by using the `--operation` option.

Note

Granular level recovery through the CLI is not presently supported. Directed restore can only be performed to the computer the command is being run on.

Table 12 Operations for the `avmossvss` command

Operation	Description
`browse`	Returns a list of information about the farm available for backup. The command results appear as standard output in the command window. The following information is displayed: • Farm name • Date • Size • Type (SharePoint 2013, 2010, or 2007)
`backup`	Performs an on-demand backup of the specified data.

Table 12 Operations for the avmossvss command (continued)

Operation	Description
	Include options with the backup operation to specify the data to back up, the Avamar server for the backup, Avamar login credentials, a label for the backup, and other options to control backup behavior.
restore	Restores the specified data. Include options with the restore operation to specify the data to restore, the Avamar server for the restore, Avamar login credentials, the target location for the restore, and other options to control restore behavior.

To check whether an operation was successful, echo the error level:

```
echo %ERRORLEVEL%
```

For example, if the echo returns a value of 0, it indicates success. Any other value indicates a failure.

Options

The options that you specify with the avmossvss command control browse, backup, and restore behavior. Some options are available for multiple operations, such as the account options for connecting to the Avamar server. Other options apply only to backups or restores.

Common options

Common options for the avmossvss command are general options that are available for multiple operations.

The following option is available for the avmossvss command.

Table 13 Common avmossvss option

Option	Description
--version	Displays the version number of the Avamar Plug-in for SharePoint VSS.

Account options

Account options for the avmossvss command enable you to specify credentials to connect to the Avamar server for backups and restores.

The following account options are available for the avmossvss command.

Table 14 Account options for the avmossvss command

Option	Description
--account=*destination* --path=*destination* --acnt=*destination*	Specifies the Avamar server account path.

Table 14 Account options for the `avmossvss` command (continued)

Option	Description
`--id=`*user@domain*`,`*hostname*	Specifies the client user name for authentication where: • *user* is the username of the registered client. • *domain* is the Avamar domain. • *hostname* is the hostname of the Avamar Plug-in for SharePoint VSS host.
`--password=`*password* `--ap=`*password* `--pswd=`*password*	Specifies the password for `--id`.
`--server=`*IP_address* `--hfsaddr=`*IP_address*	Specifies the Avamar server IP address.

Logging options

Logging options enable you to create a log file for `avmossvss` operations and specify options.

The following logging options are available for the `avmossvss` command.

Table 15 Logging options for the `avmossvss` command

Option	Description
`--informationals`	Sets the information level for status messages.
`--logfile`	Creates log files in the Avamar `var` directory. On Windows, the directory path is `C:\Program Files\avs\var`.
`--logfile=`*file* `--log`	Specifies the full path and file name of the `avmossvss` plug-in log file. **Note** 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 at the command prompt.
`--noinformationals`	Disables informational messages.
`--nostdout`	Disables output to standard output (stdout).
`--nowarnings`	Disables warning messages.
`--quiet`	Disables both warnings and status messages.

`--verbose`
`--verbose=`*n*
`--v`
	Enables all status and warning messages.
	Use `--verbose` to specify a verbosity level, where *n* is a number from 1 through 6, with 6 being the highest level of verbosity.

Browse options

Browse options for the `avmossvss` command enable you to specify credentials for an account that is authorized to browse available backups.

Table 16 Browse option for the `avmossvss` command

Option	Description
`--farm-username=`*domain/username*	Specifies the farm administrator username. When the farm administrator's user name and password are specified, the actual components and names are displayed. If the credentials are not specified, long numerical GUIDs are displayed.
`--farm-password=`*password*	Specifies the farm administrator password. When the farm administrator's user name and password are specified, the actual components and names are displayed. If the credentials are not specified, long numerical GUIDs are displayed.
`--initialbrowse-timeout=`*seconds*	Seconds waiting for an initial browse response before the timeout pop-up appears and command execution terminates. The default value is 60.

Backup options

Backup options for the avmossvss command enable you to control backup behavior. Many of these options are the same as the plug-in options that you specify in Avamar Administrator when you perform an on-demand backup or create a dataset for scheduled backups.

The following avmossvss command options are available for the backup operation.

Table 17 Backup options for the avmossvss command

Option	Description
--expires={*days* | *timestamp*}	Specifies the backup expiration date as a number of *days* from the day of the backup 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, 2014-06 is equivalent to 2014-06-01 00:00:00.
--path=*Avamar_domain/SharePoint_WFE_server*	Specifies the Avamar (MCS) domain name, and the SharePoint WFE name.
--retention-type=*type*	Specifies one of the following retention types: • none • daily • weekly • monthly
--send-adhoc-request	Notifies the server that a CLI backup will occur. The backup operation will appear in the Avamar activity log. This flag is not required for CLI operations, and the flag is not enabled by default.

Restore options

Restore options for the avmossvss command enable you to control restore behavior. Many of these options are the same as the plug-in options that you specify in Avamar Administrator when you perform a restore.

The following avmossvss command options are available for the restore operation.

Table 18 Restore options for the avmossvss command

Option	Description
--farm-username=*domain/username*	Specifies the farm administrator username.
--farm-password=*password*	Specifies the farm administrator password.
--initialbrowse-timeout=*seconds*	Specifies the number of seconds to wait for a browse response before timing out. The default value is 60 seconds.

Table 18 Restore options for the avmossvss command (continued)

Option	Description
	This can be increased in slow environments to avoid browse timeouts.
--overwrite-existing	Allows overwriting of the existing farm components during restore.
--target=*path*	Specifies the target directory path. Required for directed restores.
--send-adhoc-request	Notifies the server that a CLI restore will occur. The restore operation will appear in the Avamar activity log. This flag is not required for CLI operations, and the flag is not enabled by default.

Help options

The --help option displays a list of available operations available for the avmossvss command. You can view all help output available for avmossvss, or only the help for a specific operation.

The following command displays all help for the avmossvss command:

```
avmossvss --helpx
```

To view only the options for a specific operation, use the --helpx and --operation=*operation* options together.

The following example provides a list of options for the backup operation:

```
avmossvss --helpx --operation=backup
```

Password encoding

To encrypt a password:

```
avtar --encodepassword=password
```

where *password* is the password for the Avamar server.

The system output displays an encrypted password, such as:

```
d3a6d7959e46d1b40b4e61b9a4eb7045eb3ec08a86f382c0cb1384e15e1b34e
cf1be2510be1795df
```

You can use the encrypted password on the command line instead of the regular password to avoid including the password as plain text in a script that automates backups.

Specifying command line options

The following methods are available for specifying options for the avmossvss command:

- Type the individual options at the command prompt.

- List the options in the `avmossvss.cmd` file, which is located in the `C:\Program Files\avs\var` 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 at the command prompt using the `--flagfile=`*path* option, where *path* is the full path and file name of the option file.
- Pass options to the CLI as environment variables. For example, if you set `Instance1=NamedInstance1` in the environment variables, then you can browse the instance by typing the following command:

  avmossvss --operation=browse %Instance1%

CLI examples

Review the `avmossvss` command examples for details on how to use options to control browse, backup, and restore behavior.

Example avtar commands

Use the `avtar --backups` command to view a list of available backups and their label numbers for a SharePoint client. For example:

avtar --id=*MCS_username* --ap=*MCS_user_password* --path=*/Keith/149ca.dc148.example.com* --backups

Example browse commands

These command examples illustrate how to use options to browse different types of data in client backups with the `avmossvss` command.

The following command specifies the farm name and displays the components and names in the farm as long GUID numbers.

avmossvss --operation=browse *farm_name*

The following command specifies the farm administrator credentials with the `--farm-username` and `--farm-password` options to display the SharePoint components and names instead of the GUID numbers.

avmossvss --operation=browse --farm-username=*username* --farm-password=*farm*

Example backup commands

Example backup commands

For a backup, the MCS user credentials must be supplied by using the --id, --ap, --server, and --path options. When backing up distributed farms (not stand-alone), specify the SharePoint farm credentials using the --farm-username and --farm-password options. The server does not need to be specified when running the command on the Avamar server associated with the client. The ad-hoc functionality is also required for both backup and browse operations.

Performing a full farm backup

The following command example performs a full backup of a SharePoint farm.

avmossvss --operation=backup --id=*MCS_USERNAME*

--ap=MCS_USER_PASSWORD --server=*MCS_ADDRESS*

--farm-username=*SHAREPOINT_ADMINISTRATOR*

--farm-password=*SHAREPOINT_ADMINISTRATOR_PASSWORD*

--path=*AVAMAR_DOMAIN_NAME/SHAREPOINT_SERVER_NAME*

--send-adhoc-request

Backing up to a Data Domain system

The following command specifies to back up to a DDR server by adding the --ddr and -ddr-index=1 options.

Note

The number in the -ddr-index=1 option represents the number of addedDDRs. If there is only one DDR attached to the Avamar server, the index value is always 1.

avmossvss --operation=backup --id=*MCS_USERNAME* **-ap=***MCS_USER_PASSWORD*

--server=*MCS_ADDRESS* **--farm--username=***SHAREPOINT_ADMINISTRATOR*

--farm-password=SHAREPOINT_ADMINISTRATOR_PASSWORD

--path=*AVAMAR_DOMAIN_NAME/SHAREPOINT_SERVER_NAME*

--send-adhoc-request --ddr=true --ddr-index=1

Example restore commands

To restore a SharePoint farm with the `avmossvss` command, specify the following options:

- Use the `--id` and `--ap` options to supply the MCS user credentials.
- Use the `--server` option to specify the Avamar server.
- Use the `--path` to specify the SharePoint server.
- Specify the SharePoint farm credentials using the `--farm-username` and `--farm-password` options.
- The `--send-adhoc-request` option is also required for both backup and browse operations.

Restoring a SharePoint database

The following example command restores the `Sales_EMEA` database:

avmossvss --operation=restore Farm/154QC/sql/Sales_EMEA
--id=*MCS_username* --ap=*MCS_user_password*
--server=*MCS_IP_address*
--path=*/CorpMoss/149ca.dc148.example.com*
--target=*C:\Restore*

When you perform a restore with the `avmossvss` command, note the following:

- You do not need to specify the file name extension when you specify the database to restore. For example, **avmossvss --operation=restore Farm/154QC/sql/Sales_EMEA** restores `Sales_EMEA.mdf` and `Sales_EME.ldf`.
- To restore a database in a SQL Server cluster, include the instance name in the path: `Farm/MACHINE/INSTANCE/DATABASE`.
- Path names are case-sensitive. If the specified case does not match, the backup is not located and restore fails.

Restoring a SharePoint database

The following example command restores a SharePoint farm:

```
avmossvss --operation=restore --id=MCS_username
--ap=MCS_user_password --server=MCS_IP_address
--path=farm_path/account
--farm-username=SharePoint_administrator
--farm-password=SharePoint_administrator_password
--send-adhoc-request --target=path
```

APPENDIX C

Troubleshooting

This chapter includes the following topics:

Log files

Both Avamar and Windows log files can be useful for troubleshooting any problems that occur.

The Windows Application Event Log is a Windows log file for monitoring Windows-related activities.

Avamar log files capture Avamar, GLR, and service events. The files are located in the `var` directory, typically `C:\Program Files\avs\var`.

To generate Avamar log files, add a command file with the flags in the `var` directory, typically *C:\Program Files\avs\var* before you perform an operation. In the command file, add debugging flags.

The following table describes each Avamar log file, the associated command file, and debugging flags.

Table 19 Avamar log files

Log file	Description	Command file	Debugging flags
`av_cluster_config_wizard.log`	Cluster Configuration Wizard log for SQL clusters	`av_cluster_config_wizard.cmd`	`--debug`
`avagent.log`	Avamar agent log	`avagent.cmd`	`--debug`
`avmossglr.log`	GLR log that contains trace and debugging information for GLR creation, mount, browse, and restore.	`avmossglr.cmd`	`--debug`
`avmossglrsvc.log`	GLR service log that contains trace and debugging information for GLR creation, mount, browse, and restore.	`avmossglrsvc.cmd`	`--debug`

`avmossvss.log`	SharePoint VSS plug-in log	`avmoss.cmd`	`--debug`
			`--debugvss`
			`--logfile="c:\somefile.txt"`
			`--subprocesstimeoutsecs=300`
			`--subworkorder-timeout=5`
			`--remotebrowse-timeout=300`
			`--writerid={Writer_GUID}`

`axionfs.log`	Contains trace and debug information for AvFS file system calls.	`Axionfs.cmd`	`--x19=65536`, used with `--debug` to trace AvFS I/O calls `--x19=262144` , used with `--debug` to trace AvFS I/O calls `--x19=327680`, used with `--debug` to trace AvFS I/O and directory enumeration calls

SharePoint command line interfaces

Command line interfaces are available for some SharePoint features and operations. These tools and features may be useful for troubleshooting SharePoint interactions with Avamar. MSDN, TechNet, and SharePoint online help provide extensive documentation for these tools.

The references listed in the following table are suggested starting points and are subject to change by Microsoft.

Table 20 Microsoft SharePoint command line tools

SharePoint tool	Description	Keywords for Microsoft TechNet search
`stsadm`	Command line tool available in SharePoint 2007, 2010, and 2013	Stsadm command line tool
Windows PowerShell	Command line tool available in SharePoint 2010 and 2013	• Windows PowerShell for SharePoint 2010 reference • Windows PowerShell for SharePoint 2013 IT pros • Stsadm to Windows PowerShell mapping (SharePoint Server 2010)

Configuration problems and solutions

The following section describes a common configuration problem and its solution.

Issues after upgrade to Windows SharePoint Services 3.0 SP2

When you upgrade from Windows SharePoint Services 3.0 or 3.0 SP1 to 3.0 SP2 on a system with the Avamar Plug-in for SharePoint VSS, the SharePoint topology does not display correctly in Avamar Administrator. This may prevent you from backing up a SharePoint farm.

Microsoft knowledgebase article 913384 on the Microsoft website provides detailed instructions for resolving these issues, which might include removing .NET frameworks later than 2.0 and applying the patch discussed in the article before reapplying updated framework software.

Backup problems and solutions

The following topics describe common backup problems and solutions.

Backup of multiple Search Service Applications fails for SharePoint 2013 or 2010

SharePoint 2013 and 2010 support configurations that have multiple Search Service Applications, with some components hosted on separate web front ends. However, backup of a farm with this configuration may fail with an error that says the OSearch15 (SharePoint 2013) or OSearch14 (SharePoint 2010) writer isn't running.

When this error occurs follow the Microsoft guidelines for search topology and configuration described in the following Microsoft TechNet articles:

- Change the default search topology in SharePoint Server 2013
  http://technet.microsoft.com/en-us/library/jj862356.aspx
- Create and configure a Search service application in SharePoint Server 2013
  http://technet.microsoft.com/en-us/library/gg502597.aspx

Backup limitations

The following limitations apply when using the Avamar Plug-in for SharePoint VSS to back up a SharePoint environment:

- Backups and restores of individual websites, lists, or list items must be a part of the backup or restore of the parent Content Database.
- The configuration database or the Central Administration content database of a SharePoint farm can only be backed up as part of the backup or restore of the entire farm.
  These databases are special databases that must be backed up or restored with everything (all content databases). A backup of these components provides a snapshot that can be useful for troubleshooting. For instance, the backup can be used with SQL Server tools to compare the present state of the components.
- The Avamar Plug-in for SharePoint VSS cannot be used to back up a SharePoint farm to tape.
- The Avamar Plug-in for SharePoint VSS cannot be used to back up an IIS metabase.
- The Avamar Plug-in for SharePoint VSS cannot be used to back up Registry keys or files on front-end servers.
  This content includes files located outside any content database, such as certain master pages, .ascx files, web.config files, and other configuration files. However, this content can be backed up with the Avamar Client for Windows, which includes them in a full Windows Server backup, or with the WSS development kit.

Avamar Plug-in for SharePoint GLR is for recovery only

After installing the Avamar Plug-in for SharePoint GLR, it appears in the list of plug-ins when you browse for backups. It cannot be selected however, because the Avamar Plug-in for SharePoint GLR is for recovery only. It uses backups created with the Windows SharePoint VSS plug-in to enable granular level recovery.

Backup can fail when farm servers have multiple NICs or IP addresses

A backup can fail when WFE servers or back-end servers have multiple NICs, multiple IP addresses, or both. Network load balancing can cause the back-end client to see the WFE server's secondary IP address instead of the primary IP address. In that situation, Avamar might report an error similar to the following:

```
Client refused browse request. 10007 Unable to connect to the
back-end client '<MACHINENAME>', error code: 2 Please ensure
that the Back-end backup agent is running.
```

To fix this error, use the Windows command line to add an avagent.cmd file and persistent routes to both clients:

1. Add an avagent.cmd file with **--netbind=<***IP address of primary NIC interface***>** on both clients.
2. On both clients, use the Windows command line to add persistent routes that use only the primary NIC for outgoing traffic routed to the Avamar system.

Backups fail when files are available through symbolic links or directory junctions

Backups with the SharePoint VSS plug-in fail if the path to SharePoint files includes symbolic links (symlinks) or directory junctions. Do not store SharePoint configuration or database files in a location that you access through a symlink or directory junction.

Restore problems and solutions

You can use the appropriate troubleshooting guidelines to resolve restore issues.

Problem when selecting only SharePoint Content Index Catalog database for restore
Restore fails in SharePoint 2013 when you select only one SharePoint Content Index Catalog database for restore and you use all default restore options.

To work around this issue, select additional databases for restore when selecting the Content Index Catalog database.

Restore of SQL databases from multiple SQL cluster groups instances on the same physical computer
Restore fails when you try to restore a SharePoint farm with a SQL Server failover cluster back-end, and more than one cluster group is actively running on a single physical machine. Only one cluster group instance is successfully restored, regardless of whether databases in the other instances are restored. Web navigation or requests for content in those databases result in `File Not Found` or `Forbidden` errors.

To resolve these issues, configure the cluster with no more than one cluster group actively running one single physical machine at a time.

Restore over locked files incorrectly appears to be successful
When you try to perform a redirected restore over locked files, such as restoring over database files, the restore shows that it completed successfully, but the files are not restored.