Dell EMC Avamar Backup Clients

User Guide

19.1

Dell Inc.

October 2020
Rev. 02

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

© 2001 - 2020 Dell Inc. or its subsidiaries. All rights reserved. Dell, EMC, and other trademarks are trademarks of Dell Inc. or its subsidiaries. Other trademarks may be trademarks of their respective owners.

Contents

Tables **8**

Preface **9**

Chapter 1: Avamar Client for AIX **12**
Client installation prerequisites 12
Client compatibility and interoperability 12
Preinstallation checks 12
Download client packages to the Avamar server 13
Limitations 13
Downloading the install package 13
Customizing the installation 13
Installing and registering 14
Uninstalling 14
Upgrading 16
Manually stopping and restarting the avagent service 16
Manually stopping the avagent service 16
Manually restarting the avagent service 17
Getting avagent status 17

Chapter 2: Avamar Client for HP-UX **18**
Client installation prerequisites 18
Client compatibility and interoperability 18
Preinstallation checks 18
Download client packages to the Avamar server 19
Downloading the install package 19
Customizing the installation 19
Installing and registering 19
Uninstalling 20
Upgrading 21
Manually stopping and restarting the avagent service 21
Manually stopping the avagent service 21
Manually restarting the avagent service 21
Getting avagent status 22

Chapter 3: Avamar Client for Linux **23**
Client installation prerequisites 23
Client compatibility and interoperability 23
Preinstallation checks 24
Download client packages to the Avamar server 24
Downloading the install package 24
Customizing the installation 25
Installing CentOS 32-bit compatibility libraries 25
Installing SUSE Linux Enterprise Server (SLES) 11 compatibility libraries 26

Preparing for Avamar client installation on SLES 15....26
Installing and registering....26
Uninstalling....28
Upgrading....29
Manually stopping and restarting the avagent service....29
Manually stopping the avagent service....30
Manually restarting the avagent service....30
Getting avagent status....30
Linux Fast Incrementals....31
Client compatibility and interoperability....31
Linux Fast Incrementals preinstallation checks....31
Downloading the Linux Fast Incrementals install package....31
Installing the Linux Fast Incrementals software....32
Uninstalling the Linux Fast Incrementals software....32
Upgrading the Linux Fast Incrementals software....32
Enabling Linux Fast Incrementals for Avamar backups....33
Disabling Linux Fast Incrementals....33
Converting regular Avamar filesystem backups to Linux Fast Incrementals backups....34

Chapter 4: Avamar Client for Mac OS X....35
Client installation prerequisites....35
Client compatibility and interoperability....35
Preinstallation checks....36
Download client packages to the Avamar server....36
Downloading the install package....36
Installing....36
Changing process data size....37
Registering....37
Uninstalling....38
Upgrading....38

Chapter 5: Avamar Client for Solaris....39
Client installation prerequisites....39
Client compatibility and interoperability....39
Preinstallation checks....39
Download client packages to the Avamar server....40
Downloading the install package....40
Customizing the install location....40
Installing and registering....41
Uninstalling....42
Upgrading....42
Manually stopping and restarting the avagent service....43
Manually stopping the avagent service....43
Manually restarting the avagent service....43
Getting avagent status....43

Chapter 6: Avamar Client for Solaris in Solaris Clusters....44
Client installation prerequisites....44
Client compatibility and interoperability....44

Preinstallation checks....44
Download client packages to the Avamar server....44
Cluster configurations....45
Installing the Avamar Client for Solaris....45
Configuring Solaris Cluster nodes....45
Bringing Solaris Cluster resources online....47
Registering with a new server....47
Controlling Avamar resource behavior....48
Uninstalling....49

Chapter 7: Avamar Cluster Client for Solaris on VCS....50
Client installation prerequisites....50
Client compatibility and interoperability....50
Preinstallation checks....50
Download client packages to the Avamar server....51
Cluster configurations....51
Downloading the install package....51
Installing and registering....52
Bringing VCS resources online....53
Uninstalling....53
Registering with a new server....55

Chapter 8: Avamar Client for Windows....56
Client installation prerequisites....56
Client compatibility and interoperability....56
Preinstallation checks....56
Download client packages to the Avamar server....57
Capabilities and limitations....57
Computers with User Account Control....57
Disabling NTFS last access time inhibits backing up changed ACLs....57
Downloading the install package....58
Installing....58
Registering....59
Uninstalling and upgrading....59

Chapter 9: Backup and Restore....61
Overview....61
Enforcement of backups to Data Domain....62
Restore authority....62
Capabilities and limitations....62
International character support....62
Restoring international characters with web restore....62
Restoring encrypted files is not supported....63
Avamar Web Restore client-type limitation....63
ACLs not preserved by Avamar Web Restore....63
Mixed backups are not supported....63
Wildcard characters not supported during restores....63
Backup always modifies the atime value....63
Avamar Web Restore for Windows, Mac, and Linux clients....64

Opening Avamar Web Restore....64
Logging in to Avamar Web Restore using LDAP....64
Logging in to Avamar Web Restore using Avamar....65
Performing a restore using Avamar Web Restore....65
Windows clients....65
Restore requirement....65
Network optimization....66
Performing a single-click backup....66
Performing an interactive backup....67
Performing a restore using Avamar client web UI....67
Getting status....68
Client notification settings....68
Progress window....69
Mac OS X clients....69
Network optimization....70
Performing a single-click backup....70
Performing an interactive backup....70
Performing a restore using Avamar client web UI....70
Getting status....71
Backup reminder....71
Progress window....72
Linux clients....72
Full backup using avscc command....72
Interactive backup and restore using Avamar client web UI....73
Performing an on-demand backup with the Linux Fast Incrementals plug-in....74
Linux Fast Incrementals plug-in backup and recovery notes....75
AIX, HP-UX, Linux, and Solaris clients....77
Backup and restore using avtar commands....77
Getting status using the command line....78

Chapter 10: Solaris Zones....79
Important terms and concepts....79
Capabilities and limitations....79
Installation errors can occur with earlier version software....79
Avagent restart limitation....80
Installation and configuration....80
Installing Avamar Client for Solaris software in the global zone....80
Installing Avamar Client for Solaris software in a non-global zone....80
Ensuring backup of all non-global zone configurations....80
Manually exporting and saving a non-global zone configuration....81
Automatically exporting and saving a non-global zone configuration....81
Non-global zone disaster recovery....82
Restoring an entire non-global zone from a global zone backup....82
Restoring an entire non-global zone from a non-global zone backup....83

Appendix A: Novell NSS Volumes....84
Overview....84
Capabilities and limitations....84
Additional resources....84

Appendix B: Tuning Client Caches..... 85
Demand-paging cache..... 85
File cache..... 85
Demand-paging cache example scenario..... 86
Cache migration after upgrading the client..... 86

Tables

1 Typographical conventions.... 10
2 Minimum supported hardware requirements for the AIX Client software.... 12
3 Installation directory and steps.... 14
4 Minimum supported hardware requirements for the HP-UX Client software.... 18
5 Installation directory and steps.... 20
6 Minimum supported hardware requirements for the Linux Client software.... 23
7 Installation directory and steps.... 27
8 Installation directory and steps.... 27
9 Linux operating system commands to stop the avagent service.... 30
10 Linux operating system commands to restart the avagent service.... 30
11 Linux operating system commands to get avagent status.... 30
12 Minimum supported hardware requirements for the Mac OS X Client software.... 35
13 Minimum supported hardware requirements for the Solaris Client software.... 39
14 Avamar client software packages for Solaris operating systems.... 40
15 Installation directory and steps.... 41
16 Avamar cluster client software packages for Solaris operating systems.... 51
17 Minimum supported hardware requirements for the Windows Client software.... 56
18 Minimum supported hardware requirements for the Avamar GLR software.... 66
19 Backup datasets for Windows operating systems.... 66
20 Avamar balloon message descriptions.... 68
21 Additional resources on Novell NSS volumes.... 84

Preface

As part of an effort to improve the product lines, revisions of the software and hardware are periodically released. Therefore, some functions that are 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 the technical support professional when a product does not function correctly or does not function as described in this document.

NOTE: This document was accurate at publication time. To find the latest version of this document, go to Online Support (https://www.dell.com/support).

Purpose

This guide describes how to install and use Avamar client software to back up and restore client data.

Audience

The information in this guide is suitable for both technical and semi-technical audiences. However, persons installing Avamar client software should be familiar with basic application installation procedures and practices on that particular computing platform.

Revision history

The following table presents the revision history of this document.

Revision	Date	Description
02	October, 2020	Updated Restore requirement section to add information for hardware requirements to perform GLR.
01	May 20, 2019	GA release of Avamar 19.1

Related documentation

The following publications provide additional information:

- *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection
- *Avamar Release Notes*
- *Avamar Operational Best Practices Guide*
- *Avamar and Data Domain System Integration Guide*
- *Avamar Reports Guide*
- *Avamar Fitness Analyzer User Guide*
- *Avamar Orchestra Getting Started Guide*
- *Avamar Product Security Guide*
- All Avamar client and plug-in user guides

Typographical conventions

These type style conventions are used in this document.

Table 1. Typographical conventions

Bold	Used 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	Used for full titles of publications that are referenced in text
`Monospace`	Used for: ● System code ● System output, such as an error message or script ● Pathnames, filenames, prompts, and syntax ● Commands and options
Monospace italic	Used for variables
`Monospace bold`	Used 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 that is 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 resolve a product issue before contacting Customer Support.

To access the Avamar support page:

1. Go to https://www.dell.com/support.
2. Type a product name in the **Enter a Service Tag, Serial Number, Service Request, Model, or Keyword** search box.
3. Select the product from the list that appears. When you select a product, the **Product Support** page loads automatically.
4. (Optional) Add the product to the **My Products** list by clicking **Add to My Saved Products** in the upper right corner of the **Product Support** page.

Documentation

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

- 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 Knowledgebase contains applicable solutions that you can search for either by solution number (for example, KB000xxxxxx) or by keyword.

To search the Knowledgebase:

1. Go to https://www.dell.com/support.
2. Under the **Support** tab, click **Knowledge Base**.
3. Type either the solution number or keywords in the search box. Optionally, you can limit the search to specific products by typing a product name in the search box and then selecting the product from the list that appears.

Live chat

To engage 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 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 a sales representative for details about obtaining a valid support agreement or with questions about an 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**.

Enhancing support

It is recommended to enable ConnectEMC and Email Home on all Avamar systems:

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

Comments and suggestions

Comments and suggestions help to continue to improve the accuracy, organization, and overall quality of the user publications. Send comments and suggestions about 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 to help address documentation issues

1

Avamar Client for AIX

Topics:

- Client installation prerequisites
- Downloading the install package
- Customizing the installation
- Installing and registering
- Uninstalling
- Upgrading
- Manually stopping and restarting the avagent service

Client installation prerequisites

Before you install Avamar software on a client system, perform the following prerequisites.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Hardware requirements for the AIX Client software

Ensure that the client computer on which you install the Avamar for AIX Client software meets the minimum requirements in the following table.

Table 2. Minimum supported hardware requirements for the AIX Client software

Requirement	Minimum
RAM	128 MB
Hard drive space	200 MB permanent hard drive space (1 GB recommended) for software installation. The Avamar client software also requires an additional 12 MB of permanent hard drive space for each 64 MB of physical RAM. This space is used for local cache files.
Network interface	10BaseT or higher, configured with the latest drivers for the platform.

Updated, detailed client compatibility information is available in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection.

Preinstallation checks

Before you install the Avamar software, perform the following:

Prerequisites

1. Ensure that the Avamar server is operational and present on the same network as the client computer.

   Verify if this action is performed by opening a command shell on the client computer and typing the following:

ping *AVAMARSERVER*

where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.

2. Make note of the network hostname (as defined in DNS) for:
   - Avamar server
   - Avamar utility node

   These DNS entries should have been added during deployment of the Avamar system.

Download client packages to the Avamar server

Before installing the Avamar client software, you must first download the UpgradeClientDownloads package from the EMC repository to the Avamar server. After downloading the file, you must install it on the server for the client installation packages to be available. Follow instructions for downloading and installing new packages from the EMC repository in the Avamar Administration Guide.

Limitations

On AIX 6.1, support for JFS2 v2 extended attributes has been added to the operating system. However, the Avamar Client for AIX does not back up or restore these attributes.

Downloading the install package

You must first download one or more install packages from the Avamar server.

Steps

1. Log in to the computer.
2. In a web browser, type the following URL:
   https://*AVAMARSERVER*/dtlt/home.html

   where *AVAMARSERVER* is the Avamar server network hostname (as defined in DNS) or IP address.
3. If a security alert dialog box appears due to browser security settings, click **Yes** or **OK** to allow redirection to the Avamar secure web server.
   The Avamar Web Restore home page appears.
4. From the links at the top of the page, click **Downloads**.
   A list of the software available from the server appears in the browser.
5. Select an operating system heading or software category heading from the list and click + next to it.

   When necessary, click **+** next to subheadings until the software package link appears.
6. Click the software package link.
   The server transfers the software package to the web browser.
7. Save the installation package to a temporary folder.
   Do not rename a software package. The Avamar push upgrade mechanisms are incompatible with renamed packages.

Customizing the installation

You can customize the Avamar Client for AIX installation by changing the base directory, /var directory, or both.

To change the base directory from the default location (`/usr/local/avamar`) to a new location, use the **-R** option with the **installp** command.

To change the /var directory, set the VARDIR environment variable to a new location before you install the Avamar Client for AIX.

When you install Avamar plug-in software after installing the Avamar Client for AIX to a nondefault directory, the plug-in installation does not automatically relocate the software to the nondefault directory. You must provide provide the relocation directory during the installation.

The installation displays an error message if the relocation directory you specify during a plug-in installation differs from the directory where the Avamar Client for AIX is installed.

Installing and registering

Do not attempt to back up a CIFS/NFS network share by installing an Avamar client on a local machine. Attempting to do so results in a severe degradation in backup and restore performance and metadata such as folders, ACLs, and file permissions are not backed up. To backup a CIFS/NFS share, install an Avamar client on the share machine or use NDMP to back up the data.

Steps

1. Open a command shell and log in as root.
2. Uninstall any previous version of the client software before you install the new version. Uninstalling provides instructions.
3. (Optional) Set the `VARDIR` environment variable to a new location by typing the following command:

   `export VARDIR="path"`

   where*path* is the new `var` directory.

4. Install the client in the default directory or in an alternate directory.

   Table 3. Installation directory and steps

Installation directory	Installation steps
Default directory	Type the following commands: **`cd /tmp`** **`geninstall -d package all`** where *tmp* is the temporary install directory and *package* is the install package filename.
Alternate directory	Type the following command: **`installp -R /path -d package all`** where *path* is the directory for the installation files and *package* is the install package filename.

5. Register this client with the Avamar server by typing the following command:
   `/usr/local/avamar/bin/avregister`
   The client registration and activation script starts and prompts you to specify the Administrator server address.
6. Type the DNS name of the Avamar server and press **Enter**.

   The output prompts you to specify the Avamar domain for the client.

   The default domain 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.
7. To accept the default domain, press **Enter**.
   The output indicates that the activation is successful and registration is complete.

Uninstalling

Steps

1. Open a command shell and log in as root.
2. List user-specified installation locations (USIL) by typing:
   `lsusil -R ALL`
   Output similar to the following appears in the command shell:

```
INSTALL PATH = /newpath
COMMENTS = Created by installp on Wed May 23 17:23:40 Asia/Calcutta
2012
```

3. List Avamar packages that are installed on the system:
   - To list Avamar packages that are installed in the default location, type:

     lslpp -l | grep Avamar

   - To list Avamar packages that are installed in a specific directory, type:

     lslpp -R /*NEW-PATH* **-l| grep Avamar**

     where *NEW-PATH* is a user-specified directory for the installation.

   - To list all Avamar packages that are installed in nondefault directories, type:

     lslpp –R ALL –l | grep Avamar

4. Uninstall the software:
   - To uninstall the software from the default directory, type:

   installp -u AvamarClient-aix6-ppc

   The following appears in the command shell:

```
+-----------------------------------------------------------------+
Pre-deinstall Verification...
+-----------------------------------------------------------------+
Verifying selections...avagent.d Info: Stopping Avamar Client
Agent (avagent)...
avagent.d Info: Client Agent stopped.
done
Verifying requisites...done
Results...
SUCCESSES
---------
Filesets listed in this section passed pre-deinstall verification
and will be removed.
Selected Filesets
-----------------
AvamarClient-aix6-ppc 7.0.0-nnn # EMC Avamar client 7.0.0-nnn...
<< End of Success Section >>
FILESET STATISTICS
------------------
1 Selected to be deinstalled, of which:
1 Passed pre-deinstall verification
----
1 Total to be deinstalled
+-----------------------------------------------------------------+
Deinstalling Software...
+-----------------------------------------------------------------+
installp: DEINSTALLING software for:
AvamarClient-aix5-ppc VERSION
Finished processing all filesets. (Total time: 2 secs).
+-----------------------------------------------------------------+
Summaries:
+-----------------------------------------------------------------+
Installation Summary
--------------------
Name Level Part Event Result
-------------------------------------------------------------------
AvamarClient-aix6-ppc 7.0.0-nnn USR DEINSTALL SUCCESS
```

   - To uninstall the software from a nondefault directory, type:

     installp –R /*NEW-PATH* **–u AvamarClient-aix6-ppc**

     The following appears in the command shell:

```
+-----------------------------------------------------------------+
Pre-deinstall Verification...
+-----------------------------------------------------------------+Verifying
selections...done
Verifying requisites...done
```

```
Results...
SUCCESSES
---------
Filesets listed in this section passed pre-deinstall verification
and will be removed.
Selected Filesets
-----------------
AvamarClient-aix6-ppc (R) 7.0.100.138 # EMC Avamar client
7.0.100-13...
<< End of Success Section >>
FILESET STATISTICS
------------------
1 Selected to be deinstalled, of which:
1 Passed pre-deinstall verification
----
1 Total to be deinstalled
+-----------------------------------------------------------------+
Deinstalling Software...
+-----------------------------------------------------------------+
installp: DEINSTALLING software for:
AvamarClient-aix6-ppc (R) 7.0.100.138
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
Finished processing all filesets. (Total time: 2 secs).
+-----------------------------------------------------------------+
Summaries:
+-----------------------------------------------------------------+
Installation Summary
--------------------
Name Level Part Event Result
-------------------------------------------------------------------
AvamarClient-aix6-ppc 7.0.100.138 USR DEINSTALL SUCCESS
```

Upgrading

To upgrade the Avamar Client for AIX software, just install the new version of software. You do not need to uninstall the old version.

NOTE: It might be necessary to deactivate the client instance from the Avamar server to successfully reactivate it with the Avamar server. The *Avamar Administration Guide* contains further information.

Manually stopping and restarting the avagent service

The Avamar Client for AIX agent (**avagent**) runs as a service and starts automatically as part of the installation. The **avagent** service also restarts automatically after a system reboot. In most cases, you do not need to manually stop or restart the **avagent** service. If you experience unexpected system behavior and do not want to reboot the entire system, you can use the following commands to manually stop and restart the **avagent** service.

Manually stopping the avagent service

Steps

1. Open a command shell and log in as root.
2. Type the following command:

   /etc/rc.d/init.d/avagent stop

Manually restarting the avagent service

Steps

1. Open a command shell and log in as root.
2. Type the following:
   `/etc/rc.d/init.d/avagent start`

Getting avagent status

Steps

1. Open a command shell and log in as root.
2. Type the following:
   `/etc/rc.d/init.d/avagent status`

2

Avamar Client for HP-UX

Topics:

- Client installation prerequisites
- Downloading the install package
- Customizing the installation
- Installing and registering
- Uninstalling
- Upgrading
- Manually stopping and restarting the avagent service

Client installation prerequisites

Before you install Avamar software on a client system, perform the following prerequisites.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Hardware requirements for the HP-UX Client software

Ensure that the client computer on which you install the Avamar for HP-UX Client software meets the minimum requirements in the following table.

Table 4. Minimum supported hardware requirements for the HP-UX Client software

Requirement	Minimum
RAM	128 MB
Hard drive space	200 MB permanent hard drive space (1 GB recommended) for software installation. The Avamar client software also requires an additional 12 MB of permanent hard drive space for each 64 MB of physical RAM. This space is used for local cache files.
Network interface	10BaseT or higher, configured with the latest drivers for the platform.

Updated, detailed client compatibility information is available in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection.

Preinstallation checks

Before you install the Avamar software, perform the following:

Prerequisites

1. Ensure that the Avamar server is operational and present on the same network as the client computer.

   Verify if this action is performed by opening a command shell on the client computer and typing the following:

   `ping` *AVAMARSERVER*

where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.

2. Make note of the network hostname (as defined in DNS) for:
   - Avamar server
   - Avamar utility node

   These DNS entries should have been added during deployment of the Avamar system.

Download client packages to the Avamar server

Before installing the Avamar client software, you must first download the UpgradeClientDownloads package from the EMC repository to the Avamar server. After downloading the file, you must install it on the server for the client installation packages to be available. Follow instructions for downloading and installing new packages from the EMC repository in the Avamar Administration Guide.

Downloading the install package

You must first download one or more install packages from the Avamar server.

Steps

1. Log in to the computer.
2. In a web browser, type the following URL:
   `https://AVAMARSERVER/dtlt/home.html`

   where *AVAMARSERVER* is the Avamar server network hostname (as defined in DNS) or IP address.
3. If a security alert dialog box appears due to browser security settings, click **Yes** or **OK** to allow redirection to the Avamar secure web server.
   The Avamar Web Restore home page appears.
4. From the links at the top of the page, click **Downloads**.
   A list of the software available from the server appears in the browser.
5. Select an operating system heading or software category heading from the list and click + next to it.

   When necessary, click **+** next to subheadings until the software package link appears.
6. Click the software package link.
   The server transfers the software package to the web browser.
7. Save the installation package to a temporary folder.
   Do not rename a software package. The Avamar push upgrade mechanisms are incompatible with renamed packages.

Customizing the installation

You can specify a new location for the var directory during the Avamar Client for HP-UX installation.

Use the **`-x ask=true`** option with the **`swinstall`** command to specify a new location. This option runs an interactive request script during the installation. The script prompts you to type a new directory location for /var/avamar.

When you install Avamar plug-in software after installing the Avamar Client for HP-UX, the plug-in installation does not automatically use the same location for the var directory that you specified during the Avamar Client for HP-UX installation. Install the Avamar plug-in software by using the **`-x ask=true`** option with the **`swinstall`** command. The documentation for Avamar plug-ins provides more information.

Installing and registering

Do not attempt to back up a CIFS/NFS network share by installing an Avamar client on a local machine. Attempting to do so results in a severe degradation in backup and restore performance and metadata such as folders, ACLs, and file permissions are not backed up. To backup a CIFS/NFS share, install an Avamar client on the share machine or use NDMP to back up the data.

Steps

1. Open a command shell and log in as root.
2. Uninstall any previous version of the client software before you install the new version. Uninstalling provides instructions.
3. Change directory to the temporary install directory by typing the following command:

   cd /*tmp*

   where *tmp* is the temporary directory.

4. Install the client software in the default directory or in an alternate directory.

   Table 5. Installation directory and steps

Installation directory	Installation steps
Default directory	Type the following command: **swinstall -s /*tmp*/*package*/ *** where *tmp* is the temporary install directory and *package* is the install package filename.
Alternate directory	a. Type the following command: **swinstall -x ask=true -s /tmp/*package* hpuxclnt,l=/*path*** where *package* is the filename of the Avamar Client for HP-UX install package and *path* is the installation directory. The output prompts you to specify the directory for cache and log files. b. Type the name of the directory to use for the installation. The output prompts you to confirm the path. c. Type **y** to confirm the location.

   The output displays the status of the installation until the installation completes.
5. Register the client with the Avamar server by typing the following command:

   /opt/AVMRclnt/bin/avregister

   The client registration and activation script starts and prompts you to specify the Administrator server address.
6. Type the DNS name of the Avamar server and press **Enter**.

   The output prompts you to specify the Avamar domain for the client.

   The default domain 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.
7. To accept the default domain (`clients`), press **Enter**.
   The output indicates that the client that is activated successfully and registration is complete.

Uninstalling

Steps

1. Open a command shell and log in as root.
2. Uninstall the Avamar software by typing:
   swremove hpuxclnt

   The following appears in the command shell:

```
======= 2013-1-10 16:09:29 PST BEGIN swremove SESSION
(non-interactive)
* Session started for user "root@hp-ux-01".
* Beginning Selection
* Target connection succeeded for "hp-ux-01:/".
* Software selections:
hpuxclnt.hpuxclnt-exec,l=/opt/AVMRclnt,r=7.0.0-nnn,
a=HP-UX_B.11.00_32/64
* Selection succeeded.
* Beginning Analysis
* Session selections have been saved in the file
"/.sw/sessions/swremove.last".
* The analysis phase succeeded for "hp-ux-01:/".
* Analysis succeeded.
* Beginning Execution
* The execution phase succeeded for "hp-ux-01:/".
* Execution succeeded.
NOTE: More information may be found in the agent logfile (location
is hp-ux-01:/var/adm/sw/swagent.log).
======= 2013-1-106 16:09:45 PST END swremove SESSION
(non-interactive)
```

Upgrading

To upgrade the Avamar Client for HP-UX software, install the new version of software. You do not need to uninstall the old version.

NOTE: It might be necessary to deactivate the client instance from the Avamar server to successfully reactivate it with the Avamar server. The *Avamar Administration Guide* contains further information.

If the client software is installed in a nondefault directory, the path of the installation directory must also get added using the `hpuxclnt,l=`*path*) option:

```
swinstall -s /tmp/package hpuxclnt,l=path
```

where *path* is the current installation directory. There is no need to add the `-x ask=true` command line option, because it upgrades using same directory for cache and log files, even when it has been relocated.

Manually stopping and restarting the avagent service

The Avamar Client for HP-UX agent (**`avagent`**) runs as a service and starts automatically as part of the installation. The **`avagent`** service also restarts automatically after a system reboots. In most cases, you do not need to manually stop or restart the **`avagent`** service. If you experience unexpected system behavior and do not want to reboot the entire system, you can use the following commands to manually stop and restart the **`avagent`** service.

Manually stopping the avagent service

Steps

1. Open a command shell and log in as root.
2. Type the following command:
   `/sbin/init.d/avagent stop`

Manually restarting the avagent service

Steps

1. Open a command shell and log in as root.
2. Type the following:

```
/sbin/init.d/avagent restart
```

Getting avagent status

Steps

1. Open a command shell and log in as root.
2. Type the following:
   ```
   /sbin/init.d/avagent status
   ```

3

Avamar Client for Linux

Topics:

- Client installation prerequisites
- Downloading the install package
- Customizing the installation
- Installing CentOS 32-bit compatibility libraries
- Installing SUSE Linux Enterprise Server (SLES) 11 compatibility libraries
- Preparing for Avamar client installation on SLES 15
- Installing and registering
- Uninstalling
- Upgrading
- Manually stopping and restarting the avagent service
- Linux Fast Incrementals

Client installation prerequisites

Before you install Avamar software on a client system, perform the following prerequisites.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Hardware requirements for the Linux Client software

Ensure that the client computer on which you install the Avamar for Linux Client software meets the minimum requirements in the following table.

Table 6. Minimum supported hardware requirements for the Linux Client software

Requirement	Minimum
RAM	128 MB
Hard drive space	100 MB permanent hard drive space (1 GB recommended) for software installation. The Avamar client software also requires an additional 12 MB of permanent hard drive space for each 64 MB of physical RAM. This space is used for local cache files.
Network interface	10BaseT or higher, configured with the latest drivers for the platform.

Updated, detailed client compatibility information is available in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection.

Preinstallation checks

Before you install the Avamar software, perform the following:

Prerequisites

1. Ensure that the Avamar server is operational and present on the same network as the client computer.

   Verify if this action is performed by opening a command shell on the client computer and typing the following:

   `ping` *AVAMARSERVER*

   where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.

2. Make note of the network hostname (as defined in DNS) for:
   - Avamar server
   - Avamar utility node

   These DNS entries should have been added during deployment of the Avamar system.

Download client packages to the Avamar server

Before installing the Avamar client software, you must first download the UpgradeClientDownloads package from the EMC repository to the Avamar server. After downloading the file, you must install it on the server for the client installation packages to be available. Follow instructions for downloading and installing new packages from the EMC repository in the Avamar Administration Guide.

Downloading the install package

Download one or more install packages from the Avamar server. Avamar 7.5.1 provides public keys and signed packages to verify code integrity.

Steps

1. Log in to the computer.
2. In a web browser, type the following URL:
   `https://`*`AVAMARSERVER`*`/dtlt/home.html`

   where *AVAMARSERVER* is the Avamar server network hostname (as defined in DNS) or IP address.
3. If a security alert dialog box appears due to browser security settings, click **Yes** or **OK** to allow redirection to the Avamar secure web server.
   The Avamar Web Restore home page appears.
4. From the links at the top of the page, click **Downloads**.
   A list of the software available from the server appears in the browser.
5. Select an operating system heading or software category heading from the list and click **+** next to it.
   When necessary, click **+** next to subheadings until the software package link appears.

   NOTE: The names of software packages that are listed under each Linux operating system may not correspond to the names of the operating system itself. For example, the software package for the CentOS 7 operating system is listed as a SLES 11 package. Install the package that is listed for the operating system regardless of the name of the package.
6. Select an operating system heading or software category heading from the list and click + next to it.

   When necessary, click **+** next to subheadings until the software package link appears.
7. Click the software package link.
   The server transfers the software package to the web browser.
8. Save the installation package to a temporary folder.
   Do not rename a software package. The Avamar push upgrade mechanisms are incompatible with renamed packages.
9. Select **Public GPG keys for Avamar Client RPM/Debian packages** and click **+** next to it.

   When necessary, click **+** next to subheadings until the software package link appears.
10. Click the download links for the public key and installer script.

11. Save the public key and installer script to the temporary folder.
12. Import the public key with the installer script by typing the following command:

    `chmod +x ./import_avpkgkey.sh`

    `sudo ./import_avpkgkey.sh`

    The script imports the public key into the system keyring.
13. Verify the client install package by typing the following command:

Option	Description
RedHat, SUSE, Fedora, and CentOS	**`rpm -K *.rpm -v`**
Debian and Ubuntu	**`gpg --verify *.deb`**

Customizing the installation

You can customize the Avamar Client for Linux installation by changing the base directory, the var directory, or both.

To change the base installation directory, use the **`rpm --relocate`** option during installation to define an alternate location. For example:

`rpm -ivh --relocate /usr/local/avamar=`*NEW-BASE-PATH AVAMAR-LINUX.RPM*

where:

- *NEW-BASE-PATH* is the new (nondefault) installation directory.
- *AVAMAR-LINUX.RPM* is the file name of the Avamar Client for Linux install package.

To change the base installation directory and var directory, use the **`rpm --relocate`** option during installation to define alternate locations. For example:

`rpm -ivh --relocate /usr/local/avamar=`*NEW-BASE-PATH* **`--relocate /var/avamar=/`***NEW-VAR-PATH AVAMAR-LINUX.RPM*

where:

- /usr/local/avamar is the default installation directory.
- *NEW-BASE-PATH* is the new (nondefault) installation directory.
- /var/avamar is the default var directory.
- *NEW-VAR-PATH* is the new var directory.
- *AVAMAR-LINUX.RPM* is the file name of the Avamar Client for Linux install package.

You can only install the Avamar Client for Linux in the default directory on Debian and Ubuntu.

NOTE: The **`rpm --relocate`** feature requires Red Hat Package Manager version 4.0.3 or later.

Installing CentOS 32-bit compatibility libraries

If you will install the Avamar Client for Linux on a 32-bit version of CentOS, install the compat-libstdc++-33 libraries.

Steps

1. Open a command shell and log in as root.
2. Obtain a copy of the compat-libstdc++-33 libraries for the system.
3. Type the following command to install the system's compat-libstdc++ package:
   `rpm -ivh compat-libstdc++-33-3.2.3-61.i386.rpm`
4. Follow the onscreen prompts to complete the installation.

Installing SUSE Linux Enterprise Server (SLES) 11 compatibility libraries

If installing Avamar Client for Linux on a 64- or 32-bit version of SUSE Linux Enterprise Server (SLES) 11, install `libxml2` and `libxml2-python` compatibility libraries.

Steps

1. Open a command shell and log in as root.
2. Obtain a copy of the following libraries for the system:
   - For 64-bit versions:

     `libxml2-2.7.6-0.1.37.x86_64.rpm and libxml2-python-2.7.6-0.1.36.x86_64.rpm`
   - For 32-bit versions:

     `libxml2-2.7.6-0.1.37.i586.rpm and libxml2-python-2.7.6-0.1.36.i586.rpm`
3. Type the following command on a single command line:
   - For 64-bit versions:

     ```
     rpm -Uvh libxml2-2.7.6-0.1.37.x86_64.rpm libxml2-python-2.7.6-0.1.36.x86_64.rpm
     ```
   - For 32-bit versions:

     ```
     rpm -Uvh libxml2-2.7.6-0.1.37.i586.rpm libxml2-python-2.7.6-0.1.36.i586.rpm
     ```
4. Follow the onscreen prompts to complete the installation.

Preparing for Avamar client installation on SLES 15

If installing Avamar Client for Linux on SUSE Linux Enterprise Server (SLES) 15, prepare for the installation by selecting the required modules and creating a directory for support files.

About this task

Before installing an Avamar client on SLES 15, complete these steps:

Steps

1. When configuring installation settings for SLES 15, select to install extensions and modules.
2. In the SUSE UI for extension and module selection, ensure that you select `Basesystem-Module 15-0`, `Desktop-Application-Module 15-0`, and `Legacy-Module 15-0` modules. These modules are required for the Avamar client.
3. To contain files required by the Avamar base system and systemV services, create this sub-directory:

   `/etc/rc.d/`

Installing and registering

Do not attempt to back up a CIFS/NFS network share by installing an Avamar client on a local machine. Attempting to do so results in a severe degradation in backup and restore performance and metadata such as folders, ACLs, and file permissions are not backed up. To backup a CIFS/NFS share, install an Avamar client on the share machine or use NDMP to back up the data.

Steps

1. Open a command shell and log in as root.
2. Uninstall any previous version of the client software before you install the new version. Uninstalling on page 28 provides instructions.
3. (Optional) Set the `VARDIR` environment variable to a new location by typing the following command:

export VARDIR="*path*"

where*path* is the new `var` directory.

4. Change directory to the temporary install directory by typing the following command:

   cd /*tmp*

   where *tmp* is the temporary directory.

5. Install the client software in the default directory or in an alternate directory.

Table 7. Installation directory and steps

Installation directory	Installation steps
Default directory on Red Hat, SuSE, Fedora, or CentOS	Type the following command: **rpm -ih *package*** where *package* is the filename of the Avamar client install package.
Default directory on Debian or Ubuntu	Type the following command: **dpkg -i *package*** where *package* is the filename of the Avamar Client for Linux install package.
Alternate base directory on Red Hat, SuSE, Fedora, or CentOS	Type the following command: **rpm --relocate /usr/local/avamar=/*path* -i *package*** where *path* is the new directory and *package* is the filename of the Avamar Client for Linux install package.
Alternate base and var directories on Red Hat, SuSE, Fedora, or CentOS	Type the following command: **rpm -ivh --relocate /usr/local/avamar=*base_path* --relocate /var/avamar=*var_path* *package*** where: ● *base_path* is the new installation directory. ● *var_path* is the new `var` directory. ● *package* is the filename of the Avamar Client for Linux install package.

6. Register and activate the client with the Avamar server.

Table 8. Installation directory and steps

Software installation path	Steps to start registration and activation
Default directory	Type the following command: **/usr/local/avamar/bin/avregister**
Alternate directory	Type the following command: **/*path*/bin/avregister** where *path* is the installation directory.

The client registration and activation script starts and prompts you to specify the Administrator server address.

7. Type the DNS name of the Avamar server and press **Enter**.

   The output prompts you to specify the Avamar domain for the client.

The default domain 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.

8. To accept the default domain (`clients`), press **Enter**.
   The output indicates that the activation is successful and registration is complete.

Uninstalling

Steps

1. Open a command shell and log in as root.
2. List the Avamar packages that are installed on the system:
   - On Red Hat, SUSE, Fedora, or CentOS, type:

     `rpm -qa | grep Av`

     The following appears in the command shell:

     ```
     AvamarClient-VERSION
     ```

   - On Debian or Ubuntu, type:

     `dpkg --list | grep Av`

     The following appears in the command shell:

     ```
     avamarclient-debian VERSION
     ```

3. Note the full package name.
4. Uninstall the software:
   - On Red Hat, SUSE, Fedora, or CentOS, type:

     `rpm -e` *AvamarClient-VERSION*

     where *AvamarClient-VERSION* is the Avamar software install package that is returned in the previous step.

     The following appears in the command shell:

     ```
     avagent.d Info: Stopping Avamar Client Agent (avagent)...
     avagent.d Info: Client Agent stopped.
     ```

   - On Debian or Ubuntu, type:

     `dpkg -P avamarclient-debian`

     The following appears in the command shell:

     ```
     avagent.d Info: Stopping Avamar Client Agent (avagent)...
     avagent.d Info: Client Agent stopped.
     Removing any system startup links for /etc/init.d/avagent ...
     uninstallation successful
     Purging configuration files for avamarclient-debian VERSION ...
     uninstallation successful
     ```

Upgrading

You can upgrade the Avamar Client for Linux software to a later release by using the **`rpm -Uvh`** command. You can use the **`--relocate`** option to specify the alternate installation or var directory that you specified when you installed the initial build.

Prerequisites

Import the public key and verify the install package by completing the instructions in Downloading the install package on page 24.

Steps

1. Open a command shell and log in as root.
2. Upgrade the Avamar Client for Linux software:
   - To upgrade the software in the default directory:
     - On RedHat, SUSE, Fedora, and CentOS, type:

       `rpm -Uvh` *AVAMAR-LINUX*
     - On Debian and Ubuntu, type:

       `dpkg -i` *AVAMAR-LINUX*

     where *AVAMAR-LINUX* is the file name of the Avamar Client for Linux install package.
   - To upgrade the software in a nondefault installation directory:

     NOTE: Upgrading the Debian and Ubuntu software to a nondefault directory is not supported.
     - To upgrade the software in a nondefault installation directory, type:

       `rpm -Uvh --relocate /usr/local/avamar=`*NEW-BASE-PATH AVAMAR-LINUX.RPM*

       where:
       - *NEW-BASE-PATH* is the installation directory that you specified when you installed Avamar.
       - *AVAMAR-LINUX.RPM* is the file name of the Avamar Client for Linux install package.
     - To upgrade the software and use a nondefault var directory, type:

       `rpm -Uvh --relocate /var/avamar=`*NEW-VAR-PATH AVAMAR-LINUX.RPM*

       where:
       - *NEW-VAR-PATH* is the var directory that you specified when you installed Avamar.
       - *AVAMAR-LINUX.RPM* is the file name of the Avamar Client for Linux install package.

   The **`rpm -Uh`** and **`dpkg -i`** commands automatically uninstalls the earlier version of the Avamar Client for Linux software, and then installs the new version.

Next steps

It might be necessary to deactivate the client instance from the Avamar server to successfully reactivate it with the Avamar server. The *Avamar Administration Guide* contains further information.

Manually stopping and restarting the avagent service

The Avamar Client for Linux agent (**`avagent`**) runs as a service and starts automatically as part of the installation procedure. The **`avagent`** service also restarts automatically after a system reboots. In most cases, you do not need to manually stop or restart the **`avagent`** service. If you experience unexpected system behavior and do not want to reboot the entire system, you can use the following commands to manually stop and restart the **`avagent`** service.

NOTE: For some systemd Linux systems, there might be two limitations:

- You can manually stop and restart the **`avagent`** service by running **`avregister`**.
- The **`avagent`** service does not start automatically after a system reboots. You need to manually restart it.

Manually stopping the avagent service

Steps

1. Open a command shell and log in as root.
2. Manually stop the `avagent` service by typing one of the commands in the following table.

Table 9. Linux operating system commands to stop the `avagent` service

Operating system and version	Command
Any version of Red Hat Linux, CentOS, or SUSE Linux Enterprise Server 10 and 11	**`service avagent stop`**
SUSE Linux Enterprise Server 9 or 8.2	**`/etc/rc.d/avagent stop`**
Debian, Ubuntu, Fedora 27 or SUSE Linux Enterprise Server 12	**`/etc/init.d/avagent stop`**

Manually restarting the avagent service

Steps

1. Open a command shell and log in as root.
2. Manually restart the **`avagent`** service by typing one of the commands in the following table.

Table 10. Linux operating system commands to restart the `avagent` service

Operating system and version	Command
Any version of Red Hat Linux, CentOS, or SUSE Linux Enterprise Server 10 and 11	**`service avagent restart`**
SUSE Linux Enterprise Server 9 or 8.2	**`/etc/rc.d/avagent restart`**
Debian, Ubuntu, Fedora 27 or SUSE Linux Enterprise Server 12	**`/etc/init.d/avagent restart`**

Getting avagent status

Steps

1. Open a command shell and log in as root.
2. Get status for the **`avagent`** service by typing one of the commands in the following table.

Table 11. Linux operating system commands to get `avagent` status

Operating system and version	Command
Any version of Red Hat Linux, CentOS, or SUSE Linux Enterprise Server 10 and 11	**`service avagent status`**
SUSE Linux Enterprise Server 9 or 8.2	**`/etc/rc.d/avagent status`**
Debian, Ubuntu, Fedora 27 or SUSE Linux Enterprise Server 12	**`/etc/init.d/avagent status`**

Linux Fast Incrementals

The Linux Fast Incrementals (also known as LFI) solution provides an incremental backup facility for high density filesystems. This solution provides increased performance by using the Linux Fast Incrementals feature to identify only modified data. This option does not also have to scan the entire filesystem. Filesystems having less than 500K files may not see much improvement with Linux Fast Incrementals.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Linux Fast Incrementals preinstallation checks

Before you install the Linux Fast Incrementals software, perform the following:

Prerequisites

- Ensure that you have operating system root privileges on the client computer.
- Ensure that the Avamar server is operational and present on the same network as the client computer.

  Verify if this action is performed by opening a command shell on the client computer and typing the following:

  `ping` *AVAMARSERVER*

  where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.
- Make note of the network hostname (as defined in DNS) for:
  - Avamar server
  - Avamar utility node

  These DNS entries should have been added during deployment of the Avamar system.
- Ensure that the Avamar for Linux filesystem client software has been installed in the default location on the Linux host. The Linux Fast Incremental feature does not support package relocation. Downloading the install package on page 24and subsequent sections provides installation instructions for the filesystem client software.
- Ensure that the quota package quota-4.01-4.11.x86_64 is installed on the Avamar client. This package can be obtained from the SLES 12 64-bit distribution.
- Ensure that all filesystems that are enabled for Fast Incremental backup have entries in the `/etc/mtab` file (i.e., Ext3/Ext4 filesystems should not be mounted with the `-n` option if `etc/mtab` is a regular file). Enabling filesystems that do not have entries in the `mtab` file fail.

Downloading the Linux Fast Incrementals install package

Download the install package for Linux Fast Incrementals from the Avamar server.

Steps

1. Log in to the computer.
2. In a web browser, type the following URL:
   `https://`*`AVAMARSERVER`*`/dtlt/home.html`

   where *AVAMARSERVER* is the Avamar server network hostname (as defined in DNS) or IP address.
3. If a security alert dialog box appears due to browser security settings, click **Yes** or **OK** to allow redirection to the Avamar secure web server.
   The Avamar Web Restore home page appears.
4. From the links at the top of the page, click **Downloads**.
   A list of the software available from the server appears in the browser.
5. Click + next to the platform heading for Linux Fast Incrementals.
6. Click + next to the operating system heading for Linux Fast Incrementals.

7. Click the link for the Linux Fast Incrementals installation package.
8. Save the installation package to a temporary folder.
   Do not rename a software package. The Avamar push upgrade mechanisms are incompatible with renamed packages.
9. Select **Public GPG keys for Avamar Client RPM/Debian packages** and click **+** next to it.
   When necessary, click **+** next to subheadings until the software package link appears.
10. Click the download links for the public key and installer script.
11. Save the public key and installer script to the temporary folder.
12. Import the public key with the installer script by typing the following command:

    ```
    chmod +x ./import_avpkgkey.sh
    ```

    ```
    sudo ./import_avpkgkey.sh
    ```

    The script imports the public key into the system keyring.
13. Verify the client installation package by typing the following command:

Option	Description
RedHat, SUSE, Fedora, and CentOS	`rpm -K *.rpm -v`
Debian and Ubuntu	`gpg --verify *.deb`

Installing the Linux Fast Incrementals software

Steps

1. Open a command shell and log in as root.
2. Change directory to the temporary install directory by typing the following command:

   cd /*tmp*

   where *tmp* is the temporary directory.
3. To install the software, type the following command:
   `rpm -ivh AvamarFastIncrementals-`*PLATFORM*`-x86_64-`*VERSION*`.rpm`
   Where:
   - *PLATFORM* is the Linux platform type.
   - *VERSION* is the version of the Linux Fast Incremental software.

Uninstalling the Linux Fast Incrementals software

Steps

1. Disable all configured mount points or filesystems.
2. Uninstall the Linux Fast Incrementals package using the following Linux command:
   `rpm -e AvamarFastIncrementals-`*PLATFORM-VERSION* `.x86_64`
   Where:
   - *PLATFORM* is the Linux platform type.
   - *VERSION* is the version of the Linux Fast Incremental software.

Upgrading the Linux Fast Incrementals software

Steps

1. Unmount all configured mount points.
2. Uninstall the Linux Fast Incrementals package using the following Linux command:

```
rpm -e AvamarFastIncrementals-PLATFORM-VERSION .x86_64
```

Where:

- *PLATFORM* is the Linux platform type.
- *VERSION* is the version of the Linux Fast Incremental software.

3. Install the latest Linux Fast Incrementals package. Installing the Linux Fast Incrementals software on page 32 has instructions.
4. Remount all configured mount points.

Enabling Linux Fast Incrementals for Avamar backups

To perform Linux Fast Incrementals backups, all filesystems or mount points that are to be protected must be enabled for Linux Fast Incrementals backup.

Steps

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

   The **Backup, Restore and Manage** window appears.
2. In the domain tree, select the domain for the client.
3. From the list of clients, select the Linux host that has filesystems or mount points that are enabled for Linux Fast Incrementals backup.
   The **Backup** tab lists available plug-ins for the client. Both the Fast Incrementals and traditional filesystem plug-ins are displayed.
4. For the Fast Incrementals plug-in, right-click the plugin, or expand the plug-in tree and right-click a mount point, and select **Fast Incrementals Enable**.

   NOTE: The filesystem cannot be in use when this operation is performed.

Results

An icon indicating that a filesystem or mount point is enabled for Fast Incrementals backups.

Disabling Linux Fast Incrementals

Steps

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

   The **Backup, Restore and Manage** window appears.
2. In the domain tree, select the domain for the client.
3. From the list of clients, select the Linux host that has filesystems or mount points disabled for Linux Fast Incrementals backup.
   The **Backup** tab lists available plug-ins for the client. Both the Fast Incrementals and traditional filesystem plug-ins are displayed.
4. For the Fast Incrementals plug-in, right-click the plugin, or expand the plug-in tree and right-click a mount point, and select **Fast Incrementals Disable**.

   NOTE: The filesystem cannot be in use when this operation is performed.

Results

The icon indicating that the filesystem or mount point is enabled changes to gray.

Converting regular Avamar filesystem backups to Linux Fast Incrementals backups

The initial backup of a Linux Fast Incrementals-enabled filesystem must be consistent, which requires that the filesystem is frozen as read-only during the entire L0 backup. This backup can take time for a large file system, and it might be preferable to convert an existing regular filesystem backup to a Linux Fast Incrementals-enabled backup. This action can result in the filesystem being frozen for a shorter time.

Conversion of a regular filesystem backup to an LFI-enabled backup is done in three phases:

1. The initial regular filesytem backup.
2. A second filesystem backup
3. Conversion of metadata to the LFI format.

Only the second step in this process requires that the filesystem to be frozen. This process usually takes a short time, especially if the change rate is low between the backup in the first step and the second step.

The conversion should be a planned activity as it may take time to complete.

Running the Linux Fast Incrementals backup conversion script

Use the `backupboost-convert` script to convert regular Avamar filesystem backups to LFI-enabled backups.

Steps

1. Open a command shell and log in as root.
2. Change to the location of the `backupboost-convert` script:

   ```
   cd /usr/local/avamar/bin/
   ```

3. Run the `backupboost-convert` script:

   ```
   backupboost-convert --config-file=config-file
    --mount-path=mount-path
   ```

   where *config-file* is the path and filename to the configuration file that is described in Example configuration file for the Linux Fast Incrementals conversion script on page 34 and *mount-path* is one of the following:

   - **`all`** converts all configured mount paths.
   - A single mount path to be converted.

   A list of mount passes can be passed into the command by using the **`--mount-list-file=`*`file-with-mount-path-list`*** option rather than the **`--mount-path=`*`mount-path`*** option, where *file-with-mount-path-list* is a file containing a list of mount points to be converted.

Example configuration file for the Linux Fast Incrementals conversion script

The following is an example of the configuration file that is used when executing the `backupboost-convert` script:

```
--server="clidev-av0"
      --vardir="/usr/local/avamar/var"
      --bindir="/usr/local/avamar/bin"
      --id="root"
      --password="5b03d381eb2c5bc4a1e……b3ed343e46c8b51"
     --acnt="/domain/account"
     --ddr-index="1"
```

4

Avamar Client for Mac OS X

Topics:

- Client installation prerequisites
- Downloading the install package
- Installing
- Changing process data size
- Registering
- Uninstalling
- Upgrading

Client installation prerequisites

Before you install Avamar software on a client system, perform the following prerequisites.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Hardware requirements for the Mac OS X Client software

Ensure that the client computer on which you install the Avamar for Mac OS X Client software meets the minimum requirements in the following table.

Table 12. Minimum supported hardware requirements for the Mac OS X Client software

Requirement	Minimum
RAM	1 GB
Hard drive space	250 MB permanent hard drive space (1 GB recommended) for software installation. The Avamar client software also requires an additional 12 MB of permanent hard drive space for each 64 MB of physical RAM. Additional disk space might be required by snapshot technology.
Network interface	Either of the following: ● 10BaseT or higher, configured with the latest drivers for the platform. ● IEEE 802.11a/b/g, configured with the latest drivers for the platform.

Updated, detailed client compatibility information is available in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection.

Preinstallation checks

Before you install the Avamar software, perform the following:

Prerequisites

1. Ensure that the Avamar server is operational and present on the same network as the client computer.

   Verify if this action is performed by opening a command shell on the client computer and typing the following:

   `ping` *AVAMARSERVER*

   where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.

2. Make note of the network hostname (as defined in DNS) for:
   - Avamar server
   - Avamar utility node

   These DNS entries should have been added during deployment of the Avamar system.

Download client packages to the Avamar server

Before installing the Avamar client software, you must first download the UpgradeClientDownloads package from the EMC repository to the Avamar server. After downloading the file, you must install it on the server for the client installation packages to be available. Follow instructions for downloading and installing new packages from the EMC repository in the Avamar Administration Guide.

Downloading the install package

You must first download one or more install packages from the Avamar server.

Steps

1. Log in to the computer.
2. In a web browser, type the following URL:
   `https://`*`AVAMARSERVER`*`/dtlt/home.html`

   where *AVAMARSERVER* is the Avamar server network hostname (as defined in DNS) or IP address.
3. If a security alert dialog box appears due to browser security settings, click **Yes** or **OK** to allow redirection to the Avamar secure web server.
   The Avamar Web Restore home page appears.
4. From the links at the top of the page, click **Downloads**.
   A list of the software available from the server appears in the browser.
5. Select an operating system heading or software category heading from the list and click + next to it.

   When necessary, click **+** next to subheadings until the software package link appears.
6. Click the software package link.
   The server transfers the software package to the web browser and the browser saves the package in the Downloads folder.

Installing

Steps

1. In the Downloads folder, double-click the software package.

   The installation wizard starts and the Welcome screen appears.
2. Click **Continue**.
   The Software License Agreement appears.
3. Read the Software License Agreement and click **Continue**.

The Disagree/Agree dialog box appears.

4. Select **Agree**.
   The Select a Destination screen appears.
5. Select the installation destination and click **Continue**.
   The Standard Install screen appears.
6. Click **Install**.
   The administrator's authentication dialog box appears.
7. Type the name and password for a user account with administrator privileges on the computer and click **OK**.
   The software is installed.

   Depending on the firewall settings on the computer, a warning dialog box might appear:

   - If the following warning message appears, go to the next numbered step.

     ```
     Do you want the application "avagent.bin" to accept incoming
     network connections?
     ```
   - If a successful install message appears, skip the next step.
8. On the warning dialog box, click **Allow**.
   The administrator's authentication dialog box appears.
9. Type the name and password for a user account with administrator privileges on the computer and click **OK**.
   The successful install screen appears.
10. Click **Close**.

Results

On some computers, a restart may be required. "Changing process data size" provides more information.

The software is then installed, and is ready for registration and activation. "Registering" provides instructions.

Changing process data size

After the installation of Avamar for Mac OS X Client, some computers might require a restart. This action is caused by a change to the process data size setting that is made on those computers.

During the installation, the installer determines whether the process data size is set to less than 96 MB. Optimal performance of Avamar for Mac OS X Client requires a minimum of 96 MB.

On computers where the process data size is less than 96 MB, the installer changes it to 96 MB and displays a restart reminder.

When this prompt appears, perform one of the following:

- To restart the computer and complete the change, click **Restart**.
- To hide the prompt and restart later, click **Not Now**. You are prompted again in 2 hours.

NOTE: If you click **Restart** and the restart process is stopped for any reason, the prompt does not appear again. The process data size is changed the next time when the computer restarts.

Registering

Before you can back up or restore any files on the client computer, you must register and activate the Avamar for Mac OS X Client software with the Avamar server.

About this task

Do not register the Avamar for Mac OS X Client software unless instructed to do so by a system administrator. The system administrator often registers and activates the client from the Avamar server.

To register the client from the client computer:

Steps

1. On the menu bar, click the Avamar icon.
   A menu appears.

2. Select **Manage > Activate Client**.
   The Activate Client Setup dialog box appears.
3. In **Administrator Server Address**, type the hostname of the Avamar server as defined in DNS, or its IP address.
4. In **Administrator Server Port**, type 28001.
5. In **Client Domain**, type the Avamar domain for this client.

   NOTE: The default domain is “clients.” However, the Avamar system administrator might have defined other domains and subdomains. Consult the Avamar system administrator for the domain to use when registering this client.

   If you are typing a subdomain (for example, clients/MyClients), do not include a slash (/) as the first character. A slash as the first character causes an error and prevents you from registering this client. Do not even use a backslash (\) in this field.
6. Click **Activate**.
   The Activate Client Setup dialog box closes, and the registration and activation process starts. Avamar client adds a green checkmark to its menu bar icon when activation is successfully completed.

Uninstalling

Steps

1. Open a Terminal (shell) session.
2. Log in as an administrator.
   The uninstall command requires root (superuser) permissions. Sudo is used to run the command with root permissions. An administrator account or another account that is listed in the sudoers file is required by sudo.
3. Run the uninstalled script by typing:
   `sudo /usr/local/avamar/bin/avuninstall.sh`

Upgrading

To upgrade the Avamar for Mac OS X Client software, run the installer for the upgrade version by using the same steps that are described in the “Installing” topic of this chapter.

Depending on the specific version of Mac OS X, the **Install** button that is mentioned in those steps might instead indicate "Upgrade."

The installer removes the older version before installing the upgrade version.

NOTE: It might be necessary to deactivate the client instance from the Avamar server to successfully reactivate it with the Avamar server. The *Avamar Administration Guide* contains further information.

5

Avamar Client for Solaris

Topics:

- Client installation prerequisites
- Downloading the install package
- Customizing the install location
- Installing and registering
- Uninstalling
- Upgrading
- Manually stopping and restarting the avagent service

Client installation prerequisites

Before you install Avamar software on a client system, perform the following prerequisites.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Hardware requirements for the Solaris Client software

Ensure that the client computer on which you install the Avamar for Solaris Client software meets the minimum requirements in the following table.

Table 13. Minimum supported hardware requirements for the Solaris Client software

Requirement	Minimum
RAM	128 GB
Hard drive space	200 MB permanent hard drive space (1 GB recommended) for software installation. The Avamar client software also requires an additional 12 MB of permanent hard drive space for each 64 MB of physical RAM. This space is used for local cache files.
Network interface	10BaseT or higher, configured with the latest drivers for the platform.

Updated, detailed client compatibility information is available in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection.

Preinstallation checks

Before you install the Avamar software, perform the following:

Prerequisites

1. Ensure that the Avamar server is operational and present on the same network as the client computer.

   Verify if this action is performed by opening a command shell on the client computer and typing the following:

ping *AVAMARSERVER*

where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.

2. Make note of the network hostname (as defined in DNS) for:
   - Avamar server
   - Avamar utility node

   These DNS entries should have been added during deployment of the Avamar system.

Download client packages to the Avamar server

Before installing the Avamar client software, you must first download the UpgradeClientDownloads package from the EMC repository to the Avamar server. After downloading the file, you must install it on the server for the client installation packages to be available. Follow instructions for downloading and installing new packages from the EMC repository in the Avamar Administration Guide.

Downloading the install package

You must first download one or more install packages from the Avamar server.

Steps

1. Log in to the computer.
2. In a web browser, type the following URL:
   https://*AVAMARSERVER*/dtlt/home.html

   where *AVAMARSERVER* is the Avamar server network hostname (as defined in DNS) or IP address.
3. If a security alert dialog box appears due to browser security settings, click **Yes** or **OK** to allow redirection to the Avamar secure web server.
   The Avamar Web Restore home page appears.
4. From the links at the top of the page, click **Downloads**.
   A list of the software available from the server appears in the browser.
5. Select an operating system heading or software category heading from the list and click **+** next to it.

   When necessary, click **+** next to subheadings until the software package link appears. Select the correct software package.

   Table 14. Avamar client software packages for Solaris operating systems

Solaris version	Avamar software package
Solaris 11 SPARC, Solaris 10 SPARC	AvamarClient-solaris10-sparc-VERSION.pkg
Solaris 11 X86_64, Solaris 10 X86_64	AvamarClient-solaris10-x86_64-VERSION.pkg
Solaris 10 X86	AvamarClient-solaris10-x86-VERSION.pkg

   where VERSION is the version of the Avamar Client for Solaris software.
6. Click the software package link.
   The server transfers the software package to the web browser.
7. Save the installation package to a temporary folder.
   Do not rename a software package. The Avamar push upgrade mechanisms are incompatible with renamed packages.

Customizing the install location

You can specify a new location for the installation and var directories during the Avamar Client for Solaris installation.

The installation provides prompts to relocate the installation and var directories. By default, the installation directory is /opt/AVMRclnt and the default var directory is /var/avamar.

When you install Avamar plug-in software after installing the Avamar Client for Solaris, the installation automatically installs the plug-in software in the same location as the Avamar Client for Solaris.

Installing and registering

Do not attempt to back up a CIFS/NFS network share by installing an Avamar client on a local machine. Attempting to do so results in a severe degradation in backup and restore performance and metadata such as folders, ACLs, and file permissions are not backed up. To backup a CIFS/NFS share, install an Avamar client on the share machine or use NDMP to back up the data.

Steps

1. Open a command shell and log in as root.
2. Uninstall any previous version of the client software before you install the new version. Uninstalling provides instructions.
3. Change directory to the temporary install directory by typing the following command:

   `cd /tmp`

   where *tmp* is the temporary directory.

4. Install the client software by typing the following command:

   `pkgadd -d package`

   where *package* is the filename of the Avamar Client for Solaris installation package.

   The output prompts you to specify the installation package to process.
5. Type **`1`** to select the Avamar Client for Solaris package and press **Enter**.
   The output prompts you to specify the installation location.
6. Select the installation location.

   Table 15. Installation directory and steps

Location	Steps
Default	Press **Enter**.
Alternate	a. Type **`y`** and press **Enter**. The output prompts you to specify the directory name for the install base. b. Type the directory name and press **Enter**. The output prompts you to confirm the directory. c. Type **`y`** and press **Enter**.

   The output prompts you to specify whether to continue with the installation.
7. Type **`y`** and press **Enter**.
   The output displays the status of the installation until the installation completes.
8. Register the client with the Avamar server by typing the following command:

   `/opt/AVMRclnt/bin/avregister`

   The client registration and activation script starts and prompts you to specify the Administrator server address.
9. Type the DNS name of the Avamar server and press **Enter**.

   The output prompts you to specify the Avamar domain for the client.

   The default domain 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.
10. Press **Enter** to accept the default domain (`clients`).
    The output indicates that the client activated successfully and registration is complete.

Uninstalling

Steps

1. Open a command shell and log in as root.
2. Uninstall the Avamar Client for Solaris software by typing:
   pkgrm AVMRclnt

   The following appears in the command shell:

   ```
   The following package is currently installed:
   AVMRclnt Avamar Client for Solaris
   (sparc) 7.0.0-nnn
   Do you want to remove this package?
   ```
3. Type **y** and press **Enter**.
   The following appears in the command shell:

   ```
   ## Removing installed package instance <AVMRclnt>
   This package contains scripts which will be executed with super-user
   permission during the process of removing this package.
   Do you want to continue with the removal of this package [y,n,?,q]
   ```
4. Type **y** and press **Enter**.
   The following appears in the command shell:

   ```
   ## Verifying package <AVMRclnt> dependencies in global zone
   ## Processing package information.
   ## Executing preremove script.
   avagent.d Info: Stopping Avamar Client Agent (avagent)...
   avagent.d Info: Client Agent stopped.
   ## Removing pathnames in class <syms>
   ## Removing pathnames in class <dirs>
   ## Removing pathnames in class <mans>
   ## Removing pathnames in class <libs>
   /opt/AVMRclnt/lib/libstdc++.so.5
   /opt/AVMRclnt/lib/libgcc_s.so.1
   /opt/AVMRclnt/lib/libDDBoost.so
   /opt/AVMRclnt/lib
   ## Removing pathnames in class <etcs>
   ## Removing pathnames in class <apps>
   /opt/AVMRclnt/etc/avagent.d
   /opt/AVMRclnt/etc/AvamarClient-UpdateReplace.sh
   /opt/AVMRclnt/etc
   /opt/AVMRclnt/bin/unix.pin
   /opt/AVMRclnt/bin/suncluster-configure.sh
   /opt/AVMRclnt/bin/avtar.bin
   /opt/AVMRclnt/bin/avtar
   /opt/AVMRclnt/bin/avscc
   /opt/AVMRclnt/bin/avregister
   /opt/AVMRclnt/bin/avagent.bin
   /opt/AVMRclnt/bin <non-empty directory not removed>
   /opt/AVMRclnt/AvamarClient-License.txt
   /opt/AVMRclnt <non-empty directory not removed>
   ## Removing pathnames in class <none>
   ## Updating system information.
   Removal of <AVMRclnt> was successful.
   ```

Upgrading

Steps

1. Open a command shell and log in as root.
2. Copy the new installation package to /opt/AVMRclnt/etc.
3. Upgrade the Avamar Client for Solaris software by typing:

```
/opt/AVMRclnt/etc/AvamarClient-UpdateReplace.sh AVAMAR-SOLARIS.pkg
```

Next steps

It might be necessary to deactivate the client instance from the Avamar server to successfully reactivate it with the Avamar server. The *Avamar Administration Guide* contains further information.

Manually stopping and restarting the avagent service

The Avamar Client for Solaris agent (**avagent**) runs as a service and starts automatically as part of the installation. The **avagent** service also restarts automatically after a system reboots. In most cases, you do not need to manually stop or restart the **avagent** service. If you experience unexpected system behavior and do not want to reboot the entire system, you can use the following commands to manually stop and restart the **avagent** service.

Manually stopping the avagent service

Steps

1. Open a command shell and log in as root.
2. Type the following command:
   ```
   /etc/init.d/avagent stop
   ```

Manually restarting the avagent service

Steps

1. Open a command shell and log in as root.
2. Type the following:
   ```
   /etc/init.d/avagent start
   ```

Getting avagent status

Steps

1. Open a command shell and log in as root.
2. Type the following:
   ```
   /etc/init.d/avagent status
   ```

6

Avamar Client for Solaris in Solaris Clusters

Topics:

- Client installation prerequisites
- Cluster configurations
- Installing the Avamar Client for Solaris
- Configuring Solaris Cluster nodes
- Bringing Solaris Cluster resources online
- Registering with a new server
- Controlling Avamar resource behavior
- Uninstalling

Client installation prerequisites

Before you install Avamar software on a client system, perform the following prerequisites.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Hardware requirements for the Solaris Client software on page 39 provides more information.

Updated, detailed client compatibility information is available in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection.

Preinstallation checks

Before you install the Avamar software, perform the following:

Prerequisites

1. Ensure that the Avamar server is operational and present on the same network as the client computer.

   Verify if this action is performed by opening a command shell on the client computer and typing the following:

   `ping` *AVAMARSERVER*

   where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.

2. Make note of the network hostname (as defined in DNS) for:

   - Avamar server
   - Avamar utility node

   These DNS entries should have been added during deployment of the Avamar system.

Download client packages to the Avamar server

Before installing the Avamar client software, you must first download the UpgradeClientDownloads package from the EMC repository to the Avamar server. After downloading the file, you must install it on the server for the client installation packages to be available. Follow instructions for downloading and installing new packages from the EMC repository in the Avamar Administration Guide.

Cluster configurations

Avamar supports backup and restore of all the supported file systems on Solaris platforms that run Solaris Cluster 3.2.

Avamar supports single-node and multi-node (active/active and active/passive) Solaris Cluster configurations.

- In an active/active cluster configuration, each node runs an instance of Avamar Client for Solaris software as an application in separate resource groups. This functionality provides application redundancy. When a failure occurs on one active node, the other active node hosts both resource groups.
- In an active/passive cluster configuration, the resource group is online on the active node until a failover occurs. Then the resource group comes online on the passive node.

You can run backups and restores on both nodes.

Installing the Avamar Client for Solaris

Steps

1. Download the required Avamar Client for Solaris installation packages as described in "Downloading the install package" in the Solaris chapter.
2. Using the following guidelines, install the Avamar Client for Solaris software on each Solaris Cluster node as described in "Installing and registering" in the Solaris chapter.
   a. Only perform step 1–step 7. Do not run **avregister**.
   b. To relocate the installation or var directory, do not select a shared directory for the installation or var directory.

Configuring Solaris Cluster nodes

Configure the required resource groups on each node in the Solaris Cluster. If the cluster includes a passive node, perform the configuration procedure on the passive node first and then on the active node.

Steps

1. Open a command shell and log in to each passive Solaris Cluster node as root.
2. Type the following:
   /opt/AVMRclnt/bin/suncluster-configure.sh

   The main menu appears in the command shell:

```
Avamar Install directory: /opt/AVMRclnt
Avamar Cluster Install directory: /opt/AVMRclnt/avcluster
*****************************************************************
Please select following options, you wish to process
*****************************************************************
1) Add Avamar agent resource into Sun Cluster resource group and
register with Avamar server
2) Remove Avamar agent resource from Sun Cluster resource group
3) Exit
Select an option from the above list:
```

3. Type **1** and press **Enter**.
   The list of existing resource groups appears in the command shell. For example:

```
Please wait...gathering list of Resource groups on which Avamar agent
can be installed
*****************************************************************
Please select eligible resource group for Avamar agent resource
*****************************************************************
1) qfs-rg
2) Return to previous menu
Enter the option:
```

4. Type the number for the required resource group and press **Enter** to configure the resource group for the Avamar agent.
   The following appears in the command shell:

```
Enter Logical Hostname for selected resource group [qfs-rg]:
```

5. Type the hostname (as defined in DNS) for the resource group you selected in step 4 and press **Enter**.
   Information similar to the following appears in the command shell:

```
Checking whether Cluster group [qfs-rg] 'qfsnode' configured with IP
Enter the shared disk path :
```

6. Type the shared disk path for this resource group and press **Enter**.
   Information similar to the following appears in the command shell:

```
Shared disk '/global/qfsnode/clusterfs' configured for selected
cluster resource group 'qfs-rg'
Configuring 'AvamarClient-License.txt'
Configuring 'bin'
Configuring 'etc'
Configuring 'lib'
Avamar binaries copied successfully
Configuration completed
Press enter to continue
```

   If you attempted to configure resource groups on an active node before configuring all passive nodes, the configuration script terminates with an error message.

7. After configuring all passive Solaris Cluster nodes, log in to the active Solaris Cluster node as root and repeat step 2–step 6.
   After successfully completing step 2–step 6, the following appears in the command shell:

```
Do you want to register selected cluster resource group with Avamar server (y/n) [y]:
```

8. Type **y** and press **Enter**.
   The following appears in the command shell:

```
=== Client Registration and Activation
This script will register and activate the client with the
Administrator server.
Enter the Administrator server address (DNS text name or numeric IP
address, DNS name preferred):
```

9. Type the network hostname (as defined in DNS) of the Avamar Administrator server and press **Enter**.
   The following appears in the command shell:

```
Enter the Avamar server domain [clients]:
```

   The default domain is “clients.” However, the Avamar system administrator might have defined other domains and subdomains. Consult the Avamar system administrator for the domain to use when registering this client.

   NOTE: If typing a subdomain (for example, clients/MyClients), do not include a slash (/) as the first character. Including a slash as the first character causes an error and prevents you from registering this client.

10. Press **Enter** to accept the default domain (clients).
    The following appears in the command shell:

```
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
avagent Info <5241>: Logging to
/opt/AVMRclnt/avcluster/qfs-rg/var/avagent.log
avagent Info <5174>: - Reading
/opt/AVMRclnt/avcluster/qfs-rg/var/avagent.cmd
avagent.d Info: Client activated successfully.
avagent Info <5241>: Logging to
/opt/AVMRclnt/avcluster/qfs-rg/var/avagent.log
avagent Info <5174>: - Reading
/opt/AVMRclnt/avcluster/qfs-rg/var/avagent.cmd
avagent Info <5417>: daemonized as process id 28803
avagent.d Info: Client Agent started.
Registration Complete.
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
Press enter to continue
```

11. Press **Enter**.
    The main menu appears in the command shell.

12. Exit the **`suncluster-configure.sh`** configuration script by typing **3** and pressing **Enter**.

Bringing Solaris Cluster resources online

After you complete the configuration procedure on each node of the Solaris Cluster, perform the following.

Type the following to bring online any group resources that are in an offline state:

 # clrg online -n *NODENAME RESOURCEGROUPNAME*

where:

- *NODENAME* is the Solaris Cluster node name.
- *RESOURCEGROUPNAME* is the name of a resource group that is in an offline state.

The following example shows the command used to bring online the qfs-rg resource group on the node named aiqsunbox07:

 # clrg online -n aiqsunbox07 qfs-rg

 # clrg status

The following appears in the command shell:

```
=== Cluster Resource Groups ===
Group NameNode NameSuspendedStatus
---------------------------------
qfs-rgaiqsunbox07NoOnline
aiqsunbox08NoOffline
```

Registering with a new server

To register the resource groups on Solaris Cluster nodes with a new Avamar server, perform the following on each Solaris Cluster node that has the required resource group online.

Steps

1. Open a command shell and log in to a Solaris Cluster active node as root.
2. Type the following:
   /opt/AVMRclnt/bin/suncluster-configure.sh

   The following appears in the command shell:

   ```
   Avamar Install directory: /opt/AVMRclnt
   Avamar Cluster Install directory: /opt/AVMRclnt/avcluster
   ******************************************************************
   Please select following options, you wish to process
   ******************************************************************
   1) Add Avamar agent resource into Sun Cluster resource group and
   register with Avamar server
   2) Remove Avamar agent resource from Sun Cluster resource group
   3) Exit
   Select an option from the above list:
   ```
3. Type **1** and press **Enter**.
   A list of existing resource groups appears in the command shell. For example:

   ```
   Please wait...gathering list of Resource groups on which Avamar agent
   can be installed
   ******************************************************************
   Please select eligible resource group for Avamar agent resource
   ******************************************************************
   1) qfs-rg
   2) Return to previous menu
   Enter the option:
   ```
4. Type the number of the required resource group.
   The following appears in the command shell:

   ```
   Avamar file system client has been already configured for selected
   cluster group 'selected_group_name'
   Do you want to register selected cluster resource group with Avamar
   server (y/n) [y]:
   ```

5. Type **y** and at the following prompts, provide the DNS address of the new Avamar server and the domain to which the client should be assigned. For example:

```
=== Client Registration and Activation
This script will register and activate the client with the
Administrator server.
Enter the Administrator server address (DNS text name or numeric IP
address, DNS name preferred): DNS_address_of_Avamar_server
Enter the Avamar server domain [clients]: domain_name
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
avagent Info <5241>: Logging to
/opt/AVMRclnt/avcluster/selected_group_name/var/avagent.log
avagent Info <5174>: - Reading
/opt/AVMRclnt/avcluster/selected_group_name/var/avagent.cmd
avagent.d Info: Client activated successfully.
avagent Info <5241>: Logging to
/opt/AVMRclnt/avcluster/selected_group_name/var/avagent.log
avagent Info <5174>: - Reading
/opt/AVMRclnt/avcluster/selected_group_name/var/avagent.cmd
avagent Info <5417>: daemonized as process id 3112
avagent.d Info: Client Agent started.
Registration Complete.
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
Press enter to continue
```

   The main menu appears in your command shell.

6. Exit the **`suncluster-configure.sh`** configuration script by typing **3** and pressing **Enter**.

Controlling Avamar resource behavior

When an Avamar resource exception occurs (for example, the **`avagent`** process that a user or the system kills), the Avamar resource by default displays its state as “online faulted” when you issue the **`clresource status`** command.

For example, a process failure does not cause a resource group failover or an automatic resource restart.

As a Solaris Cluster administrator, you can issue specific commands to change the default behavior of an Avamar resource:

- Issue the following commands to ensure that the failover of a resource group occurs immediately after an Avamar resource exception:

  `clrs disable AVMRAppRes-`*RESOURCE_GROUP_NAME*

  `clrs set -p Failover_enabled=true AVMRAppRes-`*RESOURCE_GROUP_NAME*

  `clrs enable AVMRAppRes-`*RESOURCE_GROUP_NAME*

- Issue the following commands to ensure that the failover of a resource group occurs after a specific number of restarts of the Avamar resource:

  `clrs disable AVMRAppRes-`*RESOURCE_GROUP_NAME*

  `clrs set -p Failover_enabled=true -p Retry_count=# AVMRAppRes-`*RESOURCE_GROUP_NAME*

  `clrs enable AVMRAppRes-`*RESOURCE_GROUP_NAME*

- Issue the following commands to ensure that the failover of a resource group never occurs after an Avamar resource exception but is marked as “faulted” after a specific number of restarts (for example, within 370 s):

  `clrs disable AVMRAppRes-`*RESOURCE_GROUP_NAME*

  `clrs set -p Failover_enabled=false -p Retry_count=# AVMRAppRes-`*RESOURCE_GROUP_NAME*

  `clrs enable AVMRAppRes-`*RESOURCE_GROUP_NAME*

Uninstalling

To uninstall Avamar client software, perform the following on each Solaris Cluster node.

Steps

1. Open a command shell and log in to a Solaris Cluster node as root.
2. Type the following:
   /opt/AVMRclnt/bin/suncluster-configure.sh

   The main menu appears in the command shell:

   ```
   Avamar Install directory: /opt/AVMRclnt
   Avamar Cluster Install directory: /opt/AVMRclnt/avcluster
   ****************************************************************
   Please select following options, you wish to process
   ****************************************************************
   1) Add Avamar agent resource into Sun Cluster resource group and
   register with Avamar server
   2) Remove Avamar agent resource from Sun Cluster resource group
   3) Exit
   Select an option from the above list:
   ```
3. Type **2** and press **Enter**.
   The list of existing resource groups appears in the command shell. For example:

   ```
   Please wait...gathering list of Resource groups on which Avamar agent
   can be installed
   ****************************************************************
   Please select eligible resource group for Avamar agent resource
   ****************************************************************
   1) qfs-rg
   2) Return to previous menu
   Enter the option:
   ```
4. Type the number for the required resource group and press **Enter**.
   You are prompted to confirm that you want to unregister the Avamar agent and unconfigure the resource group. For example:

   ```
   Selected Cluster group name is 'qfs-rg'
   Do you want to unregister Avamar agent and unconfigure Avamar from
   selected Cluster group (y/n) [n]:
   ```
5. Type **y** and press **Enter**.
   The script performs the following:
   - Brings the resource group offline.
   - Unregisters the Avamar application from the selected resource group.
   - Removes the Avamar binaries for the selected resource group.
6. Repeat the previous four steps for each Solaris Cluster node.
   The main menu appears in the command shell.
7. Exit the suncluster-configure.sh configuration script by typing **3** and pressing **Enter**.
8. On each Solaris Cluster node, uninstall the Avamar Client for Solaris software as described in "Uninstalling" in the Solaris chapter.

7

Avamar Cluster Client for Solaris on VCS

Topics:

- Client installation prerequisites
- Cluster configurations
- Downloading the install package
- Installing and registering
- Bringing VCS resources online
- Uninstalling
- Registering with a new server

Client installation prerequisites

Before you install Avamar software on a client system, perform the following prerequisites.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Hardware requirements for the Solaris Client software on page 39 provides more information.

Updated, detailed client compatibility information is available in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection.

Preinstallation checks

Before you install the Avamar software, perform the following:

Prerequisites

1. Before you install the Avamar client software, ensure that the environment meets the following requirements:
   - The following software has been installed on each Solaris Cluster node:
     - Veritas Cluster Server
     - Veritas Volume Manager (VxVM)
     - Veritas File System (VxFS)
     - Avamar Client for Solaris

       "Avamar Client for Solaris" provides installation instructions.
2. The following resources have been configured for VCS service groups:
   - IP resource, which identifies the service group
   - Mount resource, which is the mount point of the shared disk where the Avamar /var directory resides
3. The Avamar server can resolve the service group name through DNS.
4. Ensure that you have operating system root privileges on the client computer.
5. Ensure that the Avamar server is operational and present on the same network as the client computer.

   Verify if this action is performed by opening a command shell on the client computer and typing the following:

   `ping` *AVAMARSERVER*

   where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.

6. Make note of the network hostname (as defined in DNS) for:
   - Avamar server
   - Avamar utility node

These DNS entries should have been added during deployment of the Avamar system.

Download client packages to the Avamar server

Before installing the Avamar client software, you must first download the UpgradeClientDownloads package from the EMC repository to the Avamar server. After downloading the file, you must install it on the server for the client installation packages to be available. Follow instructions for downloading and installing new packages from the EMC repository in the Avamar Administration Guide.

Cluster configurations

Avamar supports backup and restore of the Veritas File System (VxFS) from Solaris platforms that run VCS.

Avamar supports single-node and multi-node (active/active and active/passive) VCS configurations.

- In an active/active cluster configuration, each node runs an instance of Avamar Cluster Client for Solaris as an application in separate service groups. This functionality provides application redundancy. When a failure occurs on one active node, the other active node hosts both service groups.
- In an active/passive cluster configuration, the service group is online on the active node until a failover occurs. Then the service group comes online in the passive node.

You can run backups and restores from both nodes.

Downloading the install package

Download one or more install packages from the Avamar server.

Steps

1. Log in to the active VCS node.
2. Open a command shell and log in as root.
3. In a web browser, type the following URL:
   `https://AVAMARSERVER/dtlt/home.html`

   where *AVAMARSERVER* is the Avamar server network hostname (as defined in DNS) or IP address.
4. If a security alert dialog box appears due to browser security settings, click **Yes** or **OK** to allow redirection to the Avamar secure web server.
   The Avamar Web Restore home page appears.
5. From the links at the top of the page, click **Downloads**.
   A list of the software available from the server appears in the browser.
6. Select an operating system heading or software category heading from the list and click + next to it.

   When necessary, click **+** next to subheadings until the software package link appears.
7. Select the correct software package.

   Table 16. Avamar cluster client software packages for Solaris operating systems

Platform	Software package
Solaris 11 SPARC, Solaris 10 SPARC	AvamarClusterClient-solaris10-sparc-VERSION.pkg
Solaris 11 x86 64-bit, Solaris 10 x86 64-bit	AvamarClusterClient-solaris10-x86_64-VERSION.pkg

   where VERSION is the version of the Avamar Cluster Client software.
8. Click the software package link.
   The server transfers the software package to the web browser.
9. Save the installation package to a temporary folder.

Do not rename a software package. The Avamar push upgrade mechanisms are incompatible with renamed packages.

Installing and registering

Install the Avamar Cluster Client for Solaris software on both nodes in the VCS cluster. Start the installation from the active node. This chapter uses /tmp as an example of a temporary directory. You may choose to use a different temporary directory for the installation. The output in this procedure refers to AvamarClusterClient-solaris10-sparc-7.0.100-nnn.pkg for illustration purposes only.

Steps

1. Log in to the active VCS node as root.
2. Change directory to the temporary install directory by typing the following command:

   cd /*tmp*

   where *tmp* is the temporary directory.

3. Install the Avamar Cluster Client for Solaris software by typing the following command:

   pkgadd -d *package*

   where *package* is the installation package.

   The output prompts you to specify the package to process.
4. Type **1** to select the Avamar cluster client package and press **Enter**.
   The output displays processing and verification information, and then prompts you to specify whether to continue with the Avamar cluster client installation.
5. Type **y** and press **Enter**.
   The output displays the status of the installation until the installation completes.
6. Run `avclustinstall` by typing:

   cd /opt/AVMRclusclnt/bin/ ./avclusinstall

   The output prompts you to specify the service group for configuration.
7. Type **1** to select `oraclegrp` and press **Enter**.
   The output prompts you to specify the resource name of the Avamar application for the selected service group.

   NOTE: The state of `oraclegrp` can be either ONLINE or PARTIAL. Usually the state is ONLINE.
8. Type the resource name of the Avamar application and press **Enter**.
   The output prompts you to specify whether to install the Avamar Plug-in for Oracle.
9. If you are installing Oracle, type **y** and press **Enter**. Otherwise, type **n** and press **Enter**.
   The output prompts you to specify the hostname or DNS alias.
10. (VCS IPv6 environments only) Edit the `avagent.cmd` file on the active VCS node:
    a. In a second command shell, log in to the active VCS node as root.
    b. Change directory to the `/opt/AVMRclusclnt/cluster/`*`group`*`/var/` directory by typing the following command:

       cd /opt/AVMRclusclnt/cluster/*group*/var/

       where *group* is the name of the cluster group.

    c. Use a UNIX text editor to open the `avagent.cmd` file.
    d. Add the following flag on a separate line at the end of the file:
       `--addr-family=6`
    e. Save the changes.
    f. Return to the first command shell session.
11. Type the hostname or DNS alias and press **Enter**.
    The client registration and activation script starts and prompts you to specify the Administrator server address.
12. Type the DNS name or IP address for the Avamar server and press **Enter**.
    The output prompts you to specify the Avamar domain for the client.
13. Type the domain name and press **Enter**.
    The output prompts you to specify whether to install Avamar in another service group.
14. Type **n** and press **Enter**.

15. Log in to the passive node as root.
16. Install the Avamar Cluster Client for Solaris software by typing the following command:

    pkgadd -d *package*

    where *package* is the installation package.

    The output displays a list of available installation packages.
17. Type **1** to select the Avamar cluster client package and press **Enter**.
    The output displays the status of the processing and configuration checks, and then prompts you to specify whether to continue with the installation of the cluster client.
18. Type **y** and press **Enter**.
    The output displays the status of the installation until the installation completes.
19. Run `avclustinstall` by typing the following commands:

    cd /opt/AVMRclusclnt/bin
    ./avclusinstall

    The output prompts you to specify the service group for configuration.
20. Type **1** and press **Enter**.
    The output prompts you to specify whether to install the Avamar Plug-in for Oracle.
21. Type **y** and press **Enter**.
    The output prompts you to specify whether to install Avamar in another service group.
22. Type **n** and press **Enter**.
23. Repeat the previous eight steps on each passive node.

Bringing VCS resources online

To bring VCS resources online, perform the following.

Type:

hares -online avagent_*SERVICEGROUP* **-sys** *HOSTNAME*

where:

- avagent_*SERVICEGROUP* is the default name of the Avamar VCS cluster agent. If you did not select the default name, use the name that you specified.
- *HOSTNAME* is the system where the VCS service group is in PARTIAL state.

Uninstalling

Steps

1. Open a command shell and log in to a VCS node as root.
2. Remove the Avamar agent from the VCS service groups by typing:
   cd /opt/AVMRclusclnt/bin

   ./avclusuninstall

   The following appears in the command shell:

   ```
   1. oraclus
   Select an option: 1
   Selected service group: oraclus
   Avamar will be uninstalled for the selected service group.
   Do you want to continue? (y/n) [n]:
   ```
3. Type **y** and press **Enter**.
   The following appears in the command shell:

```
Current backup or restore activity will be stopped on active node for
this group.
Do you want to continue? (y/n) [n]:
```

4. Type **y** and press **Enter**.
   The following appears in the command shell:

```
Removing Agent from oraclus service group...
Agent resource deleted from group oraclus ...
Removing the binaries now...
Do you want to uninstall Avamar in another service group? (y/n) [n]:
```

5. Type **n** and press **Enter**.
6. Remove the Avamar Cluster Client for Solaris software by typing:
   pkgrm AVMRclusclnt

   The following appears in the command shell:

```
The following package is currently installed:
AVMRclusclnt Avamar Cluster Client
(sparc) 7.0.100-nnn
Do you want to remove this package? [y,n,?,q]
```

7. Type **y** and press **Enter**.
   The following appears in the command shell:

```
## Removing installed package instance <AVMRclusclnt>
This package contains scripts which will be executed with super-user
permission during the process of removing this package.
Do you want to continue with the removal of this package [y,n,?,q]
```

8. Type **y** and press **Enter**.
   The following appears in the command shell:

```
## Verifying package <AVMRclusclnt> dependencies in global zone
## Processing package information.
## Executing preremove script.
## Removing pathnames in class <syms>
## Removing pathnames in class <dirs>
## Removing pathnames in class <mans>
## Removing pathnames in class <libs>
/opt/AVMRclusclnt/lib/libstdc++.so.5
/opt/AVMRclusclnt/lib/libobk_avamar64.so
/opt/AVMRclusclnt/lib/libobk_avamar.so
/opt/AVMRclusclnt/lib/libgcc_s.so.1
/opt/AVMRclusclnt/lib
## Removing pathnames in class <etcs>
## Removing pathnames in class <apps>
/opt/AVMRclusclnt/etc/stop.sh
/opt/AVMRclusclnt/etc/start.sh
/opt/AVMRclusclnt/etc/avagent.d
/opt/AVMRclusclnt/etc/AvamarClient-UpdateReplace.sh
/opt/AVMRclusclnt/etc
/opt/AVMRclusclnt/bin/unix.pin
/opt/AVMRclusclnt/bin/sbtscan
/opt/AVMRclusclnt/bin/oracle.pin
/opt/AVMRcluscl
nt/bin/avtar.bin
/opt/AVMRclusclnt/bin/avtar
/opt/AVMRclusclnt/bin/avscc
/opt/AVMRclusclnt/bin/avregister
/opt/AVMRclusclnt/bin/avoracle
/opt/AVMRclusclnt/bin/avclusuninstall
/opt/AVMRclusclnt/bin/avclusinstall
/opt/AVMRclusclnt/bin/avagent.bin
/opt/AVMRclusclnt/bin
/opt/AVMRclusclnt/AvamarClient-License.txt
## Removing pathnames in class <none>
## Updating system information.
Removal of <AVMRclusclnt> was successful.
```

Registering with a new server

To re-register VCS cluster client against a new server, perform the following actions.

Steps

1. Open a command shell and log in to the active VCS node as root.
2. Type the following:
   /opt/AVMRclusclnt/cluster/oraclegrp/bin/avregister

   The following appears in the command shell:

   ```
   === Client Registration and Activation
   This script will register and activate the client with the
   Administrator server.
   Enter the Administrator server address (DNS text name or numeric IP
   address, DNS name preferred):
   ```
3. Type the network hostname (as defined in DNS) of the Avamar Administrator server and press **Enter**.

   The following appears in the command shell:

   ```
   Enter the Avamar server domain [clients]:
   ```

   The default domain is “clients.” However, the Avamar system administrator might have defined other domains and subdomains. Consult the Avamar system administrator for the domain to use when registering this client.

   NOTE: If you are typing a subdomain (for example, clients/MyClients), do not include a slash (/) as the first character. Including a slash as the first character causes an error and prevents you from registering this client.

8

Avamar Client for Windows

Topics:

- Client installation prerequisites
- Capabilities and limitations
- Downloading the install package
- Installing
- Registering
- Uninstalling and upgrading

Client installation prerequisites

Before you install Avamar software on a client system, perform the following prerequisites.

Client compatibility and interoperability

Before you install Avamar software on a client system, ensure that the client operating system and hardware configuration is supported.

Hardware requirements for the Windows Client software

Ensure that the client computer on which you install the Avamar for Windows Client software meets the minimum requirements in the following table.

Table 17. Minimum supported hardware requirements for the Windows Client software

Requirement	Minimum
RAM	512 MB
Hard drive space	250 MB permanent hard drive space (1 GB recommended) for software installation. The Avamar client software also requires an additional 12 MB of permanent hard drive space for each 64 MB of physical RAM. Additional disk space might be required by the snapshot technology. Backing up the Windows System State requires an additional 1 GB of free disk space.
Network interface	Either of the following: ● 10BaseT or higher, configured with the latest drivers for the platform. ● IEEE 802.11a/b/g, configured with the latest drivers for the platform.

Updated, detailed client compatibility information is available in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection.

Preinstallation checks

Before you install the Avamar software, perform the following:

Prerequisites

1. Ensure that the Avamar server is operational and present on the same network as the client computer.

Verify if this action is performed by opening a command shell on the client computer and typing the following:

ping *AVAMARSERVER*

where *AVAMARSERVER* is the network hostname (as defined in DNS) or IP address of the Avamar server.

2. Make note of the network hostname (as defined in DNS) for:
   - Avamar server
   - Avamar utility node

   These DNS entries should have been added during deployment of the Avamar system.

Download client packages to the Avamar server

Before installing the Avamar client software, you must first download the UpgradeClientDownloads package from the EMC repository to the Avamar server. After downloading the file, you must install it on the server for the client installation packages to be available. Follow instructions for downloading and installing new packages from the EMC repository in the Avamar Administration Guide.

Capabilities and limitations

The Avamar for Windows Server Guide provides installation instructions for the Avamar Client for Windows on a computer running Windows cluster or Windows Server 2008.

Computers with User Account Control

In Windows Vista, Microsoft added the User Account Control (UAC) feature. Later versions of the Windows operating system, such as Windows 7, continued this feature with minor changes.

Microsoft designed UAC to provide additional operating system security by preventing the installation of software that runs with administrator privileges, unless an administrator authorizes the elevated privileges.

When you start the Avamar Client for Windows installer without administrator privileges on a computer with a default implementation of UAC, the software requires that you provide the username and password for an account with administrator privileges. Otherwise, the installation exits.

After successful installation of Avamar Client for Windows, any nonadministrative user can start to use it without loss of functionality.

Disabling NTFS last access time inhibits backing up changed ACLs

If you disable NTFS Last Access Time feature on a Windows backup client, then the Avamar Client for Windows software cannot detect any further Windows ACL changes. This action means that the ACL setting that is stored during the original file backup is the ACL setting that Avamar Client for Windows applies on all future restores.

About this task

The Windows operating system enables the NTFS Last Access Time feature by default, but sometimes users disable this setting for performance purposes. Reestablishing proper ACL backup behavior requires that you:

Steps

1. Enable NTFS Last Access Time feature.

   There are two ways to reenable the NTFS Last Access Time feature:

   a. Search the Windows Registry for the following key:
      HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\FileSystem\NtfsDisableLastAccessUpdate

      If the key exists, and its value is **1**, modify the value to **0**.

If the key does not exist, or if it exists with a value of **0**, then Windows has NTFS Last Access Time enabled. Take no further action.

b. On Windows XP, Server 2003, and Vista platforms, you can enable NTFS Last Access Time by typing the following command at a command prompt:
`fsutil behavior set disablelastaccess 0`

2. Delete all local Avamar Client for Windows cache files.

   The Avamar Client for Windows cache files are:

   `C:\Program Files\avs\var\f_cache.dat`

   `C:\Program Files\avs\var\p_cache.dat`

   Delete these files. Avamar Client for Windows regenerates these files during the next backup.

Downloading the install package

Download one or more install packages from the Avamar server.

Steps

1. Log in to the computer.
2. In a web browser, type the following URL:
   `https://`*`AVAMARSERVER`*`/dtlt/home.html`

   where *AVAMARSERVER* is the Avamar server network hostname (as defined in DNS) or IP address.
3. If a security alert dialog box appears due to browser security settings, click **Yes** or **OK** to allow redirection to the Avamar secure web server.
   The Avamar Web Restore home page appears.
4. From the links at the top of the page, click **Downloads**.
   A list of the software available from the server appears in the browser.
5. Select an operating system heading or software category heading from the list and click + next to it.

   When necessary, click **+** next to subheadings until the software package link appears.
6. Click the software package link.
   The server transfers the software package to the web browser.
7. Save the installation package to a temporary folder.
   Do not rename a software package. The Avamar push upgrade mechanisms are incompatible with renamed packages.

Installing

Use the following procedure to install Avamar Client for Windows software on all supported versions of Microsoft Windows except any Windows Server or Windows Cluster installations.

About this task

The *Avamar for Windows Server User Guide* provides information for installation, configuration, and use on Microsoft Windows Server 2008, Windows Server 2008 Core, and Windows Cluster Server 2003.

NOTE: Do not attempt to back up a CIFS/NFS network share by installing an Avamar client on a local machine. Attempting to do so results in a severe degradation in backup and restore performance and metadata such as folders, ACLs, and file permissions are not backed up. To backup a CIFS/NFS share, install an Avamar client on the share machine or use NDMP to back up the data.

Steps

1. Log in to the computer.
   "Downloading the install package" describes how to access and download the software.
2. Locate the downloaded software package and double-click it.
   A User Account Control dialog box appears.
3. Click **Yes**.

When you run the install program from a user account that does not have Adminstrator privileges, type the username and password for an account with Administrator privileges and then click **Yes**.

4. Follow the instructions in the wizard.
   After you accept the End User Licensing Agreement, the Custom Setup screen appears.
5. Select whether to install Avamar Client for Windows software with a Graphical User Interface (GUI):
   - To install with a GUI, leave the **Avamar Client User Interface** option enabled, and click **Next**.
   - To install without a GUI, click **Avamar Client User Interface** and select **Entire feature will be unavailable**, and click **Next**.

   The Ready to install Avamar for Windows screen appears.
6. Enter the server information and click **Install**.
   A User Account Control dialog box appears.
7. Click **Yes**.
8. When the installation completes, click **Finish**.
   The installation wizard closes and the Avamar icon appears in the system tray.

Registering

Before you can back up files or restore files, you must register the client with the Avamar server.

About this task

Do not register the Avamar Client for Windows unless instructed to do so by the system administrator. The administrator often registers and activates the client from the Avamar server.

To register and activate the Avamar Client for Windows software from the client computer:

Steps

1. Right-click the Avamar system tray icon.
2. Select **Manage > Activate Client**.
   The Activate Client Setup dialog box appears.
3. In **Administrator Server Address**, type the hostname of the Avamar server as defined in DNS, or its IP address.
4. In **Administrator Server Port**, type 28001.
5. In **Client Domain**, type the Avamar domain for this client.
   NOTE: The default domain is “clients.” However, the Avamar system administrator can define other domains and subdomains. Consult the Avamar system administrator for the domain to use when registering this client. When typing a domain (for example, clients/MyClients), do not include a slash (/) as the first character. A slash as the first character causes an error and prevents you from registering this client. Do not even use a backslash (\) in this field.
6. Click **Activate**.
   The Activate Client Setup dialog box closes, and the activation process starts. Avamar client adds a green check mark to its system tray icon when activation successfully completes.

Uninstalling and upgrading

You do not have to uninstall earlier versions of Avamar Client for Windows software before you install a new version.

When installing the Avamar Client for Windows on a computer that has a version of the software installed, the installation program prompts you to select one of the following:

- Upgrade current Avamar Client for Windows installation to the new version.
- Remove old Avamar Client for Windows installation.

NOTE: It might be necessary to deactivate the client instance from the Avamar server to successfully reactivate it with the Avamar server. The *Avamar Administration Guide* contains further information.

If you decide to remove the old installation, rerun the installation file to install the new version. The current installation session becomes an “uninstall” session, then terminates.

You can also use the Windows Control Panel **Add/Remove Programs** feature to completely uninstall the Avamar Client for Windows.

NOTE: If you should revert to an older version of the Avamar Client for Windows software, you must completely uninstall the existing version before installing the older version. You cannot revert to an older version by using the upgrade process.

9

Backup and Restore

Topics:

- Overview
- Restore authority
- Capabilities and limitations
- Avamar Web Restore for Windows, Mac, and Linux clients
- Windows clients
- Mac OS X clients
- Linux clients
- AIX, HP-UX, Linux, and Solaris clients

Overview

After installation and registration, the data on Avamar clients is typically backed up automatically by way of regularly scheduled backups that are initiated by the Avamar server. A system administrator backed up data using Avamar Administrator or the AUI. However, you can also initiate on-demand backup and restore operations directly from the Avamar client.

NOTE: The NetWorker client (lgtoclnt) can be installed by running the NetWorker Upgrade/Install for Client Downloads workflow package. The workflow automates the steps that are required to make the client available or to upgrade it alongside the Avamar clients on the Avamar Web Documents & Downloads page. Refer to workflow documentation for installation information.

NOTE: The *Avamar for Windows Server User Guide* provides information about installation, backup, and recovery on Microsoft Windows Server 2008, Windows Server 2008 Core, and Windows Cluster Server 2003.

NOTE: When performing on-demand backups, you can only initiate a single backup at a time. The Avamar client user interface governs this limitation. However, if backups are performed from the command line, ensure that each on-demand backup operation is complete before initiating another one.

There are two restore interfaces for Windows, Macintosh, and Linux clients:

- Avamar Web Restore
- Avamar client web UI

Use these interfaces to restore directories and files that are backed up using a file system plug-in. To restore data that is backed up with other plug-ins, refer to the guide specific to the plug-in.

Use Avamar Web Restore to restore individual files and to restore directories and multiple files as zip files. Certain limitations apply to Avamar Web Restore, as described in "Capabilities and limitations".

The Avamar client web UI (AUI) provides enhanced features for desktop computers and laptop computers. Use the Avamar client web UI to restore a file, restore several files, or restore complete folders. Restore files and folders to their original location or to a new location. Also use Avamar client web UI to launch interactive backups through file system plug-ins.

NOTE: The Avamar AUI is only supported in stand-alone environments.

Enforcement of backups to Data Domain

If the Avamar server is configured to enforce backups to a Data Domain system, the server rejects backups that are not destined for the Data Domain. This enforcement covers backups that you configure through the Avamar Administrator and the AUI, as well as from command-line interfaces and other tools.

These backups must have additional flags that indicate the storage target. The *Avamar and Data Domain System Integration Guide* provides more information about backup enforcement and the related client version requirements. Backup enforcement is disabled by default.

Restore authority

Avamar client grants you authority to restore a folder or a file only if your login credentials grant operating system Write permission for the restore location.

If you want to restore a folder or file that has the same path and name as one that exists on your computer, your login credentials must authenticate you as the owner of that existing folder or file before Avamar client restores over it.

Capabilities and limitations

This section describes capabilities and limitations of Avamar Web Restore. These limitations do not apply to the Avamar client web UI.

International character support

Avamar generally supports the use of specific supported international characters in the names of directories, folders, and files. However, proper display of international language characters is contingent on the client computer installed system fonts being compatible with the original language.

If you browse backups that were created with international characters and a compatible font is not installed on the system, then any characters that the system cannot resolve are displayed as rectangles. This process is a normal limitation of that particular situation and does not affect the ability to restore these directories, folders, or files. The *Avamar Release Notes* provide additional international language support information.

Restoring international characters with web restore

With the Avamar Web Restore feature, restores with directories or multiple files are delivered in the form of a zip file. When unzipping the file, file and directory names with international characters might not restore correctly due to inherent limitations in some zip utilities.

To correctly restore files with international characters using the Avamar Web Restore feature, use a zip utility that fully supports international characters. Examples of zip utilities that have been confirmed to work correctly include:

- Winrar 3.80 or later
- Winzip 12.0 or later
- 7zip 4.65 or later

NOTE: Microsoft Windows compressed folders are specifically known to not reliably handle international characters. Do not use this option with the Avamar Web Restore feature.

Restoring encrypted files is not supported

It is not possible to restore encrypted files with the Avamar Web Restore feature. Any files that were encrypted at the time of the original backup are restored as empty (0 bytes) files. Contact the Avamar system administrator, who can restore encrypted files by using Avamar Administrator or AUI.

Avamar Web Restore client-type limitation

You can use the Avamar Web Restore feature to restore data from Windows clients, Macintosh clients, and Linux clients.

If you use the Web Restore interface to restore data from other client types, the data is corrupted during the restore process. This issue also applies to data that originated on a Windows computer, Macintosh computer, or Linux computer but was copied to and backed up from another computer. The data that is backed up from second computer cannot be restored to the original computer through Avamar Web Restore. If you should restore data from other client types, contact the Avamar system administrator who can restore the files by using Avamar Administrator or the AUI.

ACLs not preserved by Avamar Web Restore

When you restore folders or files with the Avamar Web Restore feature, ACLs and any other access rights to the folders or files that might have existed on the original client are not preserved.

Mixed backups are not supported

The full backup for a client and all subsequent incremental and differential backups must be stored on either the Avamar server or a single Data Domain system.

Avamar does not support any of the following scenarios:

- Full backup on a Data Domain system and incremental or differential backups on the Avamar server
- Full backup on the Avamar server and incremental or differential backups on a Data Domain system
- Full backup on one Data Domain system and incremental or differential backups on another Data Domain system

  Therefore, if you change the device on which backups for a client are stored, then you must perform a full backup before any further incremental or differential backups.

Wildcard characters not supported during restores

When performing restores from the **avtar** command line, wildcard pattern matching characters, such as asterisk (*) and question mark (?), are not supported.

The only way to constrain a restore operation is to define a partial path within the backup (that is, a single file or directory structure) and restore only that data.

Backup always modifies the atime value

On UNIX and UNIX variants, **avtar** always modifies the atime (access time) value for files that are opened and read during the backup.

This action occurs during an initial backup when the file has been modified since the last backup or when the client's file cache has been deleted.

Avamar Web Restore for Windows, Mac, and Linux clients

Use Avamar Web Restore to restore files that were backed up from Windows clients, Mac OS X clients, and Linux clients.

For proper display, view Avamar Web Restore in a web browser that provides a viewport that is at least 1024 pixels in width and at least 768 pixels in height.

Opening Avamar Web Restore

Steps

1. Open a web browser and type the following URL:
   `http://AVAMARSERVER`

   where AVAMARSERVER is the Avamar server network hostname (as defined in DNS) or IP address.

   You are redirected to the Avamar secure web server. The protocol changes to HTTPS. You may see an alert page if the server's certificate is not accepted by your web browser. Continue to the Avamar Web Restore home page.

2. From the links at the top of the page, click a destination.

   Alternatively, click one of the icons on the body of the page.

Logging in to Avamar Web Restore using LDAP

Steps

1. On the home page, from the links at the top of the page, click either **Search** or **Browse**.

   Click **Search** to search for files by filename. Click **Browse** to browse through a directory tree for files.

   Alternatively, hover the cursor over the Search or Browse icons on the home page, and click the **Log-in Required** icon that appears.

   The login page appears.

2. In **User ID**, type your username.

   This username is the one that you use to log in to your company's domain applications that use LDAP v.3-compatible authentication, such as Active Directory. When your username includes a domain segment (@domain), remove that segment.

   For example, if you log in with the username "jsmith@biz.domain.com", use jsmith.

3. In **Password**, type your password.
4. In **Domain**, select **LDAP**.
   The list of LDAP domains appears.
5. From the list of LDAP domains, select the domain of your user account.
   The list only includes domains that an administrator configures Avamar to recognize.
6. Begin the authentication process by using one of the following methods:
   - When you have backups from more than one computer, in **Client Path**, select the Avamar client path for a computer.
   - When you have backups from only one computer, click **Login**.

   Avamar Web Restore authenticates your credentials and the page you selected appears.

Logging in to Avamar Web Restore using Avamar

Steps

1. On the home page, from the links at the top of the page, click either **Search** or **Browse**.

   Click **Search** to search for files by filename. Click **Browse** to browse through a directory tree for files.

   Alternatively, hover the cursor over the Search or Browse icons on the home page, and click the **Log-in Required** icon that appears.

   The login page appears.

2. In **User ID**, type your username.
   Use your Avamar system username.
3. In **Password**, type your password.
4. In **Domain**, select **Avamar**.
5. In the text area of **Domain**, type the full path of the Avamar domain of your computer.

   The path is case-sensitive. The server does not validate the existence of the path that you type.

   For example, if the Avamar server registered your computer in the /clients/accounting domain, type **`/clients/accounting`**. Typing **`/Clients/accounting`** does not display the /clients/accounting domain.

6. In **Client Name**, type the client computer's name.

   Use the same name that the Avamar server used to register the computer.

7. Click **Login**.

   Avamar Web Restore authenticates your credentials and the page you selected appears.

Performing a restore using Avamar Web Restore

To restore files and folders using Avamar Web Restore:

Steps

1. On the Avamar Web Restore home page, from the links at the top of the page, click either **Search** or **Browse**.

   Click **Search** to search for files by filename. Click **Browse** to browse through a directory tree for files.

2. Log in.
3. Using either search or browse, select files and folders.
4. Click the Download icon.

   When you select multiple files, Avamar Web Restore combines all selections into one zip file that retains the relative path structure of the source. When you select only one file, Avamar Web Restore does not place it in a zip file.

   Avamar Web Restore sends the file to your web browser.

5. Save the zip file or individual file on your computer.

   Open zip files using a zip utility.

Windows clients

Avamar Client for Windows initiates on-demand backups and restores using the Avamar client application. This application is accessible through the system tray icon.

Restore requirement

To restore files to a Windows system, the logged in account must have the Windows “Restore files and directories” user right that is assigned to it in Local Security.

This user right is assigned by default to an account if it is a member of either the Administrators or Backup Operators groups.

An account that is not a member of either of these groups, or of another group that includes this user right, must have this right assigned, either through group membership or individual assignment, before it can be used to restore files.

The following table provides information about minimum hardware requirements for Avamar Granular Level Recovery(GLR) software.

Table 18. Minimum supported hardware requirements for the Avamar GLR software

Requirement	Minimum
RAM	512 MB
Hard drive space	512 MB permanent hard drive space (2 GB recommended) has been allocated for software installation. The Avamar GLR software also requires an additional 400 MB of permanent hard drive space for each 128 MB of physical RAM. Additional disk space can be required by the snapshot technology.
Network interface	Either of the following option is required: ● 10BaseT or higher, configured with the latest drivers for the platform. ● IEEE 802.11a/b/g, configured with the latest drivers for the platform.

Network optimization

Avamar Client for Windows is designed to minimize network and server load by blocking a backup request when you currently have an on-demand or a scheduled backup running or waiting to run. A message is displayed when this action occurs.

Performing a single-click backup

You can launch an on-demand backup with a single click on the Avamar Client for Windows context menu. This backup does not open a user interface.

Prerequisites

The backup dataset depends on whether the client is running a server version of the Windows operating system, as shown in the following table.

Table 19. Backup datasets for Windows operating systems

Windows OS type	Dataset
Non-server	Dataset for each of the computer's assigned groups.
Server	Default dataset.

To start a single-click backup:

Steps

1. Right-click the Avamar icon in the system tray.
   The context menu appears.
2. Click **Back Up Now**.

Results

The backup request is sent to the server.

Performing an interactive backup

You can launch an on-demand backup using the Avamar client web UI.

About this task

This interactive backup permits the selection of:

- **Dataset by group** — Choose to back up the dataset of any of the assigned groups for the computer.
- **Specific backup sets** — Select individual files, multiple files, and directories to include in the backup. This feature must be administratively enabled.

  To start an interactive backup:

Steps

1. Right-click the Avamar icon in the system tray and select **Back Up** from the context menu.

   The Backup page opens in a web browser. This page displays information about the dataset and backup schedule for each of the groups for the computer.
2. Review the available policy trees, and select the appropriate backup group.
   If the computer is in only one backup group, only one policy tree appears.

   NOTE: If the Backup page includes the Select Now button, you can select the files and directories to include in the backup instead of selecting a backup group. The online help describes how to use this feature.
3. Click **Back Up Now**.

Performing a restore using Avamar client web UI

You can initiate an on-demand restore using the Avamar client web UI from the Avamar icon in the system tray. The web UI opens in the default web browser for the computer.

About this task

From the web UI, use the Search page to search for files and directories by name, or use the Browse page to find files and directories using a familiar directory tree view. Using either method, you can select and restore any of the retained versions of a file.

To restore files and directories using the Avamar client web UI:

Steps

1. Right-click the Avamar icon in the system tray and select **Restore** from the context menu.

   The web UI opens in the default web browser.

   Depending on the Avamar server settings, a login screen may appear. If it happens, log in. The web UI opens with the Search page. To use the Browse page instead, select Browse from the side menu.
2. (Optional) Select an alternate computer as the backup source.

   This feature is described in the online help.
3. Use the **Search** page or the **Browse** page to add folders and files to the restore set.
4. Choose how to name the restored files:
   - Select **New Name** to assign an automatically generated new name to each file that you restore.
   - Select **Overwrite Existing File** to retain the names of all files in the restore set.
5. (Optional) Select a new restore location:
   a. Click **Browse**.
      The location browser appears and displays a list of folders on the computer.
   b. Select a folder for the restore location.
   c. Click **Select Folder**.
      The location tool closes and the new restore location is listed in Restore to.
6. Click **Restore**.

Getting status

The Avamar Client status window provides information about backup and restore tasks. It also provides supplementary access to local settings and logs for Avamar client.

About this task

To view the status of backup and restore tasks from the Avamar client:

Steps

1. Right-click the Avamar icon.
   The context menu appears.
2. Select **Manage > View Console**.

Results

In-progress and completed backups appear in the main window pane of the Avamar Client status window. Access to local settings and logs is available through the menu bar.

Client notification settings

You can configure Avamar Client for Windows to display or hide client notifications. These notifications are enabled by default.

About this task

The client notifications are:

- **Backup Reminder**—Reminder that appears after a set number of days have elapsed since the last backup. Possible values are: `1, 2, 3, 4, 5, 6, 7`, or `Never.`
- **Balloon Messages**—Task messages that appear in balloons near the Avamar icon.

To enable or disable client notifications:

Steps

1. Right-click the Avamar icon in the system tray.
   The context menu appears.
2. On **Settings > Show Backup Reminder**, select a setting.
   A checkmark appears next to the selected setting.
3. On the **Settings** submenu, click **Show Balloon Messages**.

   When a checkmark appears, the balloon messages appear. When the checkmark is cleared, the balloon messages do not appear.

   Balloon messages are brief messages that appear near the Avamar icon. The following table describes these messages.

Table 20. Avamar balloon message descriptions

Message	Description
Backup Started	An automatic backup starts, and an on-demand backup task is received.
Backup Finished	Either an automatic backup or an on-demand backup finishes.
Backup Canceled	A backup (automatic or on-demand) is canceled through the Progress window, the console, or administrative action.
Restore Started	A restore task is received from the web UI. One message for each separately selected folder, and for each folder that contains selected files.
Restore Finished	A restore task finishes.
Restore Canceled	A restore is canceled through the Progress window, the console, or administrative action.
Upgrade Started	An upgrade of the Avamar Client for Windows software started.

Table 20. Avamar balloon message descriptions (continued)

Message	Description
Upgrade Finished	An upgrade of the Avamar Client for Windows software finished successfully.
Upgrade Failed	An upgrade of the Avamar Client for Windows software failed.

Progress window

The Progress window provides a visual means of determining the progress of an Avamar Client for Windows task, and enables you to pause or cancel the task.

About this task

By default the Progress window appears whenever a task starts.

You can change the setting so that the window is hidden. However, while the window is hidden, you cannot pause backups.

To show or hide the Progress window:

Steps

1. Right-click the Avamar icon in the system tray.
   The context menu appears.
2. On the **Settings** submenu, click **Show Progress Bar**.
   When a checkmark appears, the Progress window appears. When the checkmark is cleared, the Progress window does not appear.

Canceling a backup

To cancel an automatic or manual backup, click **Stop** on the **Progress** window.

Pausing a backup

You can pause manual and automatic backups for up to 30 minutes.

When you restart a paused backup, the backup resumes at the point it was paused. After 30 minutes, the backup resumes automatically.

Avamar clients are designed so that backups have a low impact on system resources. However, you may pause a backup to reclaim resources. When paused, a backup uses minimal system resources.

To pause a backup, click **Pause** on the **Progress** window. To resume a backup, click **Resume**.

Mac OS X clients

You can initiate on-demand backups and restores using the Avamar for Mac OS X Client, located in the Applications folder.

By default, this application is launched at login. All features and actions are accessible through its icon on the menu bar.

Network optimization

The Avamar for Mac OS X Client is designed to minimize network and server load by blocking a backup request if you currently have an on-demand or a scheduled backup running or waiting to run. A message is displayed when this occurs.

Performing a single-click backup

You can launch an on-demand backup with a single click on the Avamar for Mac OS X Client context menu. This backup does not open a user interface.

About this task

A single-click backup includes the dataset for each of the assigned groups for the computer.

To start a single-click backup:

Steps

1. Click the Avamar icon on the menu bar.
   The context menu appears.
2. Click **Back Up Now**.

Performing an interactive backup

You can launch an on-demand backup using the Avamar client web UI.

About this task

This interactive backup permits the selection of:

- **Dataset by group**—Choose to back up the dataset of any of the computer assigned groups for the computer.
- **Specific backup sets**—Select individual files, multiple files, and directories to include in the backup. This feature must be administratively enabled.

  To start an interactive backup:

Steps

1. Click the Avamar icon on the menu bar, and then click **Back Up** from the context menu.
   The Backup page opens in the web browser. This page displays information about the dataset and backup schedule for each of the groups for the computer.
2. Review the available policy trees, and select the appropriate backup group.
   If the computer is in only one backup group, only one policy tree appears.
   NOTE: If the Backup page includes the Select Now button, you can select the files and directories to include in the backup instead of selecting a backup group. The online help describes how to use this feature.
3. Click **Back Up Now**.

Performing a restore using Avamar client web UI

You can initiate on-demand restores from the Avamar icon on the menu bar using the Avamar client web UI. The web UI opens in the default web browser.

About this task

From the web UI, use the Search page to search for files and directories by name, or use the Browse page to find files and directories using a familiar directory tree view. Using either method, you can select and restore any of the retained versions of a file.

To restore files and directories using the Avamar client web UI:

Steps

1. Click the Avamar icon on the menu bar, and then click **Restore** from the context menu.
   The web UI opens in the default web browser.

   Depending on the Avamar server settings, a login screen may appear. If it happens, log in.

   The web UI opens with the Search page. To use the Browse page instead, select Browse from the side menu.
2. Use the **Search** page or the **Browse** page to add folders and files to the restore set.
3. Choose how to name the restored files:
   - Select **New Name** to assign an automatically generated new name to each file that you restore.
   - Select **Overwrite Existing File** to retain the names of all files in the restore set.
4. (Optional) Select a new restore location:
   a. Click **Browse**.
      The location browser appears and displays a list of the folders on the computer.
   b. Select a folder for the restore location.
   c. Click **Select Folder**.

      The location tool closes, and the new restore location is listed in Restore to.
5. Click **Restore**.

Getting status

The Work Order List window provides information about backup and restore tasks. It also provides supplementary access to local settings and logs for the Avamar client.

About this task

To view the status of backup and restore tasks:

Steps

1. Click the Avamar icon on the menu bar.
   The context menu appears.
2. Select **Manage > View Console**.

Backup reminder

You can configure the Avamar for Mac OS X Client to display or hide the backup reminder. This notification is enabled by default.

About this task

The backup reminder appears when more than 24 hours have elapsed since the last backup.

To enable or disable the backup reminder:

Steps

1. Click the Avamar icon on the menu bar.

   The context menu appears.
2. On **Settings > Show Backup Reminder**, select a setting.

   The possible values are: **1, 2, 3, 4, 5, 6**, or **7** days, or **Never**.

   A checkmark appears next to the selected setting.

Progress window

The Progress window provides a visual means of determining the progress of an Avamar for Mac OS X Client task. It also enables you to pause or cancel the task.

About this task

By default the Progress window appears whenever a task starts.

You can change this setting so that the window is hidden. However, while the window is hidden, you cannot pause backups.

To show or hide the **Progress** window:

Steps

1. Click the Avamar icon on the menu bar.

   The context menu appears.
2. On the **Settings** submenu, click **Show Progress Bar**.

   When a checkmark appears next to the option, then the **Progress** window appears. When the checkmark is cleared, then the **Progress** window does not appear.

Canceling a backup

To cancel an automatic or manual backup, click **Stop** on the **Progress** window.

Pausing a backup

You can pause manual and automatic backups for up to 30 minutes.

When you restart a paused backup, the backup resumes at the point it was paused. After 30 minutes, the backup resumes automatically.

Avamar clients are designed so that backups have a low impact on system resources. However, you may pause a backup to reclaim resources. When paused, a backup uses minimal system resources.

To pause a backup, click **Pause** on the **Progress** window. To resume a backup, click **Resume**.

Linux clients

Back up and restore of Linux clients can also be performed in several ways.

The following sections describe tasks you can initiate for Linux clients:

- Full backup using avscc command
- Interactive backup and restore using Avamar client web UI
- Backup and restore using avtar commands
- Performing an on-demand backup with the Linux Fast Incrementals plug-in on page 74

Full backup using avscc command

Running avscc at the command line with the backupnow flag backs up Linux clients much the same as a single-click backup of a Windows or Mac computer.

About this task

This command launches a backup of the source dataset for each group that is assigned to the client and includes any additional source added through the web UI.

To initiate a backup using avscc:

Steps

1. Open a command shell.
2. Change the working directory to the location of the `avscc` executable by typing:
   `cd /usr/local/avamar/bin`
3. Run avscc with the backupnow flag by typing:
   `avscc --command=backupnow`

   The invoked instance of `avscc` submits a backup request to the server and exits. The server schedules and runs the backup task.

Interactive backup and restore using Avamar client web UI

You can perform interactive backups and restores using a web browser to access the Avamar client web UI.

Linux clients require the following environment to use these features:

- Desktop environment with a window system
- Firefox 3.0 or newer web browser that is configured to be launched by a call to one of the following environment variables:
  - (For KDE) kfmclient
  - (For GNOME) gnome-open
  - (Others) BROWSER

Performing a backup

You can perform an on-demand backup through the Avamar client web UI in two ways.

About this task

When you perform an on-demand backup through the Avamar client web UI, you can select:

- **Dataset by group**—Choose to backup the dataset of any of the assigned groups for the computer.
- **Specific backup sets**—Select individual files, multiple files, and directories to include in the backup. This feature must be administratively enabled.

  To initiate an on-demand backup using the web UI:

Steps

1. Open a command shell.
2. Change the working directory to the location of the `avscc` executable by typing:
   `cd /usr/local/avamar/bin`
3. Invoke `avscc` with the **backup** flag by typing:
   `avscc --command=backup`

   The login window appears in the web browser.
4. Log in to the web UI.

   The Backup page opens in a web browser. This page displays information about the dataset and backup schedule for each of the groups for the computer.
5. Review the available policy trees, and select the appropriate backup group.

   If there is only one backup group for the computer, then only one policy tree appears.

   NOTE: If the Backup page includes the Select Now button, you can select the files and directories to include in the backup instead of selecting a backup group. The online help describes how to use this feature.

6. Click **Back Up Now**.

Performing a restore

You can initiate an on-demand restore through the Avamar client web UI.

About this task

Use this interface to select and restore single files, multiple files, and directories. You can restore files and directories to their original location or to a new location.

To initiate an on-demand restore using the web UI:

Steps

1. Open a command shell.
2. Change the working directory to the location of the `avscc` executable by typing:
   `cd /usr/local/avamar/bin`
3. Invoke `avscc` with the **restore** flag by typing:
   `avscc --command=restore`

   The login window appears in the web browser.
4. Log in to the web UI.

   The Search page appears. To use the Browse page instead, select **Browse** from the side menu.
5. Use the **Search** page or the **Browse** page to add folders and files to the restore set.
6. Choose how to name the restored files:
   - Select **New Name** to assign an automatically generated new name to each file that you restore.
   - Select **Overwrite Existing File** to retain the names of all files in the restore set.
7. (Optional) Select a new restore location:
   a. Click **Browse**.

      The location browser appears and displays a list of the folders on the computer.
   b. Select a folder for the restore location.
   c. Click **Select Folder**.

      The location tool closes and the new restore location is listed in Restore to.
8. Click **Restore**.

Performing an on-demand backup with the Linux Fast Incrementals plug-in

Steps

1. In Avamar Administrator, click the **Backup & Restore** launcher link.
   The **Backup, Restore and Manage** window is displayed.
2. In the domain tree, select the domain for the client.
3. From the list of clients, select the client computer to back up.

   You can only view clients in the domain for the login account. To view all clients, log in to the root domain.
4. Click the **Backup** tab.
   A list of plug-ins on the client appears in the left pane of the **Backup** tab.
5. To back up, browse to and select the checkbox next to the data.
6. If you browse the client file system, specify a valid client username and password, then click **OK**.

   The username and password must have read permissions on the files and directories that you select for backup.
7. (Optional) To view a summary of all directories and files that you selected for backup, select **Actions** > **Preview List**.
8. Select **Actions** > **Back Up Now**.
   The **On Demand Backup Options** dialog box appears.
9. Select the backup retention setting:
   - To automatically delete this backup from the Avamar server after a specific amount of time, select **Retention period**. 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**.

10. 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 *Avamar Product Security Guide* provides additional information.

11. Click **More Options**.
    The **Backup Command Line Options** dialog box appears.
12. (Optional) Select the **Show Advanced Options** checkbox to view advanced options, which appear in red.
13. Select the **Backup Mode**.

    You can select whether to let the system determine whether to perform a full or incremental backup, or you can force a full backup, or force an incremental backup.

14. Click **OK** on the **Backup Command Line Options** dialog box.
15. Click **OK** on the **On Demand Backup Options** dialog box.
    The **On Demand Backup Request** dialog box indicates that the backup started.
16. Click **Close**.

    The restore workflow for the Linux Fast Incrementals plugin is the same as the traditional filesystem plugin. Avamar Web Restore for Windows, Mac, and Linux clients on page 64 has further information.

Linux Fast Incrementals plug-in backup and recovery notes

This section contains notes and troubleshooting information that is related to the Fast Incrementals plug-in.

File system is read-only during level 0 backups

When a level 0 (full) backup is performed with the Linux Fast Incrementals plug-in, the file system is in read-only mode for the duration of the backup.

Fast Incrementals backups are at the file system level only

The Linux Fast Incrementals plug-in can only perform backups at the file system level. You cannot use the plug-in to backup individual files and directories.

Only mount points are restored when top level checkbox is selected

When selecting the top level checkbox of a backup for restore, this "top folder" is not restored. Only the mount point underneath it is restored.

When performing a redirected restore of multiple mount, files or directories may overwrite each other when the path of a file or directory in one mount point is the same as the path or directory in another mount point.

Backup retries not supported

If a Fast Incrementals backup fails (for example, if the client system reboots during the backup), the backup will not retry automatically after the reboot, but should complete on the next scheduled backup window.

If the client system reboots unexpectedly or crashes during a Fast Incrementals backup, the Fast Incrementals state will be lost and the next backup will revert to a Level 0 backup to maintain backup consistency.

Fast Incrementals backups can only be restored with the Fast Incrementals plug-in

"Cross-platform" restores are not supported. You cannot restore Fast Incrementals backups using the traditional Linux client plug-in. You can only restore using the Fast Incrementals plug-in.

Error message related to quota package

An error message similar to the following is displayed during reboot:

```
Enabling local filesystem quotas: quotaon: using
/xfs_local/aquota.group on /dev/mapper/lbbb_vgrp_0-lbbb_vol_00
[/xfs_local]: Invalid cross-device link
```

This issue happens when the following actions occur:

- When a filesystem being protected by Fast Incrementals backup is updated in fstab.
- When quotas are configured over the filesystem and the machine is subsequently rebooted.

This issue is an expected error and the quota configurations are not disturbed.

Do not change file permissions for Linux Fast Incremental journal or configuration files

Do not change file permissions for Linux Fast Incrementals journal files or the directory where these files reside (`/var/avamar/BackupBoost/journals`). Do not change the file permissions for Linux Fast Incrementals configuration files or the directory where these files reside (`/var/avamar/BackupBoost/config`). Changing permissions on these files may result in configuration errors, data inconsistency, or the unnecessary creation of full backups.

Disk space required for journal and configuration files

The space that is required for Linux Fast Incrementals journal and configuration files depends on several factors, such as:

- The number of filesystems that are configured.
- The number of inodes that are changed on each filesystem.
- The number of characters in inode name (if greater than 32 bytes).

For example, if a filesystem contains 10 million inodes, and assuming a 10% change rate, then approximately 300 MB of disk space would be required for the journal and configuration files for the filesystem.

Changing the filesystem UUID

Do not change UUID of a filesystem that has been configured for Linux Fast Incrementals. If changing the UUID is required, first deactivate the filesystem for LFI, change the UUID, then active the filesystem for LFI again.

Notes about Linux feature support with Linux Fast Incrementals

- Linux lazy unmount is not supported. An error message is then generated.
- Linux mount move and an error message are generated.
- No support for stackable filesystems or fuse filesystems which are mounted to a Linux Fast Incrementals configured filesystem.
- Linux containers are not supported with LFI.
- The `debugfs` command is not supported. If it is run, LFI cannot capture the generated events and does not backup these files/inodes.
-
- Running `e2fsck` on an LFI configured filesystem results in a full backup.
- LFI creates a device special file for each enabled filesystem. These files are located in the system's `/dev` directory (for example, `/dev/lfsdisk01`). These created files are deleted when the filesystem is disabled for LFI.

AIX, HP-UX, Linux, and Solaris clients

This section describes on-demand back up and restore for AIX, HP-UX, Linux, and Solaris clients.

Back up and restore of Linux clients can also be performed using `avscc` commands and the web UI. Linux clients explains more.

Backup and restore using avtar commands

AIX, HP-UX, Linux, and Solaris clients can initiate on-demand backups and restores using the `avtar` command line.

NOTE: Space limitations in this guide cause the examples in this topic to continue (wrap) to more than one line. However, you must type all commands and options in a command shell on a single command line (no line feeds or returns allowed).

Performing an on-demand backup

Back up AIX, HP-UX, Linux, and Solaris clients on-demand from the command line using an avtar command.

The avtar command must be in the following basic format:

avtar -c --label=*NAME FILE1 [FILE2 ...] DIR1 [DIR2 ...]* **--id=***USER*

where:

- *NAME* is a short descriptive name for the backup.
- *FILE1 [FILE2 ...] DIR1 [DIR2 ...]* is a space-separated list of filepaths and directory paths to include in the backup.
- *USER* is the username to use for authentication.

This must be the username of an Avamar internal user account and use the format USERNAME@DOMAIN, where USERNAME is the username of the account and DOMAIN is the authentication domain for the account.

The following example backs up files within the MyFiles and abcd directories on a Linux computer, and labels the backup jdoeFiles:

```
/usr/local/avamar/bin/avtar -c --label="jdoeFiles" MyFiles/ abcd/ --id=jdoe@avamar/clients/
MyClient
```

Performing a restore

Restore files to AIX, HP-UX, Linux, and Solaris clients from the command line using an avtar command.

The `avtar` command must be in the following basic format:

avtar -xv --label=*NAME* **--before=***DATE* **--after=***DATE FILE1 [FILE2 ...] DIR1 [DIR2 ...]* **--target=***PATH* **--id=***USER*

where:

- *NAME* is a short descriptive name for the backup.
- *DATE* is the endpoint date for backups used in the restore. When used with **after**, all backups on or after DATE are included. When used with **before**, all backups on or before DATE are included. When both are used a time span can be expressed.

  DATE is formatted as YYYY-MM-DD HH:MM:SS. The value of DATE may be truncated to reduce its specificity. For example, YYYY is acceptable.
- *FILE1 [FILE2 ...] DIR1 [DIR2 ...]* is a space-separated list of filepaths and directory paths to include in the restore.
- *PATH* is the top level directory of a new restore location for the files and directories in the restore.

  When **--target=***PATH* is not included in the restore command, files and directories are restored to their original location. In that case, files are not overwritten unless the **overwrite** option is included, using the following format:

  --overwrite={always | modified | newest | newname}

  where:

  - always—Replaces any file existing on the client with a back up from the same filepath.
  - modified—Replaces any file existing on the client with a back up from the same filepath, unless the date/time stamp of the backed up file is the same as the existing file.

- newest—Replaces any file existing on the client with a back up from the same filepath, only if the date/time stamp of the backed up file is newer than the date/time stamp of the existing file.
- newname—Restores a file that matches the filepath of a file existing on the client but appends a version number to the restored file to prevent overwritting the existing file.

- *USER* is the username to use for authentication.

  This must be the username of an Avamar internal user account and use the format USERNAME@DOMAIN, where USERNAME is the username of the account and DOMAIN is the authentication domain for the account.

  The following example restores all of the files found in the backup labeled newsletters that were created before the indicated date and time into the old_newsletters directory on an HP-UX or Solaris computer.

  /opt/AVMRclnt/bin/avtar -xv --target="old_newsletters" --before="2011-12-1 15:00:00" --id=jdoe@avamar/clients/MyClient --label="newsletters"

  The following example restores files found in the abcd and MyFiles directories in the backup labeled newsletters into the old_newsletters directory on a Linux computer.

/usr/local/avamar/bin/avtar -xv --label="newsletters" --target="old_newsletters" abcd/ MyFiles/ --id=jdoe@avamar/clients/MyClient

Getting status using the command line

Get status of AIX, HP-UX, Linux, and Solaris clients from the command line using an `avtar` command.

Use the following format for the `avtar` command:

avtar {--backups | --list} --verbose=*LEVEL* **--label=***NAME* **--after=***DATE* **--before=***DATE* **--count=***NUMBER* **--id=***USER*

where:

- *LEVEL* is the level of verbosity that is returned by the command.
- *DATE* is the endpoint date for backups that are used in the restore. When being used with, all backups on or after or before DATE is included. When both are used a time span can be expressed.

  DATE is formatted as YYYY-MM-DD HH:MM:SS. The value of DATE may be truncated to reduce its specificity. For example, YYYY is acceptable.

- *NUMBER* is the number of backups to list. If not specified, all backups are listed.
- *NAME* is a short descriptive name for the backup.
- *USER* is the username of the Avamar internal user account that is used for authentication.

Use the format USERNAME@DOMAIN, where USERNAME is the username of the account. DOMAIN is the authentication domain for the account.

The following example uses **--backups** to display information about the three most recent backups that are created after the indicated date and time. Verbose (status and warning) messages are enabled, and the command path is correct for a Linux client.

/usr/local/avamar/bin/avtar --backups --verbose --count=3 --after="2011-4-1 11:17:33"--id=jdoe@avamar/clients/MyClient

The following example uses **--list** to list files and directories inside the backup that is labeled jdoeFiles that were created before the indicated date and time. Highly verbose (**--verbose=2**) messages are enabled, and the command path is correct for an HP-UX or Solaris computer.

/opt/AVMRclnt/bin/avtar --list --verbose=2 /myfiles/rem --label="jdoeFiles" --before="2011-12-1 04:30:15" --id=jdoe@avamar/clients/MyClient

10

Solaris Zones

Topics:

- Important terms and concepts
- Capabilities and limitations
- Installation and configuration
- Non-global zone disaster recovery

Important terms and concepts

This topic introduces important terms and concepts that you should be familiar with before you deploy Avamar in a Solaris 10 Zones environment.

Important terms and concepts:

- **Solaris 10 containers**—As an integral part of the Solaris 10 operating system, Solaris Containers isolate software applications and services by using flexible, software-defined boundaries. Solaris Containers allow many private execution environments to be created within a single instance of the Solaris operating system. Each environment has its own identity, separate from the underlying hardware, yet behaves as if it is running on its own system, making consolidation simple, safe, and secure.
- **Solaris 10 zones**—Solaris Zones are part of a Solaris Container, delivering security, application fault, and namespace isolation. A Solaris Zone is a virtual environment that has security and application fault containment and its own namespace that can be tailored to the application that runs in it.
- **Global and non-global zones**—One zone is always designated as and named the “global zone.” Global zones provide a structure within which other “non-global” zones can be created.

  The global zone encompasses all processes running on the system, regardless of whether these processes run within a non-global zone.

  Instead of "local zone," “non-global zone” is used because “local” is not an antonym of “global” in the context of Solaris zones.

Capabilities and limitations

You should note the limitations described in the two sections that follow.

- Installation errors can occur with earlier version software
- Avagent restart limitation

Installation errors can occur with earlier version software

Installing earlier versions of Avamar Client for Solaris software in non-global zones can display errors.

If you do so, then the following error may appear:

```
pkgadd: ERROR: postinstall script did not complete successfully
```

You can safely ignore this error as it is incorrect—the software did install correctly. Furthermore, version 3.7.2.94 and later software does not return this error.

Avagent restart limitation

If you restart the `avagent` process from the global zone, it forcibly terminates all `avagent` processes (both global and non-global), but only restarts the `avagent` process in the global zone.

If you install Avamar Client for Solaris software in non-global zones, then you must manually restart each `avagent` process in each non-global zone. Restarting the `avagent` processes directly from the non-global zone works as expected.

Installation and configuration

You can install the Avamar Client for Solaris software in the global zone or in individual non-global zones.

The only difference is whether you begin the installation sequence from the global zone or from a non-global zone.

Installing Avamar Client for Solaris software in the global zone

To install Avamar Client for Solaris in the global zone:

Steps

1. Open a command shell and log in as root.
2. Log in to the global zone.

   The “global#” prompt indicates that you are successfully logged in to the global zone.
3. Perform the following installation tasks in the Avamar Client for Solaris section.
   a. Downloading the install package
   b. Installing and registering

Installing Avamar Client for Solaris software in a non-global zone

To install Avamar Client for Solaris in the global zone:

Steps

1. Open a command shell and log in as root.
2. Log in to the global zone.

   The “global#” prompt indicates that you are successfully logged in to the global zone.
3. From the global zone, log in to the desired non-global zone.

   The shell prompt should change from “global#” to some other zone designation.
4. Perform the following installation tasks in the Avamar Client for Solaris section.
   a. Downloading the install package
   b. Installing and registering

Ensuring backup of all non-global zone configurations

Use the following information to ensure successful backup of non-global zone configurations.

AIX, HP-UX, Linux, and Solaris clients on page 77 explains more.

To successfully restore non-global zone data, a current copy of the non-global zone configuration must exist on the Avamar server.

NOTE: Attempting to restore non-global zone data without current zone configuration information might result in loss of data.

There are two methods to export and save a non-global zone configuration:

- Manually exporting and saving a non-global zone configuration
- Automatically exporting and saving a non-global zone configuration

Those methods are described in the following sections. By using the second method, each time you perform a backup, the zone configuration is automatically saved with the backup.

Manually exporting and saving a non-global zone configuration

To manually export and save a non-global zone configuration:

Steps

1. Open a command shell and log in to the global zone as root.

   The “global#” prompt indicates that you are successfully logged in to the global zone.

2. Print each non-global zone configuration and direct it to a file by typing:
   `zonecfg -z zone1 export > zone1.config`

   where zone1 is the non-global zone configuration to back up.
3. Place this configuration file in a location that ensures its inclusion in the next backup by the Avamar server.
4. Repeat steps 2–3 for each global zone you back up.

Automatically exporting and saving a non-global zone configuration

The best practice to back up the zone configuration is to create a preprocessing script that exports and saves the zone configuration each time a backup occurs.

Steps

1. Open a command shell and log in to the global zone as root.

   The “global#” prompt indicates that you are successfully logged in to the global zone.

2. Use a UNIX text editor to create a separate preprocessing script for each non-global zone in the /opt/AVMRclnt/etc/scripts directory.

   For example, the following command creates the zone1_config.sh preprocessing script for the zone1 non-global zone:

   `vi /opt/AVMRclnt/etc/scripts/zone1_config.sh`

   Each script should contain the following entries:

   ```
   #!/usr/bin/sh zonecfg -z zone1 export > /zone_configs/zone1.config
   ```

   where zone1 is the non-global zone name.
3. Save the changes.
4. Create an Avamar dataset for each non-global zone to back up:
   a. In Avamar Administrator, select **Tools > Manage Datasets**.

      The Manage All Datasets window appears.

   b. Click **New**.

      The New Dataset dialog box appears.

   c. Type a name for the new dataset.

      Do not use any of the following characters in the dataset name:

      ~!@$^%(){}[]|,`;#\/:*?<>'"&.

   d. Click the **Source Data** tab.
   e. Select **Enter Explicitly**, and select **Solaris File System** from the **Select Plug-in Type** list.
   f. Select **Select All Data for All Local File Systems**.
   g. Click the **Options** tab.

h. Select the **Show Advanced Options** checkbox.
i. In the **Run user-defined script at beginning of backup** text box in the **Pre-Script** section of the **Options** tab, type the name of the preprocessing script, such as zone1_config.sh.
j. Click **OK**.

5. Repeat steps 2–4 for each non-global zone to back up.

Non-global zone disaster recovery

To restore global zone data, follow the procedure at AIX, HP-UX, Linux, and Solaris clients on page 77.

To perform disaster recovery of the entire non-global zone, use one of the two procedures that follow:

- Restoring an entire non-global zone from a global zone backup

  This is the recommended method. AIX, HP-UX, Linux, and Solaris clients on page 77 explains more.

- Restoring an entire non-global zone from a non-global zone backup

Redirected restores are supported. Any zone that has been backed up from one machine can be restored to a different machine. This action can be performed if the new target machine has the same operating system, software packages, and dependencies as the original machine.

Restoring an entire non-global zone from a global zone backup

To restore a non-global zone from a global zone backup, first restore the zone configuration file to a temporary directory in the global zone. Then restore the rest of the non-global zone.

About this task

This action requires two separate restore operations.

Steps

1. In Avamar Administrator, restore only the zone configuration file to a temporary directory in the global zone.

   Do not restore any other files at this time.

2. Open a command shell and log in to the global zone as root.

   The “global#” prompt indicates that you are successfully logged in to the global zone.

3. Type:
   `cd /tmp`

   where /tmp is the temporary directory in the global zone.
4. Specify that the zone1.config file should be used when re-creating the zone by typing:
   `zonecfg -z zone1 -f zone1.config`
5. Install the zone by typing:
   `zoneadm -z zone1 install`
6. To prevent the system from displaying sysidtool prompts on initial zone login, delete the .UNCONFIGURED file by typing:
   `rm /export/home/zones/zone1/root/etc/.UNCONFIGURED`
7. Return to Avamar Administrator and restore the remaining non-global zone files and directories.

   During the restore, include the **`--restoresystem`** advanced plug-in option.

   The *Avamar Administration Guide* provides additional information about supplying advanced plug-in options.

8. Return to the command shell session.
9. After the restore completes, boot up the zone by typing:
   `zoneadm -z zone1 boot`
10. Confirm that the zone is running by typing:
    `zoneadm list -cv`

    The following appears in the command shell:

```
ID NAME STATUS PATH BRAND IP
0 global running / native shared
4 zone1 running /zones/zone1 native shared
```

11. Confirm that you can log in to the zone by typing:
    zlogin zone1

Restoring an entire non-global zone from a non-global zone backup

Steps

1. In Avamar Administrator, restore only the zone configuration file to a temporary directory in the global zone.

   Do not restore any other files at this time.

2. Open a command shell and log in to the global zone as root.

   The “global#” prompt indicates that you are successfully logged in to the global zone.

3. Type:
   cd /tmp

   where /tmp is the temporary directory in the global zone.
4. Specify that the zone1.config file should be used when re-creating the zone by typing:
   zonecfg -z zone1 -f zone1.config
5. Install the zone by typing:
   zoneadm -z zone1 install
6. To prevent the system from displaying sysidtool prompts on initial zone login, delete the .UNCONFIGURED file by typing:
   rm /export/home/zones/zone1/root/etc/.UNCONFIGURED
7. Boot up the zone by typing:
   zoneadm -z zone1 boot
8. Confirm that the zone is running by typing:
   zoneadm list -cv

   The following appears in the command shell:

```
ID NAME STATUS PATH BRAND IP
0 global running / native shared
4 zone1 running /zones/zone1 native shared
```

9. Log in to the zone by typing:
   zlogin zone1
10. Reinstall the Avamar Client for Solaris software in the non-global zone, and register it with the Avamar server.

    NOTE: It might be necessary to deactivate this non-global zone client instance from the Avamar server to successfully reactivate it with the Avamar server.

11. Return to Avamar Administrator, and restore the remaining non-global zone files and directories.

    NOTE: Sun Microsystems has recommended that no shared LOFS file systems be restored within a non-global zone. By default, Avamar does not traverse any LOFS or NFS file systems during backups, which is not an issue.

A

Novell NSS Volumes

Topics:

- Overview
- Capabilities and limitations
- Additional resources

Overview

Novell Storage Services (NSS) is the file system originally created for NetWare.

With the introduction of Novell Open Enterprise Server (OES) Linux, Novell made its common services available on this operating system. By doing so, it has provided an easier migration path for customers wishing to deploy Linux in their environments. Therefore, you can create NSS volumes on and manage them from Linux.

Novell Open Enterprise Server (OES) Linux has introduced a new feature, XAttr Extension for Novell Storage Services (NSS), which allows easy backup and restore of NSS file metadata.

Capabilities and limitations

Consider the following capabilities and limitations.

- Files hosted on NSS volumes

  To maintain data integrity of transactional systems that use files hosted on NSS volumes, shut down those applications before you initiate a backup.

- Lack of snapshot support

  There is no snapshot support for NSS on OES Linux.

- OES Linux local eDirectory database

  The OES Linux local eDirectory database is not included in backups.

Additional resources

See the following additional resources on Novell NSS volumes.

Table 21. Additional resources on Novell NSS volumes

Topic	Location	Filename
Novell Storage Services	Novell web site	nss_enu.pdf
Linux User Management	Novell web site	lumadgd.pdf

B

Tuning Client Caches

Topics:

- Demand-paging cache
- File cache
- Demand-paging cache example scenario
- Cache migration after upgrading the client

Demand-paging cache

Demand-paging cache is the new method for managing Avamar file and hash caches.

File and hash caches store information about data that has been backed up to the Avamar server. Demand-paging cache replaced the original Avamar caching implementation for all client backups.

Demand-paging cache improves the `avtar` program's capacity to handle a file cache for large file systems by enabling the system to perform the following actions:

- To automatically determine the optimal in-RAM cache size for the client environment.
- To adjust the cache size as needed

Demand-paging cache reduces memory consumption by removing the need to store the entire cache in memory for each instance of `avtar`.

The original cache implementation stored cache information in the f_cache.dat file. The demand-paging cache feature uses a new cache file, f_cache2.dat, which is stored in the var directory. Because the demand-paging cache files use unique names, the demand-paging cache feature does not interfere with the original cache file, f_cache.dat. The *Avamar Operational Best Practices* for earlier releases of Avamar provides more information about the original monolithic cache implementation.

Demand-paging cache divides the cache into a series of pages. All pages that belong to a backup are kept in a page list. Not all of these pages are memory-resident, but are brought into memory in time order. Demand-paging cache keeps a subsampled list of hashes for each page in memory to handle out-of-order access. This list is called the champion list.

Files that are larger than a threshold size are designated as "must have entries." These entries are almost always added to the champion list. If a hash is not in the pages in memory, but is in the champion list, the associated page is read into memory. A semi-random selection process designates champions beyond those files that are designated as "must have" entries.

File cache

File cache management is implemented by using pages from f_cache2.dat. The `avtar` process loads pages, as needed, from f_cache2.dat into RAM instead of the entire file.

The original file cache implementation uses approximately 1 GB of disk space and 1 GB of RAM to track approximately 10 million files when `avtar` is running. This data is shared among all of the 16 backups that can be stored in the cache file. This method imposes limits on the maximum size of file systems that Avamar can back up. Demand-paging cache removes this size limitation.

Demand-paging cache requires 1 GB of disk space to track approximately 10 million files during a backup. The demand-paging file cache can store up to 16 backups worth of nonshared information, which means that the file cache for a normal use case can use approximately 20 GB of disk space. In comparison to the original file cache method, backups that implement the demand-paging file cache require up to 20 times more disk space.

However, demand-paging cache enables RAM utilization to remain fairly flat at a much lower size regardless of the number of files in the file system. Automatic tuning can change the actual RAM utilization amount.

Demand-paging cache example scenario

Each page consists of 100,000 entries and 15,000 champions.

NOTE: The entries and champion sizes are the maximums per page. The actual utilization is about 60% to 70% of that maximum because of the characteristics of the hash tables, which are used here for their fast access.

For the file cache, each entry is 64 bytes, or 6.4 MB per page and each champion is 20 bytes or 300 KB per page.

On disk, the champions are stored with the entries that give a size of about 6.7 MB for each page of the file cache. There is some overhead, but it is a very small percentage of the total size, which is usually not relevant.

In RAM, the champions are stored separately. The page sizes are about 6.4 MB for the file cache. The champions are brought into RAM in a single array that contains all of the champions for all of the applicable backups in the cache.

The file cache that is required for 40 M files is approximately 616 pages: 40 M / 65,000 (estimated) or 4.13 GB on disk (616 * 6.7 MB).

Auto-tuning alters the number of pages that are stored in memory which is based on the size of previous backups and other factors, including the actual memory available to the process. The values may be considerably smaller or larger, based on previous backups requirements.

Cache migration after upgrading the client

Where applicable, the demand-paging cache feature automatically migrates the contents of the f_cache.dat file to the new cache file during `avtar` backup operations.

The migration runs when `avtar` determines that demand-paging cache files do not exist or exist but are not valid, or when `avtar` finds that the f_cache.dat files and their relative timestamps fit within the migration period.

The default migration period is 14 days. You can change the default migration period by specifying the `---cache-migration-period` option with the `avtar` command. Memory improvements from the use of the demand-paging cache feature are not noticeable until after the migration completes. Memory use increases slightly during the migration period since avtar uses both forms of cache at the same time.

After the migration period ends, the backup process no longer checks the original cache. After 180 days, the `avagent` process automatically deletes the old cache files. You can change the default time period of 180 days by specifying the `---cachelifetime=`*DAYS* option with the `avagent` command.

At any time, you can prevent a client migration by removing the f_cache.dat and file before you run an `avtar` backup. You can also prevent a migration by performing one of the following alternatives:

- To prevent a cache migration, run `avtar` with the `--nocache` option. Use of the `--nocache` option stops all caching. Use the `--nocache` option with caution.
- To prevent only a file cache migration, run `avtar` with `--enable-filecache=false` option.