

**EMC<sup>®</sup> AVAMAR<sup>®</sup>**  
**NDMP ACCELERATOR**  
**5.0**

**USER GUIDE**  
**P/N 300-008-823**  
**REV A02**

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# TABLE OF CONTENTS

---

- Foreword .....5**
  - Scope and Intended Audience ..... 5
  - Product Information ..... 5
  - Your Comments ..... 6
  - Typeface Conventions ..... 6
  - Notes, Tips, and Warnings ..... 7
  
- Introduction .....8**
  - Functional Overview ..... 8
  - Supported Configurations ..... 9
  - General Capabilities and Limitations ..... 9
  - EMC Celerra Capabilities and Limitations ..... 11
  - NetApp Capabilities and Limitations ..... 13
  
- EMC Celerra Installation and Configuration .....14**
  - Connect Components to Your Network ..... 14
  - Verify Networking ..... 15
  - Installation Procedure ..... 16
    - Create ndmp User Account on Celerra ..... 16
    - Modify NDMP snapTimeout Parameters If Necessary ..... 16
    - Obtain and Copy Avamar NDMP Accelerator Install Packages ..... 17
    - Install Avamar Linux Client ..... 18
    - Install Avamar NDMP Accelerator ..... 18
    - Configure and Register the Accelerator ..... 19
  
- NetApp Installation and Configuration .....24**
  - Connect Components to Your Network ..... 24
  - Verify Networking ..... 25
  - Installation Procedure ..... 27
    - Obtain and Copy Avamar NDMP Accelerator Install Packages ..... 27
    - Install Avamar Linux Client ..... 28
    - Install Avamar NDMP Accelerator ..... 28
    - Configure and Register the Accelerator ..... 29
    - Enable NDMP Services on Filer ..... 34
  
- Post-Installation and Configuration .....36**
  - Changing Accelerator Configuration Settings ..... 36
  - Uninstalling Avamar NDMP Accelerator Software ..... 37

---

Upgrading Avamar NDMP Accelerator Software .....	37
Configuring NTP Time Services .....	38
<b>Using Avamar NDMP Accelerator .....</b>	<b>40</b>
Performing an On-Demand Backup .....	40
Select for Restore Overview .....	44
Locating and Selecting a Backup by Calendar Date .....	44
Locating and Selecting a Backup by Content .....	45
Performing a Recovery (Restore) .....	46
Scheduling Backups .....	48
Setting Up Scheduled Backups .....	48
Enabling Scheduled Backups .....	54
<b>Appendix A — Plug-in Options .....</b>	<b>55</b>
Important Terms and Concepts .....	55
NDMP Plugin Options .....	56
<b>Appendix B — The avndmp Script .....</b>	<b>58</b>

# FOREWORD

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## Scope and Intended Audience

**Scope.** This publication describes how to install, configure, administer and use the Avamar NDMP Accelerator (accelerator) to back up and restore supported EMC Celerra IP storage systems and NetApp filers.

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**NOTE:** For the sake of clarity, this publication often uses the term “storage device” to generically refer to any supported data filer, file server or IP storage system.

---

**Intended Audience.** The information in this publication is primarily intended for system administrators who are responsible for installing software and maintaining servers and clients on a network.

**Prerequisites.** Persons using this publication should have current practical experience with:

- Network Data Management Protocol (NDMP)
- Supported EMC Celerra IP storage systems or NetApp filers currently deployed at your site
- Unix shell scripts

## Product Information

For current documentation, release notes, software updates, information about EMC products, licensing and service, go to the EMC Powerlink website at <http://Powerlink.EMC.com>.

## Your Comments

Your suggestions will help us continue to improve the accuracy, organization and overall quality of our publications. You may email your comments to:

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Please include the following information:

- Product name and version
- Document name, part number, and revision (for example, A01)
- Page numbers
- Other details that will help us address the documentation issue

## Typeface Conventions

The following table provides examples of standard typeface styles used in this publication to convey various kinds of information.

EXAMPLE	DESCRIPTION
Click <b>OK</b> . or Select <b>File &gt; Close</b> .	Bold text denotes actual buttons, commands, menus and options that initiate action. Sequential commands are separated by a greater-than (>) character. For example, the second example instructs you to select the <b>Close</b> command from the <b>File</b> menu.
Type: <b>cd /tmp</b>	Bold fixed-width text denotes shell commands that must be entered exactly as they appear.
--logfile=FILE	All caps text often denotes a placeholder (token) for an actual value that must be supplied by the user. In this example, FILE would be an actual filename.
Installation Complete.	Regular (not bold) fixed-width text denotes command shell messages, code and file contents.

## Notes, Tips, and Warnings

The following kinds of notes, tips, and warnings appear in this publication:

---

**IMPORTANT:** This is a warning. Warnings always contain information that if not heeded could result in unpredictable system behavior or loss of data.

---

---

**TIP:** This is a tip. Tips present optional information intended to improve your productivity or otherwise enhance your experience with the product. Tips never contain information that will cause a failure if ignored.

---

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**NOTE:** This is a general note. Notes contain ancillary information intended to clarify a topic or procedure. Notes never contain information that will cause a failure if ignored.

---

# INTRODUCTION

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The Avamar NDMP Accelerator (accelerator) is a dedicated single-node Avamar client that, when used as part of an Avamar system, provides a complete backup and recovery solution for supported EMC Celerra IP storage systems and NetApp filers by using Network Data Management Protocol (NDMP) to communicate with these storage devices.

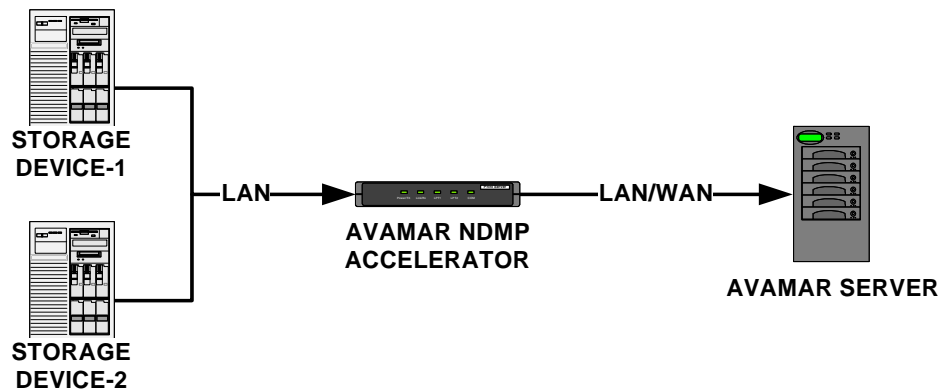
---

**NOTE:** For the sake of clarity, this publication often uses the term “storage device” to generically refer to any supported EMC Celerra IP storage system or NetApp filer.

---

## Functional Overview

Avamar NDMP Accelerator uses the standard Network Data Management Protocol (NDMP) as well as published extensions of the NDMPcopy utility.



Data from the storage device is not stored on the accelerator. The accelerator performs NDMP processing, real-time data de-duplication, then forwards that data to the Avamar server. Due to the inherent advantages of data de-duplication, you can locate the accelerator either locally (LAN) or remotely (WAN) with respect to the Avamar server. However, in order to ensure acceptable performance, the



accelerator must be located on the same Local Area Network (LAN) as the storage device being protected.

The Avamar NDMP Accelerator is a full peer to other Avamar clients (for example, Avamar Linux Clients, Avamar Windows Clients, and so forth) with one exception: whereas the Avamar Administrator graphical management console can be used to browse the live filesystems of most other clients, it cannot browse the live filesystem of storage devices.

## Supported Configurations

The Avamar NDMP Accelerator supports the following configurations:

COMPONENT	SUPPORTED VERSION(S)	
	EMC CELERRA	NETAPP
Storage Devices	DART 5.6 or 5.5 with I18N enabled.	Data ONTAP 7.3, 7.2 or 7.1.
Networking	<ul style="list-style-type: none"> <li>• 100baseT or 1000baseT connection required between storage device and the accelerator</li> <li>• Either LAN or WAN connection supported between the accelerator and the Avamar server</li> </ul>	

## General Capabilities and Limitations

This topic discusses general capabilities and limitations of the Avamar NDMP Accelerator.

**Avamar NDMP Accelerator Configuration and Setup.** Instructions for configuring and setting your Avamar NDMP Accelerator are beyond the scope of this publication. Refer to your *Avamar System Installation Manual* for detailed Avamar NDMP Accelerator configuration and setup instructions.

**Full Support for NDMP Version 4.** Beginning with Avamar 5.0, the Avamar NDMP Accelerator fully supports NDMP version 4.

**Full Support for Storage Device ACLs and Q-tree Data.** The accelerator can protect and restore all storage device accounting information and Access Control Lists (ACLs). The use of NDMP is the only method to protect the metadata associated with both user files and the storage device itself.

**Support for Multiple Storage Devices Using One Accelerator.** A single accelerator can support more than one storage device. However, by default you will still be limited to running one backup at a time.

For example, consider two storage devices (storage device-1 and storage device-2), which are registered to the same accelerator. Both storage devices are backed up by using scheduled group backups and both storage devices belong to the same group.

When the scheduled group backups are initiated, storage device-1 will begin backing up immediately; storage device-2's backup job will be queued until storage device-1's job completes.

---

**IMPORTANT:** If you want to backup multiple storage devices simultaneously, you must specifically configure your accelerator to do this (page 10).

---

**Support for Multiple Backup Streams From a Single Storage Device.** If you have configured your accelerator to support multiple backups (page 10), you can use this feature to add more than one stream from the same storage device. In most cases, this will result in improved backup throughput from the same storage device.

In order to do this, run the `avsetupndmp` script (page 29) and add more than one instance of the same storage device. When you set up scheduling for your storage device backups (page 48), be sure to add all storage device instances to the Avamar group.

For best performance, you should also add additional system RAM.

**Support for Multiple Simultaneous Backups.** A single accelerator can support multiple simultaneous backups. This requires additional system RAM.

---

**IMPORTANT:** Support for multiple simultaneous backups requires 8 GB of RAM or greater (4 GB per client instance, with a maximum of 4 client instances per accelerator), and the use of the appropriate operating system kernel for the amount of RAM installed.

---

With this option enabled, up to four backups can run simultaneously, provided that all were initiated as scheduled group backups (on-demand backups run one at a time).

**Number of Bytes Reported by Avamar for Small Backups.** The number of bytes that Avamar reports for small NDMP backups may be off by a small amount (a few kilobytes). This behavior is normal. The NDMP device adds a small amount of "housekeeping" data to the backup.

**Data Backed Up on Other Avamar Client Types Cannot Be Restored to a Storage Device.** Volumes, directories and files that are included in a backup performed by other Avamar client types are fully browsable by Avamar Administrator. However, these entities cannot be restored to a storage device.

**Avamar NDMP Accelerator Cannot Be Configured Using Avamar Administrator.** Configuration of an Avamar NDMP Accelerator is performed using the `avsetupndmp` script. It is not possible to modify any accelerator settings using Avamar Administrator.

**Browsing Directories and Files Is Not Supported.** When browsing a storage device filesystem for purposes of creating a dataset or performing an on-demand backup, only volumes will be visible. You cannot browse into volumes and view individual directories or files.

**Include/Exclude Not Supported.** Dataset include or exclude rules cannot be used when performing an NDMP backup.

**No Control of Overwrite Options on Restore.** None of the overwrite and open file options are applicable when performing an NDMP restore. NDMP implicitly always overwrites existing files when restoring.

**Web Restore with External Authentication Not Supported.** Data from an NDMP backup cannot be restored with Avamar Web services by an externally authenticated user.

**User and Group Names Not Displayed.** When listing the contents of a backup the users and groups are displayed as their numbers instead of their names.

**Cannot Use Wildcards When Selecting Files to Backup.** Wildcard characters cannot be used when specifying volumes or directories to be backed-up. This is an NDMP limitation.

**Cancelling Backups Might Take Several Minutes.** Due to the behavior of some storage devices, cancelling an NDMP backup might take several (typically 3–5) minutes.

**Environment Variables Not Supported.** Avamar does not permit you to set arbitrary NDMP environment variables when defining a dataset or performing on-demand backups and restores.

**Passwords Cannot Contain Single-Quotes.** During installation and configuration of the Avamar NDMP Accelerator for use with your storage device, the `avsetupndmp` script asks for an NDMP user account password. This password cannot contain single-quotes.

#### **I 18N Characters Might Not Display Properly in**

**Avamar Administrator.** Some international (I18N) characters in file and directory names might not render correctly in Avamar Administrator. However, this does not affect the ability to actually restore them.

**Restore Limitations.** Only one volume can be restored at a time.

## EMC Celerra Capabilities and Limitations

This topic discusses capabilities and limitations of the Avamar NDMP Accelerator that are specific to integrating with EMC Celerra IP storage systems.

**Backward Compatibility With Pre-5.0 Avamar Servers.** For best results, you should use a version 5.0 accelerator with a version 5.0 Avamar server. However, if you must use a version 5.0 accelerator with an earlier version Avamar server, the following limitation applies:

EMC Celerra backups stored on an Avamar 4.1 or earlier server cannot be used to restore more than one individual file in the same restore operation. Multiple restore operations must be used to restore several individual files.

**Restoring a Directory to Celerra Includes the Directory File.** Beginning with Avamar 5.0, restoring a single directory includes all files as well as the directory file. Previously, Avamar NDMP Accelerator restored only the files within the directory. The directory file itself was not restored.

**Incremental Backups Should Only Be Performed at the Volume**

**Level.** For best results, always perform incremental backups at the volume level. For Celerra, Avamar will default to performing full backups of lower level directories and subdirectories. However, it is possible to override this default behavior and force an incremental backup of lower level directories and subdirectories. This is not a good practice as it can cause unpredictable application behavior.

**Sub-Volume Backups Always Level-0.** Any sub-volume (that is, non-root) backups of Celerra always use Level-0 backups. If the Prefer Incremental, but do a Full if required plugin option is selected, a level 0 backup is performed. If the Force and incremental (level 1) dump plugin option is selected, a level 1 backup is performed. The level 1 backup may report an error.

**Multiple Backup Stream Limitation.** EMC Celerra IP storage systems are limited to a maximum of 4 simultaneous backup streams.

**Avoid Including Certain Unix Hardlinks in Incremental Backups.** Some Unix hardlinks with non-ASCII characters in the name might not be tracked correctly during incremental backups of Celerra. It is best to exclude these hardlinks from incremental backups. If this is not possible, use Level-0 backups instead.

**Path Length Limitations.** EMC Celerra IP storage systems impose a maximum path length limit of 1023 characters. However, the known practical limit for specifying paths in Avamar is only 976 characters. Therefore, you cannot specify paths greater than 976 characters at any time.

Additionally, during restores, the total path length when specifying a directory is limited to 255 characters.

**File Size Limitation.** The size of a backup from a Celerra storage device differs from the actual size of the on-disk data. For example, the size of a backup from a Celerra storage device shows the size of the deduplicated disk, not the actual file size. Avamar Administrator shows size statistics for completed backups in the Activity window on the Activity Monitor tab.

**Maximum Number of Files Limitation.** Each individual Avamar backup can contain a maximum of 10 million files.

**Incremental Backup Limitation.** An incremental backup that includes too many files to back up might fail due to memory limitations.

# NetApp Capabilities and Limitations

This topic discusses capabilities and limitations of the Avamar NDMP Accelerator that are specific to integrating with NetApp filers.

**Backward Compatibility With Pre-5.0 Avamar Servers.** For best results, you should use a version 5.0 accelerator with a version 5.0 Avamar server. However, if you must use a version 5.0 accelerator with an earlier version Avamar server, the following limitations apply:

NetApp backups taken with a version 5.0 accelerator are not compatible with older Avamar backups. Therefore, the first time a filer is backed up with a version 5.0 accelerator, a full backup is automatically taken (forced). Version 5.0 accelerators are able to restore from pre-5.0 backups with no limitations.

Furthermore, in order to perform backups and restores with an Avamar 4.1 server, version 5.0 dnavclient RPM must be installed on the server's utility node.

NetApp backups taken with a version 5.0 accelerator cannot currently be stored on pre-4.1 Avamar servers.

## **Support for Backup and Restore of Volumes, Q-trees and**

**Directories.** The accelerator is capable of performing backups and restores at the volume, q-tree or directory levels. Selection of any entity type other than a volume (q-tree, directory) must be done by typing the path to that entity within the volume.

**Only One Target Volume or Directory per Backup or Restore.** Each individual Avamar backup or restore can only comprise one target storage device volume or directory. Selection of multiple source directories or files is not permitted.

**Backing Up Empty Directories.** Avamar reports one to a few kilobytes for a backup of an empty directory. The actual number of kilobytes reported depends on the number of empty files. This behavior applies only to a NetApp filer. The same backup on Celerra correctly reports 0 KB.

## **Extra "restore\_symboltable" File Written During Restores from NetApp**

**filers.** When restoring from a NetApp filer, an extra file "restore\_symboltable" is created on the restore target. This file is created by the NetApp filer (not Avamar software) and is a known limitation of restoring from a NetApp filer. Refer to NetApp Bug ID 30347 for additional information. Note also that if the dataset used for backups already contains a "restore\_symboltable" file that it will be renamed to "rstabRENAME47026EF7" on the restore target.

**LUN Restore Issue.** When restoring a LUN, the Avamar Administrator **Restore to original location** setting does not correctly restore the data as a LUN. The interim solution is to manually specify a NetApp Qtree root directory as a restore location for the LUN. Doing this will cause the NetApp filer to create the proper LUN container.

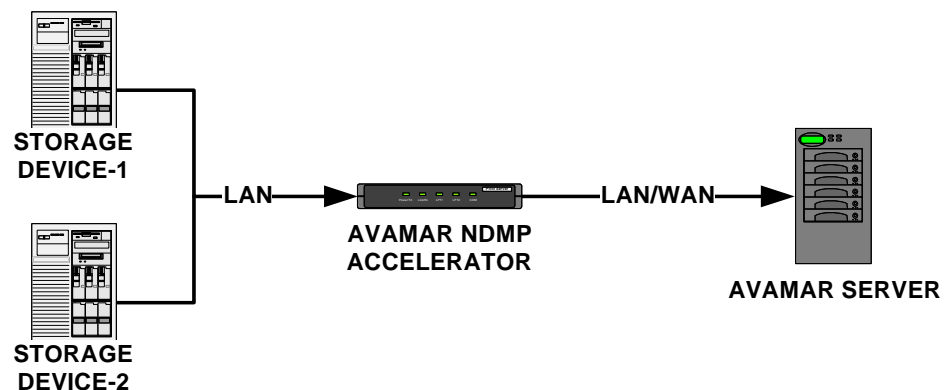
# EMC CELERRA INSTALLATION AND CONFIGURATION

---

This chapter describes how to install and configure the Avamar NDMP Accelerator for use with supported EMC Celerra IP storage systems.

## Connect Components to Your Network

The following diagram shows a typical Avamar NDMP Accelerator deployment.



1. Connect your Avamar server, Avamar NDMP Accelerator and Celerra to your corporate LAN by using 100baseT or 1000baseT network connections.
2. Add each hostname to corporate DNS or modify /etc/hosts files on each network host such that:
  - (a) Avamar server and Avamar NDMP Accelerator can resolve each other's hostnames.
  - (b) Avamar NDMP Accelerator and Celerra can resolve each other's hostnames.

---

**NOTE:** It is not required that the Avamar server and Celerra be able to directly resolve each other's hostnames.

---

## Verify Networking

In order for all aspects of the Avamar NDMP Accelerator to function properly, the Avamar server and Avamar NDMP Accelerator must be resolvable by corporate DNS from each other. Similarly, the Avamar NDMP Accelerator and Celerra must also be resolvable by corporate DNS from each other.

1. Deploy your Avamar server, Avamar NDMP Accelerator and Celerra on your network.
2. Ensure that your Avamar server, Avamar NDMP Accelerator and Celerra are turned on and operating properly.

User=admin

3. Open a command shell and log into your Avamar server as user admin.

4. Type:

```
ping ACCEL
```

Where ACCEL is the actual Avamar NDMP Accelerator IP address or hostname as defined in corporate DNS.

This command should demonstrate that the Avamar NDMP Accelerator is responding to the `ping` command.

User=admin

5. Open a command shell and log into the Avamar NDMP Accelerator as user admin.

6. Type:

```
ping AVAMARSERVER
```

```
ping CELERRA
```

Where AVAMARSERVER and CELERRA are the actual IP addresses or hostnames as defined in corporate DNS, of your Avamar server and Celerra, respectively.

These commands should demonstrate that both the Avamar server and Celerra are both responding to the `ping` commands.

7. Log into Celerra Manager.
8. Expand the **NetWork** menu (along left side), then click the **Ping** tab.
9. Ping the Avamar NDMP Accelerator

This command should demonstrate that the Avamar NDMP Accelerator is responding to the `ping` command.

---

**IMPORTANT:** Any failure to correctly resolve any hostname from any of the network hosts involved in this integration (Avamar server, Avamar NDMP Accelerator or Celerra) must be identified and corrected before proceeding any further with this installation procedure.

---

## Installation Procedure

In order to successfully install and configure an Avamar NDMP Accelerator, you must perform all of the following tasks in the following order:

- *Create ndmp User Account on Celerra* (page 16)
- *Obtain and Copy Avamar NDMP Accelerator Install Packages* (page 17)
- *Install Avamar Linux Client* (page 18)
- *Install Avamar NDMP Accelerator* (page 18)
- *Configure and Register the Accelerator* (page 19)

### Create ndmp User Account on Celerra

1. Log into Celerra Manager.
2. Create a user account named `ndmp` (case-sensitive, all lower case).
3. Create a password for the `ndmp` user account.
4. Note this password for future use.

You will need to type this password during the *Configure and Register the Accelerator* (page 19) installation task.

5. Ensure that the `ndmp` user account has sufficient privileges to run NDMP jobs and access all data on the Celerra.

### Modify NDMP snapTimeout Parameters If Necessary

To avoid problems with running multiple NDMP backups simultaneously, increase the value for the NDMP `snapTimeout` parameter. The default value for the NDMP `snapTimeout` parameter is 5 minutes. Increase the value to at least 30 minutes. The following command can be used from the CLI on the Control Station:

```
server_param server_2 -f NDMP -m snapTimeout -v 30
```

Additional information for changing Celerra server parameters is available in the *EMC Celerra Network Server Parameter Guide*.



## Obtain and Copy Avamar NDMP Accelerator Install Packages

The easiest way to obtain Avamar Linux Client and Avamar NDMP Accelerator install packages is to copy them from an operational Avamar server on your network to your accelerator. The remainder of this task explains how to do this.

---

**TIP:** You can also extract the Avamar Linux Client and Avamar NDMP Accelerator packages from a customer tarball. For information about obtaining and extracting individual installation packages from a customer tarball, contact EMC Technical Support.

---

User=root

1. Open a command shell and log into the Avamar server as root.
2. Use a secure copy program to copy the Avamar Linux Client and Avamar NDMP Accelerator packages from the Avamar server to a temporary directory on the accelerator by typing the following commands:

```
cd /usr/local/avamar/src/RHEL4_64
scp AVAMARLINUX.rpm root@ACCELERATOR:/tmp
scp AVAMARNDMP.rpm root@ACCELERATOR:/tmp
```

Where AVAMARLINUX.rpm, and AVAMARNDMP.rpm are the actual filenames of the Avamar Linux Client and Avamar NDMP Accelerator packages and ACCELERATOR is the accelerator hostname or IP address.

---

**NOTE:** /tmp is used as an example temporary install directory in the remainder of this chapter. Your actual temporary install directory may be different.

---

3. Note the actual filenames of the Avamar Linux Client and Avamar NDMP Accelerator packages.

---

**NOTE:** AVAMARLINUX.rpm and AVAMARNDMP.rpm are used as example filenames for the Avamar Linux Client and Avamar NDMP Accelerator install packages, respectively.

---

## Install Avamar Linux Client

User=root

1. Open a command shell and log into the accelerator as root.
2. Change directory to the temporary install directory you created in the previous task (page 17).

```
cd /tmp
```

3. Type:

```
rpm -ivh AVAMARLINUX.rpm
```

Where AVAMARLINUX.rpm is the actual filename of the Avamar Linux Client install package you previously downloaded.

The following appears in the command shell:

```
Preparing... ##### [100%]
 1:AvamarClient
##### [100%]
Installation complete
You may run /usr/local/avamar/bin/avregister to register and activate this
client with the Administrator server.
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 23920
avagent.d Info: Client Agent started.
```

## Install Avamar NDMP Accelerator

User=root

1. Ensure that you are still logged into the accelerator as root.
2. Change directory to the temporary install directory you created in the previous task (page 17).

```
cd /tmp
```

3. Type:

```
rpm -ivh AVAMARNDMP.rpm
```

Where AVAMARNDMP.rpm is the actual filename of the Avamar NDMP Accelerator install package you previously downloaded.

The following appears in the command shell:

```
Preparing... ##### [100%]
 1:AvamarNDMP
##### [100%]
ndmjob Info: Server started.
avagent Info: Stopping Avamar Client Agent (avagent)...
avagent Info: Client Agent stopped.
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 23956
avagent Info: Client Agent started.
Installation complete
You may run /usr/local/avamar/bin/avsetupndmp to register and activate this
NDMP Accelerator Node with the Administrator server.
```

## Configure and Register the Accelerator

Avamar NDMP Accelerator configuration is performed by the `avsetupndmp` script; registering the accelerator with the Avamar server is performed by the `avregister` script.

User=root  
Configure  
Accelerator

1. Ensure that you are still logged into the accelerator as root.

2. Type:

```
avsetupndmp
```

The following appears in the command shell:

```
Configure systems for backup and restore.
```

```
avsetupndmp will stop all running agents, do you wish to continue Y/N? [Y]:
```

---

**IMPORTANT:** Stopping all running agents will permanently cancel any backups in progress.

---

3. Press **ENTER** to accept the default action to stop all running agents.

The following appears in the command shell:

```
avagent Info: Stopping Avamar Client Agent (avagent)...  
avagent Info: Client Agent stopped. [ OK ]  
Successfully copied init script.  
Configure Avamar Server parameters.  
Reading /usr/local/avamar/etc/usersettings.cfg...
```

```
Network address or DNS name of the Avamar Server [avamar-1.example.com]:
```

4. Type the Avamar server DNS name or IP address and press **ENTER**.

avamar-1.example.com is used as an example Avamar server name for the remainder of this procedure.

The following appears in the command shell:

```
Root password of Avamar Server [*****]:
```

5. Type the Avamar server software root password and press **ENTER**.

---

**NOTE:** This prompt is not asking for the operating system root password; it is asking for the Avamar server software root password.

---

The following appears in your command shell:

```
Enable support for multiple simultaneous backups? (IMPORTANT: Requires 8 or  
more GB of RAM) [N]:
```

---

**IMPORTANT:** Enabling support for multiple simultaneous backups without satisfying the minimum hardware and operating system requirements specified in *General Capabilities and Limitations* (page 9) will adversely affect backup performance.

---

6. Do one of the following:

IF	DO THIS
You want to enable multiple simultaneous backups.	Type <b>y</b> and press <b>ENTER</b> .
You do not want to enable multiple simultaneous backups.	Press <b>ENTER</b> to accept the default action (do not enable multiple simultaneous backups).

The following appears in the command shell:

```
Writing /usr/local/avamar/etc/usersettings.cfg...
Successfully wrote '/usr/local/avamar/etc/usersettings.cfg'
Configure individual system parameters.
```

The following systems are configured:

```
Choose an action:
 1. Add a new system
 2. Edit an existing system
 3. Remove a system from the list
 4. Exit setup
Enter action: [4]:
```

7. Type **1** and press **ENTER**.

The following appears in the command shell:

```
Setting up a new system account

What kind of system do you want to setup?
 1. EMC Celerra
 2. NetApp Filer
Enter choice:
```

8. Type **1** and press **ENTER**.

The following appears in your command shell:

```
Starting setup for EMC Celerra
Network address or DNS name of the EMC Celerra [filer.company.com]:
```

9. Type the Celerra DNS name or IP address and press **ENTER**.

MyCelerra.example.com is used as an example Celerra name for the remainder of this procedure.

The following appears in your command shell:

```
The ndmp user password on "MyCelerra.example.com":
```

---

**IMPORTANT:** This password cannot contain single-quotes.

---

10. Type the Celerra ndmp user account password you created in *Create ndmp User Account on Celerra* (page 16) and press **ENTER**.

The following appears in the command shell:

```
Repeat password:
```

11. Re-type the same password you entered in step 10 and press **ENTER**.

The following appears in the command shell:

```
Password encoding scheme ("md5" or "text") to use for "MyCelerra.example.com"
[md5]:
```

You must specify the correct password encoding scheme currently in use on your Celerra.

---

**IMPORTANT:** The only valid entries are **md5** or **text**; any other entries or specifying the incorrect encoding scheme will cause an error.

---

12. Type the correct password encoding scheme (either **md5** or **text**) and press **ENTER**.

The following appears in the command shell:

```
Checking username and password... verified Avamar account name for
"MyCelerra.example.com" [MyCelerra.example.com]:
```

This prompt is asking for a descriptive name for this Celerra client instance that will appear various places in Avamar Administrator. Any user-defined name is acceptable. The default Avamar account name is the Celerra DNS name or IP address you previously entered in step 9.

---

**IMPORTANT:** This name must be unique. Be especially careful when adding a second client instance of the same Celerra system that you differentiate it from any existing Avamar account name.

---

MyCelerra.example.com is used as an example Avamar account name for the remainder of this procedure.

13. Do one of the following:

IF	DO THIS
You want to specify an Avamar account name other than the default.	Type your account name and press <b>ENTER</b> .
You want to use the default Avamar account name.	Press <b>ENTER</b> to accept the default Avamar account name.

The following appears in the command shell:

```
Routable address or DNS name of this accelerator from "MyFiler.example.com"
[ndmpa-1.example.com]:
```

14. Type this accelerator DNS name or IP address and press **ENTER**.

ndmpa-1.example.com is used as an example accelerator name for the remainder of this procedure.

The following appears in the command shell:

```
Writing /usr/local/avamar/var/MyCelerra-ndmpa3/.avagent...
Writing /usr/local/avamar/var/MyCelerra-ndmpa3/ndmp.cfg...
```

```
Trying to get list of volumes from MyCelerra.example.com...
```

```
Trying to get list of volumes from MyCelerra.example.com...
<dir name="/CIFS_share1" />
<dir name="/NFS_share1" />
<dir name="/.etc_common" />
<dir name="/" />
Finished setup for MyCelerra.example.com:/usr/local/avamar/var/MyCelerra-ndmpa3.
```

The following filers are configured:  
 MyCelerra-ndmpa3 /usr/local/avamar/var/MyCelerra-ndmpa3

Choose an action:  
 1. Add a new filer  
 2. Edit an existing filer  
 3. Remove a filer from the list  
 4. Exit setup  
 Enter action: [4]:

15. Do one of the following:

IF	DO THIS
You want to add another Celerra or an additional Avamar client instance of an existing Celerra now.	Select menu option 1 (by typing <b>1</b> and pressing <b>ENTER</b> ) and repeat steps 7 thru 15.
You do not want to add another Celerra or an additional Avamar client instance of an existing Celerra now.	Press <b>ENTER</b> to accept the default action (exit setup).

16. Wait for **avsetupndmp** to complete.

The following appears in the command shell:

```
Attempting to restart avagent service.

avagent Info: Client 'MyCelerra.example.com' in directory '/usr/local/avamar/var/MyCelerra.example.com'
avagent Info <5241>: Logging to /usr/local/avamar/var/MyCelerra.example.com/avagent.log
avagent Info <5417>: daemonized as process id 6669
avagent Info: Client Agent MyCelerra.example.com started. [ OK ]
```

IMPORTANT: Be sure to run **avregister** if you have added new accounts.

17. Type the following:

**avregister**

---

**NOTE:** If you added more than one Celerra or client instance during your **avsetupndmp** session, **avregister** will automatically attempt to register all client instances it detects on the accelerator.

---

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):
```

Register and  
 Activate  
 Accelerator With  
 the Avamar Server

18. Type the actual network hostname (as defined in DNS) of your 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, your Avamar system administrator may have defined other domains and sub-domains. Consult your Avamar system administrator for the specific domain you should use when registering this client.

---

**IMPORTANT:** If typing a sub-domain (for example, clients/linux), do not include a slash (/) as the first character. Including a slash as the first character will cause an error and prevent you from registering this client.

---

19. Press **ENTER** to accept the default domain (clients).

The following appears in the command shell:

```
avagent.d Info: Server stopped. [ OK ]
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent.d Info: Client activated successfully. [ OK ]
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 3385
avagent.d Info: Server started. [ OK ]
Registration Complete.
```

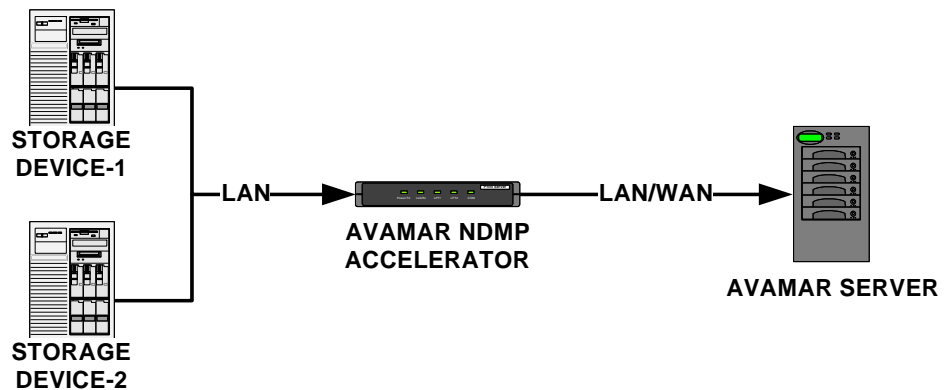
# NETAPP INSTALLATION AND CONFIGURATION

---

This chapter describes how to install and configure the Avamar NDMP Accelerator for use with supported NetApp filers.

## Connect Components to Your Network

The following diagram shows a typical Avamar NDMP Accelerator deployment.



1. Connect your Avamar server, Avamar NDMP Accelerator and filer to your corporate LAN by using 100baseT or 1000baseT network connections.
2. Add each hostname to corporate DNS or modify /etc/hosts files on each network host such that:
  - (a) Avamar server and Avamar NDMP Accelerator can resolve each other's hostnames.
  - (b) Avamar NDMP Accelerator and filer can resolve each other's hostnames.

---

**NOTE:** It is not required that the Avamar server and filer be able to directly resolve each other's hostnames.

---



## Verify Networking

In order for all aspects of the Avamar NDMP Accelerator to function properly, the Avamar server and Avamar NDMP Accelerator must be resolvable by corporate DNS from each other. Similarly, the Avamar NDMP Accelerator and filer must also be resolvable by corporate DNS from each other.

1. Deploy your Avamar server, Avamar NDMP Accelerator and filer on your network.
2. Ensure that your Avamar server, Avamar NDMP Accelerator and filer are turned on and operating properly.

User=admin

3. Open a command shell and log into your Avamar server as user admin.
4. Type:

```
ping ACCEL
```

Where ACCEL is the actual Avamar NDMP Accelerator IP address or hostname as defined in corporate DNS.

This command should demonstrate that the Avamar NDMP Accelerator is responding to the `ping` command.

User=admin

5. Open a command shell and log into the Avamar NDMP Accelerator as user admin.
6. Type:

```
ping AVAMARSERVER
```

```
ping FILER
```

Where AVAMARSERVER and FILER are the actual IP addresses or hostnames as defined in corporate DNS, of your Avamar server and filer, respectively.

These commands should demonstrate that both the Avamar server and filer are both responding to the `ping` commands.

7. Open a command shell and log into the filer.
8. Type:

```
ping ACCEL
```

Where ACCEL is the actual Avamar NDMP Accelerator IP address or hostname as defined in corporate DNS.

This command should demonstrate that the Avamar NDMP Accelerator is responding to the `ping` command.

9. Also ensure that the filer allows NDMP connections from the Avamar NDMP Accelerator by typing:

```
options ndmpd.access
```

10. Do one of the following:

IF	DO THIS
The previous command returned <code>all</code> or <code>legacy</code> .	No further action is necessary.
The previous command did not return <code>all</code> or <code>legacy</code> .	Grant access to the Avamar NDMP Accelerator by typing either <b><code>options ndmpd.access host=HOSTNAME</code></b> - or - <b><code>options ndmpd.access host=IP-ADDR</code></b> Where <code>HOSTNAME</code> and <code>IP-ADDR</code> are the Avamar NDMP Accelerator hostname or IP address, respectively.

---

**IMPORTANT:** Any failure to correctly resolve any hostname from any of the network hosts involved in this integration (Avamar server, Avamar NDMP Accelerator or filer) must be identified and corrected before proceeding any further with this installation procedure.

---

## Installation Procedure

In order to successfully install and configure an Avamar NDMP Accelerator, you must perform all of the following tasks in the following order:

- *Obtain and Copy Avamar NDMP Accelerator Install Packages* (page 27)
- *Install Avamar Linux Client* (page 28)
- *Install Avamar NDMP Accelerator* (page 28)
- *Configure and Register the Accelerator* (page 29)
- *Enable NDMP Services on Filer* (page 34)

### Obtain and Copy Avamar NDMP Accelerator Install Packages

The easiest way to obtain Avamar Linux Client and Avamar NDMP Accelerator install packages is to copy them from an operational Avamar server on your network to your accelerator. The remainder of this task explains how to do this.

---

**TIP:** You can also extract the Avamar Linux Client and Avamar NDMP Accelerator packages from a customer tarball. For information about obtaining and extracting individual installation packages from a customer tarball, contact EMC Technical Support.

---

User=root

1. Open a command shell and log into the Avamar server as root.
2. Use a secure copy program to copy the Avamar Linux Client and Avamar NDMP Accelerator packages from the Avamar server to a temporary directory on the accelerator by typing:

```
cd /usr/local/avamar/src/RHEL4_64
scp AVAMARLINUX.rpm root@ACCELERATOR:/tmp
scp AVAMARNDMP.rpm root@ACCELERATOR:/tmp
```

Where AVAMARLINUX.rpm, and AVAMARNDMP.rpm are the actual filenames of the Avamar Linux Client and Avamar NDMP Accelerator packages and ACCELERATOR is the accelerator hostname or IP address.

---

**NOTE:** /tmp is used as an example temporary install directory in the remainder of this chapter. Your actual temporary install directory may be different.

---

3. Note the actual filenames of the Avamar Linux Client and Avamar NDMP Accelerator packages.

---

**NOTE:** AVAMARLINUX.rpm and AVAMARNDMP.rpm are used as example filenames for the Avamar Linux Client and Avamar NDMP Accelerator install packages, respectively.

---

## Install Avamar Linux Client

User=root

1. Open a command shell and log into the accelerator as root.
2. Change directory to the temporary install directory you created in the previous task (page 27).

```
cd /tmp
```

3. Type:

```
rpm -ivh AVAMARLINUX.rpm
```

Where AVAMARLINUX.rpm is the actual filename of the Avamar Linux Client install package you previously downloaded.

The following appears in the command shell:

```
Preparing... ##### [100%]
 1:AvamarClient
##### [100%]
Installation complete
You may run /usr/local/avamar/bin/avregister to register and activate this
client with the Administrator server.
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 23920
avagent.d Info: Client Agent started.
```

## Install Avamar NDMP Accelerator

User=root

1. Ensure that you are still logged into the accelerator as root.
2. Change directory to the temporary install directory you created in the previous task (page 27).

```
cd /tmp
```

3. Type:

```
rpm -ivh AVAMARNDMP.rpm
```

Where AVAMARNDMP.rpm is the actual filename of the Avamar NDMP Accelerator install package you previously downloaded.

The following appears in the command shell:

```
Preparing... ##### [100%]
 1:AvamarNDMP
##### [100%]
ndmjob Info: Server started.
avagent Info: Stopping Avamar Client Agent (avagent)...
avagent Info: Client Agent stopped.
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 23956
avagent Info: Client Agent started.
Installation complete
You may run /usr/local/avamar/bin/avsetupndmp to register and activate this
NDMP Accelerator Node with the Administrator server.
```

## Configure and Register the Accelerator

Avamar NDMP Accelerator configuration is performed by the `avsetupndmp` script; registering the accelerator with the Avamar server is performed by the `avregister` script.

User=root  
Configure  
Accelerator

1. Ensure that you are still logged into the accelerator as root.

2. Type:

```
avsetupndmp
```

The following appears in the command shell:

```
Configure systems for backup and restore.
```

```
avsetupndmp will stop all running agents, do you wish to continue Y/N? [Y]:
```

---

**IMPORTANT:** Stopping all running agents will permanently cancel any backups in progress.

---

3. Press **ENTER** to accept the default action to stop all running agents.

The following appears in the command shell:

```
avagent Info: Stopping Avamar Client Agent (avagent)...
avagent Info: Client Agent stopped. [ OK ]
Successfully copied init script.
Configure Avamar Server parameters.
Reading /usr/local/avamar/etc/usersettings.cfg...
```

```
Network address or DNS name of the Avamar Server [avamar-1.example.com]:
```

4. Type the Avamar server DNS name or IP address and press **ENTER**.

avamar-1.example.com is used as an example Avamar server name for the remainder of this procedure.

The following appears in the command shell:

```
Root password of Avamar Server [*****]:
```

5. Type the Avamar server software root password and press **ENTER**.

---

**NOTE:** This prompt is not asking for the operating system root password; it is asking for the Avamar server software root password.

---

The following appears in your command shell:

```
Enable support for multiple simultaneous backups? (IMPORTANT: Requires 8 or
more GB of RAM) [N]:
```

---

**IMPORTANT:** Enabling support for multiple simultaneous backups without satisfying the minimum hardware and operating system requirements specified in *General Capabilities and Limitations* (page 9) will adversely affect backup performance.

---

6. Do one of the following:

IF	DO THIS
You want to enable multiple simultaneous backups.	Type <b>y</b> and press <b>ENTER</b> .
You do not want to enable multiple simultaneous backups.	Press <b>ENTER</b> to accept the default action (do not enable multiple simultaneous backups).

The following appears in the command shell:

```
Writing /usr/local/avamar/etc/usersettings.cfg...
Successfully wrote '/usr/local/avamar/etc/usersettings.cfg'
Configure individual system parameters.
```

The following systems are configured:

```
Choose an action:
 1. Add a new system
 2. Edit an existing system
 3. Remove a system from the list
 4. Exit setup
Enter action: [4]:
```

7. Type **1** and press **ENTER**.

The following appears in the command shell:

```
Setting up a new system account

What kind of system do you want to setup?
 1. EMC Celerra
 2. NetApp Filer
Enter choice:
```

8. Type **2** and press **ENTER**.

The following appears in your command shell:

```
Starting setup for NetApp Filer
Network address or DNS name of the NetApp Filer [filer.company.com]:
```

9. Type the NDMP filer DNS name or IP address and press **ENTER**.

MyFiler.example.com is used as an example NDMP filer name for the remainder of this procedure.

The following appears in your command shell:

```
NDMP user on "MyFiler.example.com" [root]:
```

This prompt is asking for a login account on the filer that has sufficient privileges to run NDMP jobs and access all data on the filer. The root user account always has sufficient privileges but you may specify another user account at your discretion.

---

**IMPORTANT:** If the user account you specify in the following step does not have sufficient privileges to run NDMP jobs and access all data on the filer, backups might not be initiated or might be incomplete.

---

10. Do one of the following:

IF	DO THIS
You intend to use the default user account (root).	Skip this step and go directly to step 11.
You intend to specify a filer account other than root.	Verify that the user account you intend to use has administrator privileges, or, at a minimum, has cli-ndmpd* and cli-ndmpcopy* CLI rights capabilities.

11. Do one of the following:

IF	DO THIS
You want to use the default user account (root).	Press <b>ENTER</b> to accept the default filer account name (root).
You want to specify a filer account other than root.	Type your account name and press <b>ENTER</b> .

The following appears in the command shell:

```
Password for "root" on "MyFiler.example.com":
```

12. Type the filer user account password and press **ENTER**.

The following appears in the command shell:

```
Repeat password:
```

13. Re-type the same password you entered in step 12 and press **ENTER**.

The following appears in the command shell:

```
Password encoding scheme ("md5" or "text") to use for "MyFiler.example.com"
[md5]:
```

You must specify the correct password encoding scheme currently in use on your NDMP filer.

---

**IMPORTANT:** The only valid entries are **md5** or **text**; any other entries or specifying the incorrect encoding scheme will cause an error.

---



---

**TIP:** To determine which password encoding scheme is currently in use on your NDMP filer, open a command shell, log into the filer and run the **options ndmpd.authtype** command. This command returns either `plaintext` or `challenge`.

- If `plaintext` is returned, then **text** is the correct entry.
- If `challenge` is returned, then **md5** is the correct entry.

EMC recommends using challenge/md5 encrypted passwords whenever possible.

---

14. Type the correct password encoding scheme (either **md5** or **text**) and press **ENTER**.

The following appears in the command shell:

```
Checking username and password... verified Avamar account name for
"MyFiler.example.com" [MyFiler.example.com]:
```

This prompt is asking for a descriptive name for this NDMP filer client instance that will appear various places in Avamar Administrator. Any user-defined name is acceptable. The default Avamar account name is the filer DNS name or IP address you previously entered in step 9.

---

**IMPORTANT:** This name must be unique. Be especially careful when adding a second client instance of the same filer that you differentiate it from any existing Avamar account name.

---

MyFiler.example.com is used as an example Avamar account name for the remainder of this procedure.

15. Do one of the following:

IF	DO THIS
You want to specify an Avamar account name other than the default.	Type your account name and press <b>ENTER</b> .
You want to use the default Avamar account name.	Press <b>ENTER</b> to accept the default Avamar account name.

The following appears in the command shell:

```
Routable address or DNS name of this accelerator from "MyFiler.example.com"
[ndmpa-1.example.com]:
```

16. Type this accelerator DNS name or IP address and press **ENTER**.

ndmpa-1.example.com is used as an example accelerator name for the remainder of this procedure.

The following appears in the command shell:

```
Writing /usr/local/avamar/var/MyFiler.example.com/.avagent...
Writing /usr/local/avamar/var/MyFiler.example.com/ndmp.cfg...
```

```
Trying to get list of volumes from MyFiler.example.com...
```

```
<dir name="/vol/local1" />
<dir name="/vol/local2" />
Finished setup for MyFiler.example.com:/usr/local/avamar/var/
MyFiler.example.com.
```

The following filers are configured:

```
MyFiler.example.com /usr/local/avamar/var/MyFiler.example.com
```

Choose an action:

1. Add a new filer
2. Edit an existing filer
3. Remove a filer from the list
4. Exit setup

```
Enter action: [4]:
```



17. Do one of the following:

IF	DO THIS
You want to add another filer or an additional Avamar client instance of an existing filer now.	Select menu option 1 (by typing <b>1</b> and pressing <b>ENTER</b> ) and repeat steps 7 thru 17.
You do not want to add another filer or an additional Avamar client instance of an existing filer now.	Press <b>ENTER</b> to accept the default action (exit setup).

18. Wait for **avsetupndmp** to complete.

The following appears in the command shell:

```
Attempting to restart avagent service.
```

```
avagent Info: Client 'MyFiler.example.com' in directory '/usr/local/avamar/var/MyFiler.example.com'
avagent Info <5241>: Logging to /usr/local/avamar/var/MyFiler.example.com/avagent.log
avagent Info <5417>: daemonized as process id 6669
avagent Info: Client Agent MyFiler.example.com started. [ OK ]
```

IMPORTANT: Be sure to run **avregister** if you have added new accounts.

19. Type the following:

**avregister**

---

**NOTE:** If you added more than one filer or client instance during your **avsetupndmp** session, **avregister** will automatically attempt to register all client instances it detects on the accelerator.

---

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):
```

20. Type the actual network hostname (as defined in DNS) of your 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, your Avamar system administrator may have defined other domains and sub-domains. Consult your Avamar system administrator for the specific domain you should use when registering this client.

---

**IMPORTANT:** If typing a sub-domain (for example, clients/linux), do not include a slash (/) as the first character. Including a slash as the first character will cause an error and prevent you from registering this client.

---

Register and  
Activate  
Accelerator With  
the Avamar Server

21. Press **ENTER** to accept the default domain (clients).

The following appears in the command shell:

```
avagent.d Info: Server stopped. [ OK ]
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent.d Info: Client activated successfully. [ OK ]
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 3385
avagent.d Info: Server started. [ OK ]
Registration Complete.
```

## Enable NDMP Services on Filer

In order to back up your NetApp filer to your Avamar server, you must enable the Network Data Management Protocol (NDMP) services on your filer.

1. Point your web browser at your NetApp filer by typing the following URL:

**http://MyFiler.example.com/na\_admin**

Where MyFiler.example.com is your actual NetApp filer network hostname (as defined in DNS) or IP address.

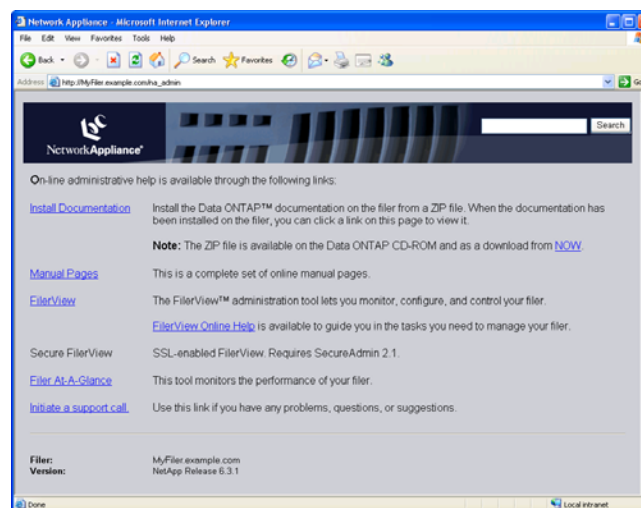
Depending on your browser security settings, a security alert dialog box might appear.

2. If a security alert dialog box appears, click **Yes** or **OK** to allow redirection to your NetApp filer administration page.

You may be prompted for login credentials at this point.

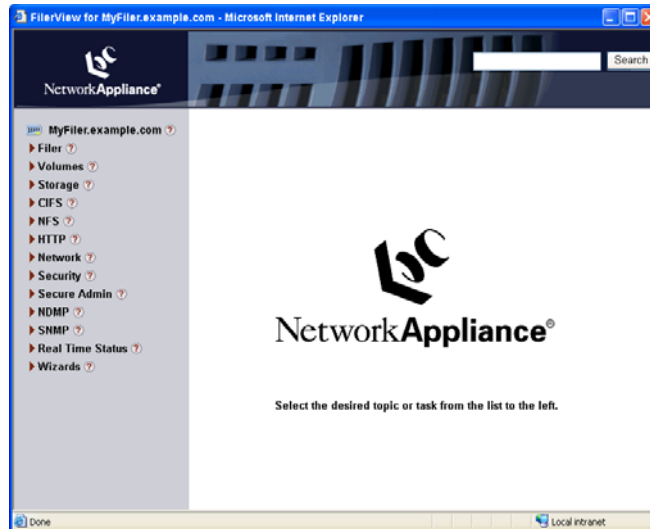
3. If a login dialog box appears, type a valid NetApp administrative user name and password, then click **Yes** or **OK** to log into the NetApp filer.

The NetApp administration page appears.



4. Click **FilerView**.

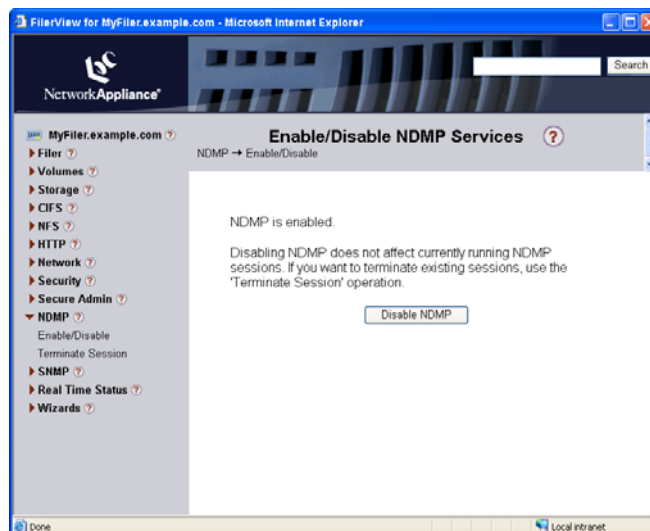
The FilerView page appears.



5. Click **NDMP**.

The Enable/Disable NDMP Services page appears.

If NDMP is already enabled, your Enable/Disable NDMP Services page will look like this:



The status NDMP is enabled appears and the alternate action button label is **Disable NDMP**.

6. If NDMP is disabled, click **Enable NDMP**.

Your Enable/Disable NDMP Services page will now look like the one previously shown.

---

**TIP:** You can also enable NDMP by opening a command shell, logging into the filer, and running the `options ndmpd.enable on` command.

---

# POST-INSTALLATION AND CONFIGURATION

---

This chapter discusses how to change Avamar NDMP Accelerator configuration settings, as well as how to uninstall or upgrade Avamar NDMP Accelerator software.

## Changing Accelerator Configuration Settings

The `avsetupndmp` program can be re-run as often as necessary to re-configure accelerator settings.

Previously configured storage devices or storage device client instances can be edited or removed by choosing the respective option in the `avsetupndmp` menu.

If you want to use the accelerator with a different Avamar server, you must re-run `avregister`.

---

**IMPORTANT:** You must always re-run `avregister` after adding a new storage device or new client instance of an existing storage device.

---

## Uninstalling Avamar NDMP Accelerator Software

User=root

1. Open a command shell and log into the accelerator as root.
2. Query the RPM database for the currently installed clients by typing:

```
rpm -qa | grep Avamar
```

The following appears in the command shell:

```
AvamarClient-VERSION  
AvamarNDMP-VERSION
```

Where VERSION is the actual version of each piece of EMC software currently installed on your system.

3. Uninstall the AvamarNDMP software by typing:

```
rpm -e AvamarNDMP-VERSION
```

Where AvamarNDMP-VERSION is the actual software package name returned in step 2.

The following appears in the command shell:

```
ndmjob Info: Server stopped.  
avagent Info: Stopping Avamar Client Agent (avagent)...  
avagent Info: Client Agent stopped.  
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log  
avagent Info <5417>: daemonized as process id 23997  
avagent Info: Client Agent started.
```

4. Uninstall the AvamarClient software by typing:

```
rpm -e AvamarClient-VERSION
```

Where AvamarClient-VERSION is the actual software package name returned in step 2.

The following appears in the command shell:

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

## Upgrading Avamar NDMP Accelerator Software

In order to upgrade your Avamar NDMP Accelerator and Linux client software, you must completely uninstall the old software and install the new software. Use of the Linux software upgrade command (**rpm -Uh**) is not supported.

## Configuring NTP Time Services

User=root

1. Open a command shell and log into the accelerator as root.
2. Copy the `/etc/ntp.conf` and `/etc/ntp/step-tickers` files from the utility node by typing:

```
ssh -x root@ACCELERATOR-NODE
cp -p /etc/ntp.conf{, .orig}
scp root@UTILITY-NODE:/etc/ntp.conf /etc/
cp -p /etc/ntp/step-tickers{, .orig}
scp root@UTILITY-NODE:/etc/ntp/step-tickers /etc/ntp/
```

Where `ACCELERATOR-NODE` and `UTILITY-NODE` are the network names or IP addresses of the accelerator and utility nodes, respectively.

3. Restart the `ntpd` service by typing:
 

```
service ntpd restart
```
4. Verify the `ntpd` service started correctly by typing:
 

```
service ntpd status
```
5. Wait 7 to 10 minutes for the system to fully settle.
6. Verify that the `ntpd` service is synchronizing time by typing:

```
/usr/sbin/ntpq -pn
```

7. Verify that the `reach` column values eventually become non-zero and that an asterisk appears in the left column of one of the time servers.

Ideally all `reach` values are 377, which is an octal value meaning that the last 8 time server contacts were all successful, with no misses.

8. If there are zero `reach` values, then troubleshoot as follows:
  - (a) Verify that the list of time servers is correct in `/etc/ntp.conf`. Check this on server nodes `0.s` and `0.0` as well.

The `restrict` statements in `/etc/ntp.conf` on nodes `0.s` and `0.0` should permit other nodes, such as the accelerator node, to obtain time.

- (b) However, if this is not the case, and the `reach` values for nodes `0.s` and `0.0` remain zero on the accelerator node, then add the following line in `/etc/ntp.conf` on nodes `0.s` and `0.0` for each NDMP Accelerator node IP address:

```
restrict ACCELERATOR-NODE-ADDRESS nomodify
```

Where `ACCELERATOR-NODE-ADDRESS` is the IP address of the accelerator node.

In spite of the meaning of the word `restrict`, the point here is to unrestrict access from the specified accelerator node.

- (c) After making changes to `/etc/ntp.conf` on nodes `0.s` and `0.0`, restart `ntpd` on those nodes by typing:

```
service ntpd restart
```

(d) Verify that there are no errors, and that the `ntpd` service is synchronizing time by typing:

```
/usr/sbin/ntpq -pn
```

(e) If problems remain, it is possible that the problems are systemic or network-related and require additional troubleshooting. Contact EMC Technical Support for assistance.

9. Ensure that `ntpd` will start up at the next reboot by typing:

```
chkconfig ntpd on
```

10. If you have not already done so, set the local time zone on the accelerator by typing:

```
/usr/sbin/timeconfig
```

---

**IMPORTANT:** For best results, you should set accelerator local time to that of the NDMP storage device so that both client and accelerator log files correlate.

---

11. Select the correct local time zone from the time zone menu.

12. Verify that the output of the `date` command is as expected by typing:

```
date
```

# USING AVAMAR NDMP ACCELERATOR

This chapter describes how to use the Avamar NDMP Accelerator to perform full or incremental backups and recoveries (restores) of supported EMC Celerra IP storage systems and NetApp filers.

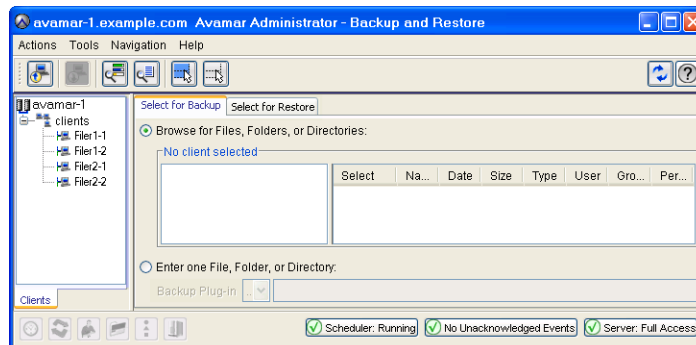
**NOTE:** For the sake of clarity, this publication often uses the term “storage device” to generically refer to any supported EMC Celerra IP storage system or NetApp filer.

## Performing an On-Demand Backup

1. Start Avamar Administrator.
2. Select **Navigation > Backup and Restore** or click the **Backup & Restore** launcher button.



The Backup and Restore window appears.



3. Click the Select for Backup tab.



- In the Clients tree, select the storage device client instance you want to back up.

The filesystem appears as a volume tree immediately to the right of the Clients tree. Placing a check mark next to a volume selects it for backup.

---

**IMPORTANT:** Each individual backup operation can only comprise one target volume. If you try to backup more than one volume, an error will occur.

---

---

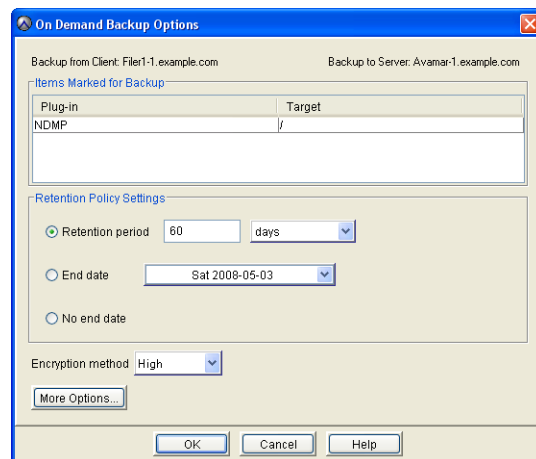
**TIP:** Select **Actions > Preview List...** to view a summary of all directories and files you have just selected for an on-demand backup.

---



- Select **Actions > Backup Now...** or click the toolbar icon shown immediately to the left.

The On Demand Backup Options dialog box appears.



- Review your backup settings.

Clicking **Cancel** returns you to the Backup and Restore window where you can modify your backup selections.

Retention Policy Settings control how long this backup will be kept for potential restores.

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

Choices are:

High      Strongest available encryption setting for that specific client platform.

Medium    Medium strength encryption.

None      No encryption.

**NOTE:** The exact encryption technology and bit strength used for any given client/server connection is dependent on a number of factors, including the client platform and Avamar server version. Refer to your *Avamar Product Security Guide* for additional information.

8. If you want to change your backup retention setting, select or type the following:

FIELD/OPTION	DESCRIPTION
Retention from today	If you want this backup to be deleted from the Avamar server after a specific number of days, weeks, months or years, select this option and type the number of days, weeks, months or years.
End date	If you want this backup to be deleted from the Avamar server on a specific calendar date, select this option and browse to that date on the calendar.
No end date	If you want to keep this backup for as long as this client remains active in the Avamar server, select this option.

---

**TIP:** If you want to include plug-in options with this backup, click **More Options...**, then select or clear the desired options and type values where applicable.

---

Forcing Full or  
Incremental  
Backups

By default, Avamar will automatically determine whether to take a full or incremental backup of this storage device. The first backup is always a full (level 0). Each subsequent backup is an incremental (level 1). Avamar will intelligently merge any previous backup data with the new level 1 incremental, thereby always resulting in a full backup.

However, if you want to force a full (level 0) or incremental (level 1) backup, click **More Options...**, select the **Show Advanced Options** option and select the desired Filer Dump Mode (either Force a level 0 dump or Force an incremental (level 1) dump).

---

**IMPORTANT:** Forcing a full (level 0) dump will re-send all data in the requested volume from the storage device to the accelerator. This is not recommended.

---

---

**IMPORTANT:** For best results, always perform incremental Celerra backups at the volume level. For Celerra, Avamar will default to performing full backups of lower level directories and subdirectories. However, it is possible to override this default behavior and force an incremental backup of lower level directories and subdirectories. This is not a good practice as it can cause unpredictable application behavior.

---

9. Click **OK**.

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

10. Click **OK** to close the status message dialog box.

## Select for Restore Overview

The Backup and Restore window Select for Restore tab provides two different ways to locate and select a backup stored on the server:

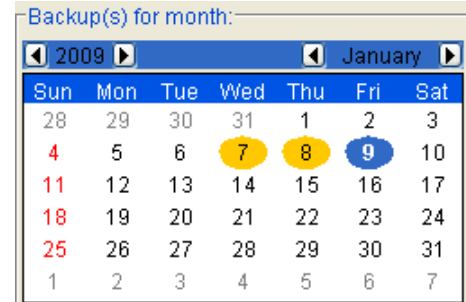
- By calendar date (page 44)
- By content (page 45)

### Locating and Selecting a Backup by Calendar Date

In order to locate backups stored on the server by calendar date, perform the following:

1. Select a Client in the clients tree.
2. Click the By Date tab.

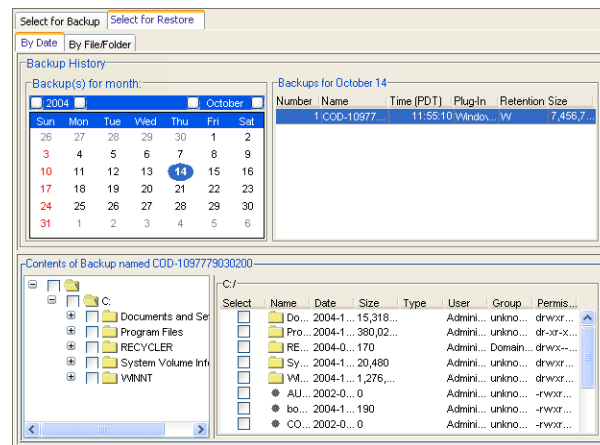
Clicking the By Date tab displays a browsable calendar for locating backups in the Avamar server.



Dates highlighted in yellow indicate that a backup was performed on that date.

Selecting a valid backup date on the calendar populates the backups list immediately to the right of the calendar.

Selecting a backup populates the contents list directly below the Backup History pane.



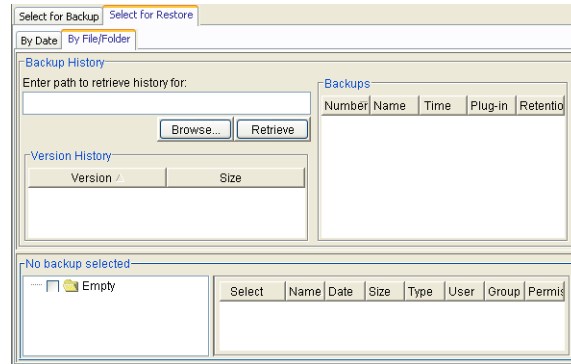
3. In the Backup History pane, browse to a valid backup date in the Calendar (highlighted in yellow).
4. Select the backup from which you want to restore the volume.

## Locating and Selecting a Backup by Content

In order to locate backups by content (that is, specific directories, folders or files within that backup), perform the following:

1. Select a Client in the clients tree.
2. Click the By File/Folder tab.

Clicking the By File/Folder tab displays a Backup History pane that can be used to retrieve all backups that contain a specified client directory, folder or file.



3. Type a slash (/) in the Enter path to retrieve history for field.
4. Click **Retrieve**.

The Version History table lists all versions and sizes for that directory, folder or file that have been backed up from this client.

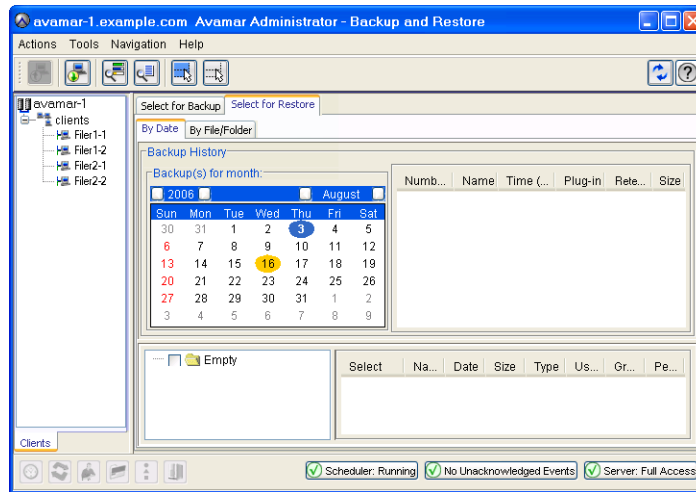
Selecting a row in the Version History table shows all backups for the selected client that contains the selected version of the directory, folder or file.

5. Select the backup from which you want to restore the volume.

## Performing a Recovery (Restore)



1. Start Avamar Administrator.
2. Select **Navigation > Backup and Restore** or click the **Backup & Restore** launcher button.  
The Backup and Restore window appears.
3. Click the Select for Restore tab.



4. In the Clients tree, select the storage device client instance.
5. Locate and select a backup from which you want to restore directories or files.

---

**TIP:** Refer to *Locating and Selecting a Backup by Calendar Date* (page 44), *Locating and Selecting a Backup by Content* (page 45) for additional information about locating backups by calendar date or content, respectively.

---

6. Select the volume you want to restore.

---

**IMPORTANT:** Each individual restore operation can only comprise one target volume. If you try to restore more than one volume, an error will occur.

---

---

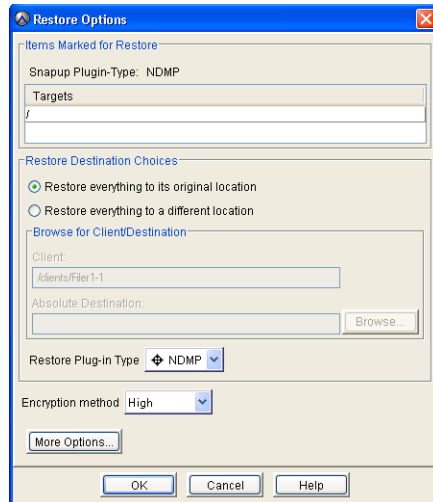
**TIP:** Select **Actions > Preview List...** to view a summary of all directories and files you have just selected for a restore.

---

7. Select **Actions > Restore Now...** or click the toolbar icon shown immediately to the left.



The Restore Options dialog box appears.



8. Review your restore settings.

Clicking **Cancel** returns you to the Backup and Restore window where you can modify your restore selections.

9. If you want to change your restore settings, select or type the following:

FIELD/ OPTION	DESCRIPTION
Restore Destination Choices	<p>Restore destination choices allows you to specify which storage device client instance and top-level (root) directory will receive the restored files.</p> <p><b>Restore Everything to its original location</b> is the default destination — all files are restored to original storage device client instance in the original top-level (root) directory.</p> <p><b>Restore Everything to a different location</b> allows you to specify another client or another directory on the same storage device client instance.</p> <p><b>IMPORTANT:</b> The original instance path is not preserved unless specified (that is, it functions like Microsoft Windows "Save As"). For example, if the original path is <code>/fs/dir1</code> and you decide to restore to <code>/fs/newdir</code>, files are restored to <code>/fs/newdir</code> rather than <code>fs/newdir/dir1</code>. Any ACLs applied to the original instance path are maintained after the recovery.</p>

**TIP:** If you want to include plug-in options with this restore, click **More Options...**, then select or clear the desired options and type values where applicable.

10. Click **OK**.

The Restore Options dialog box closes and the following status message appears: Restore initiated.

11. Click **OK** to close the status message dialog box.

## Scheduling Backups

In order to have your storage device backups performed on a regular schedule, you must:

- Create a new group expressly for storage device backups
- Add the storage device client instance to this new group
- Assign a dataset to this new group
- Assign a schedule to this new group
- Assign a retention policy to this new group
- Enable scheduling for this new group

**IMPORTANT:** Any single Avamar dataset can only point to a maximum of one storage device volume and only one dataset can be assigned to any particular group. This effectively means that a separate group must be created and a separate unique dataset created and assigned for each storage device volume you want to backup.

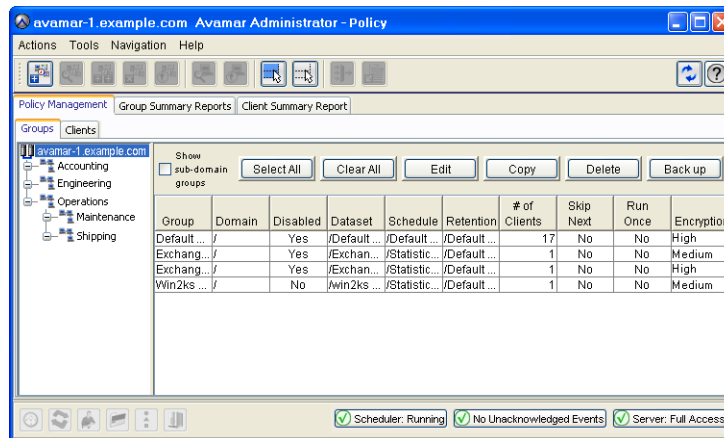
A thorough discussion of groups, group policy, datasets, schedules and retention policies is beyond the scope of this publication. Refer to your *Avamar System Administration Guide* for additional information.

## Setting Up Scheduled Backups

1. Start Avamar Administrator.
2. Select **Navigation > Policy** or click the **Policy** launcher button.



The Policy window appears.

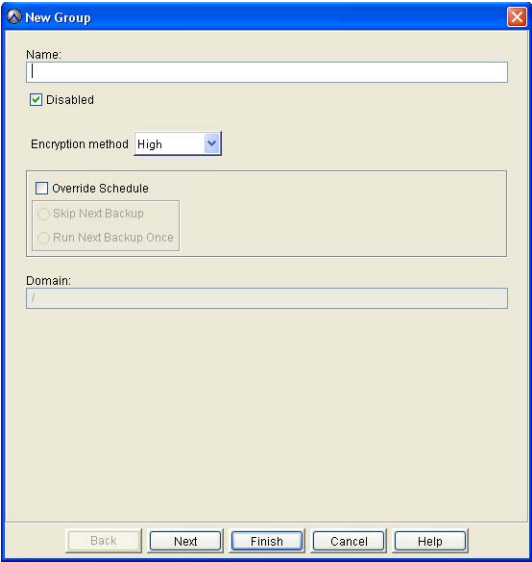






3. Select **Actions > New Group...** or click the toolbar icon shown immediately to the left.

The New Group wizard appears.



4. Select or type the following:

FIELD/OPTION	DESCRIPTION
Name	Type a name for this new group. <b>IMPORTANT:</b> Do not use any of the following characters in your group name: asterisk (*), forward slash (/), backward slash (\), colon (:), semicolon (;), question mark (?), greater-than sign (>), less-than sign (<) or vertical bar ( ).
Disabled	This option is selected by default. Clear this option if you want to immediately use this group to take regularly scheduled client backups.
Encryption Method	This is the group encryption method that will be used by all members of this group for client/server network communications unless it is overridden at the client level. Choices are:  High      Strongest available encryption setting for that specific client platform.  Medium    Medium strength encryption.  None      No encryption.  <b>NOTE:</b> The exact encryption technology and bit strength used for any given client-server connection is dependent on a number of factors, including the client platform and Avamar server version. Refer to your <i>Avamar Product Security Guide</i> for additional information.

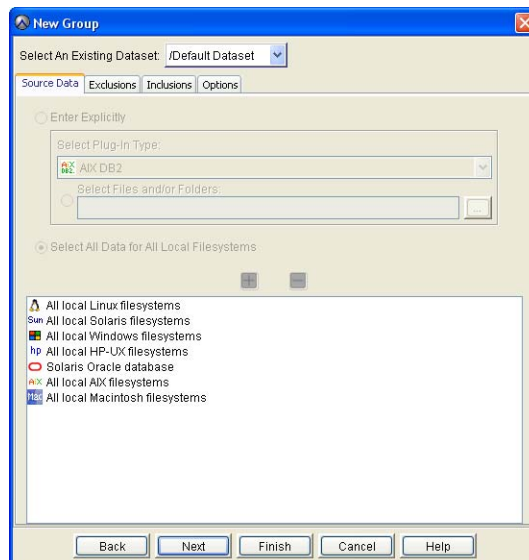
FIELD/OPTION	DESCRIPTION
Override Schedule	Select this option if you want to override the assigned schedule for this group.  You can also skip the next scheduled backup entirely ( <b>Skip Next Backup</b> ) or perform the next scheduled backup one time only ( <b>Run Next Backup Once</b> ).
Domain	Location in the Avamar where this group should reside.

The remaining wizard screens are used to select a dataset, schedule and retention policy, as well as build a client list for this group.

You can click **Finish** at any time. Doing so will cause the new group to be created using system default settings and an empty client list. You can change those settings by editing the group properties.

5. Click **Next**.

The next New Group wizard screen appears.



This screen is used to select a dataset for use with this group.

6. Select a dataset from the **Select an Existing Dataset** drop-down list.

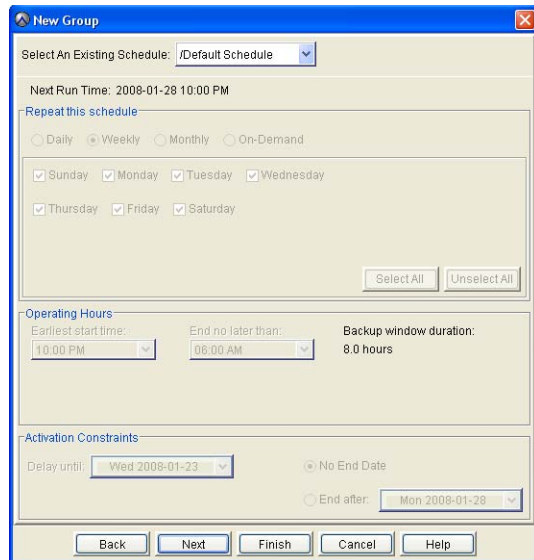
---

**NOTE:** Datasets are not modifiable from this screen. Detailed dataset properties are shown so that you can review them prior to making your selection. Refer to your *Avamar System Administration Guide* for additional information about editing dataset properties.

---

7. Click **Next**.

The next New Group wizard screen appears.



This screen is used to select a schedule for use with this group.

8. Select a schedule from the **Select an Existing Schedule** drop-down list.

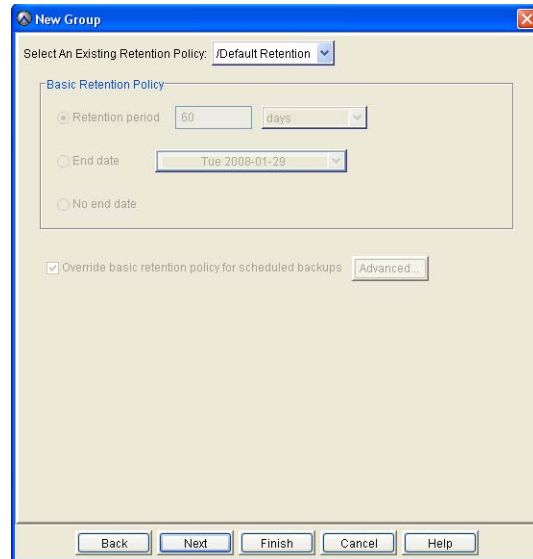
---

**NOTE:** Schedules are not modifiable from this screen. Detailed schedule properties are shown so that you can review them prior to making your selection. Refer to your *Avamar System Administration Guide* for additional information about editing schedule properties.

---

9. Click **Next**.

The next New Group wizard screen appears.



This screen is used to select a retention policy for use with this group.

10. Select a retention policy from the **Select an Existing Retention Policy** drop-down list.

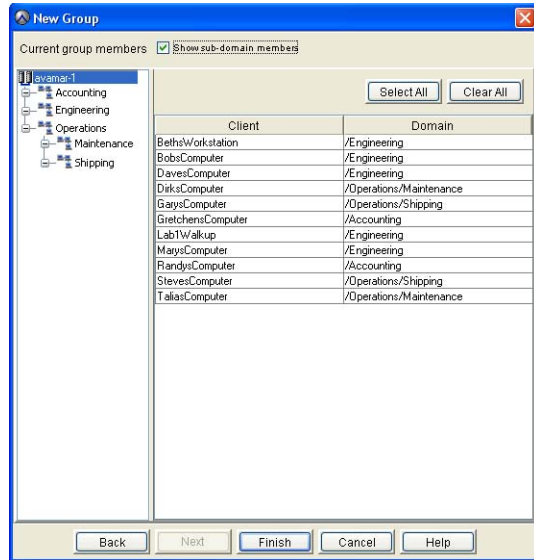
---

**NOTE:** Retention policies are not modifiable from this screen. Detailed retention policy properties are shown so that you can review them prior to making your selection. Refer to your *Avamar System Administration Guide* for additional information about editing retention policy properties.

---

11. Click **Next**.

The final New Group wizard screen appears.



This screen is used to build a list of clients that will be members of this group. In this case, our group will contain only one client — the storage device client instance.

12. Select the storage device client.

---

**TIP:** Clicking **Select All** selects all clients; clicking **Clear All** deselects all clients (opposite of **Select All**).

---

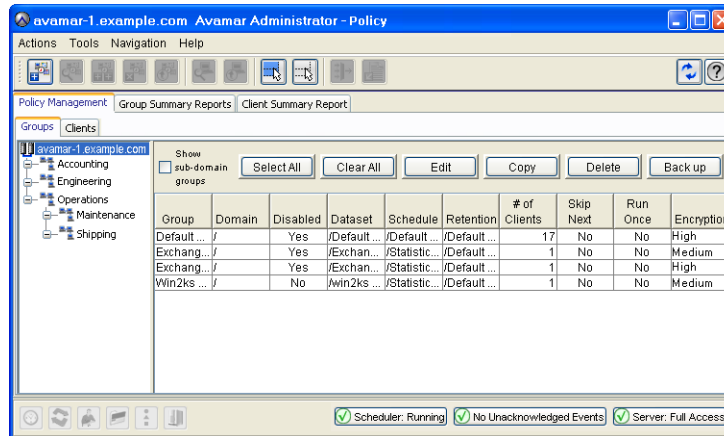
13. Click **Finish**.

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

## Enabling Scheduled Backups

1. Start Avamar Administrator.
2. Select **Navigation > Policy** or click the **Policy** launcher button.

The Policy window appears.



3. Click the Policy Management tab.
4. Click the Groups tab.
5. Select the group you created in the previous procedure (the group that now contains only your storage device).
6. Select **Actions > Group > Disable Group**.  
 This unsets the **Disable Group** option on the **Actions > Group** menu.  
 A confirmation message appears.
7. Click **Yes** to enable this group.

# APPENDIX A — PLUG-IN OPTIONS

---

## Important Terms and Concepts

Plug-in options provide additional control of backups and restores. These options are context-sensitive to both the operation being performed and the specific plug-in selected for that operation.

These options can be specified during on-demand backup and restore operations, or persistently set within datasets for all future scheduled backups.

Backup or restore option dialog boxes automatically appear when initiating on-demand backups or restores, respectively.

When creating a new dataset, the new dataset wizard offers an opportunity to configure persistent backup plug-in option settings for that dataset.

To view or set plug-in options for an existing dataset:

1. Start Avamar Administrator.
2. Select **Tools > Manage Datasets...**  
The Manage All Datasets window appears.
3. Select a dataset from the list and click **Edit**.  
The Edit Dataset dialog box appears.
4. Click the **Options** tab.

Plug-in options can be set two ways:

- By using the graphical controls
- By typing option names and values as free text

**Setting Plug-in Options by Using Graphical Controls.** By clicking the Options tab and selecting a plug-in you can display all current options for that specific plug-in.

These settings are represented by graphical controls (for example, options, radio buttons, list boxes, and so forth).

The advantage to setting plug-in options by using graphical controls is that you cannot type an option name or value incorrectly. Only valid states are shown.

Setting **Show Advanced Options** expands this list even further by displaying options that are normally only of interest to persons debugging an Avamar system. These advanced options are shown in red.

**Typing Option Names and Values as Free Text.** You can also set plug-in options by typing option names and values as free text.

Clicking **More** expands the dialog box to include Enter Attribute and Attribute Value fields, which can be used to input plug-in options and values as free text.

However, it must be understood that no error checking or validation is performed on these free text entries and that free text entries override settings made by way of the graphical controls.

## NDMP Plugin Options

This topic lists and describes the plugin options available for use with any of the following Avamar NDMP plugins:

- NDMP
- EMC Celerra via NDMP
- Netapp Filer via NDMP

### Backup Options

FIELD/OPTION	DESCRIPTION
Filer Dump Mode	One of the following: Prefer Incremental, but do a Full if required Prefer Incremental, but do a Full if required Force an incremental (level 1) dump
<b>Save file/directory permissions(ACL's) with the backup</b>	If selected, extended file and directory Access Control Lists (ACLs) are saved during the backup. This is the default setting. <b>NOTE:</b> This option is not available for use with the EMC Celerra via NDMP plugin. <b>IMPORTANT:</b> Unsetting this option prevents the Avamar server from saving ACLs during your backup. You will therefore not be able to restore ACLs at any future time.



## Restore Options

FIELD/OPTION	DESCRIPTION
<b>Restore file/directory permissions(ACL's) that were saved with the backup</b>	<p>If selected, ACLs saved during NDMP backups are restored.</p> <p><b>NOTE:</b> This option is not available for use with the EMC Celerra via NDMP plugin.</p> <p><b>IMPORTANT:</b> If ACLs were not saved during the NDMP backup, they cannot be restored.</p>

## APPENDIX B — THE AVNDMP SCRIPT

---

**avndmp** is the script that actually performs an NDMP backup or restore.

This information is provided for reference purposes only. Inexperienced personnel should not invoke this script directly. Contact EMC Technical Support for additional information.

```
avndmp {--backup | --browse | --check-filer-version
| --check-ndmp-enabled | --restore}

[--acceladdr=ACCELERATOR] [--advanced_options="FLAGS"]
[--allowsubvolumeincremental] [--avamar-account-path=PATH]
[--avtarflags="OPTIONS"] [--avtarport=PORT] [--check-password]
[--debug] --fileraddr=FILER [--filerpswd=PASSWORD]
[--filertype={md5 | text}] [--fileruser=USER] [--full]
[--incremental] --labelnum=NUM [--logfile=FILE] [--prefix=STRING]
[--restoretargget=PATH] [--snappath=PATH] [--version]
```

### Commands

One (and only one) of the following commands must be supplied on each command line:

<b>--backup</b>	Backs up an NDMP filer.
<b>--browse</b>	Browses NDMP filer for available volumes.
<b>--check-filer-version</b>	Returns specific version of NetApp software.
<b>--check-ndmp-enabled</b>	Returns status of NDMP services on the filer.
<b>--restore</b>	Restores an NDMP filer.

### Options

<b>--acceladdr=ACCELERATOR</b>	Specifies IP address or DNS name of the Avamar NDMP Accelerator.
<b>--advanced_options="FLAGS"</b>	List of advanced options from work order.

<code>--allowsubvolumeincremental</code>	Used with <code>--backup</code> to force incremental backups of target subdirectories.
<code>--avamar-account-path=PATH</code>	Specifies a user location (PATH) in the Avamar server. Derived from work order.
<code>--avtarflags="OPTIONS"</code>	OPTIONS from work order that are passed to <code>avtar</code> . Enclose OPTIONS in double-quotes and separate multiple options with white space.
<code>--avtarport=PORT</code>	PORT <code>avtar</code> uses to communicate with <code>avagent</code> . Derived from work order.
<code>--check-password</code>	If supplied, the <code>ndmjob -q</code> command will be issued in order to validate the user name and password on the storage device. It will not print anything if the password is valid, and will print an error and exit with error status if it is not.
<code>--debug</code>	Enables debug mode, which prints messages programmers can use to debug script execution.
<code>--fileraddr=FILER</code>	Specifies IP address or DNS name of the NDMP FILER. This option is required for all commands.
<code>--filerpswd=PASSWORD</code>	PASSWORD for the <code>--id=fileruser</code> account.
<code>--filertype={md5   text}</code>	Specifies filer authentication method to be either <code>md5</code> or <code>text</code> when logging in with the <code>--id=fileruser</code> account.
<code>--fileruser=USER</code>	NDMP filer log-in account.
<code>--full</code>	Used with <code>--backup</code> to perform a full backup of NDMP filer.
<code>--incremental</code>	Used with <code>--backup</code> to perform an incremental backup of NDMP filer. This is the default backup mode.
<code>--labelnum=NUM</code>	Used with <code>--restore</code> to select the label (sequence) number of the backup to restore. This option is required.
<code>--logfile=FILE</code>	Logs to this FILE. If no FILE value is supplied, default log file ( <code>avndmp.log</code> ) is used.
<code>--prefix=STRING</code>	Prefix this STRING to all log files. This is typically the Work order ID (WID). Derived from work order.

<b>--restoretarg</b> <b>et=PATH</b>	Used with <b>--restore</b> to specify an alternative restore location (other than the default location specified by <b>--snappath</b> ) on the NDMP filer.
<b>--snappath=PATH</b>	Used with <b>--backup</b> to specify a location (PATH) on NDMP filer to begin backup. Used with <b>--restore</b> to specify which volume to retrieve from the Avamar server and the default location on the NDMP file to restore it.
<b>--version</b>	Shows version, then exits.

### avtar NDMP Options

<b>--dumpformat</b>	Writes NDMP stream.
<b>--dumplittle</b>	Writes NDMP stream with little-endian byte ordering.
<b>--dumpnetapp_acls</b>	Writes NDMP stream with NetApp ACLs.