BrightStor® ARCserve® Backup for Linux

NDMP NAS Option Guide

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Chapter 1: Introducing the Option

BrightStor® ARCserve® Backup offers the BrightStor® ARCserve® Backup NDMP NAS Option as one of its options. This option lets you back up and restore data on Network Attached Storage (NAS) devices using Network Data Management Protocol (NDMP). The BrightStor ARCserve Backup NDMP NAS Option application resides on the same application server as BrightStor ARCserve Backup and handles all communication between BrightStor ARCserve Backup and the NAS server that performs backup and restore jobs.

This chapter describes the features and architecture of the option. It also provides a basic overview of the backup and restore process, including the role of the Common Agent.

Features

The NDMP NAS Option includes the following feature set:

- **Push Technology—**You can complete a backup more efficiently by processing the data locally at the NAS server. Push technology offloads system resources from the BrightStor ARCserve Backup host server and minimizes network traffic by initiating the backup and restore jobs remotely on the NAS server.
- **Real-time Remote Browsing—**System administrators can view real-time file and directory information about the remote target machine.

  Note: This feature requires NAS-vendor support.
- **Local and Three-way NDMP Backups and Restores—**As long as one NAS server has an attached tape device, you can use the attached tape device for backing up data from any other NAS servers in the configuration. The tape device does not need to be attached locally to the NAS server to back up or restore that server.
- **NAS Changer Support—**The NDMP NAS Option supports backing up and restoring NAS servers using changers or tape library units attached locally to a NAS server or remotely to a different NAS server. This feature lets you back up and restore a local or remote NAS server using a three-way NDMP backup or restore.

Option Architecture

The NDMP NAS Option provides services that allow BrightStor ARCserve Backup to back up and restore files and directories. These services utilize several components in a variety of configurations to perform backups and restores.

Network Data Management Protocol (NDMP)

NDMP is a communication protocol that allows interaction with a NAS server on the network. It lets a backup application, such as BrightStor ARCserve Backup, control the backup and retrieval of data performed by an NDMP server. The NDMP-enabled server executes on NAS servers. It enables data transfers between tape library units and disks connected locally and remotely to any NAS server on the network.

NDMP allows a network backup application, such as BrightStor ARCserve Backup, to initiate backup operations from a network node. The backup application does not perform data movement. Instead, the NDMP server executing on the NAS server performs the data transfer.

NAS Server

The NAS server implements the NDMP protocol and performs the actual backup and restore operations. The NDMP server executes on the NAS server and is supplied by the manufacturer of the NAS server. BrightStor ARCserve Backup interfaces with the NDMP server running on the NAS server using NDMP.

Remote Browsing

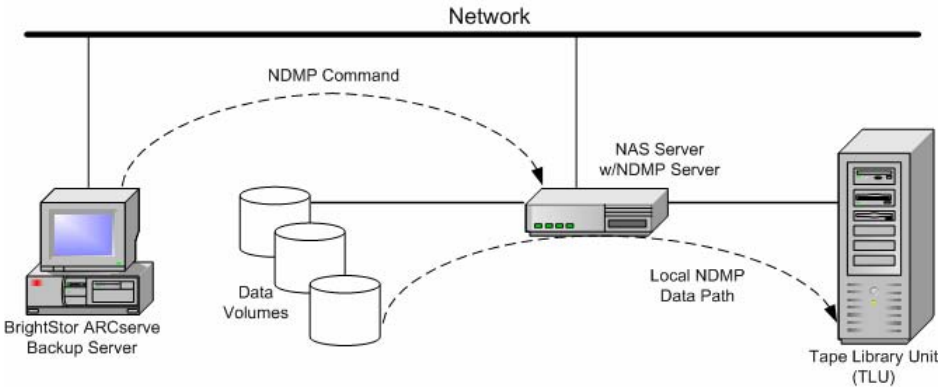
BrightStor ARCserve Backup automatically enumerates files and directories for Network Appliance servers that support NDMP Version 4. If a NAS server supports NDMP Version 3, volumes are automatically enumerated. For NAS servers with NDMP Version 2 support, you must provide information for browsing volumes to the nas.cfg file. For more information about configuring the nas.cfg file to enable remote browsing, see File System Configuration in the chapter “Installing the Option.”

Supported NAS Backup Configurations

BrightStor ARCserve Backup supports NAS local and three-way NDMP backups.

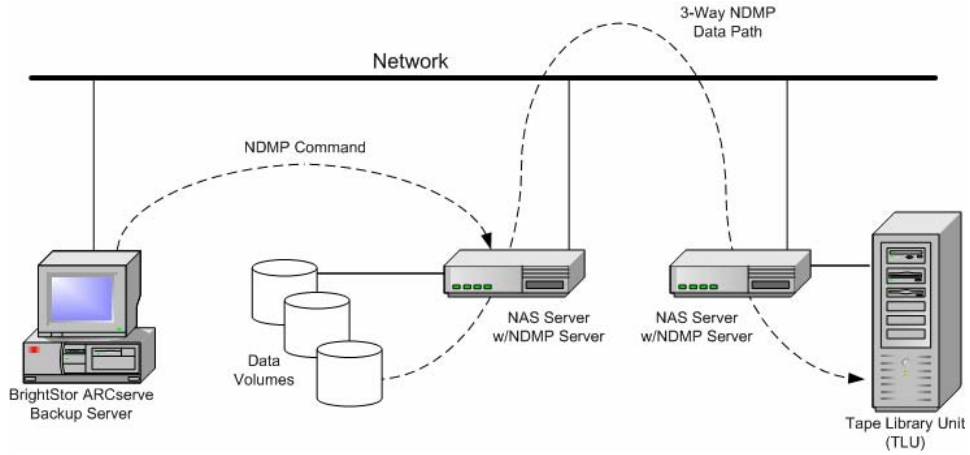
NAS Local NDMP Backups

If a NAS server has a locally-attached tape device, BrightStor ARCserve Backup can trigger a serverless backup of the NAS server's data to this device, as shown in the illustration below:



NAS Three-way NDMP Backups

Some NAS servers on the network may not have tape devices attached to them. As long as at least one NAS server has an attached tape device, that device can be used when backing up other NAS servers. For example, NAS Server 1 does not have a tape device attached to it, but NAS Server 2 does. The NDMP NAS Option can back up NAS Server 1's data to the tape device attached to NAS Server 2. This configuration is known as NAS three-way NDMP backup.



How the Option Backs Up Data

BrightStor ARCserve Backup gives you great flexibility in specifying options, filters, and scheduling information for your jobs. You can use the Backup Manager to configure and to submit a backup job for data in your network. Choose any NAS server as your source and a tape device connected to a NAS server as your destination.

When you back up data from a file system, the Network Appliance NAS server creates a snapshot of that data set so that the backup reflects a consistent view of the data at the time of the backup. The data is then indirectly backed up from this snapshot.

For an overall description of the backup features of BrightStor ARCserve Backup, see the *Administrator Guide*.

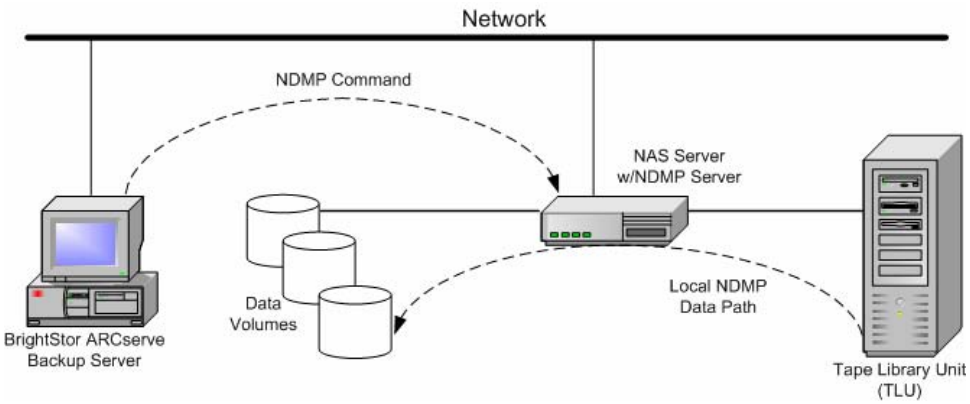
The BrightStor ARCserve Backup functionality available for backing up data depends on the NDMP version implemented and the type of NAS server. For information about vendor-specific restrictions, see the appendix “Feature Support Summary.”

How the Option Restores Data

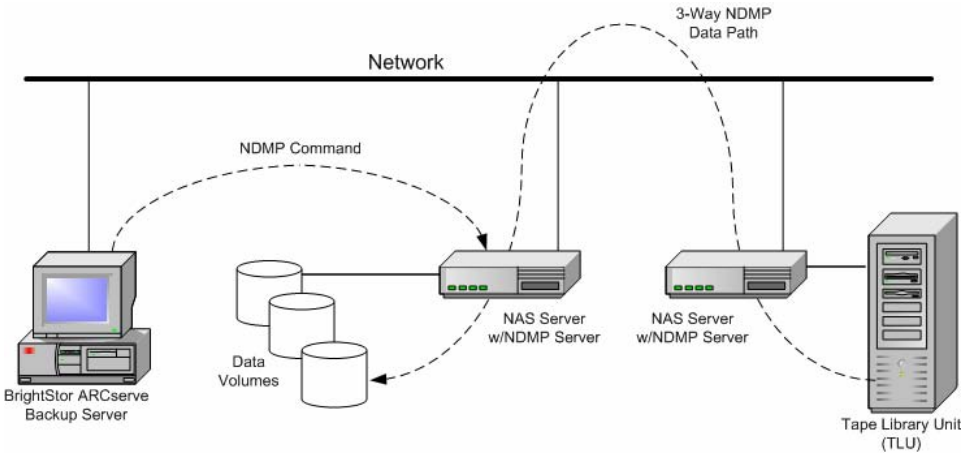
To restore data from a tape device to a NAS server, use the Restore Manager to configure and to submit the job. For an overall description of the restore features, see the *Administrator Guide*.

The BrightStor ARCserve Backup functionality available for restoration of data depends on the NDMP version implemented and the type of NAS server. For information about vendor-specific restrictions, see the appendix, “Feature Support Summary.”

The following diagram illustrates a local restore:



The following diagram illustrates a three-way restore:



Restore by Source

You can view NAS servers by clicking the Source tab of the Restore Manager. You can select individual NAS files or directories for recovery, as you can for other types of hosts or clients supported by BrightStor ARCserve Backup.

Restore by Destination

Because NAS backups are third-party backups, they use the NAS vendor's proprietary format. Although most NAS servers use NDMP, it is advisable to perform backup and restore operations to the same vendor's type of server. Furthermore, you cannot restore the NAS session if you move the tape to a device locally connected to the BrightStor ARCserve Backup server.

Browsing and file or directory selection for restores functions in the same way as browsing NAS servers from the Source tab of the Backup Manager.

The Common Agent

The Common Agent (caagent) is a standard component for all BrightStor ARCserve Backup agents and options. This agent runs at all times as a daemon. Its primary functions include:

- Enabling and disabling all BrightStor ARCserve Backup agents and options
- Listening for requests on behalf of all the agents and options you installed on your system

The Common Agent installs automatically when you install the NDMP NAS Option. The Common Agent uses a configuration file called agent.cfg to track all of the BrightStor ARCserve Backup agents and options in your system. When you install a new agent, the agent.cfg file updates with the new agent's information. The Common Agent uses the new agent's information to detect the new agent in your system and to enable and disable that agent, as necessary.

You will not need to modify the agent.cfg file often. You will need to change it only when you want to enable certain debugging messages or to change the default TCP/IP port on which the Common Agent runs. You can also use this file to set the status of the agent to enabled or disabled.

Chapter 2: Installing the Option

This chapter describes how to install and configure the NDMP NAS Option. The information in this chapter assumes you are familiar with the characteristics and requirements of the specified operating systems in general, and with administrator responsibilities on those operating systems in particular.

Installation Prerequisites

If you wish to use the NDMP NAS Option, you must first prepare and configure the NAS server, and the BrightStor ARCserve Backup server. Before proceeding, verify that:

- Your system meets the minimum hardware and software requirements needed to install the NDMP NAS Option. For a list of requirements, see the readme file.
- The NAS server's operating system is compatible with BrightStor ARCserve Backup. For information about hardware and software requirements for Network Appliance devices, see the appendix "Using Network Appliance NAS Devices."
- You installed the BrightStor ARCserve Backup base product, including the BABmgr and BABsvr packages, and that they work properly in your system. To configure BrightStor ARCserve Backup, you must run csetup.
- You know the hostname of the NAS server and have access information.
- You added the NAS Client. (Use the BrightStor ARCserve Backup Database Manager to add it.)

  Note: If the NAS filer does not support NDMP Version 4 or Snapshot Extension, you may need to configure the BrightStor ARCserve Backup server for browsing. For instructions about performing this task, see Configure the BrightStor ARCserve Backup Server for Browsing.
- You have superuser privileges or the proper authority to install software on the computers where you will be installing the option.

Option Installation

The NDMP NAS Option follows the standard installation procedure for the system components, agents, and options of BrightStor ARCserve Backup. For the detailed steps in this procedure, see the *Getting Started*.

After you complete the installation procedure, be sure to restart your computer when prompted.

Configure the BrightStor ARCserve Backup Server for Browsing

Starting with NDMP Version 4, BrightStor ARCserve Backup can browse the disks on the filer using the Snapshot Extension. This capability is supported by Network Appliance filers. If the filer does not support NDMP Version 4 and Snapshot Extension, the following setup must be completed to enable browsing.

The BrightStor ARCserve Backup server must be able to NFS mount the NAS file systems and have root access to them. For Network Appliance filers, the easiest way to accomplish this task is to use a web browser.

1. Open the NAS server URL.

   For example, using Network Appliance: http://NAShostname/na_admin (replace NAShostname with the real NAS hostname).

2. Select Filer View.
3. On the left side will be a menu bar. Expand the NFS Section.
4. Select Manage Exports.
5. Highlight a file system, for example '/vol/vol0', and click Add Option.
6. Enter your host name or IP address in the Host field. This should be done for both root and access from the drop down menu.
7. Click OK, and then click Apply.
8. After all options have been applied for all the filesystems that you want to have access to, click Export All.

The camediad_setup Script

This script is called automatically by the BrightStor ARCserve Backup configuration script, csetup, to configure camediad to work with the NAS servers. It is located in the $BAB_HOME/bin directory of the host.

It will prompt for information such as the particular NAS hostname, the user name and password of the NAS Administrative Account, and a list of backup devices attached to the NAS.

You must call the script directly to configure additional NAS servers at a later date. The configuration file, camediad.cfg, should not be edited manually because additional processing is required to make the changes effective. If it is necessary to configure your system's NAS servers at a later date, you must re-enter the information for all of your NAS servers, including those that have been configured previously using camediad_setup.

After the camediad_setup script has completed, you should verify that the NAS Agent registered with the Common Agent (the NAS Agent facilitates browsing NAS filer contents). You can do this by running the "caagent" list command. If the NAS Agent is not listed, run the nassetup script (located in the nasagent subdirectory of the NAS installation directory). This situation can occur if you install the Common Agent after installing the NDMP NAS Option. You can also use the nassetup script to add information to or modify the Common Agent configuration file (agent.cfg).

For more information about the Common Agent, see the section The Common Agent in the chapter “Introducing the Option.”

How the Administrator Configures Devices Attached Locally to NAS Filers

After installing the NDMP NAS Option, run the csetup script to configure BrightStor ARCserve Backup. The csetup script is located in $BAB_HOME/sbin. If your $BAB_HOME environment variable is not properly set, execute the BrightStor ARCserve Backup environment variable commands in /etc/profile.d/bab.sh.

Configuring the tape devices involves performing the following tasks:

- Task 1: Set up NAS attached tape drives and changers
- Task 2: Start the BrightStor ARCserve Backup server
- Task 3: Verify the device set up

The procedures in the following sections describe how to perform these tasks. Each section contains excerpts from the csetup script.

Setup NAS Attached Tape Drives and Changers

To set up NAS attached tape drives and changers, use the following procedure:

1. Enter the host name of the NAS filer.

   ```
   N A S  Tape Drive Configuration Utility
   Please enter the host name of the NAS filer. Please ensure that you are able
   to ping the filer with this host name. If not, you must make an entry in
   /etc/hosts filer to allow access to this filer by the specified host name.
   Please enter the hostname of a NAS filer:  ca-netapp
   ```

2. Enter the administrative user for the NAS filer. For Network Appliance filers, the user is usually root.

   ```
   Please enter this NAS filer's 'root' or administrative user's username: root
   ```

3. Enter the password for the root user on the NAS Filer. Reenter the password for verification.

   ```
   Please enter the password for this user: _
   Re-enter password for verification: _
   ```

4. Enter the name of the no-rewind device attached to the NAS filer, and then press Enter.

   ```
   Please enter name of all the tape drives attached to this filer. At lease one
   tape drive must be configured on this filer. Please enter the name of all the
   tape drives irrespective of whether they are part of changer or stand alone
   tape drive. For instructions on how to determine the name of tape drives, see
   the NDMP NAS Option Guide.
   Please enter a "no-rewind" device name attached to “ca-netapp2” [Press Enter
   when done]: nrst1l
   ```

   Note: For information about how to determine the name of a tape drive, see the appendix Using Network Appliance NAS Devices.

5. Do one of the following:

   - To add more no-rewind device names, repeat Step 4 as necessary.
   - If you do not want to add more no-rewind device names, press Enter to continue.

6. Enter the name of a media changer attached to the NAS filer.

   ```
   Please enter the name of the changer devices attached to the filer. For
   instructions about how to determine the name of changer devices for a
   particular NAS Filer, please refer to "NDMP NAS Option Guide".

   Please enter a name of changer device attached to 'ca-netapp2' [Press Enter
   when done]: mc2
   ```

7. Do one of the following:

   - Repeat Step 6 as necessary to add more media changers.
   - Press Enter.

8. Enter y if the information is correct.

   ```
   Filer:              ca-netapp
   User:               root
   Tape Drives:nrst1l
   Changers:           mc2
   Is this correct?    (default: y) [y,n] y
   ```

9. If this is the only NAS filer that requires configuration, enter **n**. To configure other NAS filers, enter **y**.

   ```
   Do you want to enter information for another filer default n) [y,n]: n
   ```

10. To enable backup to disk, enter **y**.

    ```
    File system device must be created if you want to use Disk Staging feature.
    Do you want to enable backup to disk?(default:n) [y,n,q]:
    ```

11. If you want to set up one or more media changers, enter y to set up your libraries. Otherwise enter n to configure your libraries at a later time.

    ```
    Do you want to configure libraries now? (default: n) [y,n,?,q] y
    ```

12. Enter 2 to configure the library attached to the NAS filer.

    ```
    1) Local SCSI Library
    2) NAS Attached Library
    3) Quit

    Please enter your choice: (“1“|”2”|”3”) 2

    If you want BrightStor ARCserve Backup to auto-detect your devices, you must
    remove all tapes from your external tape drives. "External tape drives"
    "drives" means drives connected to this system that are external to your
    changers. If you do not have external tape drives or if you do not want
    BrightStor ARCserve Backup to auto-detect your devices, then continue without
    making changes.

    [ !!!WARNING: During interactive configuration we do not cross-check which
    drive belongs to which changer. You may assign incorrect drives to the
    changer or the groups. You must know which drives belong to which changer
    before you continue with this configuration. ]

    (Press Enter when you are done...)
    ```

13. Select a configuration method. Enter e if you want BrightStor ARCserve Backup to automatically detect and assign group names to your devices.

    ```
    If we are auto-detecting your devices please enter the letter 'a' for auto.
    If you know the scsi ID's of your devices and want to go directly to our
    interactive library group configuration section enter the letter 'i'

    e - Express setup: (Library, drives, and groups are automatically configured)

    a - Automatic setup: (Library and drives are automatically configured,
    requires group setup by user)

    i - Interactive setup: (Complete user interaction of configuring the library,
    drives, and groups)

    Note: Interactive setup is not supported for the NAS device configuration.

    Please enter your choice: (e|a|i) e
    ```

14. Enter y to continue with the express configuration method.

    ```
    Be aware that if this script has been run directly from the command line and
    NOT through csetup, then any previous library parameters in the camediad.cfg
    file will remain unchanged.
    We will be starting some background processes to determine your parameters.
    This can take considerable length of time. If you wish to view the auto
    detect process dynamically open another terminal and issue the following
    command: tail -f /opt/CA/BrightStorARCserve/logs/camediadcfg.log
    ```

    Shall we continue? (y/n) **y**

15. If you have a cleaning tape in the library, enter y.

    ```
    We will be configuring one library at a time. After the first library and its
    device groups are configured we will come back and configure the remaining
    changers (if any).
    The notation used to describe devices is called a tuple. Our tuples are of
    the form (adapter,scsisid,lun) - So if you see (0,4,0) ir means that you have
    a device on adapter 0, scsiid 4 lun 0
    We will first define library parameters for library (1,2,0)
    Do you want to enable tape drive cleaning? (default yes) [y,n,q] y
    ```

16. If the changer has a barcode reader and you want to enable it, enter y.

```
If you have bar coding would you like to enable it? (default yes) [y,n,q] y
```

17. If the information displayed is correct, enter y.

```
Your library name is : "E_LIB1"
The tape cleaning option is set to "NO"
The bar code option is set to "YES"
The slot file option is set to "NO"
The total slots in the library are: 19
Tape drive : (1,1,0)
Group association: CH_GRP0
Start slot : 1   End Slot : 19
Please review carefully. The script did not test for every possible error
condition.
Is this correct? (default yes) [y,n,q] y
```

Start the BrightStor ARCserve Backup Server

To start the BrightStor ARCserve Backup server, use the following procedure:

1. If the BrightStor ARCserve Backup server is not running, you can start it by running the following command:

```
> cstart
```

2. To verify that all the BrightStor ARCserve Backup services are started, run the following command:

```
> bab -status
caservd         : OK
cadiscovd       : OK
cauthd          : OK
caloggerd       : OK
cadbd           : Total 1 user(s)
User #1 - connection established
camediad        : OK
caqd            : READY
```

Note: If the BrightStor ARCserve Backup server does not start properly, pause momentarily, stop all BrightStor ARCserve Backup services and then repeat the steps from the beginning.

Verify the Device Setup

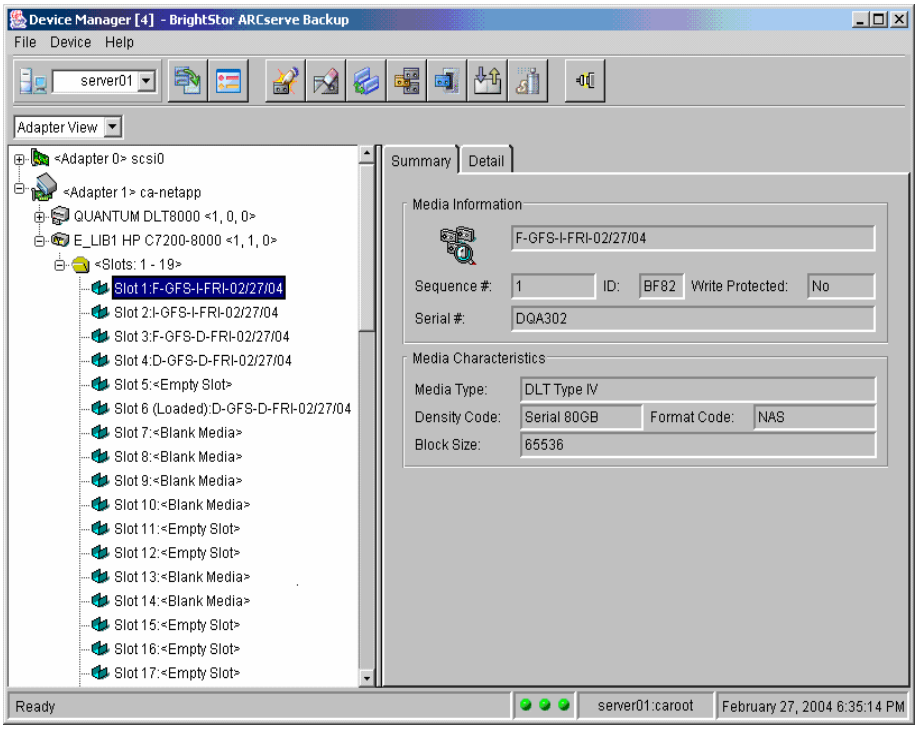
To verify successful configuration of NAS attached devices, use the following procedure:

1. Start BrightStor ARCserve Backup by entering the following URL in the address bar of your browser:

   ```
   http://<BABServer>:6060/
   ```

   Note: Substitute the correct BrightStor ARCserve Backup server name or IP address in the above URL.

2. From the BrightStor ARCserve Backup Home Page, click the Device Manager icon. The Device Manager opens. Use the information in this window to verify that your device is properly configured.



How the Administrator Configures NAS Filer Disks for Browsing

The following sections describe how to configure the option to allow browsing of NAS filers, which will help in submitting backup and restore jobs. To enable the option to browse filer disks, you will need to perform the following tasks:

- Configure the NAS Agent.
- Add the NAS clients.

Configuration Checklist

To complete the tasks in this section, you should have the following information available to you:

- The name and IP address of the NAS filer.
- The superuser user name (usually root) and password for the NAS filer.

Configure the NAS Agent

BrightStor ARCserve Backup configures the NAS Agent during the installation process. Use the following procedure if you installed or reinstalled the Common Agent after installing the NDMP NAS Option.

To configure the NAS Agent, use the following procedure:

1. From the nasagent folder, run the following command:

   ```
   $BAB_HOME/nasagent>./nassetup

   Please enter the NAS (Network Attached Storage) Option home directory
   (default: /opt/CA/BrightStorARCserve/nasagent):
   ```

   Note: The option is typically installed in the $BAB_HOME/nasagent folder.

2. Press Enter, and then choose one of the following options:

   - If the default path of option's home directory is correct, press Enter.
   - If the path is not correct, type the correct path and then press Enter.

   Note: This step enables you to register the NAS Agent with Common Agent. However, to be able to browse the filer, you must start the Common Agent using the following command:

   ```
   /opt/BrightStorAB/nasagent>caagent start
   BrightStor ARCserve Backup Common Module for Agents started...
   ```

3. If the Common Agent is already running, you must either restart it either by running the "caagent stop" command followed by "caagent start" command or by running the following command:

   ```
   $BAB_HOME/nasagent>caagent update

   The BrightStor Enterprise Backup Common Module for Agents is updated.
   ```

4. To validate the NAS Agent installation, run the following command:

   ```
   $BAB_HOME/nasagent>caagent list

   Obj_type   Name             VersionStatus

   34         NASagent  11.5.0  ENABLED
   ```

   Note: The NAS Agent must be listed and the status should be enabled.

Register NAS Filers

After installing the NAS Agent, you must register the NAS filers with the BrightStor ARCserve Backup server to enable NAS filer browsing. To perform this task, you need the information described in the section Configuration Checklist. NAS filers can be registered with the BrightStor ARCserve Backup database either from the command line or using the web application interface.

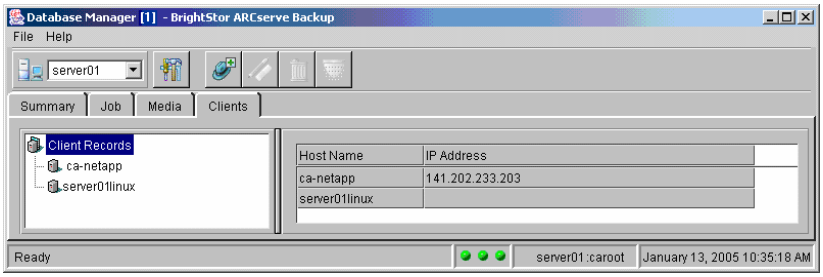
To add a NAS client, use the following procedure:

1. Verify that all BrightStor ARCserve Backup services are running. You can do this by running the cstatus command.
2. To register the NAS filer, run the following command, and then go to the next step.

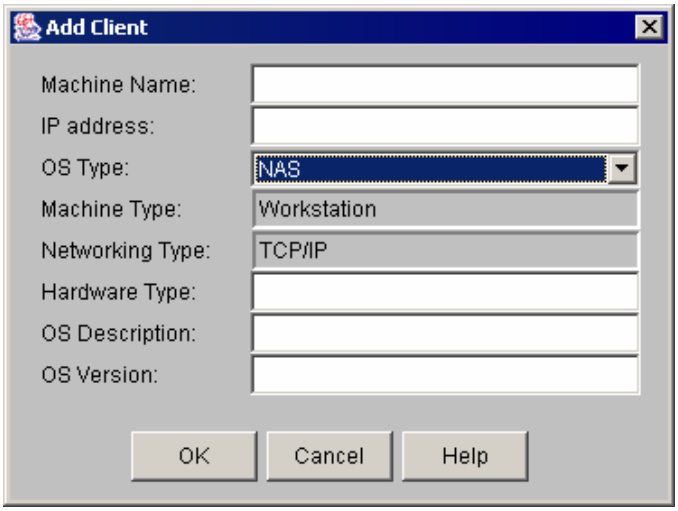
   ```
   />ca_dbmgr –client add <hostname> [ -ip <xxx.xxx.xxx.xxx> ] –os NAS
   ```

   If you want to use the Web interface to register the NAS filer, do the following:

   a. Start the Database Manager and select the Clients tab. The Database Manager opens.



   b. Click the Add toolbar button to add a new client. The Add Client dialog opens.



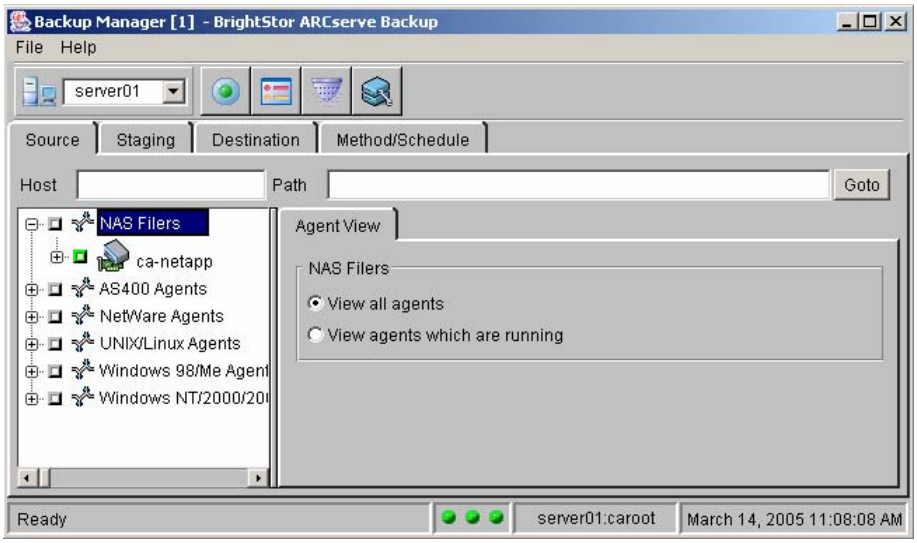
c. Enter the machine name and IP address of the NAS filer.

d. From the OS Type drop-down list, select NAS, and then click OK.

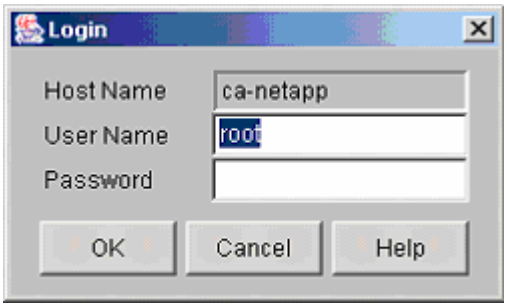
The NAS filer is now registered with the BrightStor ARCserve Backup database.

Note: You should verify that you can ping the NAS filer using the host name. If you cannot ping the NAS filer, update the /etc/hosts file by adding a new line with this host name and IP address of the NAS filer.

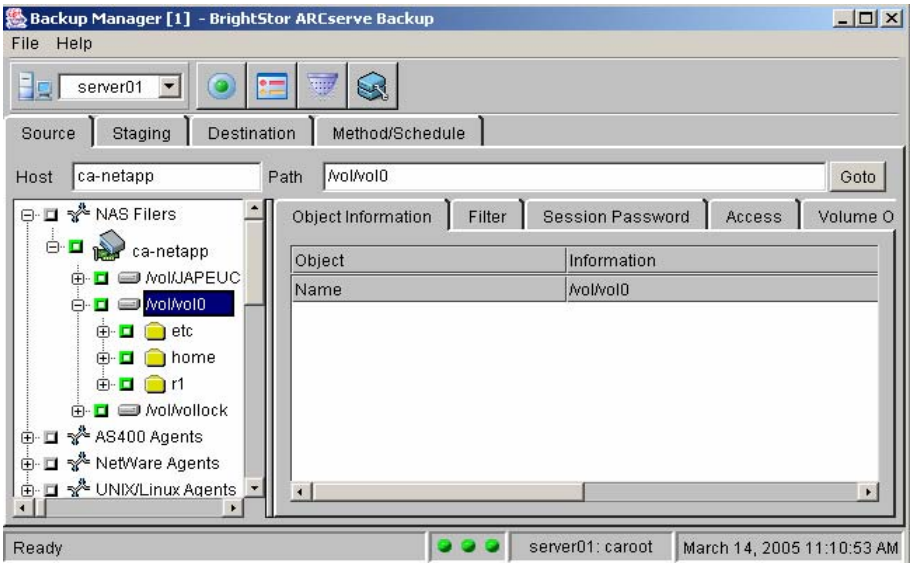
3. Start the Backup Manager and select the Source tab. Expand the NAS filers node on the tree. This should list the newly configured NAS filer with a green check box next to its name.



4. Select a NAS node to open a Login dialog.



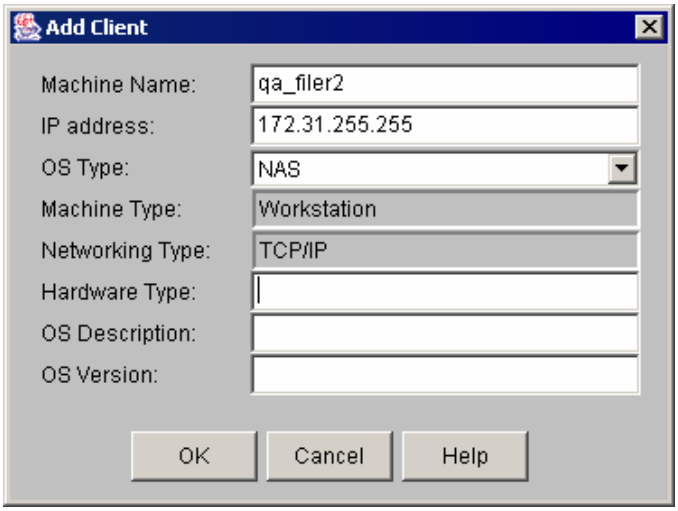
5. Enter the user name and password for the account that has access to the NAS filer and click OK. The volumes and files on the NAS filer display.



Add a NAS Client

Using the BrightStor ARCserve Backup Database Manager, add the NAS Client to define the NAS server as a BrightStor ARCserve Backup client machine. To do so:

1. Open the BrightStor ARCserve Backup Database Manager and select the Clients tab.
2. Click the Add Client toolbar button. The Add Client dialog opens.



3. Add the NAS server's machine name and IP address.
4. From the OS Type drop-down list, select NAS, and then click OK.

File System Configuration

The NDMP NAS Option installs a configuration file called nas.cfg in the BAB_HOME/config folder. This is the file in which you specify the items that are eventually displayed on the Source tab of the Backup Manager. After configuring this file, you can browse the items entered in the Backup Manager.

Configure NDMP Version 2

If the NAS servers support NDMP Version 2, you must configure the nas.cfg file. The NDMP NAS Option cannot determine volume mappings for these servers. You must enter the volume information. To enter the volume information, use the following steps:

1. Open the nas.cfg file located in the $BAB_HOME/config folder.
2. On the first line, enter the host name of the NAS server. Enclose the host name with square brackets. For example, [nasfiler].
3. Enter each logical volume name on a separate line following host name.
4. To configure additional NAS servers, begin a new section and repeat Steps 2 and 3.
5. When you are finished adding NAS servers, close and save the file.

Configure NDMP Version 4

If you are using a NAS server with NDMP Version 4 and support for Snapshot Management Extensions, you do not have to alter the nas.cfg file.

Configure Snapshot

A snapshot is an online, read-only copy of an entire file system that protects against deletions or modifications of files without duplicating file contents. Snapshots enable you to restore files, and also back up the files to tape even while the NAS server is in use. The NAS administrator can also create and schedule snapshots of data on a file system.For more information on how to create or schedule snapshots, refer to the documentation provided by the NAS vendor.

If you want to backup snapshots on the filer to tape, the nas.cfg file should be configured to add information of the snapshot.

For example, if you want to backup snapshot 'hourly.0' of '/vol/vol0' of filer 'NASFiler', make the following entries in nas.cfg:

```
[NASFiler]
/vol/vol0/.snapshot/hourly.0
```

where .snapshot/hourly.0 represents the path of the snapshot for the volume /vol/vol0.

For more information on determining the snapshot path, refer to the Appendix of the supported NAS vendor.

Snapshot backups cannot be restored to the snapshot location because they are read-only. If you submit a restore job by selecting the snapshot location, the restore is redirected to the volume from which the snapshot was created.

Note: If you select a snapshot location for restore, the restore job will fail.

Uninstall the Option

The command that you can use to uninstall one or more of BrightStor ARCserve components is as follows:

```
$BAB_HOME/bin/uninstall
```

When you run this command, the list of BrightStor components installed on your machine are displayed. Select the NDMP NAS Option.

Chapter 3: Using the Option

This chapter shows you how to perform a backup or a restore using the NDMP NAS Option. For an overall description of the backup features, see the *Administrator Guide*.

Backup Operations

To back up data from your network, use the Backup Manager to configure and submit a backup job. You can use any NAS server as your source and a tape device connected to either the same NAS server or another NAS server as your destination. Although all NAS servers use NDMP, it is advisable to perform backup and restore operations to the same vendor's type of server.

The *Administrator Guide* provides a description of the BrightStor ARCserve Backup's backup features. When you select a NAS server for a backup, a customized set of standard BrightStor ARCserve Backup options is available. The version of NDMP in use on the NAS server causes some of the standard options not to be available. The unavailability of other options results from limitations of a vendor's particular server.

Backup Options

When you select a NAS server for backup, the options presented are limited to those supported by the NAS server. NAS-supported backup options include:

- Pre/Post
- Log
- Database
- Load Options

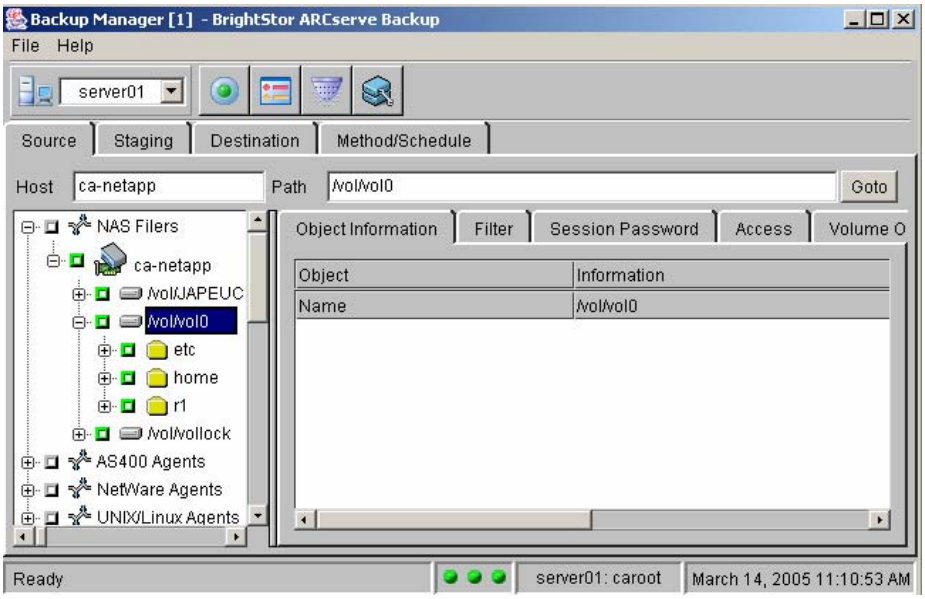
For additional information about these options, see the *Administrator Guide*.

Filter Options

When you select individual files or directories on a NAS server for backup, you can use the Exclude File/Directory Pattern filter. You can enter an asterisk (*) as a wildcard character but it must be either the first, the last or both the first and the last characters in the exclusion pattern. The filter observes no distinction between patterns that refer to files or directories, so, the Exclude filter acts on both.

Backup Source Tab

NAS servers defined in the BrightStor ARCserve Backup database displays as entries in the Source tab. Expanding a particular NAS server displays the file systems on that server. Browsing a particular NAS server displays the list of directories and files on that particular NAS server. You can browse the directories of NAS servers just as you would any other BrightStor ARCserve Backup-supported host or client.

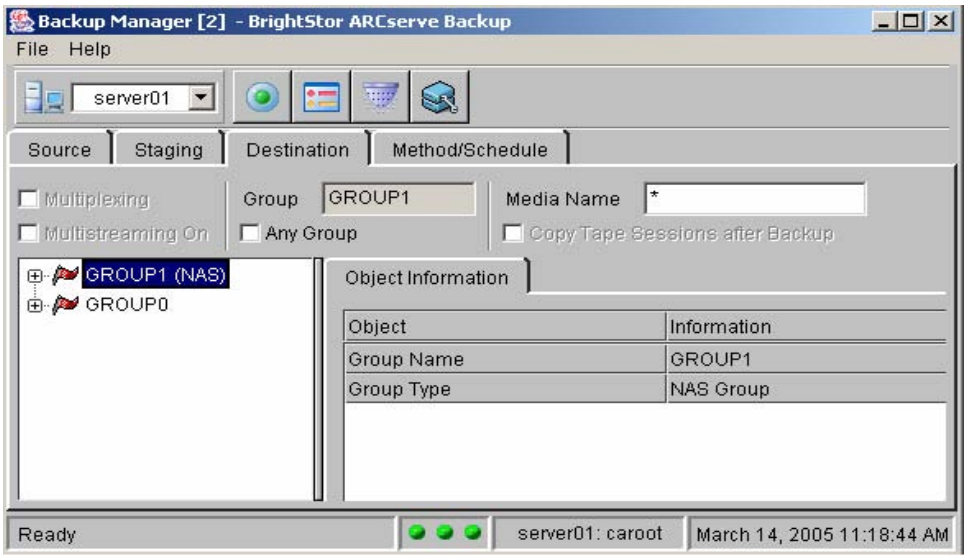


Backup Manager Destination Tab

The Destination tab presents NAS device groups as defined in camediad.cfg file. You can back up data from one NAS server either to the same or to another NAS server (NAS to NAS backups).

Note: BrightStor ARCserve Backup does not support the Multiplexing, Multistreaming, or Tapecopy options with NDMP NAS backups.
NAS source cannot be backed up to Staging groups.

The following illustrates the Backup Destination tab:



Restore Operations

To restore data from a NAS server, use the BrightStor ARCserve Backup Restore Manager for configuring and submitting the job. You can restore data from the tape device attached directly to the local NAS server or from a tape device attached to a different NAS server.

The *Administrator Guide* provides a description of the BrightStor ARCserve Backup restore features. However, NAS server restores create some limitations for the normal functionality of the BrightStor ARCserve Backup. Some of these result from the NDMP protocol, while others result from limitations imposed by particular NAS servers.

Restore Options

When you select a NAS server for restore, the options presented are limited to those supported by the NAS server. NAS server-supported options include:

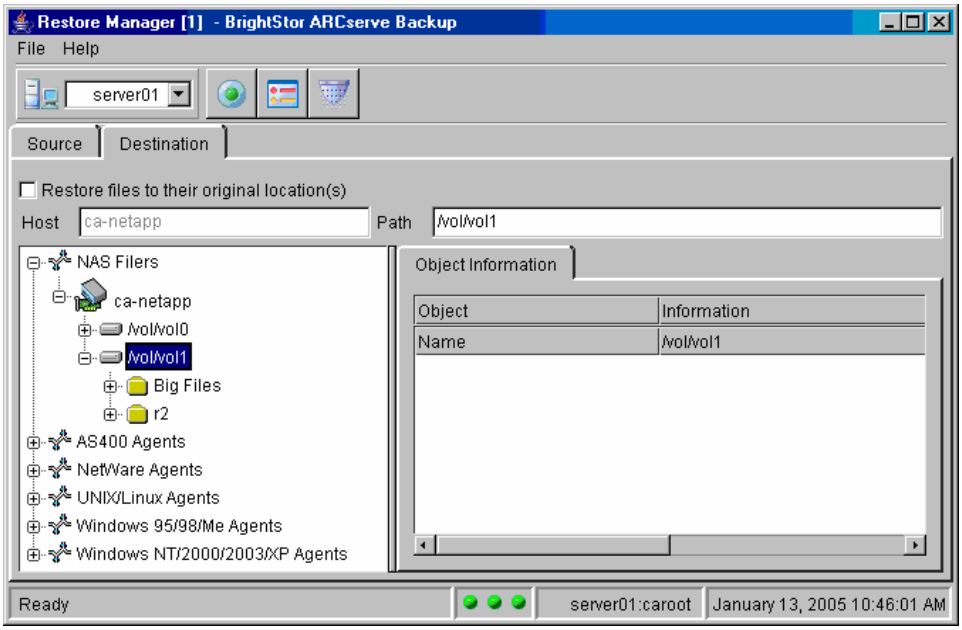
- Pre/Post
- Log
- Media Rules

For additional information about these options, see the *Administrator Guide*.

Restore Manager Destination Tab

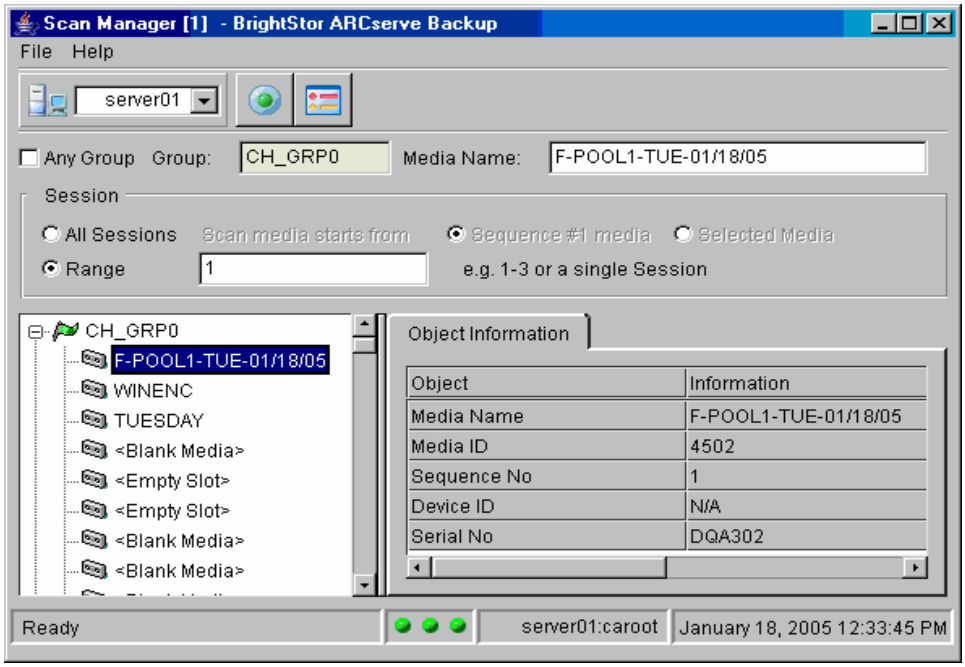
The Destination tab of the Restore Manager and the Source tab of the Backup Manager behave in exactly the same way; you can browse servers and select files and directories using this tab. Additionally, you can restore data to a NAS server from a tape device attached to another NAS server.

The following illustrates the Restore Destination tab:

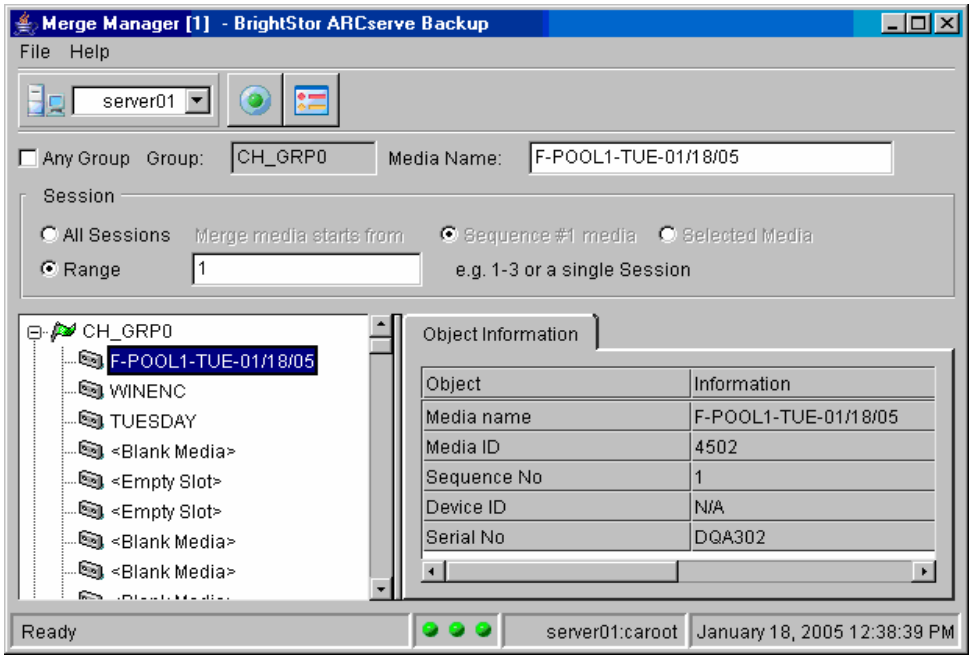


Scan and Merge

To find out information about sessions on a tape, you can make use of Scan Manager to submit a Scan Job. Scan Manager allows scan of single session, list of sessions or entire tape.



You can also Merge the details of session on the tape by submitting a Merge Job using Merge Manager. Merging the details allows you to browse the contents of the backup in Restore Manager or Database Manager. Merge Manager also allows you to submit a merge of single session, list of sessions or entire tape.



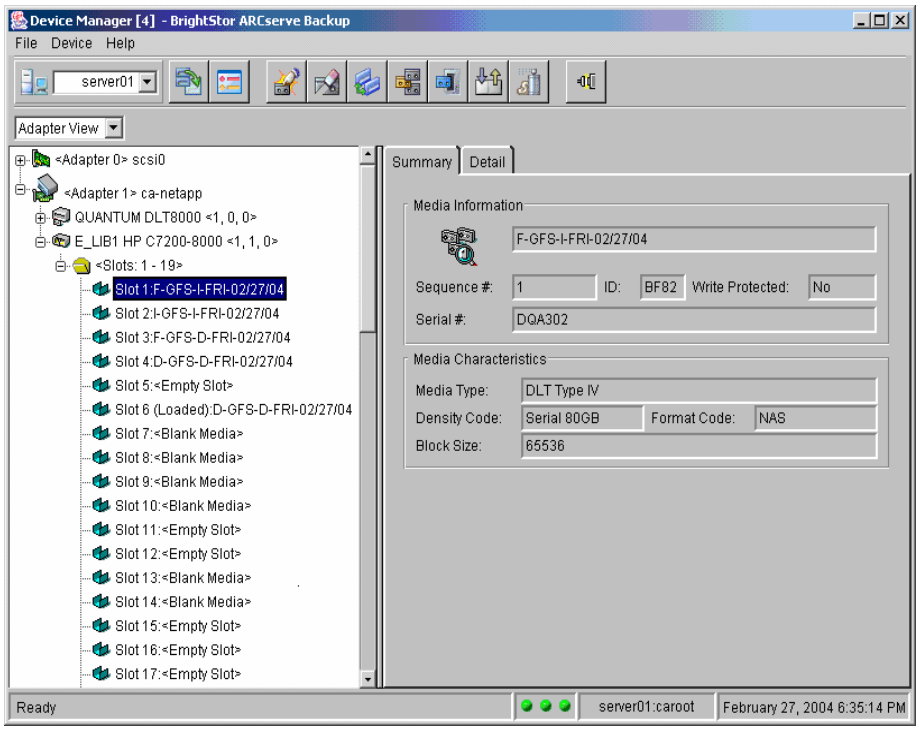
Devices and Media

The Device Manager gives you information about storage devices that are connected to your network, the media in these devices, and the status of these devices. You can also use the Device Manager to manage the tape drives and media attached to NAS servers.

Adapter, Device, and Group Views

The Device Manager shows adapter, device, and group information about tape devices attached to the NAS servers. This information corresponds to the information in the camediad.cfg file created during installation or updated by running the camediad_setup script).

The following illustrates the Device Manager:



Note: If you want BrightStor ARCserve Backup to use tape devices attached to NAS servers, you must run camediad_setup, to first configure those devices with BrightStor ARCserve Backup.

Media Management

You can manage media by using the Device Manager to erase, format, and eject media from tape devices attached to NAS servers. The option also supports tape library units and all the media management functionality associated with it.

Database Management

BrightStor ARCserve Backup stores backup job information for each backup job you run, including media and media device information, in the BrightStor ARCserve Backup database. You can use this information to perform intelligent restores by keeping track of each file and directory that you backed up to a specific media. When you want to restore a specific file, the database determines where the file is stored. For more information about the database, see the *Administrator Guide*.

Reports

The information stored in the database can be used for many types of reports. You can access these reports with the Report Manager. The Report Manager provides several functions to help manage both reports and logs. For more information about reports, see the A*dministrator Guide*.

Command Line Utilities

BrightStor ARCserve Backup offers command line utilities for performing NDMP NAS Operations. Following operations are supported from command line.

- Backup
- Restore
- Merge
- Scan

Backup

You can backup the entire NAS server, volume and files with the backup utility.

For example, to backup specific files, run the following command:

```
ca_backup –source <NAS hostname > -filesystem <volume name> -filelist  <filelist>
-username <user login ID>  -password <NAS admin password>
```

Restore

You can restore NAS backed up data using file system view, session view and by tape.

For example, to restore a specific volume in the file system view, run the following command:

```
ca_restore –source <NAS hostname> <volume name > -group < NAS groupname>
```

Merge

You can merge information from media attached to the NAS server into the BrightStor ARCserve Backup database with the merge utility. The information from the media is appended to the existing database files. You can also use the merge utility to restore data from a BrightStor ARCserve Backup host that differs from the host used to create the backup.

For example, to merge a specific tape, run the following command:

```
ca_merge -group <nas group name> -tape <tape name> <tape id>
```

For more information about using the merge utility, see the *Administrator Guide*

Scan

You can scan the BrightStor ARCserve Backup media for information about previously backed-up sessions with the scan utility.

NAS sessions, however, are third-party backups with contents that cannot be interpreted by the scan utility. The operation only reports session-level details of a NAS session. You can also view the results of the media scan in the Report Manager under the Activity Log listing or under the User Log listing (if an additional log file is created). Furthermore, you can select a specific session or scan the entire media for session-level details.

For example, to scan a specific tape, run the following command:

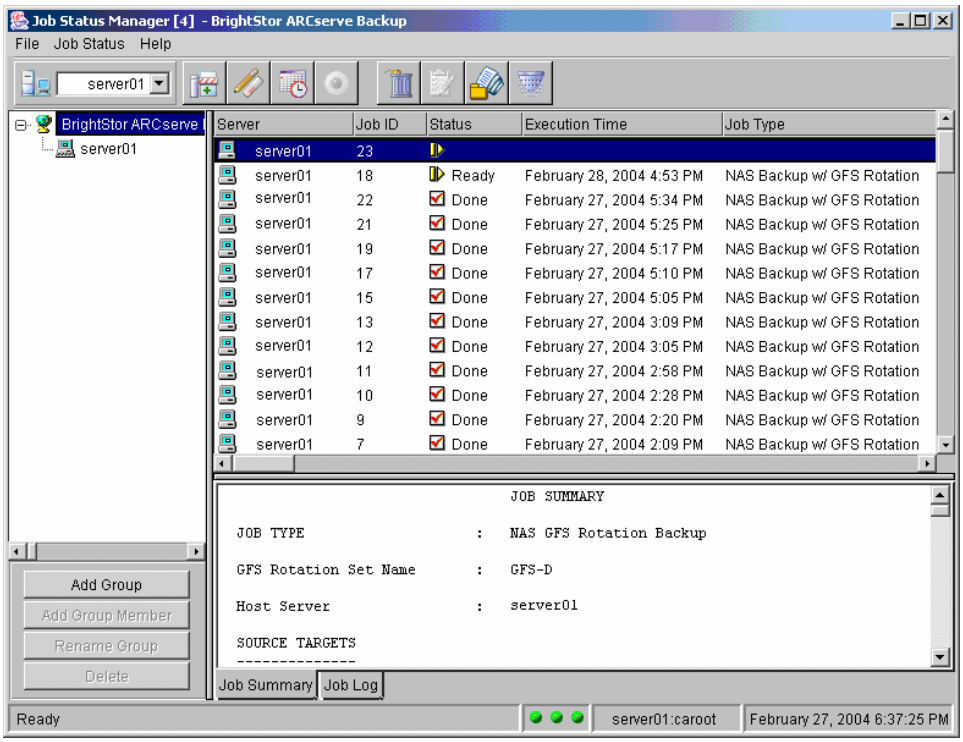
```
ca_scan -group <nas group name> -tape <tape name> <tape id>
```

For more information about using the scan utility, see the *Administrator Guide*

Job Status

You can use the Job Status Manager to centrally manage BrightStor ARCserve Backup servers. The left-panel of the browser navigates through BrightStor ARCserve Backup servers and their objects. All servers are arranged into groups, which you can configure. The right panel displays information on the job queue, job summary, and job log.

The following illustrates the Job Status Manager window:



Note: For more information about using the Job Status Manager, see the *Administrator Guide*.

Appendix A: Using Network Appliance NAS Devices

This appendix contains information about how to configure and use Network Appliance NAS servers with the NDMP NAS Option.

Network Appliance Servers Configuration

Before the NDMP NAS Option can use a Network Appliance server, you must set certain parameters on the NAS server. You can specify most of these server settings from the NAS server's web-based Administrative Interface or from any Telnet console.

Access the Administrative Interface

To access the web-based Administrative Interface, enter the following URL in your web browser's address bar:

```
http://<IP address of the Netapp server>/na_admin/
```

You can also use Telnet to access the system by entering:

```
c:/>  telnet  <IP address of the NetApp>
```

Enter the administrator name and password to log in.

User Accounts

The Network Appliance Data ONTAP operating system supports a system account named root. You can also configure optional administrative user accounts to control a server using a Telnet session on the server console, or the server's web-access site.

NDMP

Network Appliance requires that you enable NDMP on the NAS server. To enable NDMP on the NAS server, you can use the web-based Administrative Interface or the Telnet session as described in the following sections.

Enable NDMP Using the Web-based Administrative Interface

To enable the NDMP protocol using the web-based Administrative Interface, follow these steps:

1. Open the NAS server URL. For example:

   ```
   http://<NAShostname>/na_admin
   ```

   (Replace NAShostname with the real NAS host name.)

2. A menu bar appears on the left side of the page. Expand the NDMP section.
3. Select Enable/Disable.
4. Make sure that NDMP is enabled.

Enable NDMP Using Telnet

To enable NDMP using Telnet, follow these steps:

1. Connect to the Network Appliance server.
2. Enter the command:

   ```
   ndmpd status
   ```

   This command shows if the NDMP status is on or off.

3. If the NDMP status is off, enable NDMP by entering the following command:

   ```
   ndmpd on
   ```

Configure Tape Library Device Names

If you have a tape library unit attached to the NAS server, to configure tape library device names, follow these steps:

1. Activate a Telnet session to issue commands on the server.
2. Enter the following command:

   ```
   sysconfig -t
   ```

   The name of the tape logical unit displays.

   Note: To display the logical device name of media changers, run the following command:

   ```
   sysconfig -m
   ```

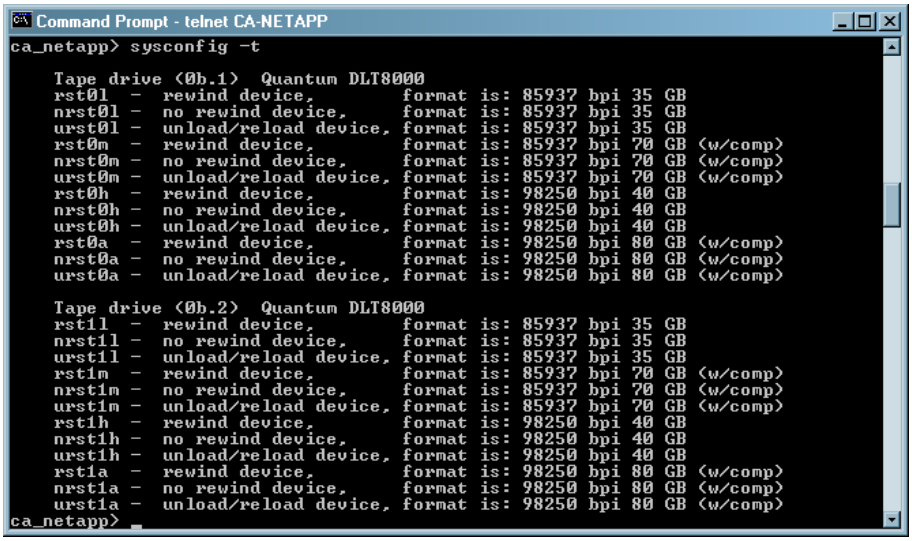
Configure the Drive Access Path

The drive access path is the path that Network Appliance servers use to communicate with NDMP drives. Use the following steps to find the drive access path:

1. Use either a Telnet session or the URL: http://<NAShostname>/na_admin to connect to the server.
2. Enter the following command to display all the tape device access path information:

   ```
   sysconfig -t
   ```

   This displays all of the tape access path information:



   The tape logical device names listed by Network Appliance NAS servers use the following syntax:

   xxxx#@

The following table explains the symbols and the corresponding values for the logical device names.

Symbol	Value	Explanation
xxxx	nrst	A no-rewind sequential tape device. Opening and closing the device does not result in the device being automatically rewound.
	rst	A logical, sequential tape device that positions the actual device at the start of the tape during every open operation.

Symbol	Value	Explanation
	urst	A logical, sequential tape device that loads and unloads the physical device in its open and close calls.
#	numeric	The device number. Device numbers start at 0.
@	l	Low-density mode for tape writes.
	m	Medium-density mode for tape writes.
	h	High-density mode for tape writes.
	a	High-density mode with hardware compression for tape writes.

Configure Snapshot Backup

You can use the NAS configuration file, nas.cfg, to browse the Network Appliance server's file system and snapshots. The nas.cfg file contains mappings of nodes to volumes or logical devices and their associated subdirectories that you may want to back up.

When you back up data from a file system, the Network Appliance NAS server creates a snapshot of that data set so that the backup reflects a consistent view of the data at the time of the execution of the backup. The data is then indirectly backed up from this snapshot.

When you configure the nas.cfg file, you can browse below the snapshot folder in the Backup Manager's source tree.

The following is an example to backup a snapshot 'daily.0' residing on a filer 'NASFiler':

```
[NASFiler]
/vol/vol0/.snapshot/daily.0
```

In general, the entry can be written as:

```
/<name of volume>/.snapshot/<name of snapshot>
```

Note: You need to enter the full path of the snapshot folder under the Network Appliance server name in the configuration file.

Limitations

There are limitations when using a Network Appliance NAS device with the NDMP NAS Option. These limitations are based on the version of NDMP in use on the NAS server. Limitations include the following:

- For backups, the use of filters is limited to exclude file and directory entries.
- Filters are not supported on restores.
- Use of tape drives is limited to those that are supported by Network Appliance.
- Use of tape library units is limited to those supported by Computer Associates.
- Although Network Appliance NAS devices support Direct Access Restore (DAR), the option supports file restoration only. If you choose to restore at least one folder, the restore reverts to scanning the session.

For additional information about vendor-specific NAS server limitations, see the appendix Feature Support Summary.

Appendix B: Frequently Asked Questions

This appendix provides answers to some commonly asked questions that you may have when using the NDMP NAS Option.

When should I use the NDMP NAS Option?

You can use NDMP NAS Option when you need to back up data stored on a NAS server to a tape device that is connected to either the same NAS server or another NAS server. In either case, the NAS server must support NDMP.

Where should I install the option?

You should install the option on the BrightStor ARCserve Backup server.

Does the option support library changers?

Yes. The NDMP NAS Option supports backing up and restoring NAS servers with tape library units attached locally to a NAS server or remotely to a different NAS server.

How do I view the Netapp system log?

To view the Netapp System Log, use the following procedure:

1. Go to http://<BABserver>/na_admin.
2. Log in to the server.
3. Choose Server View.
4. Select System Log messages.
5. Check the approximate time of the problem.

How do I reinitialize a NAS server?

To reinitialize a NAS server, use following procedure:

1. Stop all the sessions on the NAS server, by connecting to the server using Telnet and running the following command:

   ```
   ndmpd -killall
   ```

2. Restart the BrightStor ARCserve Backup Common Agent service.
3. If BrightStor ARCserve Backup did not detect all NAS devices, run csetup, and choose Media Server from the menu to reconfigure NAS devices.
4. Start the Media Server.

Can I archive the data on the NAS server to the backup device connected to the BrightStor ARCserve Backup server using the NDMP NAS Option?

No. You can only use the NDMP NAS Option to archive the data on the NAS server to its locally attached tape device or to another NAS server with an attached tape device. If the data on the NAS server needs to be backed up to the device on the BrightStor ARCserve Backup server, you can use NFS mount to back up the NAS server.

For more information about NFS mount, see Configure the BrightStor ARCserve Backup Server for Browsing in the chapter "Installing the Option."

Can I archive the data on other non-NAS servers to the tape device connected to the NAS server?

No. Only data from a NAS server can be archived.

Can I share a backup device on a SAN connected to the BrightStor ARCserve Backup server and the NAS device, and use the NDMP NAS Option to back up data from the NAS server to the shared backup device?

No. The NDMP NAS Option does not support sharing a backup device on the SAN.

Can I share a backup device on a SAN connected to the BrightStor ARCserve Backup server and the NAS device, and use the NDMP NAS Option to back up data from the NAS server to the shared backup device?

No. The NDMP NAS Option does not support sharing a backup device on the SAN.

Appendix C: Troubleshooting

This appendix describes common problems and gives tips and information on solving them.

Devices Do Not Display in the Device Manager

Reason:

There are two probable causes:

- The server name, user name, or user password is incorrect or not configured.
- The device may be in use.

Action:

If the devices do not appear in the Device Manager, you should:

- Verify that the name of the server and user name and password were configured correctly by running the media server configuration again.
- Verify that the tape drive is not already opened and in use by another NDMP session.

Unable to Connect to a NAS Filer

Reason:

This can occur if the host machine is not able to ping the NAS filer using its name. This is also characterized by a gray node in Backup Manager.

Action:

To test this, try to ping the NAS filer from the command line.

```
/>ping ca-netapp2

ping: unknown host ca-netapp2
```

If ping is unable to connect to the machine, make an entry in /etc/hosts file for the NAS filer. Doing so should enable the ping command to connect, and restarting the Media Server should enable the agent to connect to the NAS filer.

Does Not Detect Loaded Tape

Reason:

This problem can occur when the BrightStor ARCserve Backup Media Server cannot exclusively open the tape drive on the filer. This can occur if the tape drive is opened by a different process, such as another BrightStor ARCserve Backup server, or if a stale connection is open on the server.

Action:

To verify the cause, telnet into the filer and run the following command:

```
ca-netapp> ndmpd status
```

This will list all the active connections to the server. Check for connections that opened the tape drive needed by the BrightStor ARCserve Backup server.

```
ca-netapp2> ndmpd status

ndmpd ON.

Session: 28
  Active
  version:                4
  Operating on behalf of primary host.
  tape device:    not open
  mover state:    Idle
  data state:     Idle
  data operation: None
Session: 27
  Active
  version:                3
  Operating on behalf of primary host.
  tape device:    nrst1l
  mover state:    Idle
  data state:     Idle
  data operation: None
```

After the session is identified (in this case, session 27), you can identify the client that has the connection by running the following command:

```
ca-netapp2> ndmpd probe 27
ndmpd ON.
Session: 27
  isActive:               TRUE
  protocol version:       3
  effHost:                Local
  authorized:             TRUE
  client addr:            172.16.123.171:34756
  spt.device_id:          none
  spt.ha:                 -1
  spt.scsi_id:            -1
  spt.scsi_lun:           -1
```

```
tape.device:            nrst21l
tape.mode:              Read/Write
mover.state:            Idle
mover.mode:             Read
mover.pauseReason       N/A
mover.haltReason        N/A
mover.recordSize:       0
mover.recordNum:        0
mover.dataWritten:      0
mover.seekPosition:     0
mover.bytesLeftToRead:  0
mover.windowOffset:     -1
mover.windowLength:     -1
mover.position:         0
mover.connect.addr_type:LOCAL
data.operation:         None
data.state:             Idle
data.haltReason:        N/A
data.connect.addr_type: LOCAL
data.bytesProcessed:    0
```

From the status output it is clear that the session is opened by the client at 172.16.123.171. If this client is not supposed to be connected, you can kill the session by issuing the command:

```
ca-netapp2> ndmpd kill 27
```

Running this command kills the session. Next, you need to restart the BrightStor ARCserve Backup Media Server to successfully connect to the device. To restart the Media Server, run the following command:

```
/opt/CA/BrightStorAB>bab –load camediad
```

Can Only Browse Volumes on the NAS Filer

Reason:

This could happen if the NAS filer does not support NDMP Version 4 or is configured not to use it.

Action:

To correct this problem, telnet into the filer and issue 'ndmpd version' command

```
ca-netapp2> ndmpd version
ndmp version is set to : 3
ca-netapp2> ndmpd version 4
ndmp version is set to : 4
```

If the attempt to set NDMP version to 4 fails or the filer does not support NDMP version 4, you must use the NFS mount method to browse the filer. For more information about NFS mount, see Configure the BrightStor ARCserve Backup Server for Browsing in the chapter "Installing the Option."

How do I enable debugging?

To enable debugging on the NDMP server, use the following procedure:

1. Log in to the remote NAS server using Telnet.
2. Enter the following command:

   ```
   ndmpd debug 50
   ```

   Note: The number 50 indicates the level of debugging information.

   The debugging information is written to a file that can be found in the root directory of the volume. The format of the file name is:

   ```
   ndmpd.#####
   ```

   ##### represents the date and time of the log.

Appendix D: Feature Support Summary

This appendix presents the supported and unsupported features of the NDMP NAS Option for Network Appliance, EMC, and Procom NAS servers. The backup and restore tables are organized by a dialog tab and the features contained on each tab. “All” indicates that everything on that dialog tab is either supported or unsupported.

Backup Features

The following table lists the backup features for the NAS servers that the NDMP NAS Option supports:

Key:

✓— Supported options

×— Unsupported options

W— Supported on Windows platforms only.

Tab	Feature	Network Appliance	EMC Celerra	EMC IP4700	Procom
Backup Media					
	Options for First Backup Media (All)	✓	**W**	**W**	**W**
	Options for Additional Backup Media (All)	✓	**W**	**W**	**W**
	Compression/Encryption Password (All)	×	×	×	×
Verification	(All)	×	×	×	×
Retry	(All)	×	×	×	×

Tab	Feature	Network Appliance	EMC Celerra	EMC IP4700	Procom
Operation	Delete Files After Backup/Disable File Estimate/Calculate and Store CRC on the Backup Media/Backup of BrightStor ARCserve Backup Database	×	×	×	×
	Eject Backup Media upon Completion	✓	W	W	W
	Database	✓	W	W	W
Pre/Post	(All)	✓	W	W	W
Job Log	(All)	✓	W	W	W
Virus	(All)	×	×	×	×
Replication	(All)	×	×	×	×
Alert	(All)	✓	W	W	W
Volume Shadow Copy Service					
	(All)	×	×	×	×
Media Exporting					
	Option	×	×	×	×
	Media Option	✓	W	W	W
Advanced	(All)	×	×	×	×
Filter	Exclude File and Directory Pattern	✓	×	×	W
	Include File and Directory Pattern	×	×	×	×
	All Other Filters	×	×	×	×

Restore Features

The following table lists the restore features for the NAS servers that the NDMP NAS Option supports.

Tab	Feature	Network Appliance	EMC Celerra	EMC IP4700	Procom
Backup Media	(All)	✓	**W**	**W**	**W**
Destination	Directory Structure	✓	**W**	×	×
	File Conflict Resolutions	×	×	×	×
Operation	Restore and Preserve Directory Attributes / Restore Registry and Event Logs	×	×	×	×
	Database	✓	**W**	**W**	**W**
Pre/Post	(All)	✓	**W**	**W**	**W**
Job Log	(All)	✓	**W**	**W**	**W**
Virus	(All)	×	×	×	×
Alert	(All)	✓	**W**	**W**	**W**
Filter	(All)	×	×	×	×

Key:

✓— Supported options

×— Unsupported options

W— Supported on Windows platforms only

General Functionality

The following table lists the major options supported by the NDMP NAS Option.

Description	Network Appliance	EMC Celerra	EMC IP4700	Procom
Rotation Backup	✓	**W**	×	**W**
GFS Rotation Backup	✓	**W**	**W**	**W**
Custom Incremental Backup	×	**W**	×	**W**
Custom Differential Backup	×	**W**	**W**	**W**
Volume-Level Backup	✓	**W**	**W**	**W**
Directory and File-Level Backup	✓	**W**	×	**W**
Volume-Level Restore	✓	**W**	**W**	**W**
Directory and File-Level Restore	✓	**W**	**W**	**W**
Snapshot/Checkpoint	✓	×	×	**W**
Direct-Access Restore	✓	**W**	×	×

Key:

✓— Supported options

×— Unsupported options

W— Supported on Windows platforms only

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