

# BrightStor<sup>®</sup> ARCserve<sup>®</sup> Backup

## Storage Area Network (SAN) Option Guide

r11.5



Computer Associates®

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# Chapter 1: Introducing the Option

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BrightStor® ARCserve® Backup is a comprehensive storage solution for applications, databases, distributed servers, and file systems. It provides backup and restore capabilities for databases, business-critical applications, and network clients.

Among the options BrightStor ARCserve Backup offers is the BrightStor® ARCserve® Backup Storage Area Network (SAN) Option. This option provides the following advantages:

- Acts as a dedicated communication path between servers and storage devices on a Storage Area Network (SAN).
- Brings the benefits of high-speed backup to all servers on a SAN.
- Eliminates Local Area Network (LAN) bottlenecks and increases transmission speeds.
- Supports multiple servers and allows SAN device sharing from any server on a SAN.

## The SAN Environment

The SAN Option servers within a SAN group consist of one primary server and one or more distributed servers. The primary server is the most important server on the SAN because no tasks can occur until it initializes the tape libraries on the SAN.

The primary server is responsible for the following actions:

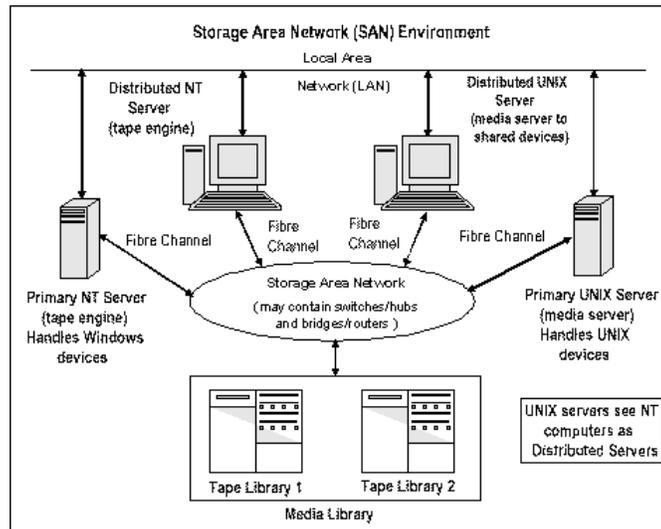
- Initializes, governs, and maintains a shared device on the SAN
- Coordinates the use of shared library resources among the servers in the SAN, preventing conflict if two servers try to allocate a device or media at the same time

You can designate any BrightStor ARCserve Backup SAN server as the primary server. However, because the primary server is responsible for managing and initializing the shared SAN, you should use your most reliable server as the primary SAN server.

## How the Option Works

When you configure a SAN for SAN Option, you create two primary servers, one for UNIX or Linux and one for Windows. The primary Windows server acts as a tape engine and handles all of the Windows devices. The primary UNIX or Linux server acts as a media server and views the Windows systems as distributed servers. Data is passed between the servers and the SAN and is stored in the Media Library.

The following diagram illustrates a Storage Area Network with BrightStor ARCserve Backup and the option installed:



When a job is ready to run, the option reserves the device and media. Once reserved, that device and media are no longer available to any other jobs across all SAN servers.

The SAN Option enables BrightStor ARCserve Backup servers to share one or more tape libraries by creating a virtual ring. Any backup or restore jobs on a server that has the option installed run as local jobs. As the backup progresses, BrightStor ARCserve Backup sends data over the SAN hardware to the tape libraries for storage instead of over the LAN cabling. This provides greater speed, reduces network traffic, and backup and restore throughput is maximized.

## Server Management

Using the Storage Area Network (SAN) Option does not change the way you manage BrightStor ARCserve Backup servers. You continue to connect to each SAN Option server through the Backup or Restore Manager to schedule backup and restore jobs and to manage your BrightStor ARCserve Backup database. However, because SANs allow multiple BrightStor ARCserve Backup servers to share a single device, you must be careful when you schedule a backup job.

## Backup Plans

Plan backups that are appropriate for your SAN configuration. You should consider the impact of multiple BrightStor ARCserve Backup servers sharing a single device. For example, if your backup device contains two tape drives and there are five option servers sharing the media libraries, do not schedule five backup jobs to begin simultaneously. This forces the option to determine which two of the five jobs to begin first.

**Note:** Each scheduled backup job waits in the queue until a tape drive is available to perform the backup.

## Benefits of Using the Option

The SAN Option provides the following benefits:

- **Decreased Costs**—Lets servers share one or more tape libraries.
- **Improved Backup and Restoration Speed**—Eliminates the need for remote backups through your Local Area Network (LAN).
- **Interoperability**—Lets servers on different platforms share SAN attached tape libraries and media.
- **Efficiency**—Centralizes backup of hardware and media.
- **Flexibility**—Optimizes flexibility by redirecting or reconfiguring in case of a device failure.

## Terminology

The following terms are commonly used in a SAN environment:

- **Storage Area Network (SAN)**—A high-speed network designed for sharing attached tape libraries.
- **SAN server group**—A group of BrightStor ARCserve Backup servers that can share a set of tape libraries on a Storage Area Network.
- **Primary server**—The BrightStor ARCserve Backup server that initializes the shared tape libraries and is responsible for controlling usage and detecting any changes in status of these devices.
- **Distributed server**—Servers in a SAN that are assigned to the primary server to use the shared tape libraries.
- **Shared device**—A device on a SAN used by a SAN server group.

# Chapter 2: Installing the Option in Windows

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This chapter explains how to install and configure the option on your primary and distributed Windows servers from one central location.

## Operating System Compatibility

This option supports the following operating systems:

- The option is compatible with the following versions of Windows:
  - Windows 2000
  - Windows 2003
- The option is compatible with the following varieties of UNIX:
  - AIX
  - HP-UX
  - Solaris
- The option is compatible with Linux.

## Installation Prerequisites

Before installing the option, verify that:

- Your system requirements meet the minimum requirements needed to install the option. For information about requirements, see the Readme.
- Your system meets the minimum hardware and software requirements needed to install BrightStor ARCserve Backup and the BrightStor<sup>®</sup> ARCserve<sup>®</sup> Backup Tape Library Option.
- You have installed BrightStor ARCserve Backup.
- You have installed the BrightStor ARCserve Backup for Windows Tape Library Option.

**Note:** If these applications are not already installed, you must install them when you install the SAN Option.

**Important!** *You must install the BrightStor ARCserve Backup Storage Area Network (SAN) Option, BrightStor ARCserve Backup, and the BrightStor ARCserve Backup Tape Library Option on the same computer. This computer can be either a local computer or a remote computer.*

- You have made a note of any changes to the default installation path.
- You have administrator privileges or the proper authority to install software where you will be installing the option.  
**Note:** Contact your BrightStor ARCserve Backup administrator to obtain the proper privileges and information if you do not have them.
- You know the user names and passwords for the primary and distributed servers.
- You know the server names and IP addresses for the primary and distributed servers.
- You have installed all SAN hardware and related device drivers.
- The Windows backup server can see all of the appropriate SAN devices, including the medium changer and tape drives.
- The communication among the SAN servers in your storage area network by pinging each server by name or by pinging their IP address with the display server name switch.

**Note:** BrightStor ARCserve Backup supports libraries configured with one drive. If your library has more than one drive, you must license the BrightStor ARCserve Backup to enable multi-drive capabilities.

## SAN Network Tasks

Before you install the option, you must complete the following tasks:

- Install all appropriate SAN hardware device drivers and the Hardware Adapter Module (HAM) for adapters to access the devices attached to the Fibre Channel adapter.  
**Note:** For information about the SAN hardware and drivers, see the BrightStor ARCserve Backup for Windows Certified Device List. You can access the Certified Device List at [ca.com](http://ca.com) by selecting Solutions, Storage BrightStor, SAN and NAS Storage Management.
- Verify that the Windows backup server can see all of the appropriate SAN devices, including the medium changer and tape drives.
- Test the communication among the SAN servers in your storage area network by pinging each server by name or by pinging the IP address of each server with the display server name switch.

- IP connectivity and name resolution among all servers participating in the SAN is essential. To ensure you have IP connectivity and name resolution, you may need to update the IP host file on each server so that the name and IP address of each server is present in the IP host file of all other servers. The IP host file on each server are in the following folders:
  - For Windows 2000: \winnt\system32\drivers\etc
  - For Windows 2003: \windows\system32\drivers\etc

## Option Installation

The SAN Option follows the standard installation procedure for the system components, agents, and options of the BrightStor ARCserve Backup. Start all installation sessions by running setup.exe. For the detailed steps of this procedure, see the *Getting Started*.

- You can install the BrightStor ARCserve Backup base product, agents, and options all in one session
- You can install the BrightStor ARCserve Backup base product first, and then install the agents and options separately later.
- You can install the Storage Area Network (SAN) Option on the primary server first, and then install the option on each of the distributed SAN servers.

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

The installation process is very flexible and allows you to decide whether to install the different system components, agents, and options of BrightStor ARCserve Backup in one installation session or in multiple installation sessions. The preferred method is to install all of the components in one installation session. You can, however, install each component sequentially in individual sessions or install selected components in one session and other components in individual sessions later.

Before starting the installation process, decide which system components, agents, and options of BrightStor ARCserve Backup you want to install during this session. Then, gather the prerequisite information for each of the agents and options you want to install. You can find this information in each agent and option guide. Select the combination of installation sessions that best meets your needs.

For example, to install the BrightStor ARCserve Backup server, the Tape Library Option, and the Agent for SQL Server, you can use any of the following combinations of installation sessions:

- Install the server, the option, and the agent in the same installation session.
- Use three separate installation sessions - one session to install the server, a second session to install the option, and a third session to install the agent.
- Use two separate installation sessions. When using two separate sessions, you can group the components in the following ways: Install the server in one session and the option and agent in a separate session; install the server and option in one session and the agent in a separate session; or install the server and agent in one session and the option in a separate session.

## Install the Option on the Primary Windows SAN Server

Installing the option enables you reap the benefits of using the option, such as high-speed backups, and elimination of transmission bottlenecks. The process of installing the option on the primary Windows SAN server consists of the following process:

1. Enter customer information
2. Select components and a database
3. Install components
4. Assign tape libraries and configurations
5. Assign primary and distributed servers

To install BrightStor ARCserve Backup, agents, and options, enter customer information, select components and a database, and install components, see the *Getting Started*. Follow the standard installation procedure in the *Getting Started* till you get to the point where the Install Summary dialog opens.

### Assign Tape Libraries and Configurations

Assigning tape libraries and configurations identifies where to store data during a backup or restore. To assign tape libraries and configurations, follow these steps:

1. Click Next on the Install Summary dialog and follow the instructions on the Assign Devices dialog to configure the Tape Library Option. By default, all of the drives are assigned to their own tape libraries automatically.

**Note:** For more information about configuring the Tape Library Option, see the *Tape Library Option Guide*.

2. Click Next and highlight the library on the Assign Cleaning Tape dialog. Then click Properties.

The Properties dialog opens.

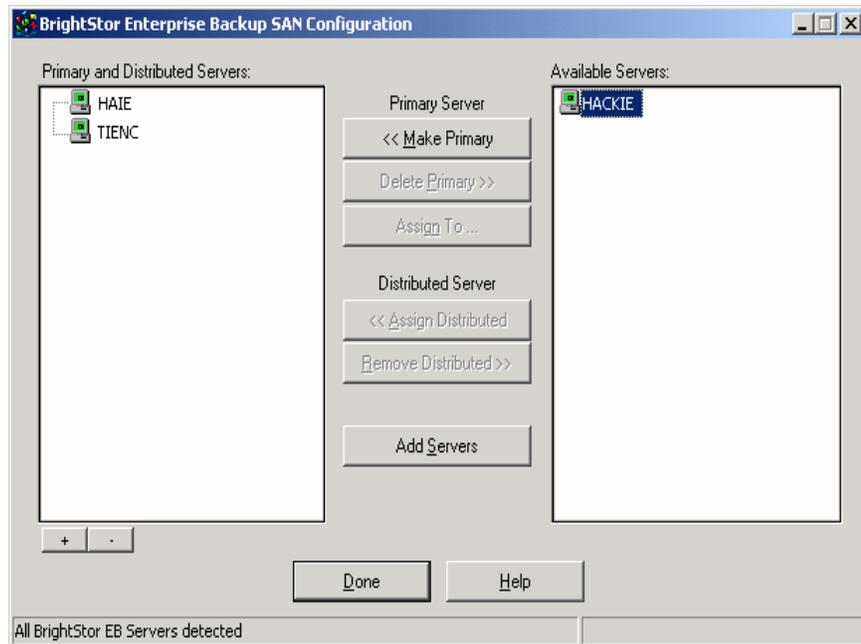
**Note:** The library corresponds to one displayed line in the Assign Cleaning Tape dialog. One displayed line includes information from the Device Information, Detail and Cleaning Slot columns.

3. Complete the Properties dialog and click OK.
4. Click **Tape cleaning slot installed** and enter the cleaning slot number. If you want tape cleaning done automatically, click **Automatic tape cleaning** and enter the number of usage hours you want between cleanings.
5. Click **Bar code reader installed** to enable the bar code reader.  
The Assign Cleaning Tape dialog opens.
6. Click Next. The Advanced Settings dialog opens. Click Next.  
The Summary dialog opens.
7. Review the summary of your tape libraries and their configurations and click Finish to exit the Tape Library Option installation.  
The Device Configuration Completed dialog opens.
8. Click Exit and then click Yes on the Exit Device Configuration dialog.  
The SAN Configuration dialog opens.

## Assign Primary and Distributed Servers

Assigning primary and distributed servers determines which server manages and initializes the shared SAN, and coordinates the use of shared library resources, and which servers will be sharing resources. To assign primary and distributed servers, follow these steps:

1. Highlight your intended primary server in the Available Servers pane on the right side of the SAN Configuration dialog, and then click Make Primary.



2. When prompted, enter the appropriate user name and password for the server, and click OK.

The server under Available Servers moves to the Primary and Distributed Servers list.

3. Click Done. If you have assigned new distributed SAN servers, the dialog prompts you to configure the distributed servers. If the prompt appears, go to the following step. If the prompt does not appear, skip the following step.

4. Click Yes if you want to start the Server Admin to configure the distributed servers.

The Server Admin dialog opens.

**Note:** For more information about configuring remote databases, see Configure Distributed Servers to Use a Remote Database in this chapter.

Click No to finish installing the option on the primary server without configuring the distributed servers.

The Install Summary dialog opens listing the products and options you have installed.

5. Click Finish.

The Registration dialog opens.

6. Choose to register now, register later, or select Do Not Ask Me Again and not register. If you choose to register, click Register Now, and then click Continue. When the Components to Register dialog opens, click the products and options you installed, fill out the User Information section and click Register.

Registration is complete.

## Install the Option on Distributed Windows SAN Servers

Before you install the BrightStor ARCserve Backup Storage Area Network (SAN) Option on your distributed Windows SAN servers, you must have already installed the option on a primary Windows SAN server. For more information about installing the option on the primary Windows SAN server, see How Installation of the Option on the Primary Windows SAN Server Works in this chapter.

The process of installing the option on distributed Windows SAN servers consists of the following set of procedures:

1. Enter customer information
2. Select distributed servers and components
3. Select a database and installing components

## Enter Customer Information

Entering customer information identifies authorized users to the system. To install BrightStor ARCserve Backup, agents, and options, and enter customer information, follow these steps:

1. Load the BrightStor ARCserve Backup CD into your primary Windows SAN server and select Install Products from the BrightStor ARCserve Backup CD.
2. Select Install BrightStor ARCserve Backup, agents, options, and more on the first dialog **and** the subsequent Install Products dialog ARCserve Backup.  
The License Agreement appears.
3. Read the entire agreement:
  - Click I Agree if you accept the terms in the license; the installation continues.
  - Click Cancel if you do not accept the terms in the license; the installation is canceled.

The Customer Information dialog appears.

4. Enter your user name and organization, and then click Next.  
The License Key Entry dialog opens.
5. Enter your license key on the License Key Entry dialog and click Next.  
(This key is a 25 character string that determines which components you will be licensing. If you have more than one license key, enter the key for your BrightStor ARCserve Backup base product first.)

**Note:** Your license key is usually shown on the back of the CD sleeve or on your license certificate.

The Select Install Type dialog opens.

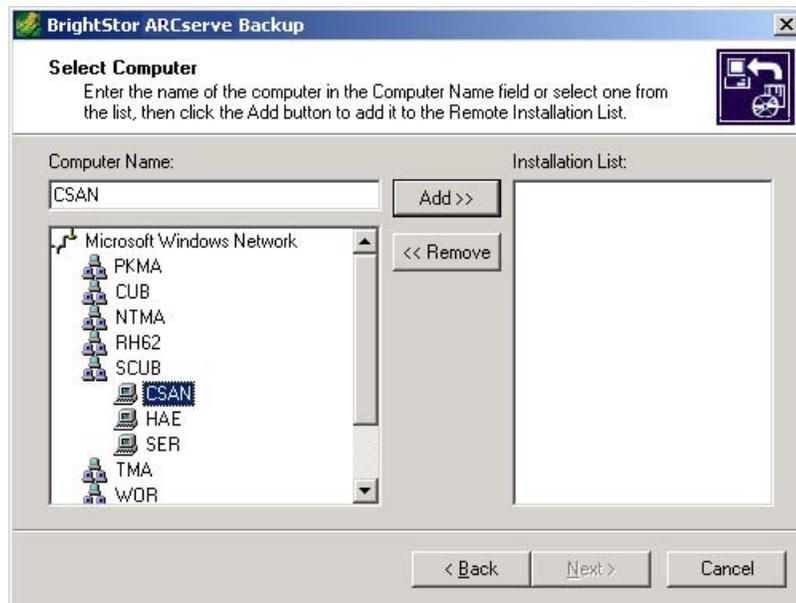
## Select Distributed Servers and Components

Selecting distributed servers determines which servers will be sharing resources. To select distributed servers and components, follow these steps:

1. Select Remote Install on the Select Install Type dialog and click Next.

The Select Computer dialog opens.

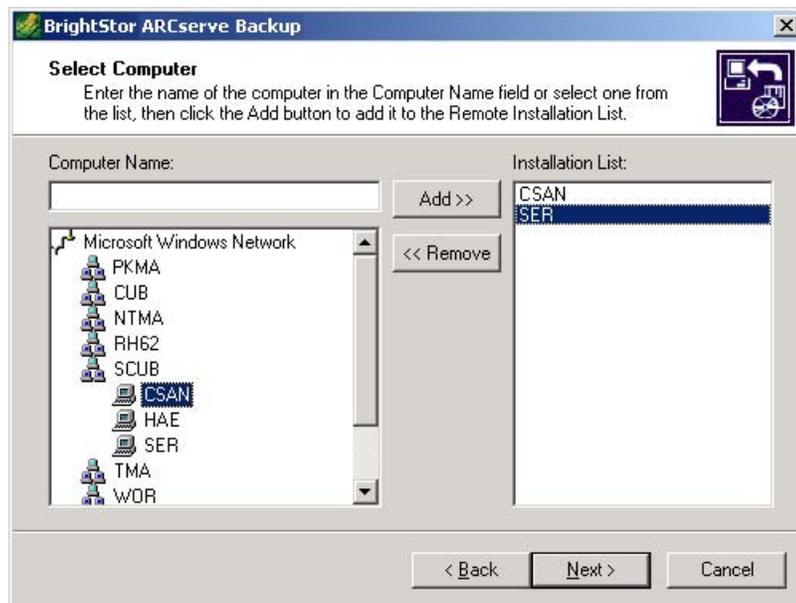
- Expand the Microsoft Windows Network in the left pane on the Select Computer dialog. Select one of the computers that you want to use as a distributed server and click Add.



The Logon Information dialog opens.

- Enter the appropriate user name and password and click OK.
- Repeat these steps for each computer you want to use as a distributed server and click Next when you have finished.

The computers you selected appear in the right pane of the Select Computer dialog.



5. Double-click a computer name on the Computer List dialog.

The Select Products dialog opens.

6. Select the BrightStor ARCserve Backup components that you want to install at this time by clicking the green square to the left of the component on the Select Products dialog. You can install one or more components during one installation session.

**Note:** The installation program customizes the installation process to contain the components you selected during this step.

When installing the option, you must select one of the following sets of components:

- If you already have BrightStor ARCserve Backup installed on the primary Windows SAN server, select the BrightStor® ARCserve® Backup for Windows Tape Library Option r11.5 and Storage Area Network Option by clicking the green squares next to each option.
- If you do not have BrightStor ARCserve Backup installed on the primary Windows SAN server, click the green squares next to Manager, Server, Server Admin, BrightStor ARCserve Backup for Windows Tape Library Option r11.5 and Storage Area Network Option.

## Select Databases and Install Components

The following procedure assumes that you have already installed BrightStor ARCserve Backup and that you are installing only the option and the Tape Library Option. For more information about installing BrightStor ARCserve Backup, see the *Getting Started*.

Selecting a database determines where critical information is stored. Installing components enables you to take advantage of their capabilities. To select a database and install components, follow these steps:

1. Click Next, select the database you want to use on the Select Database dialog, and click Next.

**Note:** The database stores critical information about BrightStor ARCserve Backup and its operations.

The Set Password dialog opens displaying the user name **caroot** in the User Name field.

2. Enter the password for the user **caroot** in the Password field, reenter the password in the Confirm Password field, and then click Next. The user caroot has administrator privileges for BrightStor ARCserve Backup.

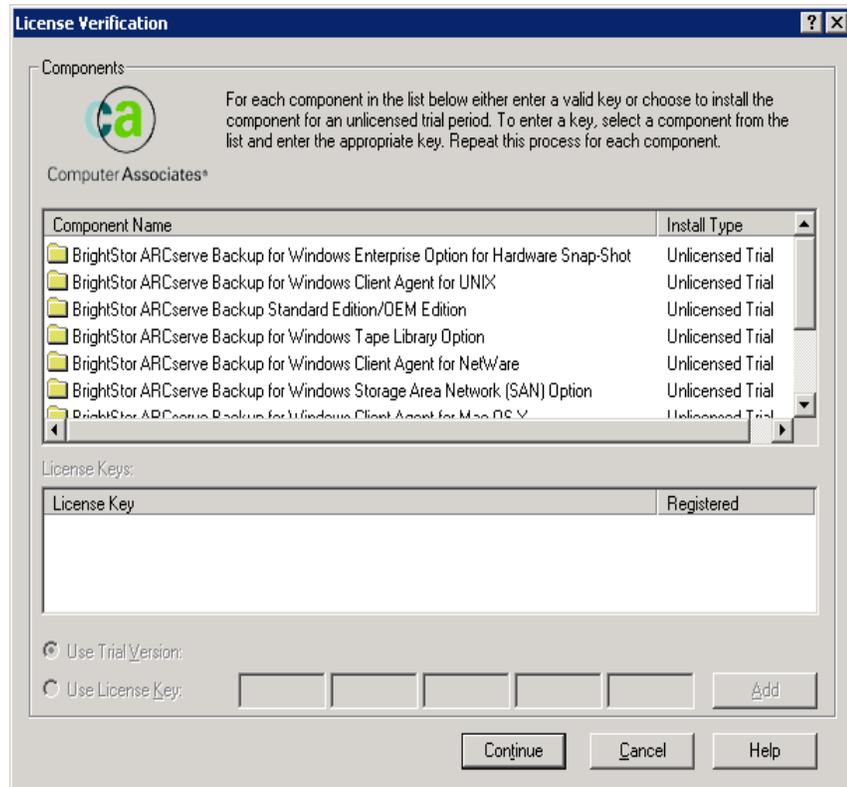
The System Account dialog opens.

3. Enter the user name and password of the user who will have Administrator and Backup Operator rights, reenter the password into the Confirm Password field, and click Next.

The Licensing Information dialog opens and displays a list of the components you selected to install.

4. Click Continue.

The License Verification dialog opens.



5. Highlight the name of a component you are installing, click **Use License Key** to enable the License Key fields, and enter the license key of the highlighted component in the License Key fields at the bottom of the dialog. Click Add.
6. Repeat the previous step for all of the components you are installing.
 

**Note:** If you do not have the license keys for the components you have selected, click **Use Trial Version**, and then click Continue. You can enter the license keys later in BrightStor ARCserve Backup by clicking Help, About BrightStor ARCserve Backup, License.
7. After you have entered all of the license keys, click Continue.

The Computer List dialog opens.

8. If you have more than one computer to use as a distributed server, see Select Distributed Servers and Components in this chapter through the previous step, for each computer. If there are no other computers that you want to use as a distributed server, go to the following step.

9. Click Install on the Computer List dialog.

The Install Status dialog opens and indicates the progress of the installation.

After the remote installation has finished, the Install Summary dialog opens.

10. Click Finish.

The installation is completed.

## Post-Installation Tasks

After you have installed the option and the other required applications, you may need to complete the following post-installation tasks, depending on your SAN network configuration and your needs:

- Assign distributed servers to a primary server.
- Configure the distributed servers to use a remote database.

### Assign Distributed Servers to Primary Servers

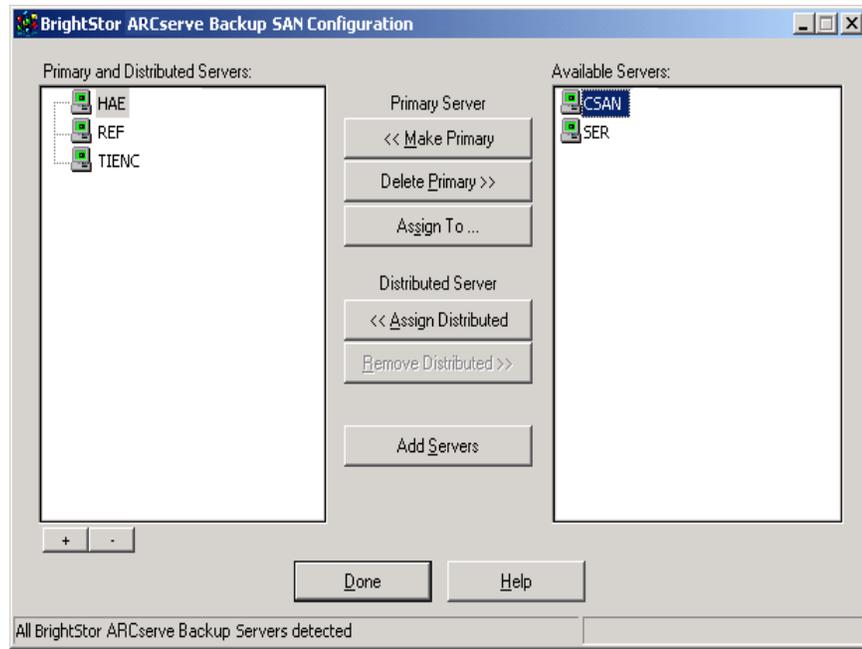
Assigning distributed servers to a primary server determines which server manages and initializes the shared SAN, and coordinates the use of shared library resources, and which servers will be sharing resources. To assign distributed servers to a primary server, follow these steps:

1. Select Programs, Computer Associates, BrightStor, and SAN Configuration from the Start Button on the task bar.

The BrightStor ARCserve Backup SAN Configuration dialog opens.

- Highlight the primary server in the left pane. In the right pane, highlight the distributed server that you are assigning to the highlighted primary server.

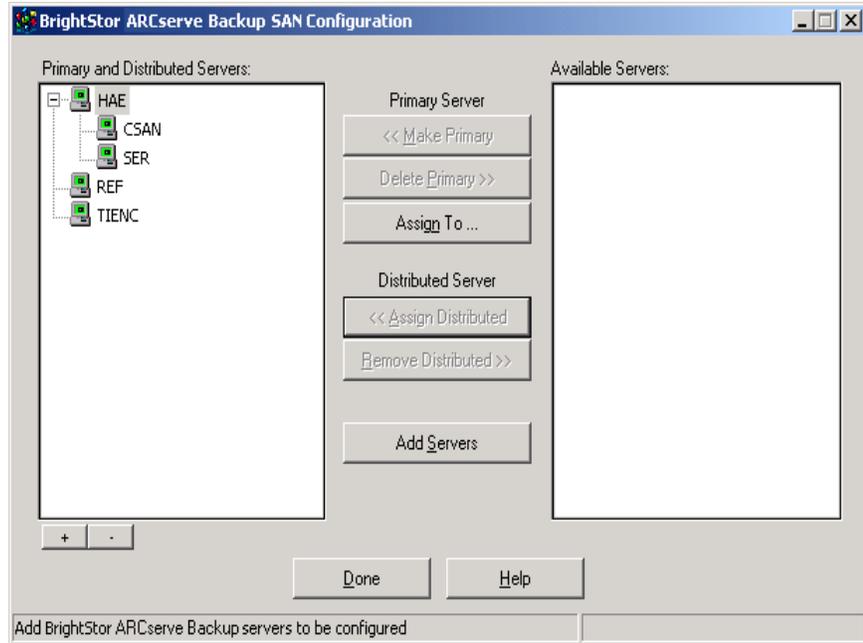
The following example shows both servers highlighted:



- Click Assign Distributed.

The distributed server is assigned.

- Repeat these steps if you have more than one distributed server to assign. After you assign each distributed server to a primary server, it moves from the right pane and appears below its assigned primary server in the left pane.



- Click Done to finish and exit the SAN configuration dialog.  
You are prompted to configure the distributed servers to use the database of the primary server.
- Click Yes if you want to start BrightStor ARCserve Backup Server Admin and configure the re-assigned distributed servers.  
The Server Admin dialog opens.  
**Note:** For more information about configuring remote databases, see Configure Distributed Servers to Use a Remote Database in this chapter.  
Click No if you do not want to configure the distributed servers at this time.

## Configure Distributed Servers to Use a Remote Database

Configuring distributed servers to use a remote database enables you to conduct a remote database backup. To configure distributed servers to use a remote database, follow these steps:

- Start the Server Admin and click the Server button.  
The Server Information dialog opens.

2. Select your distributed Windows SAN server name in the Server Name field and the Domain Name files to which the Distributed Windows SAN Server belongs.

Server Information

Choose the BrightStor ARCserve Backup server you want to manage.

Domain Name: SERVERLESS

Server Name: SERVERLESS

Select the type of server

Windows  
Enter the BrightStor ARCserve Backup user name.

NetWare  
Enter the full NDS context.

UNIX/Linux  
Enter the BrightStor ARCserve Backup user name.

Security information

User Name: caroot

Password: xxxxxxxx

For Windows, Linux and UNIX you have to specify the internal BrightStor ARCserve Backup user not the system user.

Remember the security information

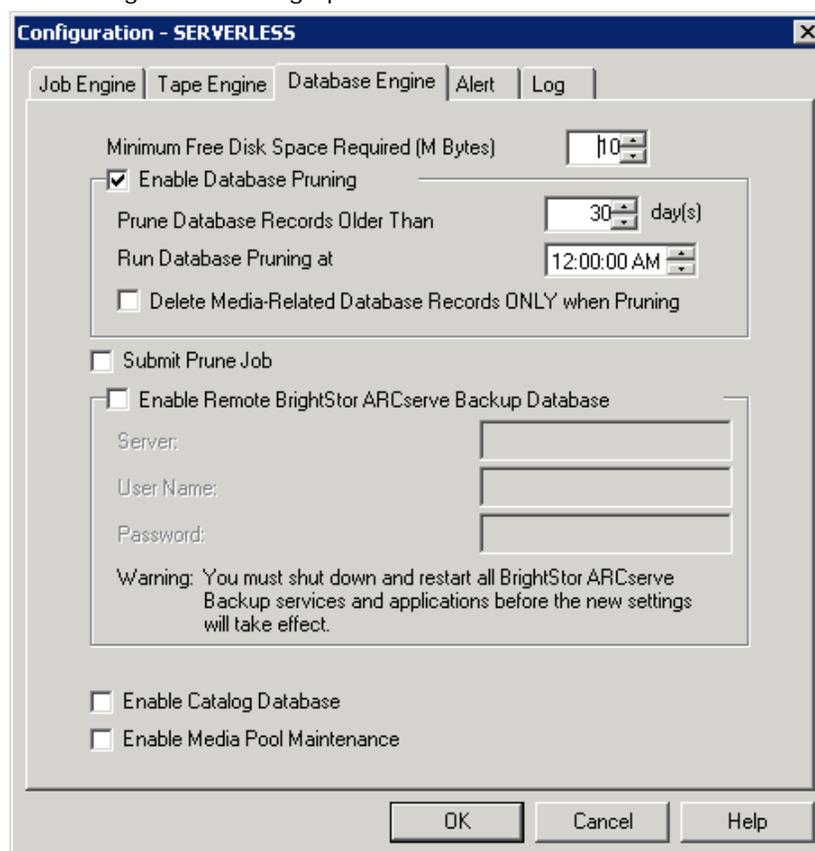
OK Cancel

3. Enter the appropriate user name and password, and click OK to connect to your distributed server.

The Server Admin dialog reopens with the server name changed to your distributed server name.

4. Select the Database Engine tab and click Configuration.

The Configuration dialog opens.



5. Select Enable Remote BrightStor ARCserve Backup Database and enter your primary Windows SAN server name in the Server field. Enter the appropriate user name and password and click OK.
6. Repeat these steps to configure all of your distributed servers to use the remote database.
7. After you have finished configuring all of the distributed servers, change the default server name back to the local server (the primary server), and close the Server Admin dialog.

# Chapter 3: Installing the Option in UNIX or Linux

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This chapter explains how to install and configure the SAN Option on a UNIX or Linux platform.

## Option Installation

The installation of the option is guided by an installation script. Each separate action of the installation script is provided in each of the following sections. Each section is arranged in the order in which they appear in the script, with each section presented under a separate heading.

## License Agreement Acceptance

After you initiate the installation script, the license agreement appears. You must enter Y for yes to continue.

## Installation Options Selection

The installation script prompts you to choose agents and options to install. Choose the agents or options you want to install by entering the number of the agent or option. Separate the numbers by commas if you are installing more than one.

Please give your selection separated by "," For example: 1,2,6  
Your choice(s): 1,2,3

## Directory Destinations Selection

The installation script prompts you for installation directory paths for the agents and options you have selected. You can select the default path, which is displayed in parenthesis on the right side of the prompt, or you can enter a path of your own choosing.

To set the directory destinations, do one of the following:

- Accept the default directory path by pressing Enter after a prompt appears.
- Enter a directory path of your own choice to the right of the displayed default path after a prompt appears, and then press Enter.

The following is an example of the directory section of the installation script:

```
Please provide the installation directory for BABsvr & BABmgr
package(default:/opt/CA): _
Please provide the installation directory for UAG package(default:/opt/CA): _
```

## Disk Space Check

If the directories you chose do not have enough disk space, the installation script displays the disk space you need. You may need to stop the installation and restart it so that you can select directories with enough disk space.

```
Checking available space in /opt                ==> [ OK ]
Checking available temp space in /var/tmp       ==> [ OK ]
```

## Modification of the Global User Profile

If you choose not to modify the global user profile, you must refer to the `/etc/env.bab` file. This is the file where the required BrightStor ARCserve Backup environment settings are stored. If you choose, you can set these environment variables in every user's environment.

The following is an example of the profile modification section of the installation script:

```
Install script can modify /etc/profile, so that BrightStor AB related
environment variables are set each time you log in.
```

```
Do you want to modify /etc/profile? [y|n]:(default: y) y
```

```
[NOTE: The following automatically generated file can be used to set
BrightStorAB related environment variables: /etc/env.bab ]
```

## The Installation Execution Report

The installation should continue without requiring any further input. As the installation ends, the installation script displays the Installation Execution Report. Each component should be reported as being installed or already installed.

```
Server & Manager          (BABmgr & BABsvr)==> [ INSTALLING ]X
Server & Manager          (BABmgr & BABsvr)==> [ INSTALLED ]

iGateway                  (iGateway)          ==> [ ALREADY INSTALLED ]
```

The installation concludes with a set of setup or configuration action items you must complete.

```
#####
Install script status          ==> [ FINISHED ]
```

Please perform the following setup/configuration:

```
Server & Manager          (BABmgr & BABsvr) ==> [ Set up Environment
Variables ]
Server & Manager          (BABmgr & BABsvr)==> [ csetup ]
Storage Area Network option (BABSsan)          ==> [ csetup ]
```

For additional information, please refer to Getting Started Guide and other documents accompanying the product.

```
Log file for this install session ==> [ /tmp/BABInstall041403-1131.log ]
```

```
#####
```

One of the items may prompt you to set up environment variables. Environment variables are important for proper operation.

If you choose not to modify the `/etc/profile`, you should edit a login script to source the `/etc/env.bab` file.

Other items display `[csetup]`. This is a prompt for you to run the `csetup` script. Execute the `csetup` script once for all setup or configuration actions.

After the installation is complete, you should review the installation log file to see if there were any installation procedure failures. The log file name includes the date and time so that older logs are not overwritten.

## Option Configuration

The csetup script guides the configuration of the option. Each separate action of the csetup script is provided in each of the following sections. Each section is arranged in the order in which they appear in the script, with each section presented under a separate heading.

After you have run csetup once, it displays a menu of choices whenever you run it again that enables you to reconfigure any individual configuration category.

### Start the csetup Script in UNIX

The csetup script guides configuration of the option. To start the csetup script in UNIX, follow these steps:

1. Run `/etc/env.bab` to set the `$PATH` environment, so you can find the csetup script easily.
2. Run the csetup script.

### Start the csetup Script in Linux

The csetup script guides configuration of the option. To start the csetup script in Linux, follow these steps:

1. Run `/etc/profile.d/bab.sh`. to set the `$PATH` environment, so you can find the csetup script easily.
2. Run the csetup script.

## Kernel Parameters

When you start the csetup script, the system checks for and displays the minimum kernel parameters settings required for BrightStor ARCserve Backup to function successfully in your environment. These requirements can be different for systems with heavy processing loads.

**Note:** For information about how to change the kernel parameters, see the chapter “Installing and Configuring BrightStor ARCserve Backup” in the Unix-Linux *Getting Started*.

The following list provides kernel parameters for HP-UX, Solaris, IBM AIX, and Linux.

- If you are using HP-UX, the script displays the following parameters:
  - semmap=256
  - semmni=256
  - semmns=1024
  - semmnu=512
  - semume=512
  - semvmx=65535
  - semaem=16384
  - shmmax=1000000000
  - shmmni=720
  - shmseg=256
  - msgmap=2048
  - msgmax=327685
  - msgmnb=6553
  - msgmni=256
  - msgssz=32
  - msgtql=2048
  - msgseg=32767
  - maxfiles=2048
  - maxuprc=1024
  - nproc=2048
- If you are using Solaris, the script displays the following parameters:
  - msgmap=2048
  - msgmnb=65535

- msgseg=32767
  - msgtql=2048
  - shmmni=720
  - shmseg=120
  - semume=128
  - semopm=20
  - semaem=16384
  - semmap=256
  - semusz=96
  - rlim\_fd\_max=1024
  - msgmax=32768
  - msgmni=128
  - msgssz=32
  - shmmax=1000000000
  - shmmin=1
  - semmni=256
  - semmsl=128
  - semvmx=128000
  - semmnu=128
  - semmns=1024
  - rlim\_fd\_cur=1024
- IBM AIX dynamically self-tunes and sets its own parameters. It requires no specific tuning.
  - If you are running Linux, the installation script displays the following parameter: Shmmax=100000000

## Domain Setup

To simplify security arrangements, BrightStor ARCserve Backup lets you set up domains - logical groups of backup servers that have common security characteristics - during configuration. In conjunction with each domain, it prompts you to set up a default user account with the caroot user name and a unique password. You access servers in a domain using the caroot user account name and the unique password for that domain.

Each domain has a primary server, which supports this network security model, and can have any number of member BrightStor ARCserve Backup servers. For redundancy, you can configure a secondary server in each domain. Each domain can have a logical name, which you establish during configuration. Domain configurations are stored on the BrightStor ARCserve Backup server under the BAB\_HOME/Config/discovery.cfg file.

The following is an example of the domain configuration section of the csetup script:

```
Is this host [dev-san-2] the primary discovery server (default: y) [y,n,?,q] Do
you have a secondary discovery server (default: y) [y,n,?,q] n What is the domain
name? xiangbo
```

```
PRIMARY_SERVER:  dev-san-2
SECONDARY_SERVER: none
DOMAIN_NAME:  angbo
Is this information correct (default: y) [y,n,?,q]
```

## Web Server Port Configuration

A port number represents an endpoint for network communications. Port numbers allow different applications on the same computer to use network resources without interfering with each other.

The csetup script prompts you to enter a port number. Typically, web servers run on port 80. To avoid conflicting with other web servers on a host, BrightStor ARCserve Backup defaults to port 6060.

You can accept the default port number or enter your own. If you choose not to use the default port, you should avoid known port numbers, such as 20, 21 for ftp, 23 for telnet, or 25 for SMTP.

**Note:** When connecting to this web server, you must include the port number at the end of the address, for example:

```
http://servername:6060.
```

## Advantage Ingres Database Configuration

The Advantage® Ingres® database stores information from backup configuration and execution. The amount of information stored inside of the database can be considerable. Consequently, it is important that you set aside enough disk space to store it all during configuration.

**Note:** If you have not allocated enough disk space initially, there are tools available to extend the database to a different file system.

## Types of Data Stored in the Advantage Ingres Database

The Advantage Ingres database stores the following kinds of data:

- Advantage Ingres database binaries
- Transaction log files
- Data files

## Disk Space Required for the Advantage Ingres Database

This section explains how to estimate the amount of disk space you should reserve for each kind of data stored in the Advantage Ingres database.

### Advantage Ingres Database Binaries

You should reserve about 400 MB for the Advantage Ingres database binaries.

### Transaction Log File

The transaction log files record all of the insert, update, and delete activities that occur before an operation is completed or committed.

You should set the amount of disk space you reserve for the transaction log files based on the largest number of files you will back up in a single session. For example, if you back up a file system containing 300 to 300,000 files, you should ensure that you have reserved enough disk space to support transaction log file operations on the largest file system, in this case 300,000 files.

To determine the amount of disk space to reserve for the transaction log files, review the following table:

<b>Setup Method</b>	<b>Max Number of Files in a Session</b>	<b>Transaction Log Size (Default)</b>
Small setup	Less than 100,000	400 MB
Medium setup	Between 100,00 and 500,000	1 GB
Large setup	More than 500,000	2 GB

### Data Files

The amount of disk space you need for data files depends on the amount of backup file information you expect the database to contain. Generally, base the amount of disk space on the number of files you are backing up on a weekly basis and the retention period of these backups.

To determine the amount of disk space to reserve for data files, review the following table:

Maximum Number of files in Database	Disk Space Required
10,000,000	400 MB
50,000,000	1000 MB
100,000,000	2000 MB

**Note:** There are database maintenance tasks that you can perform on a regular basis to reclaim some disk space.

### Other Considerations

During insert, update, and delete operations, both the transaction log file and the data files are affected at the same time, potentially slowing the operation of your system. For this reason, you should put the transaction log file and the data files in different locations by using different file systems or disk controllers for each.

### Extension of the Advantage Ingres Database to Other Locations

If you know that more than one file system is necessary to store all of your data, you can create several database extensions to spread the data across different file systems and locations. You can create database extensions during the initial configuration of the Advantage Ingres database or you can do it later. However, creating the database extension during the initial configuration, when your files contain little or no data, is faster because this operation creates the extensions and then spreads existing data across all locations.

### Database Extension

During the initial installation of Advantage Ingres, the setup script prompts you for the directory where you want the Advantage Ingres binaries installed. The script then asks if you want to perform a Normal setup or a Custom setup. Select the Normal setup if you have a database that will have small backups, for which performance is not a requirement.

If you have a database with large amounts of data and you run large backup jobs, use a Custom setup. With Custom setup, the installation script prompts you for an alternate location for the transaction log and data files. The script also prompts you for the transaction log file size.

At the end of the Advantage Ingres installation, the script prompts you to create database extensions. If you agree to create extensions, the script also prompts you for the number of database extensions and their locations.

## Global Scratch Set

A media pool is a logical collection of media containing a save set and a scratch set that BrightStor ARCserve Backup manages as a unit. Normally, a backup job can only overwrite media from the scratch set of its own media pool when it backs up data.

If you want to let backup jobs overwrite the media from the scratch sets of other media pools, you must enable the Global Scratch Set feature when prompted during configuration.

## Media Management Option Configuration

BrightStor ARCserve Backup provides a Media Management Option (MMO) that lets you create vaulting rules to protect, control, and manage tape resources. In an environment where you have multiple BrightStor ARCserve Backup servers, you can set up an MMO primary system that receives tape and media pool information from all BrightStor ARCserve Backup servers. The MMO primary system is (by default) the same system as the BrightStor ARCserve Backup primary discovery system. After you have configured the MMO, BrightStor ARCserve Backup centralizes single tape and media pool information on the MMO primary database.

In a SAN environment, you should set up the MMO primary system, even if you do not expect to use MMO functionality. The MMO primary central database prevents tapes from being overwritten by different server operations. If you have created one domain for all the servers in your SAN, you should keep your Domain primary, MMO primary, and SAN primary on the same physical computer.

## Modification of the System Tape Driver Configuration File

The following information applies to Solaris environment only.

In a Fibre Channel environment, the device driver assigns the SCSI ID and LUN (Logical Unit Number) for a target when it first discovers the device. BrightStor ARCserve Backup then adds the SCSI ID and the LUN for the device to the st.conf file, which is the system configuration file for the st driver, and to the cha.conf file, which is a configuration file for the SCSI pass through driver.

Later, when the driver loads during start up, depending on the entries in the configuration file, the driver tries to locate the device. If the number of device entries in the st.conf file and the cha.conf file is large, the system can take a long time to start because the st and cha drivers must scan through many entries in their respective files. To prevent a slow startup, enable persistent binding in your Fibre Channel environment. For instructions on enabling persistent binding, see the documentation provided by your Fibre Channel supplier.

If you enable persistent binding, the system maintains the SCSI ID - target relationship during discovery, which occurs each time a system starts. After a system has started, it maintains a constant view of the same SCSI ID - target relationship.

## Backup to Disk

The Backup to Disk function lets BrightStor ARCserve Backup use a file system residing on a disk as a backup medium. After you have configured a file system device as a backup device, BrightStor ARCserve Backup provides it with the same functionality that it provides for a tape device.

**Note:** The amount of data BrightStor ARCserve Backup can back up to a file system device is limited by the available disk space. Also, for NFS mounted file system devices, the root of BrightStor ARCserve Backup server must have read-write privileges on the NFS mount.

## SAN Server Configuration

The SAN Option configures the relationships between the primary and distributed servers. Before you configure your servers in the SAN, ensure that all of the servers you intend to add can communicate with each other. When the option configuration finishes, the system creates the configuration file sanpeer.cfg in the directory:

```
$BAB_HOME/config
```

The first server entry in sanpeer.cfg is always the primary server. The other server entries refer to either the UNIX or Linux distributed servers or the Windows primary server, depending on the prefix. UX identifies UNIX or Linux servers, NT identifies Windows servers.

If you start SAN services on the primary server, you should have two processes running under the name `sanpeer` and one process running under the name `sanghost`. If you start SAN services on the distributed server, you should have two processes running under the name `sanpeer` and no process running under `sanghost`. All of the servers sharing devices in the SAN should reflect the same entries, in the same order.

If you plan to set up a domain for all of the servers in the SAN, configure your primary domain server as the primary SAN server.

## Library Configuration

To configure libraries, the script first checks if there are any existing library configurations, then asks if you want to remove those configurations.

If you specify that the option should remove the existing configurations, the script removes the library configurations in `$BAB_HOME/config/camediad.cfg` by placing a semicolon (;) at the start of each library configuration line. Library configurations are the sections in `camediad.cfg` that start with the label `[CHANGER]`. This prevents `camediad` from reading that line when `camediad` is started.

If you choose not to remove the existing configurations, the configuration process leaves existing library configurations as they are and configures your other libraries. You should choose no if you have two libraries, one that is already configured and one that is not.

For example, if you have two libraries, library A and library B and you have configured library A in the past, but not library B, you can choose no to configure library B. But if you reconfigured library A and then configure library B, you will have two sets of configurations for library A, and one for library B. If you start `camediad` at this point, the system tries to access the same library twice causing the Tape Engine to run incorrectly, which then causes the library initialization to fail.

## Library Setup Modes

The configuration process has the following library configuration modes:

- Express setup
- Automatic setup
- Interactive setup

In the Express and Automatic setup modes, the configuration process starts `camediad`. `Camediad` auto-detects all the devices on your system and determines which tape drives belong to which library in a process called mapping.

Camediad begins by trying to map the serial number from each tape drive to the serial numbers that the library reports. If this fails, it shifts to a second method in which it polls and maps each drive individually. The second method can take a longer time depending on the number of tape drives you have.

In the Interactive setup mode, the configuration process does not start camediad. To use the Interactive setup mode, you must know which tape drives belong to which library. If you are not sure which tape drives belong to which library, use the Express or Automatic setup mode.

## Express Setup

Express setup runs camediad, which determines the tape drives that belong to each library. Express setup configures one group per tape drive and automatically configures the groups with slot sharing. It also assigns every group to the entire range of slots available in the library.

For example, if you have a library with 100 slots and 4 drives, Express setup configures each drive under a group with the starting slot of 1 and the ending slot of 100. All groups have access to all slots. If you do not want to use slot sharing and you want to separate the slots by groups, use the automatic or interactive setup.

## Automatic Setup

Automatic setup runs camediad, which determines which tape drives belong to which library. With Automatic Setup, you can control whether your system uses slot sharing. In addition, you can retain control over group configuration.

**Note:** Automatic setup can take a long time if the library has a large number of tape drives (for example, 40 or more). To complete the configuration, you must enter 40 group names, and if you do not select slot sharing, you must also enter a starting slot and ending slot for each of these 40 groups.

## Interactive Setup

Interactive setup does not start camediad and does not auto-detect your tape drives.

**Important!** *To use the Interactive setup mode, you must know which tape drives belong to which library.*

In the Interactive setup mode, you can control whether your system uses slot sharing. In addition, you retain control over group configuration. As with Automatic setup, this process can take a long time if the library has a large number of tape drives.

The following is an example of the Interactive setup portion of the configuration script:

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 configure one library at a time. Please be patient: on some systems probing the scsi bus takes time...

We found the following devices. Please retain this information: you will need it when we make group assignments later

```
ADAPTERS: Adapter 0: /devices/pci@1f,0/pci@1/fibre-channel@4/
```

Library Found:

```
DEC    TL800    (C) DEC  SCSIID: 2 LUN: 0  ADAPTER 0:
/devices/pci@1f,0/pci@1/fibre-channel@4/
SERIAL NUMBER: 2K00027769
```

Tape drive found:

```
COMPAQ DLT4000 SCSIID: 2 LUN: 1  ADAPTER 0: /devices/pci@1f,0/pci@1/fibre-
channel@4/  SERIAL NUMBER: CX902R0458
```

```
Tape drive found: COMPAQ DLT4000 SCSIID: 2 LUN: 2  ADAPTER 0:
/devices/pci@1f,0/pci@1/fibre-channel@4/  SERIAL NUMBER: CX902R0480
```

Press <ENTER> when ready...

Groups names and library names are restricted to an 8 character limit with no white space. Library names are optional but group names are not.

Does this library (2,0, ADAPTER 0:/devices/pci@1f,0/pci@1/fibre-channel@4/) reside on SAN? [y|n|q]y

Enter a name for Library ID 2, Lun 0, ADAPTER 0: /devices/pci@1f,0/pci@1/fibre-channel@4/ Name:(optional: <ENTER> when done) lib Do you want to enable tape drive cleaning? (default yes) [y,n,q]

## Bar Code Readers

During configuration, you are prompted to indicate whether a library has a bar code reader.

The bar code reader reads the bar codes from the tapes and stores that bar code information in its own memory. BrightStor ARCserve Backup can then access the information from the library and associate each bar code with the appropriate tape and the slot that holds the tape.

After the BrightStor ARCserve Backup services are started for the first time, all the tapes are read one by one by moving the tapes into the drive. After the initial reading of all the tapes, the tape name and its bar code is stored in the BrightStor ARCserve Backup data directory. The next time you start BrightStor ARCserve Backup, BrightStor ARCserve Backup retrieves the tape information from the bar code database, speeding up initialization and the startup of the Tape Engine.

If you answer no to the prompt about bar code reading capability, you are prompted to indicate whether to enable slots file.

The BrightStor ARCserve Backup server stores the media information in a slots file and uses this information in much the same way it uses information in the barcode database.

**Note:** BrightStor ARCserve Backup supports only one drive per group.

**Important!** *Do not manually modify `camediad.cfg` to say yes to both the question about bar code reading and the question about enabling slots file. This can cause BrightStor ARCserve Backup to malfunction.*

## Slots Configuration

If you respond with a y for yes to the question about enabling slots file, you must then configure the slots. You can configure slots in two ways. You can assign all the slots to all the groups or keep the slots exclusive. For example, a library with two drives and twenty slots will have two groups, for example, GROUP0 and GROUP1.

Either GROUP0 can have slots from 1 to 10 and GROUP1 can have slots from 11 to 20 or both GROUP0 and GROUP1 can have slots from 1 to 20. You should use the second approach because it lets you share tapes across groups.

## System User and caroot Equivalence

For command line operations, BrightStor ARCserve Backup uses the concept of equivalence. Consequently, to complete the configuration of the option, you must run `cauth_setup` to set up equivalence between the BrightStor ARCserve Backup `caroot` user and a system user. With equivalence, any system user account on any host can be granted the same access privileges as `caroot`. The equivalence does an implicit log in for the logged in user and runs any command line utilities.

You can set the password for `caroot` during BrightStor ARCserve Backup configuration and modify it later using the `cauth_setup` script. You must know the password for `caroot` to set up equivalences.

# Chapter 4: Using the Option in Windows

---

This chapter provides the information you need to use the SAN Option. Specifically, it explains how you can use the option to perform the following tasks:

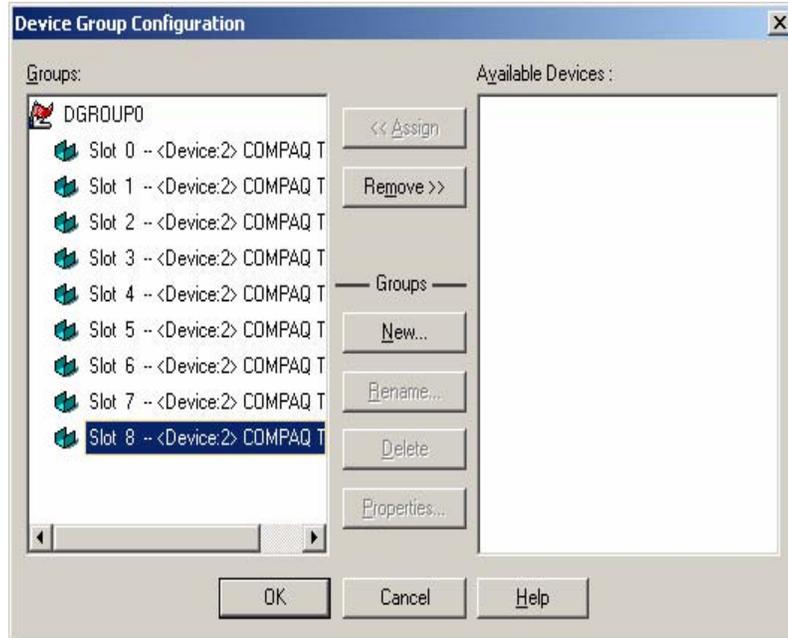
- Create shared device groups
- Back up and restore data
- Manage devices
- Manage media
- Create and configure remote databases
- Manage the database
- Monitor job status
- Control when jobs run
- Create reports and logs
- Use virtual libraries

## Create Shared Device Groups

Creating shared device groups is the key to the flexibility and efficiency of BrightStor ARCserve Backup. To create shared device groups, follow these steps:

1. Select Programs, Computer Associates, BrightStor, Device Group Configuration from the Start Button on the task bar.

The Device Group Configuration dialog opens.



2. Click New.

The New Group dialog opens.



3. Select the type of device group in the Type field, and enter a name for the device group in the Name field. Click OK.

The new device group is displayed in the Device Group Configuration dialog.

## Data Backup and Restoration in SAN Environment

To back up or restore data in your SAN environment, use the Backup Manager or Restore Manager to configure and submit backup or restore jobs. These backup and restore jobs run locally on the SAN Option installed server to which you submitted them. The data travels over the SAN hardware to the library, instead of over the LAN cabling. This speeds job processing and reduces Ethernet traffic. If you use the Media view, information on backups performed by all SAN servers is available from the database.

The option also provides a large number of backup and restore options, filters, and scheduling features for your jobs. For more information about the backup and restore job options, filters, and job scheduling features, see the *Administrator Guide*.

## Device Management

Use the Device Manager to display information about the storage devices connected to your SAN server group, the media in these devices, and the status of these devices. Through the Device Manager, you can see all of the shared devices connected to your SAN server group.

Consider the following when managing devices:

- Each BrightStor SAN Option installed server in the SAN server group displays the same view of the SAN attached devices.
- If you change the device configuration on the primary server (reconfiguring a library as a RAID, for example), you must restart all distributed server tape engines for distributed servers to see the new configuration correctly.

For more information about managing devices, see the *Administrator Guide*.

## Media Management

Consider the following when managing media:

- Because SAN servers share media, be careful when selecting media from a scratch set. Scheduled jobs can be affected if the media is unavailable.
- Only one administrator of media pools should supervise the SAN server group.
- If you add or delete a media pool from one server in a Windows SAN server group, and have Remote-Database configured, the same action is reflected on each Windows server in the group.

- A tape in a save set cannot be destroyed, formatted, or erased, unless it is moved to a scratch set.
- Media pools are not shared in a cross-platform SAN environment. Use special care when using media pools in a cross-platform environment. However, media belonging to a save set on one platform is moved to a save set called ELO\_Pool on all other platforms.

For more information about media pools, see the *Administrator Guide*.

## Media Pools

A *media pool* is a collection of media that is managed as a set and shared in the SAN. Each media pool is assigned a name, and the media is organized by serial numbers. Manage media pools from the BrightStor ARCserve Backup Media Pool Manager window, which you access by clicking the Media Pool Manager icon.

## Synchronization of Media Pools Across SAN Servers

BrightStor ARCserve Backup does not check other server jobs for duplicate set names. You must be sure not to create jobs with duplicate set names because BrightStor ARCserve Backup synchronizes media pools across servers. If you create duplicate set names, media from two jobs is combined into the same media pools and BrightStor ARCserve Backup could potentially overwrite the incorrect media. Use the Remote Database Manager to synchronize media pools across SAN servers. For more information about remote databases and media pools, see the *Administrator Guide*.

## Custom Jobs and Media Pools

Custom jobs can use the media pool called Default. Because custom jobs typically use a specific media name, it is generally safe for multiple jobs to use this media pool. You can also create your own media pools and specify that each job uses media from its own pool. For more information about media pools, see the *Administrator Guide*.

## Create and Configure Remote Databases

To create and configure a remote database, see the section Configure Distributed Servers to Use a Remote Database in the chapter "Installing the Option in Windows."

## Database Management

The BrightStor ARCserve Backup database records job information for each job, including media and library information. With the SAN Option installed, each server still uses its own database unless you configure it to use a remote database; however, media names are synchronized.

## Job Management

The Job Status Manager is a graphical tool that lets you centrally manage servers across a SAN. With the Job Status Manager, you can perform the following tasks:

- Add, delete, modify, or reschedule jobs
- Monitor the progress of active jobs
- View job details
- View activity and tape logs

Each server has its own job queue, but you can use the Job Status Manager to monitor all jobs on the SAN by creating a new group and assigning all of the servers to that group.

The following sections explain how to create server groups, add members to the groups, and control when jobs run.

### Create Server Groups

Creating server groups enables you to take advantage of the flexibility and efficiency of BrightStor ARCserve Backup. To create server groups, follow these steps:

1. From the Quick Start Job Status window, right-click BrightStor ARCserve Backup Installed Server and select New Server Group from the pop-up menu.

A new server group is appended to the end of the list.

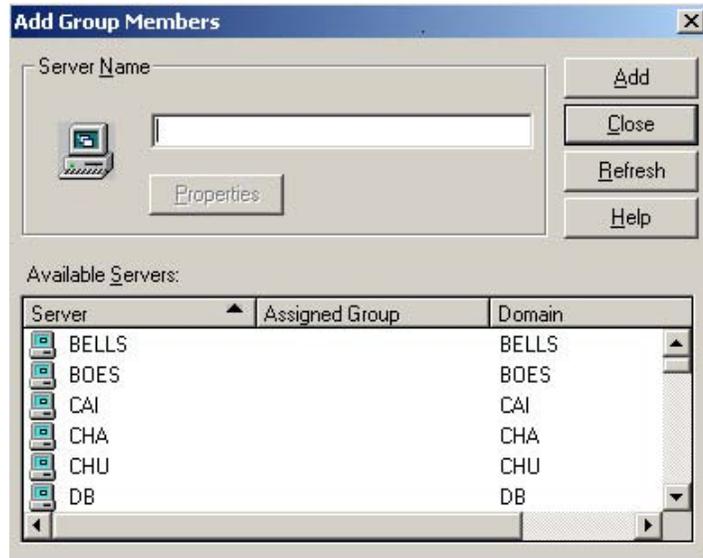
2. Right-click the server name to edit the name of this server group. From the pop-up menu select Rename, and enter a new name.

## Add Members to Server Groups

Adding members to a server group defines the group to the system. To add members to a server group, follow these steps:

1. On the Job Status tab, right-click the server group and select Add Member from the pop-up menu.

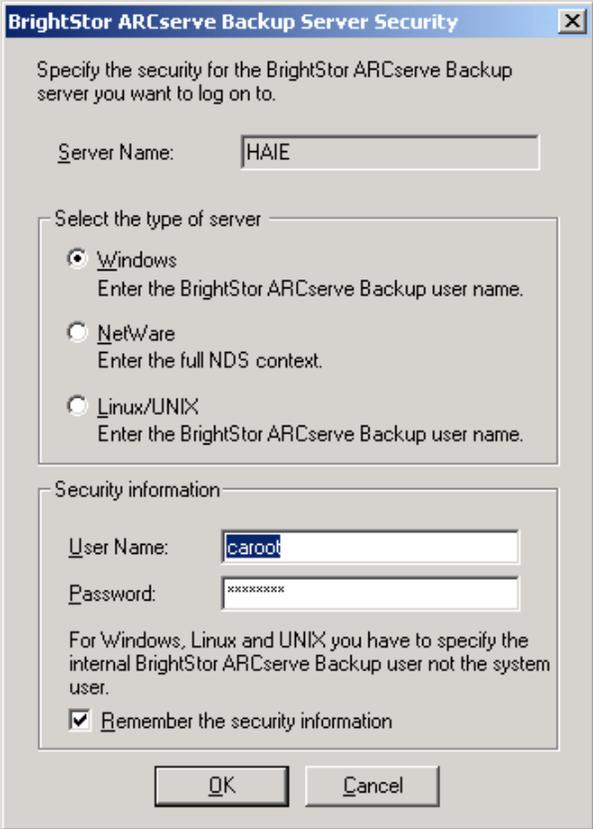
The Add Group Members dialog opens.



2. Enter the name of the server you want to add to the group into the Server Name field or select the server name from the Available Servers list.

3. Click Add.

The BrightStor ARCserve Backup Server Security dialog opens.



The screenshot shows a dialog box titled "BrightStor ARCserve Backup Server Security". The dialog contains the following elements:

- A title bar with the text "BrightStor ARCserve Backup Server Security" and a close button (X).
- Instructional text: "Specify the security for the BrightStor ARCserve Backup server you want to log on to."
- A "Server Name:" label followed by a text input field containing "HAIE".
- A section titled "Select the type of server" with three radio button options:
  - Windows**: Enter the BrightStor ARCserve Backup user name.
  - NetWare**: Enter the full NDS context.
  - Linux/UNIX**: Enter the BrightStor ARCserve Backup user name.
- A section titled "Security information" with two text input fields:
  - "User Name:" with the text "carool" entered.
  - "Password:" with "\*\*\*\*\*" entered.
- Instructional text: "For Windows, Linux and UNIX you have to specify the internal BrightStor ARCserve Backup user not the system user."
- A checked checkbox labeled "Remember the security information".
- At the bottom, there are "OK" and "Cancel" buttons.

4. Enter the appropriate information, select the options you want, and click OK.
5. Click Close on the Add Group Members dialog.

The new server name appears in the list of servers under the selected group.

## Control of Job Runtime

BrightStor ARCserve Backup can determine if a device is being used by a job, even if it is on a different server. It can then wait until the device is free before starting another job.

When there are many jobs waiting in the queue for the same device, there is no way to determine which job will run next. If priority is important, configure the start times based on how long you think the previous job will take. By carefully arranging the start times, you should have no more than one job ready to begin at a time.

For more information about scheduling, managing jobs, and the Job Status Manager, see the *Administrator Guide*.

## Reports and Logs

BrightStor ARCserve Backup provides the following options for displaying logs and reports:

- **Activity Log**—(BrightSTor.log) Contains comprehensive information about the operations performed by BrightStor ARCserve Backup. It provides an audit trail of all backup activity, including every job that is run. You can find a session number if you need to restore a session. It is located in the upper right corner of the Job Status Manager.
- **Tape Log**—(TAPE.LOG) Contains all Tape Engine-related messages.
- **Job Log**—Tracks activity related to a specific job.
- **Report Manager**—Generates reports from the BrightStor ARCserve Backup database for viewing or printing. You can open the Report Manager from the Quick Access menu and view reports such as the Job report, Backup Media Error report, Session report, Backup Device report, and the Media Pool report.

The Activity Log and the Tape Log are located in the ARCserve home directory on the file server. You can view them from the ARCserve and Tape Engine consoles on the NetWare server as well as from the Report Manager.

For more information about reporting, see the *Administrator Guide*.

## Virtual Libraries

The Tape Library Option, in conjunction with the Virtual Library feature, provides a versatile tool for addressing a wide range of storage requirements. The Virtual Library feature works seamlessly over the Tape Library Option. Using the Virtual Library feature, you can configure physical libraries into smaller virtual (logical) libraries and let the smaller libraries share the same robotics, import and export slots, and cleaning media.

When you use the Virtual Library feature, be aware of the following restrictions:

- You can configure the Virtual Library for shared Tape Library on the primary server only.
- If the device configuration on the primary server changes (for example, you reconfigure a library into multiple Virtual Libraries), then you must restart all of the distributed server tape engines so that the distributed servers can see the new configuration correctly.

For more information about Virtual Libraries, see the *Administrator Guide*.



# Chapter 5: Using the Option in UNIX or Linux

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This chapter explains how to use the option in a UNIX or Linux environment to perform the following tasks:

- Back up and restore data
- Manage devices
- Manage media
- Manage the database
- Monitor job status
- Control when jobs run
- Create reports and logs
- Prevent multiple instances of the same device in the Device Manager
- Restart comediad or the SAN processes on the primary server

## Data Backup and Restoration in SAN Environment

To back up or restore data in your SAN environment, use the Backup Manager or Restore Manager to configure and submit backup or restore jobs. These backup and restore jobs run locally on the server to which they are submitted. The data goes over the SAN hardware to the library for storage, instead of over LAN cabling. This speeds job processing and reduces network traffic.

The option also provides a large number of backup and restore options, filters, and scheduling features for your jobs. For more information about backup and restore job options, filters, and job scheduling features, see the *Administrator Guide*.

## Device Management

Use the Device Manager to display information about the storage devices connected to your SAN server group, the media in these devices, and the status of these devices. Through the Device Manager, you can see all of the shared devices.

Consider the following when managing devices:

- Each SAN Option installed server in the SAN server group displays the same view of the SAN attached devices.
- If you change the device configuration on the primary server (reconfiguring a library as a RAID, for example), you must restart all distributed server tape engines for distributed servers to see the new configuration correctly.

For more information about managing devices, see the *Administrator Guide*.

## Media Management

Consider the following when managing media:

- Because SAN servers share media, be careful when selecting media from a scratch set. Scheduled jobs can be affected if the media is unavailable.
- Only one administrator of media pools should supervise the SAN server group.
- A tape in a save set cannot be destroyed, formatted, or erased, unless it is moved to a scratch set.
- Media pools are not shared in a cross-platform SAN environment. Use special care when using media pools in a cross-platform environment. However, media belonging to a save set on one platform is moved to a save set called ELO\_Pool on all other platforms.

For more information about media pools, see the *Administrator Guide*.

## Media Pools

A *media pool* is a collection of media that is managed as a set and shared in the SAN. Each media pool is assigned a name, and the media is organized by serial numbers. Manage media pools from the BrightStor ARCserve Backup Media Pool Manager window, which you access by clicking the Media Pool Manager icon.

## Database Management

The database information allows you to perform intelligent restores by keeping track of each file and directory backed up to media. When you want to restore a specific file, the database determines on which media the file is stored. For more information about the database, see the *Administrator Guide*.

## Job Management

The Job Status Manager is a graphical tool that lets you centrally manage SAN Option servers across a SAN. With the Job Status Manager, you can do the following:

- Add, delete, modify, or reschedule jobs
- Monitor the progress of active jobs
- View job details
- View activity and tape logs

Each server has its own job queue, but you can use the Job Status Manager to monitor all jobs on the SAN by creating a new group and assigning all of the servers to that group.

For more information about the Job Status Manager, see the *Administration Guide*.

## Control of Job Runtime

BrightStor ARCserve Backup can determine if a device is being used by a job, even if it is on a different server. It can then wait until the device is free before starting another job.

When there are many jobs waiting in the queue for the same device, there is no way to determine which job will run next. If priority is important, configure the start times based on how long you think the previous job will take. By carefully arranging the start times, you should have no more than one job ready to begin at a time.

For more information about scheduling, managing jobs, and the Job Status Manager, see the *Administrator Guide*.

## Reports and Logs

BrightStor ARCserve Backup provides the following options for displaying logs and reports:

- **Media Server Log**—(camediad.log) Provides an audit trail of all BrightStor ARCserve Backup Media Server activity, including when the server is loaded and unloaded. It logs all tape activity for debugging purposes.
- **Database Log**—(cadbd.log) Contains information pertaining to all possible database activities including Backups, media Pool operations, Media formatting, and GFS operations.

The option also provides reports through the Report Manager. The Report Manager generates reports from the BrightStor ARCserve Backup database for viewing or printing and offers the same reporting functions as BrightStor ARCserve Backup. Some available reports are: the Job Records report, Media Records report, Media Sessions report, and the GFS Rotation Job report.

## Multiple Instances of the Same Devices on the SAN

The following sections explain how to prevent multiple instances of the same devices from appearing in the Device Manager.

### Remove Display of Multiple Instances of the Same Devices

BrightStor ARCserve Backup does not support failover to the same device through a different hardware path. However, it does support failover to another group. Consequently, there is no need for multiple instances of the same device to appear in the Device Manager. To remove multiple instances of the same device that appear in the Device Manager, follow these steps:

1. Expand the adapters to list the devices in the BrightStor ARCserve Backup Device Manager. Three numbers are listed next to each device. The first number is the adapter number; the second number is the SCSI ID; and the third is the Logical Unit Number (LUN).

**Important!** *Make a note of this information or use a screen capture. When camediad is unloaded, this information disappears. You must have this information to locate the duplicates in the camediad.cfg file.*

2. Enter the following command to unload `camediad`:

```
# bab -unload camediad
```

3. Make a backup copy of the following files:

```
$BAB_HOME/config/caserv.cfg
```

```
$BAB_HOME/config/camediad.cfg
```

4. Open the `$BAB_HOME/config/caserv.cfg` file. Then locate and add `-NOSCAN` to the following line:

```
yes REGULAR sbin/camediad
```

The line then looks like this:

```
yes REGULAR sbin/camediad -NOSCAN
```

5. Save and exit the `caserv.cfg` file, and then enter the following command to reconfigure the services:

```
# bab -reconfig all
```

6. Edit the `$BAB_HOME/config/camediad.cfg` file to your specifications, and then save `$BAB_HOME/config/camediad.cfg` file when the editing is complete.

**Note:** For detailed information about editing the `camediad.cfg` file, see the next section, `Edit the camediad.cfg File: An Example`.

7. Enter the following command to start `camediad`:

```
# bab -load camediad
```

In the following example, one ATL P3000 library exists on the system. It is connected to a switch, and the switch is connected to two adapters on the BrightStor ARCserve Backup server. BrightStor ARCserve Backup finds duplicate ATL P3000 devices with the same serial number. To resolve this situation, you must comment out one of the duplicate `DEVICE` lines in the `camediad.cfg` file. To comment out one of the duplicate device lines, follow these steps:

1. Open the `camediad.cfg` file on the BrightStor ARCserve Backup server, and scroll down to the `[DEVICE]` section.
2. Open another terminal window in which to work.

3. Locate the path of the device in the open terminal window and make a note of the path information.

For this example, we see an ATL P3000 located on the following paths:

```
/dev/rcha0,1,0
```

```
/dev/rcha1,2,0
```

**Note:** The statement `/dev/rcha1,2,0` indicates that the adapter number is 1, SCSI ID is 2, and the Logical Unit Number (LUN) is 0.

4. Enter the following command in the terminal window to display the serial number of the first device:

```
# ioctl_cmd /dev/rcha0,1,0 2
```

In this example, the serial number displayed for this device is 123456789.

**Note:** The 2 at the end of the command is an extra parameter that displays the serial number.

5. Enter the following command to display the serial number for the second device:

```
/dev/rcha1,2,0 2
```

The serial number 123456789 is also displayed for this device. The serial numbers are identical, indicating that these are duplicate devices.

6. Comment out one of the device lines in the `camediad.cfg` file by entering a semicolon (;) at the beginning of the line, before the word `DEVICE`, as shown in the following example:

```
;DEVICE = "/dev/rcha0,1,0" SCSI (0,1,0) "123456789"
```

The semicolon added in front of `DEVICE` causes BrightStor ARCserve Backup to ignore everything to the right of the semicolon on that line.

Save and exit the `camediad.cfg` file when you are done.

## About Restarting comediad or the SAN Processes on the Primary Server

The following list describes the conditions under which you can restart comediad or the SAN processes on the primary server without having to restart the SAN processes and comediad on the distributed server:

- If SAN processes are running on the primary and distributed servers, comediad is running **only** on the distributed server, and no jobs are running.
- If SAN processes and comediad are running **only** on the distributed server (neither are running on the primary server) and no jobs are running.
- If SAN processes are running **only** on the distributed server, comediad is not running on either the primary or the distributed server, and no jobs are running.

**Note:** If these conditions exist, you can reboot the primary server and restart comediad on the primary server without restarting the SAN processes and comediad on the distributed server.

**Important!** *If you have a UNIX primary server and a Windows primary server on the same cross-platform SAN, but no UNIX distributed servers, and you restart comediad on the UNIX primary server, you must restart the Tape Engine on the Windows primary server. You do not, however, need to restart the Tape Engine on the Windows distributed server because the distributed Tape Engine automatically reconnects to the primary Tape Engine.*



# Chapter 6: Implementing Cross-Platform SAN Environments

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This chapter describes how to install and configure a cross-platform SAN in UNIX, Linux, Windows, and NetWare environments.

## Supported Configurations

The following configurations are supported:

- BrightStor ARCserve Backup Windows servers can share SAN attached tape libraries with any one of the UNIX or Linux platforms supported by BrightStor ARCserve Backup.
- BrightStor ARCserve Backup Windows servers can share SAN attached tape libraries with NetWare servers running BrightStor® ARCserve® Backup for NetWare.

The following configurations are **not** supported:

- The SAN attached tape library **cannot** be shared between UNIX or Linux platforms and NetWare platforms.
- You cannot format or erase Windows multiplexing tapes from the BrightStor ARCserve Backup for NetWare server.
- You cannot use BrightStor ARCserve Backup Windows multiplexing tapes with the BrightStor ARCserve Backup for NetWare server. The Netware server automatically skips BrightStor ARCserve Backup Windows Multiplexing tapes when enumerating NetWare jobs.

In cross-platform SAN environments:

- The Windows primary server acts as a distributed server to the UNIX or Linux primary server or as a distributed server to the NetWare primary server.
- Tape library and its tape drive(s) must support serialization.
- Tape media in the tape library must have a bar code label on it.
- BrightStor ARCserve Backup **NetWare** SAN servers work only with BrightStor ARCserve Backup **Windows** servers running Windows 2000 or Windows 2003 operating systems.

The following table summarizes which combinations of operating systems you can use together when creating a SAN with both UNIX or Linux and Windows or Windows and NetWare servers.

	AIX	HP-UX	Win 2003	Linux	Sun Solaris	Win 2000	NetWare 6.5
AIX	YES	YES	YES	YES	YES	YES	NO
HP-UX	YES	YES	YES	YES	YES	YES	NO
Linux	YES	YES	YES	YES	YES	YES	NO
Solaris	YES	YES	YES	YES	YES	YES	NO
Win 2003	YES	YES	YES	YES	YES	YES	YES
Win 2000	YES	YES	YES	YES	YES	YES	YES
NetWare 6.5	NO	NO	YES	NO	NO	YES	YES

**Note:** You must install SAN Option and BrightStor ARCserve Backup on all operating system platforms.

## Terminology

**Windows primary server**—The Windows server designated as the primary server. There can only be one Windows primary server.

**Windows distributed server**—Any other Windows server that uses the SAN attached tape library. Each server must be configured as a distributed server and assigned to the Windows primary server. There can be multiple distributed servers.

**NetWare primary server** —The NetWare server designated as the primary server. There can be only one NetWare primary server.

**NetWare distributed server**—Any other NetWare server that uses the SAN attached library. Each server must be configured as a distributed server and assigned to the NetWare primary server. There can be multiple distributed servers.

**UNIX or Linux primary server**—The UNIX or Linux server designated as the primary server. There can be only one UNIX or Linux primary server.

**UNIX or Linux distributed server**—Any other UNIX or Linux server that uses the SAN attached library. Each server must be configured as a distributed server and assigned to the UNIX or Linux primary. There can be multiple distributed servers.

## IP Connectivity and Name Resolution

You must have IP connectivity and name resolution among all servers in your cross-platform SAN. To achieve this, update the IP host file on each server participating in the cross-platform SAN, so that the name and IP address of each server is present in the IP host file of every other server. The following lists the locations of the IP host files by operating system:

- On Windows 2000:  
`\winnt\system32\drivers\etc`
- On Windows 2003:  
`\windows\system32\drivers\etc`
- On AIX, HP-UX, Solaris, and Linux:  
`/etc`
- On NetWare:  
`\etc`

Test the connectivity by using the ping utility on each server. Ensure that you can ping each cross-platform server by server name, not just IP address. The following lists the ping commands for each operating system:

- On Windows—At the command prompt, type:  
`#ping <server name>`
- On AIX, HP-UX, Solaris, and Linux—At the console command prompt, type:  
`#ping <server name>`
- On Windows—At the command prompt, type:  
`#ping <server name>`

The following sections describe how to install and configure the BrightStor ARCserve Backup Storage Area Network (SAN) Option for cross-platform SAN servers.

## Install and Configure on UNIX or Linux in a Cross-Platform SAN

Installing and configuring the option on a UNIX or Linux platform enables cross platform use of tape libraries. To install and configure the SAN Option on a UNIX or Linux platform in a cross-platform SAN environment, follow these steps:

1. Log on to the UNIX or Linux computer you plan to use as the primary server and run `csetup`.  
This script invokes `sansetup`, which guides you step-by-step through the SAN configuration.
2. Enter the name of the local primary server, the number of distributed servers, the distributed server names (one at a time), and the names of all other UNIX or Linux servers you want to use in the SAN, when prompted.

**Note:** Record the names of the UNIX or Linux servers in the order you enter them. You will use this information later in this procedure.

The setup script prompts you to add the Windows primary server as the distributed server in the SAN. This information is saved in `sanpeer.cfg` under the directory:

```
/$BAB_Home/config
```

**Note:** At this point, SAN-related processes start. There should be two `sanpeer` processes and one `sanghost` process on the primary server.

3. Complete the `csetup` to finish the changer configuration and start all of the BrightStor ARCserve Backup services.

The system initializes and inventories all of the libraries in the SAN.

4. Run `csetup` on each of the distributed servers, one at a time after the primary server has initialized. Enter the server names on the distributed servers in the same order as you did on the primary server.

**Note:** If the number of distributed servers is large, you can copy the `sanpeer.cfg` file from the UNIX or Linux primary server to all of the UNIX or Linux distributed servers. This ensures that the order of UNIX or Linux distributed server names is identical on all the members.

5. Configure the library on each distributed server after you have completed the SAN configuration on each distributed server, and start the BrightStor ARCserve Backup processes on each distributed server.

**Note:** You will see only two `sanpeer` processes on the distributed servers. The `sanghost` process does not run on the distributed servers.

## Cross-platform UNIX and Linux Considerations

Be aware of the when installing the option on UNIX or Linux servers in a cross-platform SAN environment:

- Before starting BrightStor ARCserve Backup on a configured server, verify that all of the processes are running and that the server sees the devices properly.
- In a cross-platform environment, the UNIX or Linux primary server acts as the primary server. On Windows, the primary server acts as a distributed server to the UNIX or Linux primary server. To set up this configuration from the sansetup program, answer yes, when prompted, to the following question:

Do you wish to add any SAN NT primary server at this time?

Is your primary server, number of distributed servers, and the names of your distributed servers correct?

To configure your Windows servers on a cross-platform SAN, follow the steps in the section Windows Installation for Cross-Platform SANs.

## Windows Installation for Cross-Platform SANs

Installing and configuring the option on a Windows platform enables cross platform use of tape libraries. Installing a cross-platform SAN that uses the SAN Option on Windows servers, consists of the following process:

- Install BrightStor ARCserve Backup, the Tape Library Option, and the SAN Option and selecting the primary and distributed servers
- Configure the SAN option
- Define the primary server

### Install the Components

Installing BrightStor ARCserve Backup, the Tape Library Option, the SAN Option, and selecting the primary and distributed servers enables the cross-platform SAN environment to function. To install BrightStor ARCserve Backup, the Tape Library Option, and the SAN Option, and select the primary and distributed servers, follow these steps:

1. Install BrightStor ARCserve Backup for Windows on each of the Windows servers participating in the cross-platform SAN.
2. Install the Tape Library Option on each Windows server participating in the cross-platform SAN. Configure your tape library on the Windows server that you plan to use as the primary Windows server.

3. Install the SAN Option for Windows on each of the Windows servers participating in the cross-platform SAN. After all of the Windows servers have the option installed, go to any of the Windows servers and open the SAN Option Configuration dialog.
4. Select the server you want to make the Windows primary from the Available Servers pane on the right of the SAN Configuration dialog. Click the Make Primary button.
5. Highlight each remaining Windows server in the Available Servers pane, highlight the Windows primary server in the Primary and Distributed Servers pane on the left, and click Assign Distributed.
6. If any Windows servers do not appear (or are missing from) in the Available Servers pane, click Add Servers, select a server and click OK. The server should appear in the Available Servers pane.

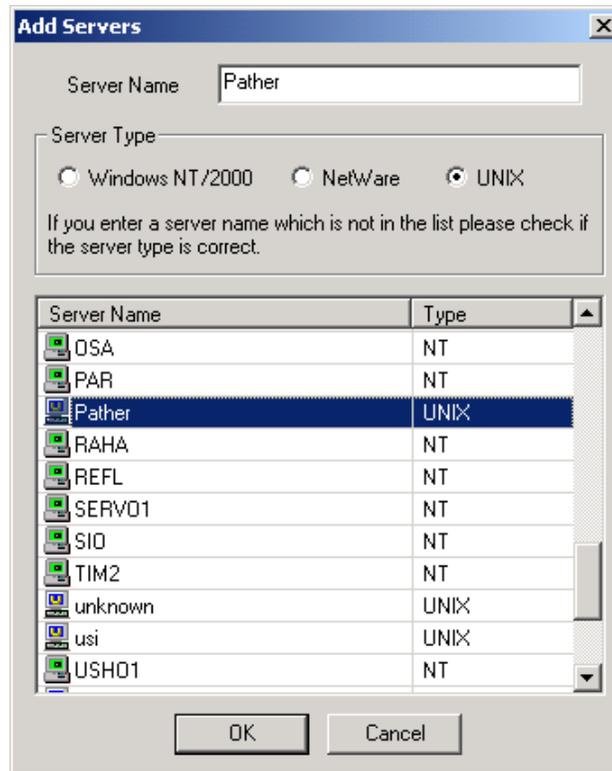
## Configure the Option

Configuring the SAN option enables you to add UNIX and Linux servers. To configure the option, follow these steps:

1. Install and configure the SAN Option on all of your UNIX or Linux servers.  
**Note:** For instructions on configuring a UNIX or Linux server on a cross-platform SAN, see, UNIX and Linux Installation for Cross-Platform SANs in this chapter.
2. Start the SAN Configuration Utility on your Windows primary server. The BrightStor ARCserve Backup SAN Configuration dialog appears.

3. Add all of your UNIX or Linux servers. To begin the process, click Add Servers.

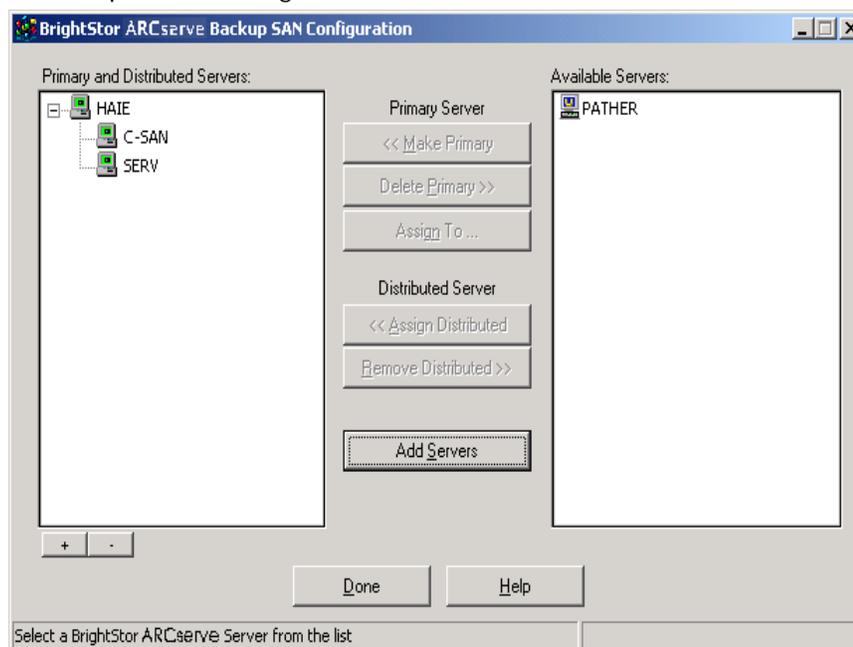
The Add Servers dialog appears.



4. Select your Server Name from the list and click OK. If your UNIX or Linux server is not listed, enter your UNIX or Linux server name into the Server Name field.

5. Click the UNIX/Linux radio button in the Server Type Group Box and click OK.

The BrightStor ARCserve Backup SAN Configuration dialog reappears with the server name you selected or entered appearing in the Available Servers pane on the right.

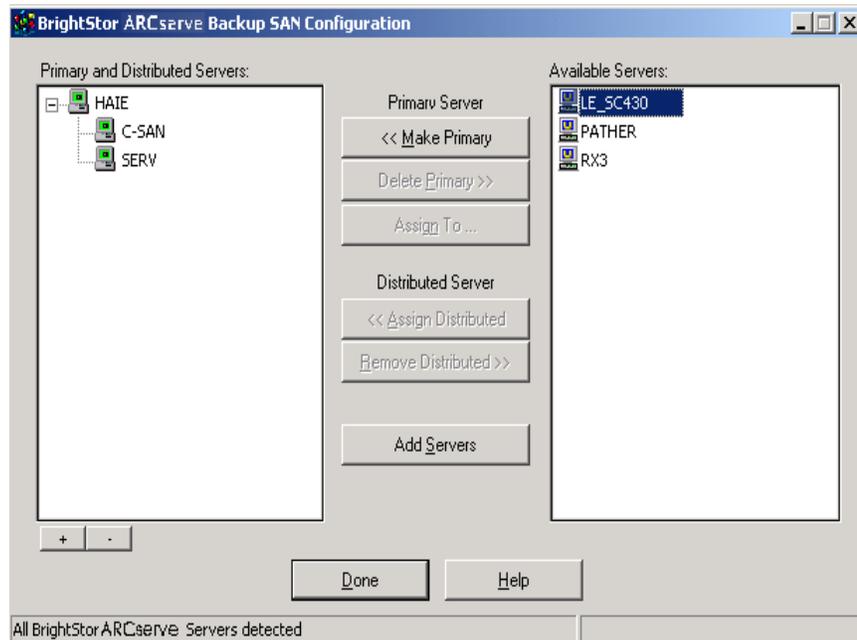


6. Repeat these steps to add additional servers.

## Define the Primary Server

The primary server manages all shared devices on a SAN. To define the primary server, follow these steps:

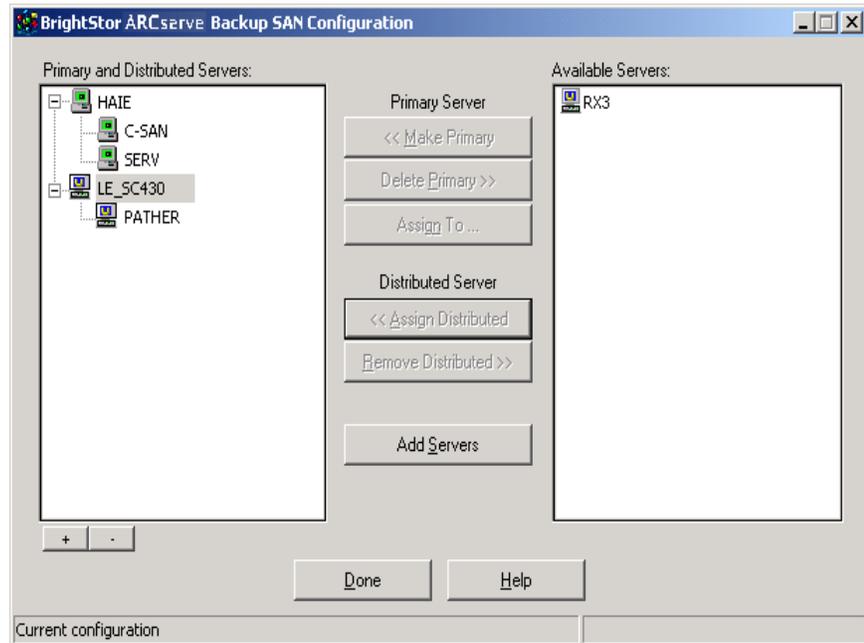
1. Define the UNIX or Linux primary server as the cross-platform primary server by highlighting the UNIX or Linux primary server in the Available Servers pane and clicking Make Primary.



When you click Make Primary, the UNIX or Linux primary server moves to the Primary and Distributed Servers pane on the left.

2. Highlight the UNIX or Linux primary server, select one of the remaining UNIX or Linux servers in the Available Servers pane, and click Assign Distributed.

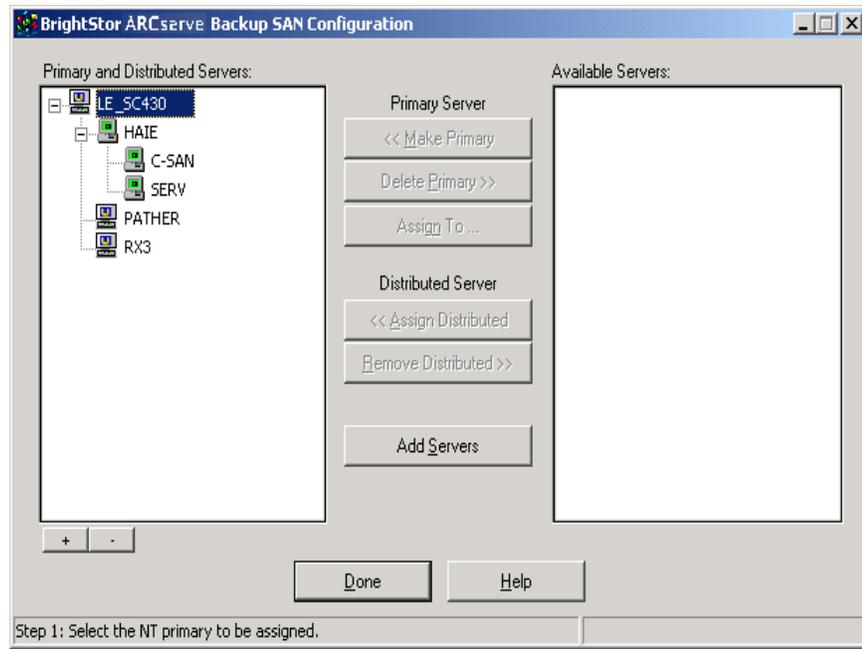
The server should now appear beneath the UNIX or Linux primary server in the Primary and Distributed Servers pane.



Repeat this step until you have assigned all of the remaining UNIX or Linux distributed servers to the UNIX or Linux primary server.

- Highlight your primary Windows server, and drag and drop it on the top of UNIX or Linux primary server.

The final configuration should look like a tree structure containing all of the UNIX or Linux servers and Windows servers.



**Note:** The UNIX or Linux primary server is now configured as the cross-platform primary server and handles the tape libraries, initialization, SAN attached devices, and media access for all SAN servers.

All UNIX or Linux distributed servers and the Windows primary server act as distributed servers under the cross-platform primary server. Windows distributed servers continue to act as Windows distributed servers under the Windows primary.

- Start BrightStor ARCserve Backup on the cross-platform UNIX or Linux primary server.
- Start BrightStor ARCserve Backup on the remaining UNIX or Linux distributed servers and the Windows primary server, one server at a time, after the cross-platform primary server has fully initialized the SAN attached tape library (the slot information is displayed in the Device Manager).
- Start BrightStor ARCserve Backup on the Windows distributed servers after it is started on the Windows primary server.

## Best Practice Installation Notes

The following is a list of cross-platform SAN best practice installation notes:

- If you plan to use a NetWare server as the primary server, ensure that you have SAN Option installed and configured on the NetWare server. To configure your SAN for NetWare, follow the Define Primary Server procedure, replacing the word UNIX or Linux with NetWare.
- Verify there is no activity taking place on the SAN attached tape libraries before starting a UNIX or Linux distributed or Windows primary server.
- You must add and assign all of the UNIX or Linux distributed servers as cross-platform UNIX or Linux distributed servers in the Windows SAN Option Configuration Utility.
- If you restart `comediad` on the UNIX or Linux primary server, you must restart `comediad` on **all** distributed UNIX or Linux servers and restart the Tape Engine on the primary Windows server and **all** distributed Windows servers.
- If you have a UNIX primary server and a Windows primary server on the same cross-platform SAN, but no UNIX distributed servers, and you restart `comediad` on the UNIX primary server, you must restart the Tape Engine on the Windows primary server. You do not, however, need to restart the Tape Engine on the Windows distributed server because the distributed Tape Engine automatically reconnects to the primary Tape Engine.

The following contains general information notes for cross-platform SAN installations in Windows 2000 or 2003 environments.

- If a shared device is participating in a RAID configuration, it is removed automatically from that configuration when you configure it as a cross-platform device. Any local devices participating in RAID configurations remain intact.
- If you configured a shared tape library as a virtual library, you must remove this configuration before configuring the library in a cross-platform SAN. For additional information, see the *Windows Tape and Optical Library Option Guide*.
- You can physically attach only one active Windows primary server to the SAN. If a primary Windows server is no longer available, you can remove a distributed server from its primary Windows server by right clicking the distributed Windows server and selecting the option Force to Remove.
- You must run `\Device Configuration\TLO Setup` to configure your shared tape library before you assign the new primary through the SAN Configuration Utility.

## NetWare Installation for Cross-Platform SANs

Installing and configuring the option on a NetWare platform enables cross platform use of shared devices. Installing and configuring the BrightStor ARCserve Backup Storage Area Network (SAN) Option on a NetWare platform for a cross-platform SAN consists of the following procedures:

- Install the Novell client, BrightStor ARCserve Backup, and the SAN Option
- Select primary servers
- Install the BrightStor ARCserve Backup for NetWare Tape Library Option

### Install the Components

Installing the client, BrightStor ARCserve Backup, and the SAN Option, and selecting the primary server enables the cross-platform SAN environment to function. To install the client, BrightStor ARCserve Backup, and the SAN option, and select the primary server, follow these steps:

1. Install the Novell Client for Windows on one of the BrightStor ARCserve Backup Windows servers.
2. Install BrightStor ARCserve Backup for NetWare r11.1 SP1 on all participating NetWare SAN servers.
3. Install the BrightStor ARCserve Backup for NetWare SAN Option on all participating NetWare SAN servers, starting with the intended NetWare primary SAN server.  
Setup is completed.
4. Run the SAN Configuration utility and add all of the NetWare servers using the Add Servers button. To add a NetWare server, enter the server name and select the NetWare radio button.
5. Click Add Servers.

The server appears in the Available Servers list.

6. Select the NetWare primary server from the Available Servers pane on the right side and click Make Primary. Select each remaining NetWare servers from the Available Servers pane and assign them as distributed servers under the NetWare primary server, by clicking Assign Distributed.

The primary and distributed servers are assigned.

7. Add the Windows primary server as a cross-platform distributed server by dragging the Windows primary server from the list displayed in the Primary and Distributed Servers pane and dropping it on the NetWare cross-platform primary server.

The final configuration is similar to a tree structure containing all NetWare servers and Windows servers, with the NetWare primary server configured as the cross-platform primary server.

## Install the BrightStor ARCserve Backup for NetWare Tape Library Option

Installing the BrightStor ARCserve Backup for NetWare Tape Library Option enables you to back up large amounts of data without manual intervention. To install the Tape Library option, follow these steps:

1. Deactivate BrightStor ARCserve Backup on all the servers using the Scheduler Console screen.
2. Install the BrightStor ARCserve Backup for NetWare Tape Library Option on all participating NetWare SAN servers, starting with the intended NetWare primary SAN server.

After setup is completed, the Device Configuration utility starts automatically.

3. Configure the tape library using the same settings for the cleaning tape and barcode as those used in the Windows Tape Library Option configuration.

After the NetWare primary SAN server completes the library initialization, the library group becomes available to all NetWare distributed servers in the SAN. You must reactivate BrightStor ARCserve Backup from the Scheduler Console screen before you can run a backup or restoration on any server.

4. Start BrightStor ARCserve Backup on all Windows NT, 2000, or 2003 SAN member servers, starting with the primary server.

**Note:** BrightStor ARCserve Backup should already be running and ready for cross-platform SAN operations. There is no need to restart BrightStor ARCserve Backup on any NetWare servers you configured using this procedure.

## Media Pools Management on a Cross-Platform SAN

When working with media pools, be aware of the following provisions:

Media pools are not shared between different platforms in a cross-platform SAN. Consequently, you should take special care when using media pools in a cross-platform environment. Media that belongs to a save set on a UNIX, Linux, or Netware platform is moved automatically to a save set called ELO\_POOL on the Windows platform. Media that belongs to a save set on a Windows platform is moved automatically to a save set called ELO\_POOL on the UNIX, Linux, or Netware platform.

Before moving any tapes out of the ELO\_POOL on the Windows cross-platform SAN server, ensure that the tapes you are trying to move are not in any save set of the media pool on the UNIX, Linux, or Netware cross-platform SAN servers. UNIX, Linux, or Netware tapes, which are in a save set of a media pool, could be overwritten if you do not follow this procedure before removing a tape manually.

Take the same precautions when you move tapes out of the ELO\_POOL on a UNIX, Linux, or Netware cross-platform SAN server.



# Appendix A: Troubleshooting

---

This appendix provides troubleshooting information to help you resolve issues that you may encounter. It is divided into the following sections:

- Troubleshooting procedures for Windows
- Troubleshooting tips for UNIX and Linux

## Windows SAN Installations

The following section contains a list of problems for Windows SAN installations and troubleshooting procedures and techniques to resolve those problems.

### **Unable to see all of your SAN Option installed Servers in the SAN Configuration Dialog**

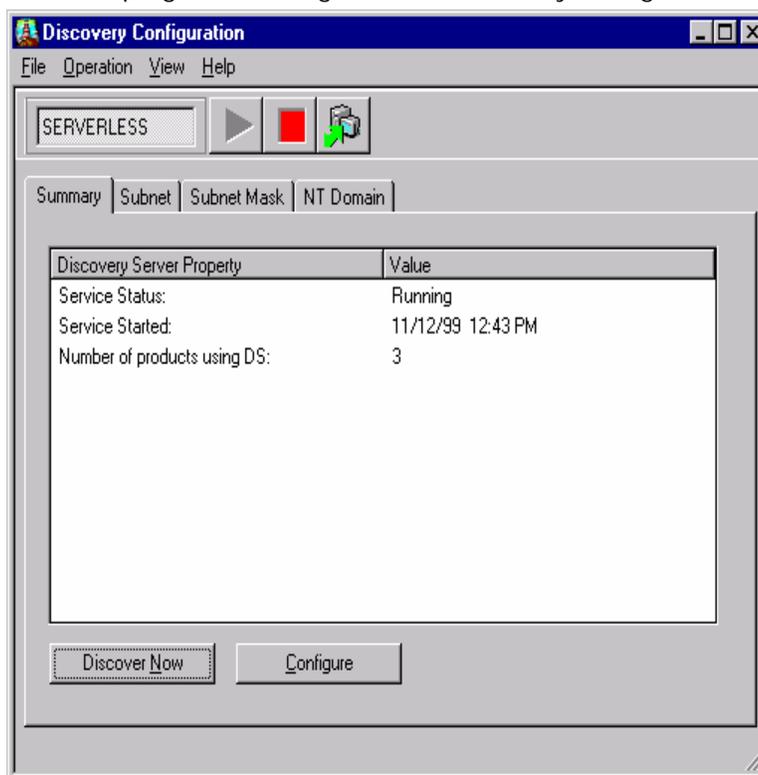
Try any one of the following procedures to resolve this problem.

#### Resolution 1

If your SAN servers cannot see each other in the SAN Configuration dialog, follow these steps:

1. Try pinging the SAN servers that do not appear in the SAN Configuration dialog.
2. Check your ethernet connections and settings if you are unable to ping these SAN servers. Correct if necessary, and then return to the previous step. If you can ping the servers, go to the next step.
3. Open the directory:  
C:\Program Files\CA\SharedComponents\BrightStor\CADS

4. Start the program dsconfig.exe. The Discovery Configuration dialog opens.



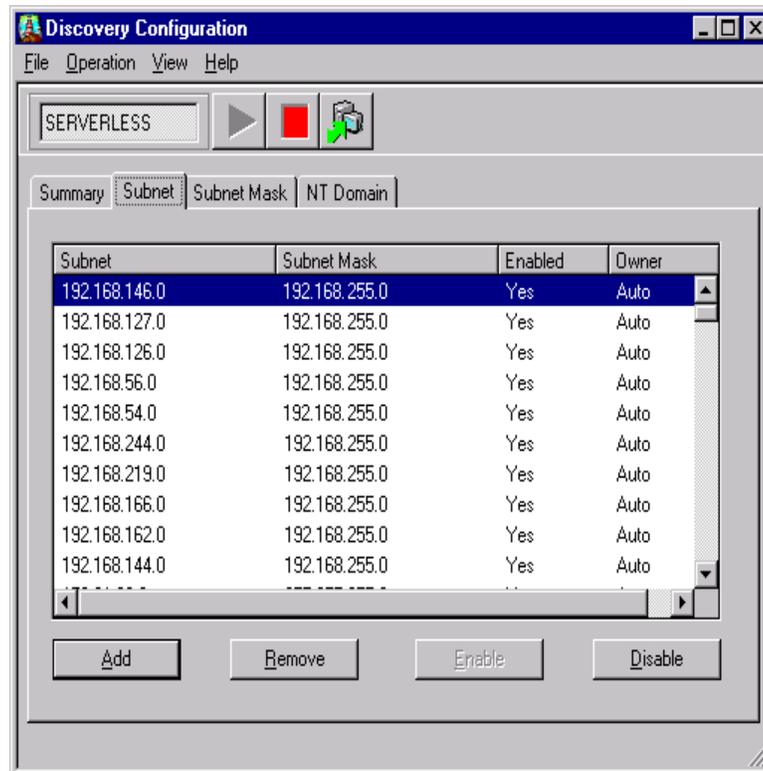
5. Click the red square button at the top of the dialog to stop BrightStor Discovery Services.
6. Click the green triangle button at the top of the dialog to restart BrightStor Discovery Services.
7. Select Programs, Computer Associates, BrightStor, SAN Configuration to open the SAN Configuration dialog.

## Resolution 2

If you can see all of your BrightStor ARCserve Backup Storage Area Network (SAN) Option installed servers, follow these steps:

1. Close the Discovery Configuration dialog and the SAN Configuration dialog. If you cannot see all SAN installed servers, go to the next step.
2. Click the Subnet tab at the top of the Discovery Configuration dialog.

- See if the subnets to which your SAN servers are connected appear on the list.



- If the subnets do not appear in the list, click Add and add your Subnet and Subnet Mask manually.
- Click the Subnet Mask tab and confirm that you have the Subnet Mask listed. If not, click Add to add your Subnet Mask manually.
- Click the red square button at the top of the dialog to stop BrightStor Discovery Services.
- Click the green triangle button at the top of the dialog to restart BrightStor Discovery Services.

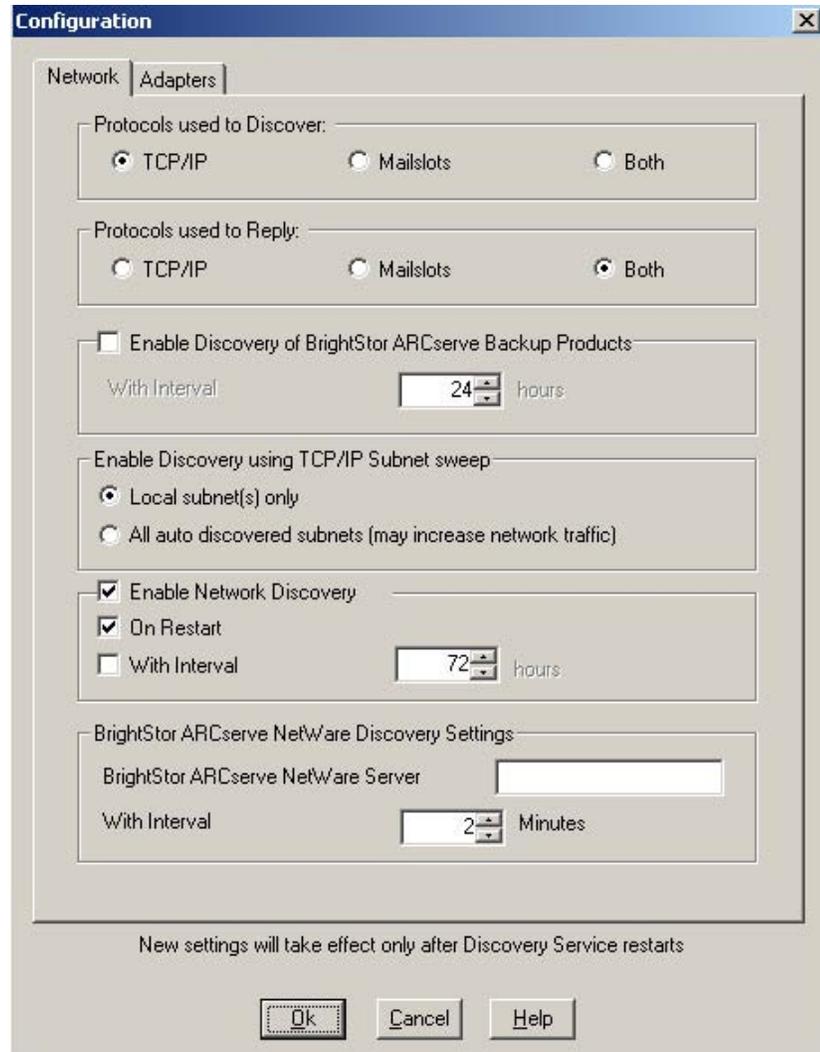
### Resolution 3

If you can see all of your SAN Option installed servers, follow these steps.

- Close the Discovery Configuration dialog and the SAN Configuration dialog. If you cannot see all SAN installed servers, go to the next step.
- Click the NT Domain tab on the Discovery Configuration dialog, click Add at the bottom of the dialog, and click OK.

3. Click the Summary tab on the Discovery Configuration dialog, and click Configure.

The Configuration dialog appears.



4. Click Both under Protocols used to Discover. Under Protocols used to Reply, click Both. Click OK.
5. Select the Adapters tab if you have a dual channel NIC card, or more than one NIC installed and active. On the Adapters tab, select the IP address that allows you to see the SAN servers, and click OK.

If you do not have more than one IP address for this server, go to the next step.

6. Click the red square button at the top of the dialog to stop BrightStor Discovery Services.
7. Click the green triangle button at the top of the dialog to restart BrightStor Discovery Services.
8. Return to the SAN Configuration dialog.

You can now see all of your SAN Option installed servers.

**Note:** Once a server has been configured as a Distributed Server, it cannot see SAN attached devices in its Tape Library Option Setup.

If you cannot see your Fibre Channel attached devices in the Tape Library Option Setup or the Device Manager, follow these steps:

1. Ensure that all of the Fibre Channel equipment is on the BrightStor ARCserve Backup for Windows Device List. You can access this list at the Computer Associates web site, [ca.com](http://ca.com), by selecting Solutions, Storage BrightStor, SAN and NAS Storage Management.
2. Open the Device Manager if all of your Fibre Channel equipment is supported. To open your Device Manager, select Start, Control Panel, Administrative Tools, Computer Management, Device Manager.
3. Check the BrightStor ARCserve Backup Activity log or the Application log in the Windows Event Viewer to see if BrightStor ARCserve Backup, the Tape Library Option, and the SAN Option licenses are installed correctly, if you cannot see all your devices.
4. Open BrightStor ARCserve Backup Server Admin if you do not have any license problems.
5. Start the Tape Engine debug log and restart the Tape Engine on each server.
6. Get the BrightStor.log and tape.log (located in the \BrightStor ARCserve Backup\log directory) from the server with the problem, whether primary or distributed server.
7. Use HyperTerminal as an assistant to monitor your Fibre Channel bridge or router to check the Fibre Channel connections, if you still cannot see all your devices. See the user documentation for your bridge or router or contact your equipment vendor for instructions on how to use HyperTerminal to monitor a bridge or router.

After the option is installed on all of the servers and the primary and distributed server relationships have been established, only the primary server is able to see the shared devices (tape library attached to the Fibre Channel fabric/loop) under the Device Configuration/Tape Library Option Setup.

If the primary windows server fails and a distributed Windows server is promoted to primary Windows server, follow these steps:

1. Open the SAN Configuration dialog on one of the distributed servers. To open the SAN Configuration dialog, select Programs, Computer Associates, BrightStor, SAN Configuration.

A list of distributed servers appears in the left hand pane of the SAN Configuration dialog, under the Primary Server.

2. Right-click on each server and select the Force To Remove feature to remove them from the control of the failed primary server.
3. Promote one of the SAN servers to Windows primary server by highlighting the server from the Available Servers list in the right pane and clicking Make Primary.
4. Assign the remaining SAN servers as distributed servers under the new primary by following these steps:
5. Highlight the primary server in the left pane.
6. Select the SAN server you are making a distributed server in the right pane.
7. Click Assign Distributed.
8. Run the Tape Library Option setup through Device Configuration to configure the tape libraries.

To bring the original primary server back into the SAN, follow these steps:

1. Open the SAN Configuration dialog on any Windows server with the option installed. To open the SAN Configuration dialog, select Programs, Computer Associates, BrightStor, SAN Configuration.

The SAN Configuration dialog appears.

2. Remove all of the distributed servers under the temporary primary server. Do not use the Force to Remove feature. Highlight the distributed server and select Remove Distributed.

3. Remove the temporary primary server by highlighting it and selecting Delete Primary.
4. Run the Tape Library Option setup through Device Configuration to reconfigure the tape libraries from the original primary server.

**Note:** Device configuration should only be done from the primary server. Devices may not appear properly in Device Configuration on a distributed server.

5. Reassign the original primary server as the primary server by highlighting it and selecting Make Primary.
6. Assign the appropriate distributed servers under the primary server. Only one primary server is allowed in a SAN.
7. Stop the Tape Engine on each server and restart the Tape Engine on the primary server first. Wait until your tape library is fully initialized, and start the Tape Engine on all the distributed servers.

My SAN Server assignment disappears from the SAN Option Configuration or my primary Windows SAN server Tape Library configuration disappears after the tape engine starts. How can I keep this from happening?

To resolve either of these problems, you must remove all entries from the BKP Registry, reassign your distributed and primary servers, configure your tape libraries, and add registry keys to the BKP Registry.

To remove entries from the BKP Registry, perform the following steps:

1. Open the Windows Cluster Administrator and highlight BrightStor AB Group in the left panel. Highlight BrightStor BKP Registry in the right panel.
2. Right-click and select Properties from the pop-up menu.  
The BrightStor BKP Registry Properties dialog appears.
3. Click the Advanced tab and select Do not restart. Click Apply.
4. Click the Registry Replication tab and highlight all the entries. Click Remove, and click Apply.  
The Registry Replication tab should now be empty.
5. Click OK.

To reassign your distributed and primary servers, perform the following steps:

1. In the Cluster Administrator window, highlight BrightStor AB Group in the left panel and BrightStor AB Group in the right panel. Right-click and select Properties from the pop-up menu.  
The BrightStor AB Properties dialog appears.
2. Click the Advanced tab, and select Do not restart. Click Apply.
3. Open the SAN Configuration dialog on the Primary SAN Server. To open the SAN Configuration dialog, select Programs, Computer Associates, BrightStor, SAN Configuration.  
The SAN Configuration dialog appears.
4. Remove your Distributed Servers, and then remove the Primary Server. Click Done.
5. Open the SAN Configuration dialog again, and reassign the Primary and Distributed Servers. Click Done.

To reconfigure the Tape Library Option, perform the following procedure:

1. Run the Tape Library Option setup on the primary SAN server through Device Configuration to configure the tape libraries.
2. Restart the Tape Engine. Wait until the tape library is fully initialized before moving on to the next part of the process.

To add registry keys to the BKP Registry, perform the following procedure:

1. In the Cluster Administrator window, highlight BrightStor AB Group in the left panel and BrightStor AB Group in the right panel. Right-click and select Properties from the pop-up menu.

The BrightStor AB Properties dialog appears.

2. Click the Advanced tab, and select Restart. Click Apply, and click OK.

The dialog closes.

3. In the Cluster Administrator window, highlight BrightStor AB Group in the left panel. Highlight BrightStor BKP Registry in the right panel. Right-click and select Properties from the menu.

The BrightStor BKP Registry Properties dialog appears.

4. Click the Advanced tab, and select Restart. Click Apply.

5. Click the Registry Replication tab, and add the following keys, one at a time:

```
SOFTWARE\ComputerAssociates\BrightStor ARCserve Backup\Base  
SOFTWARE\ComputerAssociates\BrightStor ARCserve Backup\ELODistributedServers  
SOFTWARE\ComputerAssociates\BrightStor ARCserve Backup\ProductsConfigInfo
```

Enter the key in the Root Registry Key field and click Add.

6. Click Apply and click OK to exit.

### Remove All Entries in the BKP Registry

1. Open the Windows Cluster Administrator and highlight BrightStor AB Group in the left panel. Highlight BrightStor BKP Registry in the right panel.

2. Right-click your mouse and then click Properties in the pop-up menu.

The BrightStor BKP Registry Properties dialog appears.

3. Click the Advanced tab and then select Do not restart. Click Apply.

4. Click the Registry Replication tab, and then highlight all the entries. Click Remove, and then click Apply.

The Registry Replication tab should now be empty.

5. Click OK.

The dialog closes.

### Reassign Distributed and Primary Servers and Configure Tape Libraries

1. In the Cluster Administrator window, highlight BrightStor AB Group in the left panel and BrightStor AB Group in the right panel. Then right-click your mouse and then click Properties in the pop-up menu.

The BrightStor AB Properties dialog appears.

2. Click the Advanced tab, and then select Do not restart. Click Apply.
3. Open the SAN Configuration dialog on the Primary SAN Server. To open the SAN Configuration dialog, select Programs, Computer Associates, BrightStor, SAN Configuration.

The SAN Configuration dialog is displayed.

4. Remove your Distributed Servers, and then the Primary Server. When finished, click Done.
5. Open the SAN Configuration dialog again, and reassign the Primary and Distributed Servers. When finished, click Done.
6. Run the BrightStor ARCserve Backup for Windows Tape Library Option setup on the primary SAN server through Device Configuration.  
This configures the tape libraries.
7. After you have configured the tape library, restart your Tape Engine. Wait until the tape library is fully initialized.

### Add Registry Keys to the BKP Registry

1. In the Cluster Administrator window, highlight BrightStor AB Group in the left panel and BrightStor AB Group in the right panel. Then right-click your mouse, and click Properties in the pop-up menu.

The BrightStor AB Properties dialog appears.

2. Click the Advanced tab, and select Restart. Click Apply, and then click OK.  
The dialog closes.

3. In the Cluster Administrator window, highlight BrightStor AB Group in the left panel. Highlight BrightStor BKP Registry in the right panel.

4. Right-click your mouse, and click Properties in the menu.

The BrightStor BKP Registry Properties dialog appears.

5. Click the Advanced tab, and then select Restart. Click Apply.

6. Click the Registry Replication tab, and add the following keys one at a time:  
  
SOFTWARE\ComputerAssociates\BrightStor ARCserve Backup\Base  
  
SOFTWARE\ComputerAssociates\BrightStor ARCserve Backup\ELODistributedServers  
  
SOFTWARE\ComputerAssociates\BrightStor ARCserve Backup\ProductsConfigInfo  
  
To add a key:
  - a. Type the key into the Root Registry Key field.
  - b. Click Add.
7. Click Apply when you are finished, then click OK to exit.

## Troubleshooting Tips for UNIX and Linux

The following list contains troubleshooting tips and techniques for the BrightStor ARCserve Backup Storage Area Network (SAN) Option on UNIX or Linux platforms:

- Before you run BrightStor ARCserve Backup, ensure that:
  - The proper Fibre Channel drivers are loaded.
  - All of the servers can see the devices on the fibre loop. If your server is not able to see the devices, check the status of the bridge, switch, fibre cables, and the devices in the loop. The Fibre Channel bridge may not be working correctly.
  - All the servers in the fibre loop can see each other over the network. Try pinging each of the servers.
- You can run sansetup at any time to change the primary server or to add or remove any distributed servers. Make any configuration changes on **all** servers.

**Note:** For the changes to take effect, you must stop and restart the SAN processes, and then the media server processes.

- Group configuration for changer drives and slots must be identical on all UNIX or Linux SAN servers.
- Start BrightStor ARCserve Backup on the distributed servers only after the primary server has loaded and initialized the device.
- Start services on all the servers one by one. If BrightStor ARCserve Backup is started on all other distributed servers at the same time, only one of the media servers will start and all others will fail.
- To turn on debugging messages for the sanpeer file, run:  

```
sanutil -setdebug <debuglevel >
```

Debug level can be from 0 to 3
- While a loop is running normally, you may see SCSI errors in the log. To correct the errors, shut down the entire loop and, one at a time, turn on the devices, the bridges, the switches, and start the UNIX or Linux machines in that order.
- If the message *failed to get global lock* appears in the log, and none of your operations are working from any of the servers, use the sanclrlock script on your primary server to clear the lock.

**Note:** Use this script only if all the servers in the loop seem to be locked. Incorrect use of this script can cause problems.

- If any of the servers crash while holding a lock on the device or a slot, use sanutil to unlock the device and the slot.

To unlock a specified drive on all BrightStor ARCserve Backup servers on the loop, enter the command:

```
sanutil -unlockdevice <drive adapter id> <drive scsi id> <drive lun id>
```

To unlock a specified range of slots on all the BrightStor ARCserve Backup servers on the loop, enter the command:

```
sanutil -unlockslot <changer adapter id> <changer scsi id> <changer lun id> <beginning slot> <end slot>
```

# Appendix B: Fibre Channel Technology

---

This appendix provides information about Fibre Channel technology.

## Fibre Channel Networks

A storage network is a high-speed single network that lets you share the libraries and servers you attach to it. At an underlying level, storage networks link storage systems. These storage systems come in a number of formats including RAID, media backup, media library, CD-ROM library, or JBOD (just a bunch of disks).

Fibre Channel is one type of storage network (others are shared SCSI and SSA). Fibre Channel was specifically designed to remove the barriers to performance existing in legacy LANs and channels. In addition to providing scalable gigabit technology, Fibre Channel provides flow control, self-management, and ultra-reliability. It is also a transport service independent of protocol and works as a generic transport mechanism.

Fibre Channel provides the connectivity, distance and protocol multiplexing needed for networking. It also supports traditional features that provide simplicity and repeatable performance. In addition, Fibre Channel has profiles that define interoperable standards so that you can use it with different protocols or applications.

Fibre Channel also provides the following technical features:

- Performance from 266 megabits per second to over 4 gigabits per second
- Support for distances up to 10 km
- Small connectors
- High-bandwidth utilization with distance insensitivity
- Greater connectivity than existing multidrop channels
- Support for multiple cost and performance levels, from small systems to supercomputers
- Ability to carry multiple existing interface command sets, including Internet Protocol (IP), SCSI, IPI, HIPPI-FP, audio, and video

## Fibre Channel Architecture

Fibre Channel represents true channel and network integration with an active, intelligent interconnection among devices. A Fibre Channel port only has to manage a simple point-to-point connection. The transmission is isolated from the control protocol, so point-to-point links, arbitrated loops, and switched topologies are used to meet the specific needs of an application.

Fibre Channel systems are assembled from the following components:

- **Node**—Fibre Channel adapters and Fibre Channel libraries connected to the Fibre Channel network are called nodes. They are the end points in the network. Nodes do not need station management, which greatly simplifies implementation.

- **Fibre Channel Ring or Arbitrated Loop**—A Fibre Channel Ring, also called Fibre Channel Arbitrated Loop, consists of nodes connected by a Fibre Channel hub. Each node in the loop can talk with every other node.

A node logs in to the ring when it is turned on or connected to the ring. The log in generates an event that is transmitted to all other nodes on the ring so that each node becomes aware of the newly logged in node.

- **Worldwide Address or ID**—Every node on the Fibre Channel ring is assigned a unique worldwide address or ID by the manufacturer. This allows each node to be identified when it logs in to the ring.

- **Node Persistency**—The order of nodes discovered in the ring by an application may change at any time, particularly during a power-cycle, or the connection or disconnection of any node in the ring. Consequently, applications rely on a node's unique worldwide address to identify the node, not on the order in which it was discovered.

- **Fibre Channel Adapter Card**—Fibre Channel adapters are installed in servers such as SCSI host bus adapters.

- **Fibre Channel Switch or Hub**—Nodes are connected to a Fibre Channel hub, creating a Fibre Channel loop, which operates like a regular 10BaseT hub. Nodes can be plugged in and removed while the Fibre Channel hub is on and operating.

Devices (media libraries) connected to a hub require applications that are network-storage aware, so they can access the device without interfering with other applications also accessing the device.

- **Fibre Channel-to-SCSI Bridge**—To connect SCSI devices to a Fibre Channel loop, a Fibre Channel-to-SCSI bridge is necessary to convert the different protocols. When the bridge is connected to a hub, any server in the loop can access the SCSI devices connected to the bridge using a Fibre Channel driver. This device driver allows standard SCSI commands to be sent over a Fibre Channel loop.
- **SCSI Persistency**—SCSI devices behind a Fibre Channel-to-SCSI bridge are assigned virtual SCSI IDs and Logical Unit Numbers (LUNs). These may not necessarily match the physical setting of the device.

The SCSI IDs and LUNs of devices behind a Fibre Channel-to-SCSI bridge remain the same between power-cycles of the bridge or the devices behind the bridge. However, if you add new devices or remove old ones, the virtual IDs can change.

## Miniport Driver Configuration

Before you can load BrightStor ARCserve Backup, you must load the appropriate hardware device drivers to access the devices attached to the Fibre Channel adapter. The adapter card vendor provides the hardware device driver. For more information about installing the hardware device drivers, see the documentation provided by your Fibre Channel vendor

BrightStor ARCserve Backup for Windows uses a Windows NT miniport driver to communicate with the Fibre Channel devices. Generally, the hardware vendor supplies this driver for adapters. You must load it prior to loading BrightStor ARCserve Backup.

The Fibre Channel bridge allows you to attach SCSI devices to the Fibre Channel loop. The Fibre Channel bridge maps the SCSI ID of each device to a different SCSI LUN. Each bridge on the Fibre Channel loop has a different SCSI ID.



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