NetWare Server Backup

NetWare® 3.12
NETWORKING SOFTWARE

Novell®

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Contents

1 How to Use This Manual

Overview

This manual is designed to help experienced NetWare® system users back up and restore data across a network using a storage device attached to a NetWare 3.12 file server.

This manual contains information and instructions about the Server Backup product only. Use this manual with your NetWare 3.12 manual set.

Other Resources for Help

Besides this manual, you can use the following resources:

- *Context-sensitive help.* If you are using a NetWare menu utility and want more information about how to complete a task, press <F1> for help.

  If you are unsure how to use a command line utility, type the utility name and add the /? option for help. For instance, for help with using the RIGHTS utility, type RIGHTS /?.

- *Hardware manuals*. Many network problems occur because of malfunctioning hardware. If you can isolate a problem to a certain computer component or cable segment, check the manuals that came with the hardware involved.

- *Novell online documentation*. The Novell online documentation viewer allows you to read NetWare manuals from your Windows or OS/2 workstation.

  All NetWare v3.12 manuals except the *Quick Access Guide* are available on the *NetWare v3.12* CD-ROM.

2 **Getting Ready**

What SBACKUP Does

SBACKUP is a NetWare® Loadable Module™ (NLM™) that allows you to back up and restore data for NetWare 3.1*x* and 4.0 (including Directory Services), and OS/2* network servers, as well as workstations or other services you select.

SBACKUP can take a snapshot copy of data that you select, store the data on the tape of your choice, and retrieve the data later. SBACKUP also allows you to

- Make full, incremental, or differential backups.

- Perform backups immediately or schedule them for a later time.

- Restore all or part of your data.

- Restore a volume to a different volume.

- Back up a server even when other users are working on it. (However, files in use are not backed up.)

- Back up and restore multiple name-space formats defined on a volume (including MS-DOS*, FTAM, Macintosh*, NFS*, and OS/2 files), retaining file attributes associated with each format.

Backup Concepts

Before using SBACKUP, you should be familiar with the following concepts (see "GLOSSARY" on page 73):

Archive Needed attribute
Backup

Backup Sessions

A backup session occurs whenever a backup is performed.

The backup session produces three types of files:

- Data files, which are sent to the selected storage media

- The Backup Session Log, put into the Backup and Restore Log file on the host

- The Backup Error Log, put into the Backup and Restore Errors file on the host

The Backup and Restore Log file and the Backup and Restore Error file are labeled with the same description you give the session. Any time this session is restored, SBACKUP adds more information to these files.

If the session log and error files on the hard disk are destroyed when you restore a session, SBACKUP creates a new error log on the hard disk.

Backup Types

SBACKUP performs the following backups:

- *Full backup:*Backs up all data. After files are backed up, the modify bit (Archive Needed attribute) is cleared from those files.

- *Incremental backup*: Backs up all data modified since the last full or incremental backup (whichever was last). After files are backed up, the modify bit (Archive Needed attribute) is cleared from those files.

◆ *Differential backup:* Backs up all data modified since the last full backup. After files are backed up, the modify bit (Archive Needed attribute) is not cleared.

◆ *Custom backup:* Backs up only the data you specify. You can also specify whether the modify bit (Archive Needed attribute) should be left in a cleared or uncleared state after the backup is finished.

For information about the modify bit, see "Archive Needed attribute" on page 73 and "Modify bit" on page 76.

Comparative Speed of Backup Types

The different types of backups also have an effect on the speed of the backup and restore operations, and on the amount of media required for the backup.

Details of these relationships are shown in Table 1.

Table 1   Comparative Speed and Media Use of Different Backup Types

Variable	Differential backups (combined with full backups)	Incremental backups (combined with full backups)
Backup speed	Slower	Faster
Restore speed	Faster	Slower
Media usage for storage	More media used	Less media used

How the Backup Type Affects a Restore

Each type of backup has a different effect on the process of restoring files.

To compare the differences in restore procedures, see Table 2 on page 14 and Table 3 on page 14.

These examples use the same backup log examples shown in Table 4 on page 15 and Table 5 on page 16, and assume that you performed either an incremental or a differential backup.

◆ *Restoring after incremental backups.* If you have done full and incremental backups and need to restore data, you must restore (in the order shown in Table 2 on page 14) the last full backup as well as all subsequent incremental backups.

Table 2   A Restore Procedure after Incremental Backups

Date (Day)	Event	Restore this session?
Sep 10 (Thu)	Unexpected data loss	—
Sep 4 (Fri)	Full	Yes
Sep 7 (Mon)	Incremental	Yes
Sep 8 (Tue)	Incremental	Yes
Sep 9 (Wed)	Incremental	Yes

◆ *Restoring after differential backups*. If you have done full and differential backups and need to restore data after an unexpected loss, you only need to restore the last full and the last differential backup (in the order shown in Table 3).

This is because each differential backup includes all files modified since the last full backup.

Table 3   A Restore Procedure after Differential Backups

Date (Day)	Event	Necessary to restore this backup session?
Sep 10 (Thu)	Unexpected data loss	—
Sep 4 (Fri)	Full	Yes
Sep 7 (Mon)	Differential	No
Sep 8 (Tue)	Differential	No
Sep 9 (Wed)	Differential	Yes

Backup Schedules

Before you begin actual backup procedures, plan a backup schedule based on your needs. Consider such factors as the number of users, frequency of changes to files, etc.

You may want to perform different types of backups on different schedules, as illustrated by the following examples.

- *Daily:* After the close of business, back up all files changed that day. If file revision is heavy and rapid, consider several backup sessions each day.

- *Weekly*: Perform an incremental or differential backup after the close of business on the last day of the week for three of the four weeks in the month.

- *Monthly*: On the last business day of the remaining week of the month (for example, the first or last Friday), perform a full backup.

- *Major changes:* In addition, perform a full backup any time you change your configuration, when you upgrade your server to a new version of NetWare, or when you modify applications.

The information in Table 2 on page 14 through Table 5, "A Backup History of Full and Differential Backups," on page 16 can help you decide how to schedule your backups.

Table 4 illustrates a series of full and incremental backups. At each full backup, all files are backed up, whether they have been modified or not.

WARNING: Don't combine differential and incremental backups. If you do, the differential backup won't contain all changes since the last full backup. Use full backups interspersed with differential backups, *or* full backups interspersed with incremental backups.

Table 4   A Backup History of Full and Incremental Backups

Date (day)	Type	Total files	No. of new or revised files	No. of files backed up
Sep 4 (Fri)	Full	47	N/A	47
Sep 7 (Mon)	Incremental	58	27	27
Sep 8 (Tue)	Incremental	65	32	32
Sep 9 (Wed)	Incremental	105	38	38
Sep 10 (Thu)	Incremental	128	51	51
Sep 11 (Fri)	Full	140	N/A	140

At each incremental backup, only files that have the modify bit (Archive Needed attribute) set are recognized as having been changed.

Therefore, only files changed since the last full or incremental backup (when the modify bit was cleared) are backed up.

Files that do not have the modify bit set are excluded from the incremental backup.

Table 5 illustrates a series of full and differential backups. As in Table 4 on page 15, all files are backed up during a full backup.

Table 5   A Backup History of Full and Differential Backups

Date (Day)	Type	Total # files	No. of new or revised files	No. of files backed up
Sep 4 (Fri)	Full	47	N/A	47
Sep 7 (Mon)	Differential	58	27	27
Sep 8 (Tue)	Differential	65	32	59
Sep 9 (Wed)	Differential	105	38	97
Sep 10 (Thu)	Differential	128	51	128
Sep 11 (Fri)	Full	140	N/A	140

When you perform a differential backup, the modify bit isn't cleared after the backup, as it is after a full or incremental backup.

Therefore, it doesn't matter whether files have been modified since the last differential backup; all files modified since the last full backup are included in the backup (unless they have been deleted).

For more on backup scheduling, see "Backup" in *Concepts*.

Restore Sessions

Use SBACKUP to retrieve and reinstate to the file structure data you have backed up to a storage media.

Normally, you perform a restore if data has been lost or corrupted since the backup was made.

What is a Restore Session?

A restore session restores data from a backup. The restore session produces the following:

- ◆ The requested data, retrieved from the storage media and restored to the location you specify.

- ◆ The Restore Error Log file, appended to the Backup and Restore Errors file on the host.

SBACKUP finds the error log that has the same description as the data being restored. It then appends this information to the data files being restored.

Each time these data files are restored, if errors have occurred, SBACKUP adds more information to the error log.

How Does a Restore Work?

SBACKUP's "Restore Options" menu allows you to specify exactly which data to restore. Several menu options work together to allow you maximum flexibility in your restore procedure.

These options allow you to do the following:

- ◆ Choose subsets of data to restore.

- ◆ Scan what you are restoring.

- ◆ Overwrite an existing *parent* or *child*.

These options are described on the following pages.

Choosing Subsets

You can select the subsets of data to restore by including or excluding parts of the directory displayed on the "Selection List Options" screen within SBACKUP.

You may be familiar with choosing subsets to restore if you performed a custom backup. You use the subsets of data included in "Include and Exclude Options" the same way during a restore as you do during a custom backup.

Scanning Data Sets

A data set is a group of data that can be manipulated by SBACKUP. Each data set in the file structure (for example, volumes, directories, files, etc.) includes several different types of information.

The types of information differ, depending on whether the data set is a parent or a child. (For more about parents and children, see "Overwriting a Parent or Child" on page 18.)

Select data set items you want backed up or restored by using the "Selection List Options" or "Restore Options."

Data sets can contain different items, depending on which TSA they are related to. Figure 1 shows typical NetWare data sets.

Figure 1   Types of Informational Items Data Sets Contain
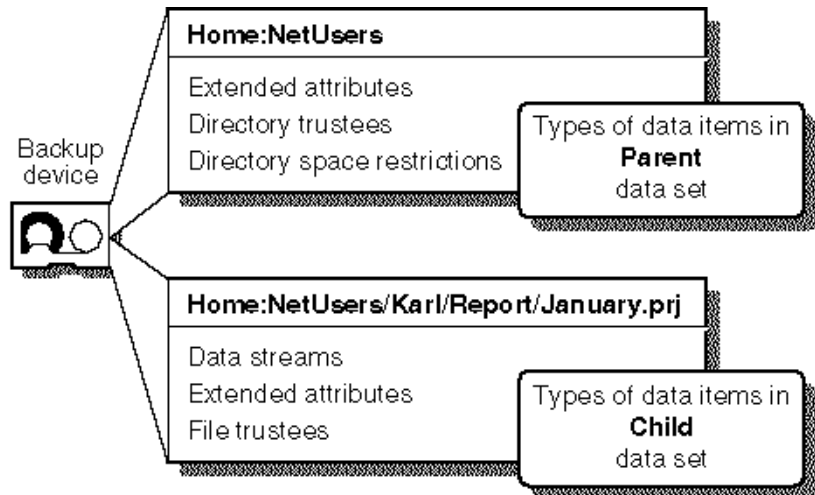
Use the Selection List Options screen to select the items you want SBACKUP to consider for the restore.

Overwriting a Parent or Child

SBACKUP allows you to overwrite all existing parents or children.

It also allows you to specify that children be overwritten only if the date on data sets on the hard disk is more recent than the date of the data set that was backed up.

Within SBACKUP, a *parent* might be a server, a volume, or a directory. A *child* is the lowest level of the directory structure, beyond which subunits cannot be created (for example, a file).

The unit below a parent is not necessarily a child; it might be another parent, or the line might end with the parent. The unit above a child must always be a parent. (See Figure 2.)

Figure 2   Parent and Child Levels in a File Structure
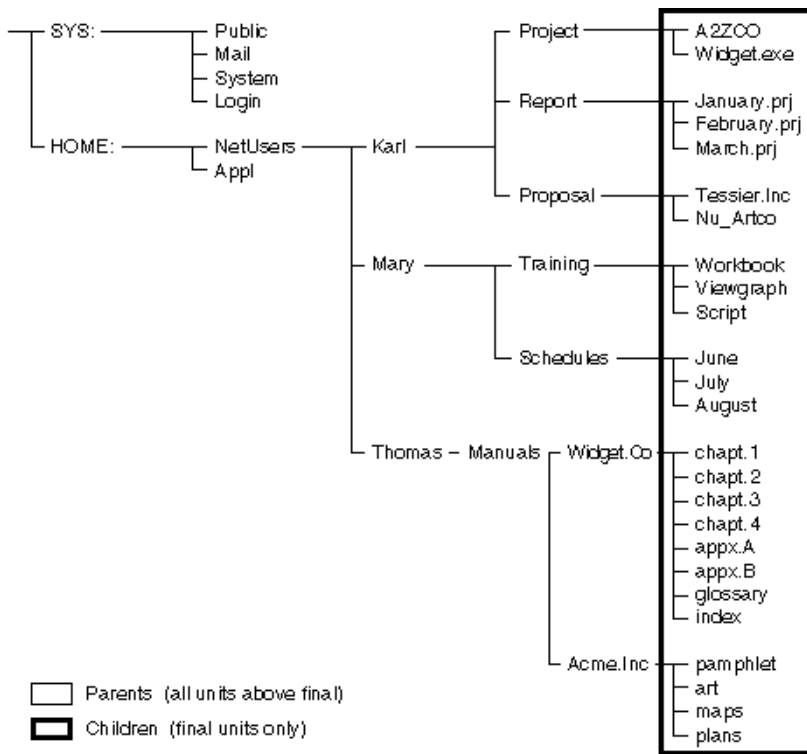
How Subsets, Scan, and Overwrite Work Together to Perform a Restore

SBACKUP reads the backup storage media and the TSA compares it to the hard disk. The TSA evaluates each data set according to the following criteria:

- Is this data set specified as a subset of what is being restored?
- Is this data set found on the hard disk?
- Which parts of the data set are subject to restoring?
- Is this data set a parent or a child?
- Is the Overwrite parameter for parent or child set to Yes, No, or "Overwrite only if newer"?
- If the parameters for a child are set to "Overwrite only if newer," does the backup copy have a more recent date than the existing copy?

shows how SBACKUP evaluates data sets before performing a restore.

Figure 3   How SBACKUP and the TSAs Evaluate Data

Go to backup session on storage media.

Read data set.

Is data set a subset of what you're restoring?

no → ignore

yes

Is data set on the hard disk?

no → Consult "How to Scan" → restore

yes

Is data set a parent or a child?

parent

child

Consult "Overwrite" parameters for:

parent   *child*

Overwrite data set?

no → ignore

only if newer

yes → restore

Compare date of data set on media to date of data set on disk.

Is date of data set on media the newer date?

no → ignore

yes → restore

Hardware Requirements

Compatible Storage Device

See Appendix A, "Supported Storage Devices," on page 63, or see your Novell Authorized Reseller.

Memory

The host server requires a minimum of 3 MB of memory above the memory required to run NetWare (approximately 2 MB).

SBACKUP will not run on the host server if it does not have the additional 3 MB of memory (unless you set the number and size of storage buffers lower than the default).

For memory and buffer settings, see Appendix C, "Enhancing Host Server Performance," on page 69.

Software Requirements

For *host server* software requirements, see Table 6 on page 23.

For *target server* software requirements, see "Software for a Target Server" on page 24.

To install software, see "Installing Backup Files on the Host Server (Attached to a Backup Device)" on page 27 and "Installing Backup Files on the Target Server (Not Attached to a Backup Device)" on page 28.

To load SBACKUP modules, see Chapter 3, "Getting Started," on page 27.

SBACKUP files were installed on the server unless you used the "Skip" option during NetWare installation and did not install files from the Server Backup diskette.

Individual modules and functions are defined in "GLOSSARY" on page 73. Their relationships are shown in Figure 4 on page 24

Software for a Host or Host/Target Server

Table 6   Software for a Host or Host/Target Server

Host Server Directory	For a WANGTEK DIBI-II Driver	For a TAPEDAI.DSK and DIBIDAI.NLM DIBI-II Driver	For a TAPEDC00 DIBI-II Driver
SYS:SYSTEM (NetWare 3.12 modules)	CLIB.NLM NUT.NLM TLI.NLM SPXS.NLM STREAMS.NLM	CLIB.NLM NUT.NLM TLI.NLM SPXS.NLM STREAMS.NLM	CLIB.NLM NUT.NLM TLI.NLM SPXS.NLM STREAMS.NLM
SYS:SYSTEM (SBACKUP Modules)	SBACKUP.NLM TSA312.NLM SMDR31X.NLM WANGTEK.NLM	AHAnnnn.DSK ASPITRAN.DSK SBACKUP.NLM SMDR31X.NLM TSA312.NLM TAPEDAI.DSK DIBIDAI.NLM	ADAPTEC.NLM SBACKUP.NLM SMDR31X.NLM TSA312.NLM TAPEDC00.NLM
SYS:SYSTEM/DIBI (SBACKUP Modules)	DIBI2$DV.DAT	DIBI2$DV.DAT	DIBI2$DV.DAT

- Use the version of NetWare 3.12 modules that came with the NetWare 3.12 installation or upgrade kit.

- The *nnnn* in AHA*nnnn*.DSK represents the specific host adapter number. For example, a 1540 host adapter uses AHA1540.DSK and a 1640 host adapter uses AHA1640.DSK.

- AHA*nnnn*.DSK, ASPITRAN.DSK, and ADAPTEC.NLM are loaded from the disk that comes with the backup device host adapter.

- Load TSA311.NLM or TSA312.NLM, AHA*nnnn*.DSK, ASPITRAN.DSK, and ADAPTEC.NLM before loading SBACKUP.NLM.

- TSA311.NLM or TSA312.NLM is required if the host server is to be backed up.

- TAPEDAI.DSK and DIBIDAI.NLM, and the TAPEDC00.NLM are loaded automatically by SBACKUP.NLM.

Software for a Target Server

The target server directory SYS:SYSTEM for NetWare 3.11 or 3.12 servers should contain the following NetWare modules:

CLIB.NLM
NUT.NLM
TLI.NLM
SPXS.NLM
STREAMS.NLM
TSA311.NLM or TSA312.NLM
SMDR31X.NLM

Use the version of each module that came with the NetWare 3.12 installation or upgrade kit.

Figure 4   Host/Target Server Configuration
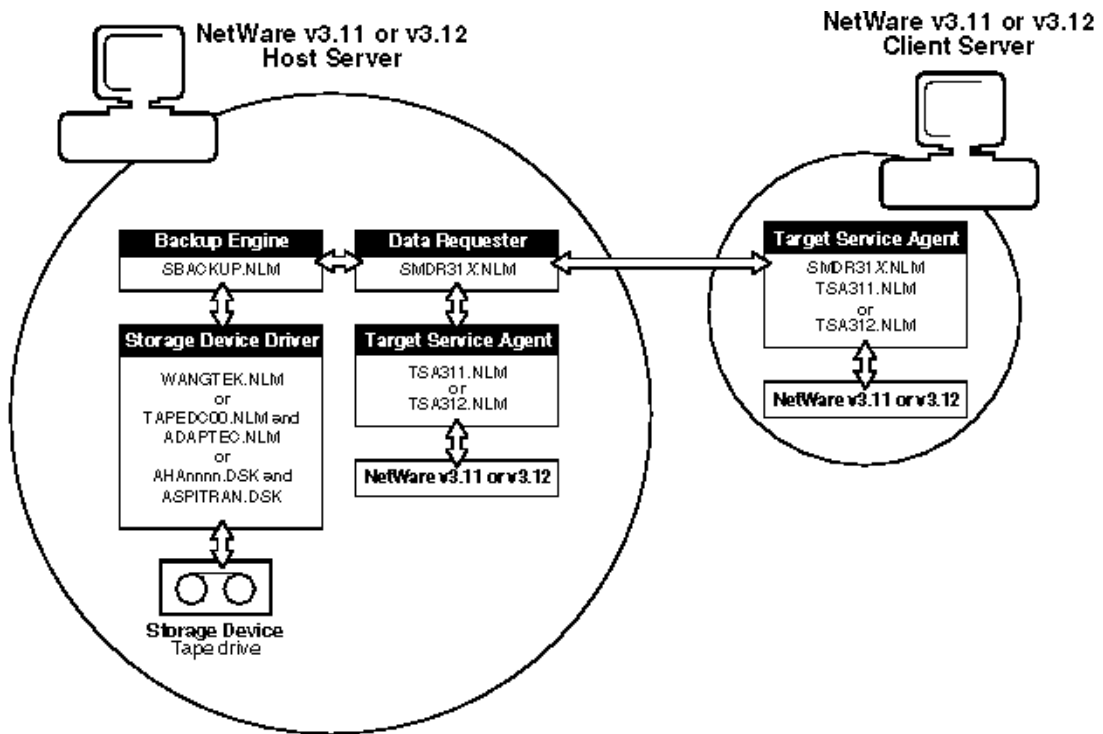
Rules for Using SBACKUP

This section lists rules that will help you avoid problems when using SBACKUP.

- Do not use SBACKUP and NBACKUP together.

  SBACKUP and NBACKUP formats are not compatible. Do not use NBACKUP for NetWare 3.11, 3.12, and higher.

- Use the NetWare 3.12 version of STREAMS.NLM, SPXS.NLM, TLI.NLM, CLIB.NLM, and NUT.NLM.

  If you use an old version of these files, SBACKUP may not load or may crash.

- Log in as SUPERVISOR or equivalent.

  This maintains network security and ensures data integrity.

- Do not mount or dismount volumes during a session.

  You might corrupt data or abend the host server.

- Make sure you have enough disk space on the target server's volume SYS: for temporary files.

  SBACKUP creates temporary files on the target server during backup. If you have linked UNIX files or files with extended attributes, the temporary files may be larger than a megabyte.

- Exit SBACKUP before unloading manually-loaded drivers.

  If you unload a manually-loaded driver (such as AHAnnnn.DSK, ASPITRAN.DSK, and ADAPTEC.NLM) before exiting SBACKUP, you abend the host server.

- Be aware of the name-space formats supported on your system.

  If file attributes and name-space formats are not configured on the volume you restore data to, the files are restored and a message specifies which name-space formats were not restored.

- Use correct name-space formats when entering paths and filenames.

  For Macintosh name-space formats, use the following format:

  `Volume::Directory:Directory:filename`

  For other formats, use the following format:

  `volume:directory/directory/filename`

◆ When you restore data, use the same case you used when you backed up the data.

Non-DOS path names and filenames are case-sensitive. NetWare recognizes DOS path names and filenames in uppercase, lowercase, or mixed case. If you're not sure of the original case, refer to your log file.

3 Getting Started

This chapter explains how to set up your hardware and software so that you can perform the backup and restore operations described in Chapter 4, "Backing Up Data," on page 33 and Chapter 5, "Restoring Data," on page 43.

The procedures described in this chapter are the following:

- Installing backup files (if necessary)
- Loading the TSA312.NLM (or TSA311.NLM)
- Loading SBACKUP and the correct driver software

Installing Backup Files

Backup files should already be installed on your server if you've properly installed NetWare 3.12 (unless you used the Skip option during installation).

If backup files were not installed during, use the following procedures to install these files on the host or target server.

Installing Backup Files on the Host Server (Attached to a Backup Device)

Before you begin, make sure you have properly installed NetWare 3.11 or 3.12 on the host server.

1 Install and set up your hardware.

For installation instructions and jumper settings, see your host adapter documentation. Use a unique I/O port address, IRQ, and DMA setting.

2 Install the correct disk driver files.

If you use the TAPEDAI.DSK and DIBIDAI.DSK DIBI-II driver software, copy the AHA*nnnn*.DSK and ASPITRAN.DSK files from the driver diskette that came with your host adapter to the host server's SYS:SYSTEM directory.

3 Install SBACKUP on your server.

   3a From a workstation, attach to the host server and log in as SUPERVISOR.

   3b Copy the SBACKUP files from diskette into the applicable directories.

   See .

   Include the following commands in the host server's AUTOEXEC.NCF file:

   `SEARCH ADD SYS:SYSTEM/DIBI`

   `SEARCH ADD SYS:SYSTEM/DR`

   `SEARCH ADD SYS:SYSTEM/TSA`

4 Reboot the server.

Installing Backup Files on the Target Server (Not Attached to a Backup Device)

Before you begin, make sure the target server is running NetWare 3.12 or 3.11. To install SBACKUP files, do the following at a workstation.

1 Attach to the target server and log in as SUPERVISOR.

2 Create a SYS:SYSTEM/TSA directory.

3 Copy the SBACKUP files from diskette into the applicable directories.

   See .

   IMPORTANT: Make sure SYS:SYSTEM does not contain files that should be in SYS:SYSTEM/TSA.

4 Include the following command in the target server's AUTOEXEC.NCF file:

   `SEARCH ADD SYS:SYSTEM/TSA`

5 Reboot the target server.

Loading the TSA312.NLM (or TSA311.NLM) on Each Server

You must load TSA312.NLM or TSA311.NLM on the target server to back up from or restore data to that server. Be sure the TSA you use matches the NetWare version installed on your server.

1 Load the TSA312.NLM (or TSA311.NLM).

Be sure to load the same TSA version as your server version.

For a host or target NetWare 3.12 (or 3.11) server, at the console of each server to be backed up or restored to, enter

LOAD TSA312

To automatically load TSA312.NLM, include commands in each NetWare 3.12 target server's AUTOEXEC.NCF file.

For more on AUTOEXEC.NCF, see "Create or Modify the System's AUTOEXEC File" in *Utilities Reference*.

2 Repeat Step 1 until each server to be backed up or restored has TSA312. NLM (or TSA311.NLM) loaded.

Loading SBACKUP and the Correct Driver Software

Determining Driver Software and Loading SBACKUP

You probably need to use DIBI-II (Device Independent Backup Interface) driver software when using SBACKUP on your system.

1 Determine the DIBI-II driver software (WANGTEK.NLM, DIBIDAI.NLM, or TAPEDC00.NLM) for your storage device and host adapter.

See Appendix A, "Supported Storage Devices," on page 63.

2 At the host server console prompt, type the commands for the DIBI-II driver that your storage device and host adapter require.

◆ For a WANGTEK DIBI-II driver, enter

LOAD SBACKUP

◆ For a DIBIDAI DIBI-II driver, enter

LOAD AHA*nnnn*LOAD TAPEDAILOAD SBACKUP

- For a TAPEDC00 DIBI-II driver, enter

  LOAD ADAPTEC
  LOAD SBACKUP

- To automatically load AHA*nnnn*, ASPITRAN, or ADAPTEC, include the **LOAD** command in the host server's AUTOEXEC.NCF file.

  For AHA*nnnn*, the *nnnn* represents the specific host adapter number. (For example, a 1540 host adapter uses AHA1540.DSK, and a 1640 host adapter uses AHA1640.DSK.)

- If a non-default port I/O address was used when the host adapter was installed, include P=*xxx*, where *xxx* is the non-default port address (example: LOAD AHA1640 P=200).

- To enhance server performance, include parameters with the LOAD SBACKUP command to change the buffers on the host server. (See Appendix C, "Enhancing Host Server Performance," on page 69.)

3 Enter your username for the host server, then enter your password as prompted.

4 Select a target or device driver.

- If only one device driver is available, the Main Menu appears. See "Selecting a Target" on page 30.

- If more than one device driver is available, the Select the Device Driver list appears. Select the device driver for your storage device and host adapter; then refer to "Selecting a Target" on page 30.

- To edit, add, or remove device driver entries, modify the DIBI2$DV.DAT file located in SYS:SYSTEM/DIBI. (See Appendix B, "Editing the Storage Device Interface," on page 67.)

Selecting a Target

1 From the Main Menu, choose Select Target to Backup/Restore.

Figure 5   Main Menu

```
┌─────────────────────────────────────┐
│             Main Menu                │
├─────────────────────────────────────┤
│ Select Target to Backup/Restore      │
│ Backup Menu                          │
│ Restore Menu                         │
└─────────────────────────────────────┘
```
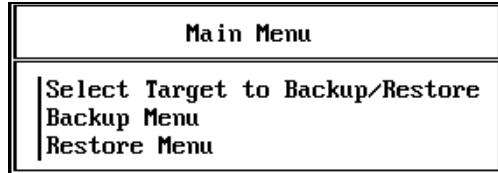
If only one target with a loaded TSA is on the network, the Enter Username box appears.

If more than one target with a loaded TSA is on the network, the Select a Target list appears.

Figure 6   Select a Target List

```
┌─────────────────────────────────────────────────────┐
│ Select a Target (Client or Server) with a Loaded TSA │
├─────────────────────────────────────────────────────┤
│ SERVER.Netware 3.11 File System                      │
│ SERVER1.DOS Workstation TSA                          │
│                                                      │
│                                                      │
│                                                      │
└─────────────────────────────────────────────────────┘
```
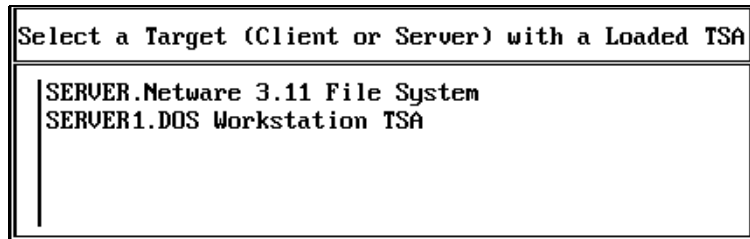
2 Select a target.

If the Enter Username box appears and your target is listed, go to .

If the Select a Target list appears and your target is listed, select a target from the list and go to .

If the Enter Username box appears, but your target is not listed, *or* the Select a Target list appears, but your target is not listed, do the following:

2a Enter **LOAD TSA312** (or **LOAD TSA311**) at the target server's console prompt.

2b At the host server console, press Esc.

2c Choose Select Target to Backup/Restore > select a target from the list.

2d When the Enter Username box appears, go to

3 Enter your username for the host server; then enter your password as prompted.

4 Verify that the target's name is in the screen header. If it is not, repeat Step 1 on page 30

5 See "Where to Go from Here" on page 32.

Inserting a Path Name

1 At an entry box, press Insert.

The Network Volumes, Network Directories, or Select list appears.

2 Select an entry > press Enter.

The selected entry appears in the entry box and another list appears.

3 Repeat Step 2 until the entire path name appears in the entry box.

4 Exit the list by pressing Esc.

5 Accept the path name and go to a menu by pressing Enter.

6 See "Where to Go from Here" on page 32.

Where to Go from Here

To	Do This
Select a different target	See "Selecting a Target" on page 30
Back up data from the target	See Chapter 4, "Backing Up Data," on page 33
Restore data to the target	See "Restoring Data to a Target" on page 43
View backup logs	See "Selecting a Working Directory" on page 51
View error logs	See "Viewing an Error Log" on page 53
Exit SBACKUP	Press Esc and answer confirmation boxes until the Exit SBACKUP box appears. Select Yes. The SBACKUP.NLM and the NLMs it loaded are unloaded and the console prompt appears.

4 Backing Up Data

Beginning the Backup Process

Before attempting to back up data, make sure that TSA312.NLM (or TSA311.NLM) is loaded on each target server and that SBACKUP is loaded on the host server. (See Chapter 3, "Getting Started," on page 27.)

Prerequisites to Backing Up

- ◆ Have all required files loaded. (See Table 6 on page 23.)

- ◆ Know the password assigned to the target (for example, server or workstation) you want to back up.

- ◆ If you are backing up an OS/2 or a DOS workstation, know the workstation password if the user has used the /password option instead of the /trust option.

Selecting a Working Directory and the Correct Backup Type

The working directory is on the host server and stores backup logs and error logs.

1 From the Main Menu, select Backup Menu.

If you have multiple servers, and this is the first time you have loaded SBACKUP, a screen appears prompting you to Select a Target (Client or Server) with a Loaded TSA.

Select the server you want to be your target server > press Enter. You are then prompted to provide your username and password (if any).

The Backup Menu appears.

Figure 7   Backup Menu

```
┌─────────────────────────────────────────┐
│         Backup Menu                      │
├─────────────────────────────────────────┤
│ Select Working Directory                 │
│ Backup Selected Target                   │
│ View Backup Log                          │
│ View Error Log                           │
└─────────────────────────────────────────┘
```
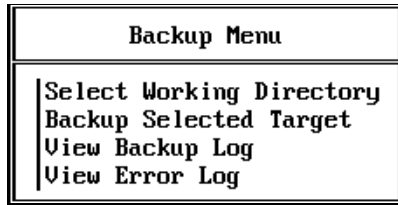
2 Choose Select Working Directory.

3 Type the path name > press Enter, or press Insert and select the path. (See "Inserting a Path Name" on page 32.)

If the path exists, the Backup Menu reappears.

If the path does not exist, the OK to create the path? message appears. Create the path by pressing Enter, or select a new path by pressing Esc and specifying a different path. The Backup Menu reappears.

4 Select Backup Selected Target.

The Backup Options screen appears (see Figure 8).

For information on the options on this screen, see "Explanation of Backup Options Screen" on page 39.

Figure 8   Backup Options

```
┌─────────────────────────────────────────────────────┐
│                 Backup Options                       │
├─────────────────────────────────────────────────────┤
│ What to Back Up:                                     │
│   NetWare server                                     │
│ Session Description:                                 │
│                                                      │
│ Options: See list                                    │
│ Selection List Options: See list                     │
│ Clear Modify Bit: No                                 │
│ Append this Session: Yes                             │
└─────────────────────────────────────────────────────┘
```
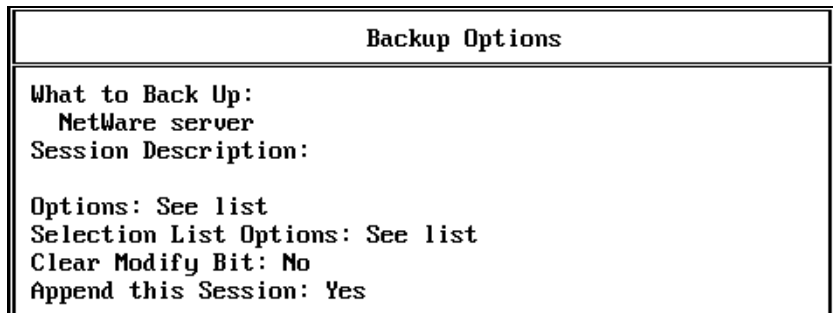
5 Select See List > press Enter.

The Options menu appears. By selecting the appropriate options, you can specify the type of backup you want to perform. Each backup type is described on the following pages.

Full Backup

A full backup allows you to back up all data, regardless of when or whether it has been previously revised or backed up.

1 Set Exclude Files That Have Not Changed to No by entering **N**.

2 Press Esc.

3 Set Clear Modify Bit to yes by entering **Y**.

4 Save your backup options.

5 Press Esc > select Yes.

6 Start the backup now (see), or set the backup to begin later (see).

Differential Backup

A differential backup allows you to back up all data that has been modified since the last Full backup.

1 Set Exclude Files That Have Not Changed to Yes by entering **Y**.

2 Press Esc.

3 Set Clear Modify Bit to No by entering **N**.

4 Use Selection List Options to further refine your options.

5 Save your backup options.

6 Press Esc > select Yes.

7 Start the backup now (see), or set the backup to begin later (see).

Incremental Backup

An incremental backup allows you to back up all data that has been modified since the last full or incremental backup (whichever was last).

1 Set Exclude Files That Have Not Changed to Yes by entering **Y**.

2 Press Esc.

3 Set Clear Modify Bit to Yes by entering **Y**.

4 Use Selection List Options to further refine your options.

5 Save your backup options.

6 Press Esc > select Yes.

7 Start the backup now (see "Start Backup Now" on page 36), or set the backup to begin later (see "Start Backup Later" on page 37).

Custom Backup

A custom backup allows you to back up only the specific files, directories, or file types that you choose.

1 For a Custom Backup, select the Backup Menu options you need.

For information about these options, see "Explanation of Backup Options Screen" on page 39.

2 Save your backup options.

3 Press Esc > select Yes.

The following section explains how to proceed from here.

Performing the Backup

At the Start Backup menu, determine whether to start the backup now, or set the backup to begin later. Each alternative is described in "Start Backup Now" on page 36 or in "Start Backup Later" on page 37.

Start Backup Now

1 From the Start Backup menu, select Start Backup Now.

If the backup device can append to media and Append This Session is set to Yes, the Insert Media to Append to message appears.

If the backup device cannot append to media or if Append This Session is set to No, the Enter Label for Media Set message appears.

2 Insert or label the media.

2a If the screen message is `Insert Media to Append to`, then insert the media cartridge into the storage device and go to

2b If the screen message is `Enter Label for Media Set`, then label the media cartridge. At the console, type the name of the media set and press Enter. Include information to help you identify the media.

The `Insert Media` message appears.

Insert the media cartridge into the storage device and go to

3 Press Enter.

The backup session begins. A status screen shows the progress of the backup. This restricts you to one backup session at a time.

To stop a backup session, see .

4 If prompted, insert another media cartridge.

Remove the old cartridge from the storage device. Label the new cartridge and insert it into the storage device.

SBACKUP increments the media label tape number, records it on the new tape, and continues with the backup.

5 When the `Backup Completed` message appears, press Enter.

6 Select View Error Log to view the error log to determine if any files were not backed up.

See .

If you do not want to view the error log, press Esc.

7 See .

Start Backup Later

1 From the Start Backup menu, select Start Backup Later.

2 Enter the date and time to begin this backup.

2a Type the starting date > press Tab or Enter.

The default is the current date.

2b Type the time you want the backup to start > press Tab or Enter.

The default is 11:59:59 pm.

2c When the date and time are set, press Esc.

2d Save changes by selecting Yes.

3 If the backup device can append to media and Append This Session is set to Yes, the `Insert Media to Append to` message appears. Insert the media cartridge into the storage device and go to Step 4.

or

If the backup device cannot append to media or if Append This Session is set to No, the `Enter Label for Media Set` message appears. Label the media cartridge.

3a At the console, type the name of the media set > press Enter.

Include information to help you identify the media.

3b Insert the media cartridge into the storage device and go to Step 4

4 Start the backup session countdown by pressing Enter.

A status screen displays the date and time when the backup session will start. The status screen remains until the session is complete. This restricts you to one backup session at a time.

To stop a backup session, see "Aborting a Backup Session" on page 38.

5 If you are prompted, insert another media cartridge.

Remove the old cartridge from the storage device. Label the new cartridge. Insert the new cartridge into the storage device.

SBACKUP increments the media label tape number, records it on the new tape, and continues with the backup.

6 Wait until the backup session is finished.

When the backup is complete, SBACKUP disconnects from the target and the Main Menu appears.

7 View the error log to determine if any files were not backed up.

See "Viewing an Error Log" on page 53.

8 See "Where to Go from Here" on page 32.

Aborting a Backup Session

1 During the backup session, press Esc.

2 Select Yes when the Abort Backup Session box appears.

The current data set is backed up and the `Dismounting Media` message appears. Dismounting may take a few minutes.

When the media is dismounted, the `Backup Terminated` message appears.

3 Press Enter > Esc.

4 See .

Explanation of Backup Options Screen

The following items appear on the Backup Options screen.

What to Back Up

You can back up a server, bindery, volume, directory, or files.

The default option, NetWare Server, backs up the entire server, except the bindery. If you want the bindery backed up, you must specify that you want it backed up.

To specify what to back up:

1 Select What to Back Up > press Enter.

The What to Back Up box appears with the NetWare Server default.

2 Enter a path name.

or

Press Insert and select the path.

(See .) The path appears in the box.

Session Description

A session description helps you locate a session when you restore data.

To specify a session description:

1 Select Session Description > press Enter.

2 Type a unique description > press Enter.

The cursor moves to the next field.

Options

Backup options included in the Options form let you limit the scope of your backup.

You can exclude user account information (such as bindery information) or types of files and directories (such as hidden files). The default is No. (Nothing is excluded from the backup.)

Options are specific to the TSA on the target to be backed up. The following options are from TSA312.NLM.

To change an option:

1 Select Options > press Enter.

The Options screen appears.

Figure 9   Options Screen

```
┌────────────────────────────────────────────────┐
│                   Options                        │
├────────────────────────────────────────────────┤
│  Exclude subdirectories:                    No   │
│  Exclude files that have not changed:       No   │
│  Exclude hidden files:                      No   │
│  Exclude hidden directories:                No   │
│  Exclude system files:                      No   │
│  Exclude system directories:                No   │
│  Exclude file trustees:                     No   │
│  Exclude directory trustees:                No   │
│  Exclude bindery:                           No   │
│  Exclude volume restrictions:               No   │
│  Exclude directory space restrictions:      No   │
│  Exclude extended attributes:               No   │
│  Exclude data streams:                      No   │
└────────────────────────────────────────────────┘
```

To change a setting:

1 Select an item > type Y for Yes or N for No > press Enter

2 Press Esc.

Selection List Options

Selection list options let you specify directories, paths, and files to back up. The default is None. (Everything in the What to Back Up box is backed up.)

For example, to exclude a directory in volume SYS: from the backup, include volume SYS: and exclude the directory you do not want backed up.

The target server's directories and files are not affected by entries in the Include/Exclude Lists.

Selection list options are specific to the TSA on the target to be backed up. The following options are from TSA312.NLM.

To change options, select Selection List Options and press Enter. The Include/Exclude Lists screen appears.

Figure 10   Include/Exclude Lists Screen

```
┌─────────────────────────────────────────┐
│         Include/Exclude Lists           │
├─────────────────────────────────────────┤
│ Exclude major TSA resources       None  │
│ Include major TSA resources       None  │
│ Exclude directories (full path) None    │
│ Include directories (full path) None    │
│ Exclude files                     None  │
│ Include files                     None  │
│ Exclude path/files                None  │
│ Include path/files                None  │
└─────────────────────────────────────────┘
```

- To include or exclude a major TSA resource, select a resource field and press Enter.

- To add an entry, press Insert. A list showing the server's bindery and volumes appears. Select an entry > press Enter > press Esc.

- To modify an entry, select the entry > press Enter. Make your changes > press Enter > press Esc.

- To remove an entry, select the entry > press Delete. When the Delete Marked Entry box appears, select Yes > press Esc.

- To include or exclude directories or files, select a field > press Enter.

- To add an entry, press Insert > select a name-space type > press Enter. Type the directory path or filename > press Enter.

  (Wildcard characters are allowed in filenames or in the directory name at the end of a directory path.)

  If you use a non-DOS name-space type, the path and filenames (uppercase, lowercase, or mixed case letters) must exactly match.

You cannot use wildcard characters for the Macintosh name-space type.

- ◆ To modify an entry, select the entry > press Enter. Make your changes > press Enter > press Esc.

- ◆ To remove an entry, select an entry > press Delete. When the Delete Marked Entry box appears, select Yes > press Esc.

Clear Modify Bit

To set the field, select Clear Modify Bit > type Y for Yes or N for No > press Enter > press Esc.

- ◆ If the field is Yes, the modify bit is cleared after files are backed up. Only modified files are backed up in the next backup session (if the Exclude Non-Modified Files field on the Options form is Yes).

- ◆ If the field is No, the modify bit is not changed after files are backed up. Files are backed up in the next backup session, even if they were not modified.

Append this Session

This option appears only if your backup device supports appendable sessions.

To set the field, select Append This Session > type Y for Yes or N for No > press Enter > press Esc.

- ◆ If the field is Yes, the backup session is appended to the media at the end of the previous session. Each appended session has separate backup and error logs.

- ◆ If the field is No, the tape rewinds and existing data is overwritten by the next backup.

5 Restoring Data

You can restore with or without session files (backup and error logs).

You specify whether to use session files when you back up data. You need less time to restore data if you use session files.

If you do not use session files, SBACKUP must go through the media, display the session header information, and ask if you want to restore this session or skip to the next session.

IMPORTANT: Before attempting to restore data to a target, make sure TSA312.NLM (or TSA311.NLM) is loaded on each target server. Make sure SBACKUP is loaded on the host server. (See Chapter 3, "Getting Started," on page 27.)

Restoring Data to a Target

1 From the Main Menu, select Restore Menu.

   ◆ If you do not have session files (backup and error logs) select Restore without Session Files. The Restore Options screen appears.

   ◆ If you have session files (backup and error logs), do the following:

1a Choose Select Working Directory.

1b Type or select the directory path.

   Type the directory path > press Enter, or press Insert and select the path. (See "Inserting a Path Name" on page 32.) The Restore menu appears.

1c Select Restore Session.

   The Restore Session menu appears.

1d Select a session.

Press Enter. The Restore Options screen appears.

2 Select options from the Restore Options screen.

For information about these options, see "Explanation of Restore Options Screen" on page 46.

3 Save your restore options by pressing Esc.

The Proceed with Restore box appears. Proceed by selecting Yes. The Start Restore box appears.

4 Start the restore by selecting Yes from the Start Restore box.

To stop a restore session, see "Aborting a Restore Session" on page 45.

5 Insert the source media cartridge into the storage device > press Enter.

The `Mounting media` message appears.

If you are using session files, the restore begins. When the restore is complete, the `Restore Completed` message appears. Press Enter. Go to "View the error log to determine if any files were not restored." on page 44

If you are not using session files, the Restore Session menu appears. Continue with "From the Restore Session menu, select a session to restore." on page 44

6 From the Restore Session menu, select a session to restore.

Follow the prompts to restore the displayed session or to select another session.

When the restore session starts, a status screen shows which data is being restored, which data has been restored, and how much time has elapsed since the restore session began.

The inset at the bottom of the screen shows errors as they occur.

When the restore is complete, the `Restore Completed` message appears. Press Enter. The Restore Menu appears.

7 View the error log to determine if any files were not restored.

See "Viewing an Error Log" on page 53.

If you do not want to view the error log, press Esc. The Main Menu appears.

Restoring Volume SYS: and Data

IMPORTANT: Before performing this procedure, try to fix volume SYS: using VREPAIR.

To restore a network server when the NetWare option Set Immediate Purge of Deleted Files is set to Off, you need an extra 20 percent of free disk space (so unpurged files can be restored).

If you do not have this much free disk space, turn the Set Immediate Purge of Deleted Files field to On. (Remember, all deleted files are purged.)

1 At the server to be restored, load INSTALL, then create and mount volume SYS:.

For detailed instructions, see *Installation and Upgrade*.

2 Copy the files from your CD-ROM or diskettes into the applicable directories.

For host servers, see Table 6 on page 23.

For target servers, see "Software for a Target Server" on page 24.

3 At the server being restored (target server), log in as SUPERVISOR and type

`LOAD TSA312`

4 At the host server, log in as SUPERVISOR and load SBACKUP.

See Chapter 3, "Getting Started," on page 27.

5 Restore the server.

Use the procedure in "Restoring Data to a Target" on page 43.

Aborting a Restore Session

1 During the restore session, press Esc.

2 Select Yes when the Abort Backup Session box appears.

The current data set is backed up and the `Dismounting Media` message appears. Dismounting may take a few minutes.

When the media is dismounted, the `Backup Terminated` message appears.

3 Press Enter > Esc.

4 Go to "Where to Go from Here" on page 32.

Explanation of Restore Options Screen

The Restore Options screen allows you to customize the restore method you want to perform. This section explains how to use each option.

Overwrite Existing Parent

- If the field is set to Yes (the default), existing parents (such as directories) are overwritten. Directory trustee rights, owner attributes, and extended attributes are updated. If a parent does not exist, it is created and its information is restored.

- If the field is set to No, existing directories are not changed. If a parent does not exist, it is created and the information is restored.

- To change Overwrite Existing Parent, select the field > type Y for Yes or N for No > press Enter. The cursor moves to the next field.

Overwrite Existing Child

- If the field is set to Yes (the default), existing children (files) are overwritten and file attributes, trustee rights, and data are updated. If a child does not exist, it is created and restored.

- If the field is set to No, files are not changed.

- To change Overwrite Existing Child, select the field > type Y for Yes or N for No > press Enter. The cursor moves to the next field.

Selection List Options

Selection list options let you include or exclude directories, paths, and files to restore. The default is None. (Everything is restored except bindery files containing users and groups, passwords, account restrictions and balances, etc.)

For example, to restore a few directories, specify those directories in the Include Directories (Full Path) list. To restore most directories, specify the directories you do not want restored in the Exclude Directories (Full Path) list.

Selection list options are specific to the TSA on the target to be restored. The following options are from TSA312.NLM.

To change options, select Selection List Options > press Enter. The Include/Exclude Lists screen appears, as shown in Figure 11.

Figure 11   Include/Exclude List Screen

```
┌─────────────────────────────────────────────┐
│            Include/Exclude Lists             │
├─────────────────────────────────────────────┤
│ Exclude major TSA resources         None     │
│ Include major TSA resources         None     │
│ Exclude directories (full path) None         │
│ Include directories (full path) None         │
│ Exclude files                       None     │
│ Include files                       None     │
│ Exclude path/files                  None     │
│ Include path/files                  None     │
└─────────────────────────────────────────────┘
```

Include or Exclude a Major TSA Resource

To include or exclude a major TSA resource, select a TSA resource field > press Enter. A file server entry box appears.

Add an Entry

- To add an entry, press Insert. A list showing the server's bindery and volumes appears.
- Select an entry > press Enter.
- Return to the Include/Exclude Lists screen by pressing Esc.

Modify an Entry

- To modify an entry, select the entry > press Enter.
- When the entry box appears, make your changes > press Enter.
- Return to the Include/Exclude Lists screen by pressing Esc.

Remove an Entry

- To remove an entry, select the entry > press Delete.
- When the Delete Marked Entry box appears, select Yes.
- Return to the Include/Exclude Lists screen by pressing Esc.

Include or Exclude Directories, Files, or Paths

To include or exclude directories, files, or paths, select an include or exclude field > press Enter. An entry box appears.

Add an Entry

- To add an entry, press Insert. The Select Name Space Type list appears.
- Select a name-space type > press Enter. An entry box appears. Type the directory path or filename > press Enter.

  Wildcard characters are not allowed in path names, but are allowed in filenames. If you use a non-DOS name-space type, the path and filenames, in uppercase, lowercase, or mixed case letters, must exactly match.

  Wildcard characters are not allowed in path names, but are allowed in filenames. If you use a non-DOS name-space type, the path and filenames, in uppercase, lowercase, or mixed case letters, must exactly match.

  You cannot use wildcard characters for the Macintosh name-space type.

- Return to the Include/Exclude Lists screen by pressing Esc.

Modify an Entry

- To modify an entry, select the entry > press Enter.
- When the entry box appears, make your changes > press Enter.
- Return to the Include/Exclude Lists screen by pressing Esc.

Remove an Entry

- To remove an entry, select an entry > press Delete.
- When the Delete Marked Entry box appears, select Yes.
- Return to the Include/Exclude Lists screen by pressing Esc.

Destination Paths

The *source path* is where the data was when the backup was made.

The *destination path* is where you want to restore the data.

Select Destination Paths to restore data to a volume or directory other than the one it was backed up from. (This provides an easy way to restore data to a new directory structure.)

If you specify a path that has not been created, the program creates the path. Your next restore session will follow the same path unless you delete the destination path or unless you exit from SBACKUP and reload it.

Change a Destination Path

To change a destination path, select the field > press Enter. The Source Paths/ Destination Paths list appears.

Add an Entry

1 To add an entry, press Insert.

2 Select a name-space type > press Enter.

3 Type the source path > press Enter.

Use only full path names without filenames. Wild card characters are not allowed.

4 Type the destination path > press Enter.

The target server can be different from the server where the backup was made.

5 Return to the Restore Options screen by pressing Esc.

Modify a Source Path

1 To modify a source path, select the entry > press F3.

2 Change the path > press Enter.

Modify a Destination Path

1 To modify a destination path, select the entry > press Enter.

2 Change the path > press Enter.

3 Return to the Restore Options screen by pressing Esc.

Remove an Entry

1 To remove an entry, select the entry > press Delete.

2 When the Delete Marked Entry box appears, select Yes.

3 Return to the Restore Options screen by pressing Esc.

6 Viewing Backup Logs and Error Logs

SBACKUP generates backup and error logs for each session. They are stored in a working directory on the host server.

The backup log contains the following:

- ◆ Session date and time

- ◆ Description of the backup session

- ◆ Target (server or client backed up)

- ◆ Media set ID (label of the backup media cartridge)

- ◆ List of data backed up, name-space types for each file, and data position on the media

The error log records errors that occur when you back up or restore data.

If a file is open during a backup session, it is not backed up. Files open during the backup are listed in the error log as skipped data sets.

Selecting a Working Directory

1 At the Main Menu, select Backup Menu or Restore Menu.

2 Choose Select Working Directory.

3 Type the path name of an existing working directory > press Enter.

or

Press Insert > select a working directory path.

See "Inserting a Path Name" on page 32.

- ◆ If the path exists, the Backup Menu or Restore Menu appears.

- ◆ If the path does not exist, the `OK to create the path?` message appears. Press Esc > select an existing path.

4 See the next section, Viewing a Backup Log, or see "Viewing an Error Log" on page 53.

Viewing a Backup Log

1 After selecting a working directory, select View Backup Log from the Backup Menu or Restore Menu.

A list of backup sessions appears. Each session is listed by description, date, time, and source.

2 Select a backup log.

A backup log appears, similar to the log in Figure 12 on page 53. Use the Up- and Down-arrow keys to view the file.

The backup log displays all supported name-space types. The DOS name space is the first in the group. A right angle bracket [ ] appears next to the file's name-space type.

SBACKUP retains both symbolic and hard links created under the NFS name-space type, but links are not listed in the backup log. Restoring the original file restores associated links.

The data position information (a number like 0001 00000102 00005248) is on the left side.

Figure 12   Sample Backup Log for Weekly Full Backup

```
NetWare Server Backup Utility  v3.12          NetWare 386 Loadable Module
                          Target: SERVER/SUPERVISOR
```

```
   Backup Log for Session Weekly Full Backup                    ↓   0

Session Date and Time: 10/15/91  11:37:22 Log
Description: Weekly Full Backup
Target: SERVER (NetWare v3.11V)
Media Set ID: Weekly Backup of SERVER #1 10/15/91  11:37:22
Backed up: NetWare server

0001 00000002 00000037>Bindery

0001 00000102 00005248>SYS:
          MACINTOSH: SYS::
               OS2: SYS:
               NFS: SYS:
0001 00000102 000053ED  >VOL$LOG.ERR
          MACINTOSH:    VOL$LOG.ERR
               OS2:    VOL$LOG.ERR
               NFS:    vol$log.err
0001 00000102 0000B787  >TTS$LOG.ERR
```

3 Press Esc three times to exit the backup log and return to the Main Menu.

4 See "Where to Go from Here" on page 32.

Viewing an Error Log

An error log records errors that occur when you back up or restore data.

1 After selecting a working directory, select View Error Log from the Backup Menu or Restore Menu.

The Select Session list appears. Each session is listed by description, date, time, and source.

2 Select an error log.

An error log appears, similar to the log shown in Figure 13 on page 54. Use the Up-arrow and Down-arrow keys to view the file.

Figure 13   Sample Error Log for Weekly Full Backup

```
NetWare Server Backup Utility  v3.12              NetWare 386 Loadable Module
                         Target: SERVER/SUPERVISOR
```

```
   Error Log for Session Weekly Full Backup                          ↓  46

Session Date and Time: 10/15/91  11:37:22 Errors
Description: Weekly Full Backup
Target: SERVER (NetWare v3.11V)
Media Set ID: Weekly Backup of SERVER #1 10/15/91  11:37:22
Backed up: NetWare server

10/15/91  11:50:44  Successfully backed up 65 parents and 1222 children,
        total written: 25152.0 KB, elapsed time: 00:07:15!

************** The following data sets were not backed up! ****************

SYS:DON/174F5CAB.ERR (In Use)
10/15/91  11:52:46  Backup session terminated!

10/15/91  11:54:17  Restore Session Begin
10/15/91  11:55:29  Unable to write data set!  Data set is currently in use
        and cannot be accessed at this time!

************** The following errors occurred in the TSA! ****************

Tue Oct 15 11:55:25 1991
  Unable to replace file "SYS$ERR.DAT"!

Tue Oct 15 11:55:52 1991
  Unable to replace file "SYS$MSG.DAT"!
```

Restore errors are appended to a session's backup error log. A `Restore Session Begins` message marks the beginning of the restore errors.

Symbolic and hard links created under the NFS name-space type can fail to be restored if the path name for the restored link *contains a regular file*.

When this happens, the error log contains messages similar to the following:

```
Error restoring name space specific information
of "XXXX:tmp/hosts" in NFS name space, error 0x7!

Unable to allocate directory handle for
"XXXX:tmp/test"!
```

3 Press Esc three times to exit the error log and return to the Main Menu.

4 See .

7 Troubleshooting

This chapter provides information on resolving problems you may encounter during backup.

No Target List Appears

This is probably not a problem. If only one target with a loaded TSA is on the network, the target list will not appear. The target is automatically selected and the Enter User Name box appears.

Target Is Not Included in Target List

1 At the target server's console prompt, type

`LOAD TSA312`

The TSA is loaded and the console prompt (:) reappears.

2 At the host server console, press Esc until the Main Menu appears.

3 Choose Select Target to Backup/Restore.

4 Select a target from the list.

Target Is Listed, but an Error Message Appears

Even though your target server is listed, a message appears saying that a `Connect to target service error` has occurred. Either you typed a wrong username and password, or the TSA is an old version.

1 At the `Connect to target service error` message, press Enter.

2 Enter your username and password when prompted.

Either the Main Menu or the `Connect to target service error` message appears.

3 Do one of the following:

If the Main Menu appears, see .

If the `Connect to target service error` message reappears, continue with .

4 Press Esc until you get to the Main Menu.

5 At the target server, copy TSA312.NLM to SYS:SYSTEM.

6 At the target server, type

```
LOAD TSA312
```

7 Choose Select Target to Backup/Restore.

8 Select the target from the list.

9 Type your username and password when prompted.

10 See .

Using the TAPEDC00.NLM Tape Driver Console Screen

The Tape Driver Console screen is available only if you load TAPEDC00.NLM.

1 Access the Tape Driver Console screen.

Press Alt+Esc until the screen appears, or press Ctrl+Esc and select the screen.

2 To select a command, type a letter > press Enter > follow the prompts.

Command	Description
Initialize	Initializes the tape device if the device was not turned on when you loaded ADAPTEC.NLM. Also reinitializes a device if it does not respond properly.
Erase	Erases data from a media (including the media name). If you use a 4mm or 8mm tape device, ERASE can take several hours. (For more information, see the tape device manual.)
Retension	Adjusts tape tension. (For more information, see the tape device manual.)

Command	Description
Test	Verifies the interoperability of ADAPTEC.NLM, the host adapter card, and the tape device. After entering the **TEST** command, the tape contents are destroyed. At the Continue Y/N? prompt, type **Y**.

The test writes sample data to the media and verifies the data. If your tape device supports random access, four seek operations with verification are performed. You are notified when the test is successfully completed. (Sample data is erased.) Return to the menu by pressing any key. |
| Unload NLM | Unloads the TAPEDC00.NLM. |

3 Press Esc to exit the Tape Driver Console screen.

4 Access SBACKUP.

Press Alt+Esc until an SBACKUP screen appears, or press Ctrl+Esc and select SBACKUP Screen from the list.

Error Codes and Meanings

If you get an error message with an error code, look up the error code in the left column and determine the error using the description in the right column of Table 7.

Table 7   Server Backup Error Codes and Meanings

0x10001	The backup restore thread is active
0x10002	The file type is invalid.
0x10003	The session ID is invalid.
0x10004	A buffer overflow error occurred.
0x10005	A close file error occurred.
0x10006	The DIBI driver is already loaded.
0x10007	A seek file error occurred.
0x10008	A get transfer buffer error occurred.
0x10009	The head FID cannot be found.

0x1000A	The control block is invalid.
0x1000B	An invalid offset to end was found.
0x1000C	An invalid record was found.
0x1000D	The SMSDF revision is invalid.
0x1000E	A media dismount error occurred.
0x1000F	A media mount error occurred.
0x10010	A media read error occurred.
0x10011	A media sector size error occurred.
0x10012	A media write error occurred.
0x10013	The next record is not in the buffer.
0x10014	Record header information is missing.
0x10015	No buffer is available.
0x10016	No media label can be found.
0x10017	No sessions are available.
0x10018	An open data file error occurred.
0x10019	An open session files error occurred.
0x1001A	Operator has aborted this operation.
0x1001B	An out of memory error occurred.
0x1001C	A push list error occurred.
0x1001D	The session file is corrupted.
0x1001E	A skip set mark error occurred.
0x1001F	A spanned sector counts mismatch occurred.
0x10020	A time out error occurred.
0x10021	The transfer buffer is invalid.
0x10022	The transfer buffer is in use.

0x10023	The TSA level is invalid.
0x10024	The TSA connection is invalid.

A Supported Storage Devices

Drivers

The following DIBI-II drivers are supported by SBACKUP 3.12:

- TAPEDC00.NLM
- WANGTEK.NLM
- DIBIDAI.NLM

Storage Devices

For supported storage device tables, see the following pages.

Figure 14 Storage Devices Compatible with TAPEDC00.NLM DIBI-II Driver Software

STORAGE DEVICES COMPATIBLE WITH TAPEDC00.NLM DIBI-II DRIVER SOFTWARE

NetWare v3.1x Backup/Restore and Upgrade Subsystem Configuration Matrix

Company/Subsystem	Storage Capacity	SCSI Controllers					QIC02 Controllers			
		Adaptec 154x/164x	174x*	Future Domain	Bus Tech	Propri-etary	Everex 811	Archive 402/9	Propri-etary	Wangtek
Archive										
Archive 2060S	60 MB	X	A	A	A					
Archive 2060L	60 MB								A	
Archive 2150S	150 MB	X	A	A	A	1				
Archive 2150L	150 MB								A	
Archive 5250S	250 MB	X	A	A	A					
Archive Python DAT	1.3 GB	X	A	A	A					
Cipher										
Cipher ST150	150 MB	X	A		A					
Cipher 540	150 MB								A	
Compaq										
325 COMPAQ	325 MB	X				4				
525 COMPAQ	525 MB	X				4				
Emerald										
Rapid Recover 150	150 MB	X	A	A	A					
LAN 150-2100	150 MB							A		
LAN 150-9100	150 MB							A		
Rapid Recover 250	250 MB	X	A	A						
Rapid Recover 525	525 MB	X	A	A						
Rapid Recover 1.3GByte	1.3 GB	X	A	A	A					
VAST VAS02G-999	2.2 GB	X	A	A	A					
Exabyte										
Exabyte 8200	2.2 GB	X	A	A	A	1,2,3				
Exabyte 8500	2.2 GB	X	A	A	A	1,2,3				
GigaTrend										
GigaTrend 101	1.2 GB	X	A	A						
GigaTrend 103	1.2 GB							A		
GigaTrend 107	1.2 GB	X	A	A						
GigaTrend 109	1.2 GB							A		
GigaTrend 1236	1.2 GB									
ServerDAT 116	1.2 GB	X	A	A						
ServerDAT 117	1.2 GB	X	A	A						
ServerDAT 121	1.2 GB				A					
Hewlett-Packard										
HP C2224A/DAT	1.3 GB	X	A	A						
HP C1502A/DAT	1.3 GB	X	A	A	A	2				
IBM										
Model 6157-002	150 MB						A			
Model 7208-002	2.2 GB						A			
Irwin										
Model 2120	120/240 MB									
Model 2320	320/640 MB	X	A							
Model 9131	1.2 GB	X	A							
Model 9231	2.2 GB	X	A							

X – Supported in NetWare v3.1x (as TAPEDC00 driver).
A – Supported in the B/R Driver Kit v1.0 (as TAPEDC00 driver).
– In "Proprietary" column, 1 = 3Com, 2 = NetFrame, 3 = Tricord, 4 = COMPAQ. The servers contain proprietary SCSI controllers. The drivers for these controllers will be in the B/R Driver Kit v1.0.
* – The Adaptec 174x controller board is supported in the NetWare v3.1x Box when configured in 154x mode only.

NetWare v3.1x Backup/Restore and Upgrade Subsystem Configuration Matrix

Company/Subsystem	Storage Capacity	SCSI Controllers					QIC02 Controllers			
		Adaptec 154x/164x	174x*	Future Domain	Bus Tech	Propri-etary	Everex 811	Archive 402/9	Propri-etary	Wangtek
Mountain										
Mountain 7150	150 MB									
Mountain 7300	300 MB									
Mountain 1200	1.3 GB	X	A	A	A					
Mountain 2100	2.2 GB	X	A							
Maynard										
Maynstream 150	150 MB									
Maynstream 250Q	250 MB									
Maynstream 525Q	525 MB	X								
Maynstream 1300 DAT	1.3 GB	X	A	A	A					
Maynstream 2200HS	2.2 GB	X	A	A	A					
NCR										
2101	2.2 GB	X	A	A	A					
2500	1.0 GB	X	A	A	A					
6100	150 MB	X	A	A	A					
6300	525 MB	X	A	A	A					
Sankyo										
CP150SE	150 MB	X	A	A	A					
CP320SE	525 MB	X	A	A	A					
Summus										
Gigatape 442 (Sony)	1.3 GB	X	A	A	A					
Tandberg										
Tandberg TDC 3600	150 MB	X	A	A	A					
Tecmar										
Proline THS-2200	2.2 GB	X	A	A	A					
Proline 150ES	150 MB	X	A	A	A					
Proline 525ES	525 MB	X	A	A	A					
Proline Data Vault	1.3 GB	X	A	A	A					
Transitional Technology										
CTS/4 DAT	1.3 GB	X								
CTS/8000/8210/8230	2.2 GB	X								
CTS/8501	5.0 GB	X								
Wangtek										
Wang DAT 1300	1.3 GB	X	A	A	A					
Wangtek 5099ES	60 MB	X	A	A	A					
Wangtek 5099EQ	60 MB								A	A
Wangtek 5125ES	125 MB	X	A	A	A					
Wangtek 5125EQ	125 MB								A	A
Wangtek 5150ES	250 MB	X	A	A	A					
Wangtek 5150EQ	250 MB								A	A
Wangtek 5525ES	525 MB	X	A	A	A					
Wangtek 6130FS DAT	1.3 GB	X	A	A	A					
Wangtek 6130HS DAT	1.3 GB	X	A	A	A					
Wangtek 6200HS DAT	2.0 GB	X	A	A	A					
Wangtek 7200HS DAT	2.0 GB	X	A	A	A					

X – Supported in NetWare v3.1x (as TAPEDC00 driver).
A – Supported in the B/R Driver Kit v1.0 (as TAPEDC00 driver).
– In "Proprietary" column, 1 = 3Com, 2 = NetFrame, 3 = Tricord, 4 = COMPAQ. The servers contain proprietary
     SCSI controllers. The drivers for these controllers will be in the B/R Driver Kit v1.0.
* – The Adaptec 174x controller board is supported in the NetWare v3.1x Box when configured in 154x mode only.

Figure 15   Storage Devices Compatible with WANGTEK.NLM DIBI-II Driver Software

STORAGE DEVICES COMPATIBLE WITH WANGTEK.NLM DIBI-II DRIVER SOFTWARE

NetWare v3.1x Backup/Restore and Upgrade Subsystem Configuration Matrix

Company/Subsystem	Storage Capacity	SCSI Controllers					QIC02 Controllers			
		Adaptec 154x/164x	174x	Future Domain	Bus Tech	Propri-etary	Everex 811	Archive 402/9	Propri-etary	Wangtek
Hewlett/Packard HP C1502A/OP66										
Wangtek Wangtek 5099EQ Wangtek 5125EQ Wangtek 5150EQ	 60 MB 125 MB 150 MB									 W W W

W - Supported in NetWare v3.1x (as WANGTEK driver)

B Editing the Storage Device Interface

Overview

Device driver information and parameters are stored in the SYS:SYSTEM/
DIBI/DIBI2$DV.DAT file. You can add, modify, or delete device driver
information from the file.

To modify DIBI2$DV.DAT:

1 At a workstation, log in to the host server as SUPERVISOR or equivalent.

2 Change the DIBI2$DV.DAT file attribute to Normal.

2a From the command line, type

```
FLAG SYS:SYSTEM\DIBI\DIBI2$DV.DAT N
```

3 At the host server's console, log in as SUPERVISOR or equivalent.

4 Load EDIT.NLM > edit the DIBI2$DV.DAT file.

4a From the command line, type

```
LOAD EDIT SYS:SYSTEM/DIBI/DIBI2$DV.DAT
```

5 Edit the file.

5a To change a parameter, select the line and edit the parameter.

5b To delete a driver, delete the line.

5c To add a new driver, type the driver name in quotation marks, the
filename, and optional parameters, for example

```
"Wangtek Tape Drive." WANGTEK PORT=200 DMA=1
IRQ=5
```

(For parameter information, see the documentation that came with the driver.)

If you leave all driver lines in the file, you can select the driver after you load SBACKUP.

6 Press Esc to exit the file.

If changes were made, the Save File box appears. Save changes by selecting Yes. The console prompt (:) appears.

If no changes were made, the console prompt (:) appears.

7 At a workstation, change the file's attribute back to Read Only.

7a From the command line, type

FLAG SYS:SYSTEM\DIBI\DIBI2$DV.DAT Ro

C Enhancing Host Server Performance

The speed of SBACKUP depends upon the host server's configuration and whether or not the server is backing up its own data or that of another server.

A server backing up its own data runs about four times faster than a server backing up data from another server.

This appendix includes four options using LOAD and SET commands that can enhance your host server's performance:

- ◆ Changing buffer size
- ◆ Modifying the packet receive buffers
- ◆ Setting subdirectory levels and minimum cache buffers
- ◆ Setting reserved buffers below 16 megabytes

For more information on the following commands and files, see System Administration.

Changing the Size and Number of Buffers

If your server has insufficient free memory, or if it has memory not being used, you can speed up a backup session by changing the number and size of the host server's buffers when you load SBACKUP. (For more about changing the size or number of buffers, see your device driver's documentation.)

If you change the size or number of buffers, you also must change the total memory allowed.

Calculate how much memory is needed by multiplying the number of buffers by the buffer size, in kilobytes. Remember that the operating system also requires 2 MB of memory.

To change the size and number of buffers, specify the size and number of buffers when loading SBACKUP by typing

```
LOAD SBACKUP SIZE=XXX BUFFER=X
```

Select the size and number of buffers from the following chart:

Available Option	Range	Default
Buffer Size (*xxx*)	16 KB to 256 KB	64 KB
Number of Buffers (*x*)	2 to 10	4

WARNING: If you use an 8- or 16-bit host adapter and a driver that does not force the use of memory below 16 MB, do not specify a buffer- and memory-size combination that exceeds 16 MB. If you do, corrupt data is copied to the backup tape.

Setting Minimum Packet Receive Buffers

1 Include the following SET command in your STARTUP.NCF file:

```
SET MINIMUM PACKET RECEIVE BUFFERS = XXX
```

Set two buffers for each user on the system.

2 To set the changes, down the server and bring it back up.

Setting Maximum Subdirectory Level and Minimum Cache Buffers

If you change the maximum subdirectory level in the server's AUTOEXEC.NCF file, you must also change the minimum cache buffers. The maximum subdirectory level default is 25.

1 Include the following commands in the STARTUP.NCF file:

```
SET MINIMUM CACHE BUFFERS=X
SET MAXIMUM DIRECTORY BUFFERS=x
```

Replace *x* with a number equal to or greater than the subdirectory level you set in the AUTOEXEC.NCF file. The default for both is 25.

2 To set the changes, down the server and bring it back up.

Setting Reserved Buffers Below 16 MB

If your driver requires memory below 16 MB and you get an OUT OF MEMORY message, increase the number of low memory buffers by modifying your STARTUP.NCF file.

1 Include the following command in the STARTUP.NCF file:

SET RESERVED BUFFERS BELOW 16 MEG=X

Replace *x* with a number between 8 and 200. The default is 8.

If your machine has 4 to 5 MB of memory, use the default. If you have more than 8 MB, set the number of buffers to 200.

2 To set the changes, down the server and bring it back up.

GLOSSARY

Archive Needed attribute

A file attribute, set by NetWare, indicating that the file has been changed since the last time it was backed up.

Backup

A duplicate of data (file, directory, volume), copied to a storage device (floppy diskette, cartridge tape, hard disk). A backup can be retrieved and restored if the original is corrupted or destroyed.

For more information, see "Backup" in *Concepts*.

Backup engine

A module loaded on a host server that contains the backup and restore interface. It reads and translates user requests, determines the type of session being initiated, and decides which modules to activate.

Backup hosts and targets

A backup host is a NetWare server with a storage device and a storage device controller attached.

A target is a server that contains data you back up or restore data to.

Any server, workstation, or service (such as NetWare Directory Services) on the network can be a target, as long as it contains Target Service Agent (TSA) files.

A target can be any server, even the host. If you back up data on the host, the target and host are the same.

Child

A data set with no subordinates. For example, in NetWare v3.12, a file would be a child, but a directory would not be, because a directory can contain subordinate directories or files.

Client

A network service, server, or workstation that has a loaded TSA and can be backed up or restored by a host server.

Data requester

The NLM that transports data between the backup engine and the TSA.

Data set

A group of data that can be manipulated by SBACKUP.

Data sets can contain different items depending on which TSA they are related to.

DIBI

Device Independent Backup Interface.

Differential backup

A backup of files marked with a modify bit. A differential backup does not clear the modify bit.

For example, if you do a full backup on Monday, the modify bit for each file is cleared. If you do a differential backup on Tuesday, only files modified on Monday are included in Tuesday's differential backup, and the modify bit is not cleared.

If you do another differential backup on Wednesday, only files modified on Monday and Tuesday are included on Wednesday's differential backup, and the modify bit is still not cleared.

Full backup

A copy of the entire contents of the target server. All bindery information, all directories, and all files are copied to the backup media. A full backup clears the modify bit.

Host adapter

A board in a host server that controls the storage device.

Host server

A NetWare server with a host adapter and storage device, such as a tape drive, attached.

Incremental backup

A backup of files marked with a modify bit. An incremental backup clears the modify bit.

For example, if you do a full backup on Monday, the modify bit for each file is cleared. If you do an incremental backup on Tuesday, only files modified on Monday are included in Tuesday's incremental backup, and the modify bit for each file is cleared.

If you do another incremental backup on Wednesday, only files modified on Tuesday are included on Wednesday's incremental backup, and the modify bit for each file is cleared.

Major resource

A category of data defined by the Target Service Agent, and recognized by SBACKUP. A major resource contains data that can be backed up as a group, for example, server, volume, etc.

Media label

A description of the contents of the backup that helps you locate data if you restore it.

Include the type of backup (full or incremental), backup frequency (daily, weekly, etc.), and a description of data sets being backed up.

Media manager

A set of routines within NetWare v3.12 and v4.0 that provide to applications a generic view of the different types of backup storage devices (disk, tape, autochanger, etc.).

These routines enable applications to communicate with the different storage devices without having device-specific drivers.

Media set ID

The media label, cartridge number, and date and time of the backup. This information is recorded on the media so you can identify the data stored on the cartridge.

Minor resource

A category of data defined by the Target Service Agent and recognized by SBACKUP.

A minor resource might be located in the directory structure below the selected major resource; for example, directories, subdirectories, or files.

Modify bit

A bit set by the operating system, when a file is changed, to indicate that data has been modified.

When a backup is performed, SBACKUP can check to see whether modify bits are set, and can back up only those files that have their modify bit set.

Different types of backups have different actions on the modify bit and on files that aren't marked with a modify bit (non-modified files).

Name-space format

The file-naming format required for different types of operating systems. For example, DOS, Macintosh, NFS, and OS/2 have different name-space formats.

Parent

A data set that can have subordinate data sets (other parents or children). For example, in NetWare v3.12, a parent would be a bindery, directory, or subdirectory.

Restore

A retrieval of data previously copied and backed up to a storage media. Perform a restore if data has been lost or corrupted since the backup.

Session

One backup or restore operation.

Storage Management Services (SMS)

Services that allow data to be stored and retrieved. SMS is independent of backup/restore hardware and file systems (such as DOS, OS/2, Macintosh, Windows, or UNIX).

For more, see "Storage Management Services" in *Concepts*.

Storage device

A device, such as a tape drive or optical disk, used to store the contents of a server or workstation.

Storage device driver

Software that controls the operation of a storage device attached to a compatible host adapter.

Storage device support driver

Software used with a DIBI interface and a storage device driver.

Storage device driver database

A database file on the host server that contains the list of supported storage device drivers.

Target

A server from which you back up data or to which you restore data. Any NetWare server, workstation, or service on the network can be a target, as long as the Target Service Agent (TSA) files are loaded.

A target can be either a different server than the host or the same server as the host. If you are backing up and restoring on the same server, the target and the host are the same.

Target Service Agent (TSA)

A program that processes data moving between a specific target and SBACKUP. SBACKUP, running on the host, sends requests to the TSA.

Servers and workstations running different software releases, or having different operating systems, require NetWare-compatible TSAs to communicate with SBACKUP.

TSAs perform the following functions:

Receive the commands from SBACKUP and process them so that the target operating system can handle the request for data.

Pass the data request from SBACKUP to the target.

Receive the requested data from the target and return it to SBACKUP in standard SMS format.

TSA resources

Categories of data, referred to as *major resources* and *minor resources*, created by each TSA. (See "Major resource" on page 75 and "Minor resource" on page 76)

Because these resources vary with each TSA, SBACKUP processes these resources in different ways.

Working directory

A directory on the host server where log and error files for each backup session are recorded and stored.