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Welcome to ServerStor for Windows, McAfee's file server backup, restore, and data management software application for the NetWare and Windows environments. Managed from the client workstation, ServerStor offers easy-to-use, pull down menus; tool bar icons; full use of the mouse; a variety of data transfer options; and a convenient means of finding data that has been stored off-line. The network administrator can also run ServerStor from the server console, recovering lost volumes after a server failure.

ServerStor is especially useful for recovering from a system hardware failure or for restoring data that has been corrupted or accidentally deleted. And it's a fast, safe way of moving large amounts of data from one server to another.

This manual will help you on your way to easier storage management.

Making It Easy. ServerStor offers clearly presented menu choices and on-screen messages to guide you through your media operations.

ServerStor offers an on-line help facility containing information about a wide variety of topics related to the operations performed by ServerStor. Refer to [Appendix A, "Help"](#) for complete information about on-line help.

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## A Powerful Package

This version of ServerStor provides a variety of powerful data management features. Here's a list of just a few of them:

- Novell SMS support for NetWare 3.x and 4.x. ServerStor supports the Novell Storage Management System (SMS), including Target Service Agents (TSAs) and the **SIDF tape format**.
- Support for multiple devices. You can install up to five backup devices (daisy-chained) on a single adapter.
- Backup protection for all attached NetWare 3.x and 4.x servers.
- Expanded host adapter and backup device support. ServerStor supports many third-party SCSI backup devices. See Chapter 3, “Installing ServerStor,” in the manual *Getting Started* for a list of supported adapters and backup devices.
- The Rescue function to recover from server crashes. ServerStor provides you with the means to quickly restore a server to its pre-crash state—*using only one command*. You don't even need to reinstall ServerStor or Windows!
- The Protect function. ServerStor allows you to easily add unprotected volumes so that they too can be covered by the Rescue function.
- The Restore Any Day function. If you need to restore a file—or your entire system—to the state it was in on a particular date, ServerStor will perform the restore in a few simple steps.
- “One-button” backups. You can execute pre-defined backup jobs by using the mouse to click the Run Job button.
- Cartridge Rotation. You get your choice of tape rotation schemes. ServerStor keeps track of what's on each cartridge, and always prompts you for the right cartridge—automatically.

- Media library support. ServerStor makes it possible to rapidly find off-line data, manipulate the transfer of data from one medium to another to the Librarian database. In short, with ServerStor you get powerful Librarian and media management.
- Wide choice of backup and restore operations. You can choose several different types of backups and restores, ranging from single files and directories all the way to complete volume contents. You can easily designate certain files and directories for inclusion or exclusion.
- Graphical file system view. It's easy to find and tag files for the various data transfer operations you'll want to perform.
- Automatic backups. You can define, save, and schedule backup jobs to run automatically in the background.
- Multiple name space support. ServerStor supports DOS, OS/2, Macintosh, and other NetWare-supported file and directory names.
- Data Compression. ServerStor supports backup devices that use hardware data compression.
- Job Scheduler. ServerStor includes a Job Scheduler utility that will enable you to run unattended backups—on a one-time basis or on a regular schedule that is defined by you.

## What ServerStor Can Do for You

ServerStor offers reliable solutions to today's most pressing data storage problems. ServerStor provides an integrated strategy for protecting and managing your valuable data, and an easily accessible set of tools to effect that strategy.

### A Librarian for Your Media Cartridges

- ServerStor serves as an on-line card catalog for your media cartridge library so that you can organize and track all of your archived and backed up data sets.
- You can set up an exclusive group of media cartridges to be used only by specified backup jobs. Every time you run one of those jobs, ServerStor tells you which media cartridge to load. When a backup job is complete, all relevant information about the job is recorded in the Librarian database: the job name, the date, the names of the media cartridges used, as well as a complete directory of all files backed up during that job.
- Once backup information has been recorded, you can search the Librarian database for a file or range of files. The Librarian window depicts exactly where the selected file resides in your media cartridge library, the date that it was backed up, and the date that it was last modified.

### Easy Job Creation and Scheduling

- When you want to create a backup job, the File System window enables you to view your on-line file system and quickly tag the files, directories, or entire volumes to be backed up.
- You can run the job immediately, or save it to run later. You can run a saved job manually, or automatically using ServerStor's powerful Job Scheduler. The Job Scheduler allows you to set up a schedule for all of your routine backups, and frees you from attending to them.

## **A Complete, Ready-to-Use Data Protection Strategy**

- During installation, ServerStor builds a Librarian database to work with your installed backup device, and copies pre-defined backup jobs onto your system. These jobs comprise McAfee's Restore Any Day data protection strategy, which you can begin using right away. Restore Any Day also serves as the basis for the Rescue function, a disaster recovery feature of ServerStor.
- When you routinely back up with Restore Any Day, you can restore any file on your system to its state on any given day within the date range you specify.

## **The Rescue Function: Automated Disaster Recovery**

- The ServerStor automated disaster recovery procedure is installed on a separate disk from the volume on which the ServerStor software resides. The Rescue disk is updated each time you perform a Complete or Differential backup of your system, so it always knows which media cartridges contain the most recent backups.
- In the event of a catastrophic failure of any Rescue-managed server, you can automatically recover with the Rescue function.

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## Label Your Backup Media!

ServerStor helps you to easily locate your data by automatically prompting you to insert the correct media cartridge when required. It is **very important** that you be able to identify a requested cartridge. That is, you must affix an external label to each media cartridge and mark it with the same ID as appears on the cartridge's electronic label (e.g., the label on the tape), if the Librarian database is going to be of any value to you.

To understand this, imagine that you're looking for a magazine article about project management. You go to your local library, and after asking the librarian, you learn that "Good Project Management" was published in *Business Projects Monthly*, July 1989. The library has every magazine ever published—but each and every one is missing its cover. The only way to find that one article is to flip through every page of every magazine. This is a library system without external labels.

No user wants to keep mounting tapes (or other media) trying to find one file. In the absence of accurate, external labeling, the best library in the business will be of little benefit.

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# Data Protection Strategy

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## ServerStor's Data Protection Strategy

ServerStor's data protection strategy is built into the product, and works in two ways:

- Restore Any Day gives you the ability to restore any file on any ServerStor volume to its state on any given day.
- The Rescue function provides automated recovery for all of your Rescue-managed volumes, in case of a catastrophic server failure.

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### Restore Any Day

The Restore Any Day strategy provides pre-defined and pre-scheduled backup jobs to back up your system:

- A weekly Complete backup of protected volumes
- A daily Differential backup of protected volumes

When you run these jobs, your media cartridge library will contain the data sets necessary to restore the entire volume (or any portion of the volume) to its state on any given day. Each time a Restore Any Day backup job is run, both the Librarian database and the McAfee Rescue disk are updated with catalog information about the job: the job name and date, the media cartridge name, and the name and date last modified of each file backed up. For details on how to Restore Any Day, see [Chapter 5, "Restore Operations."](#)

## The Rescue Function

The Rescue function is a strategy designed to automatically recover any Rescue-protected volume from a catastrophic server failure. If such a failure occurs, choose the Rescue function button in the tool bar to recover the volume.

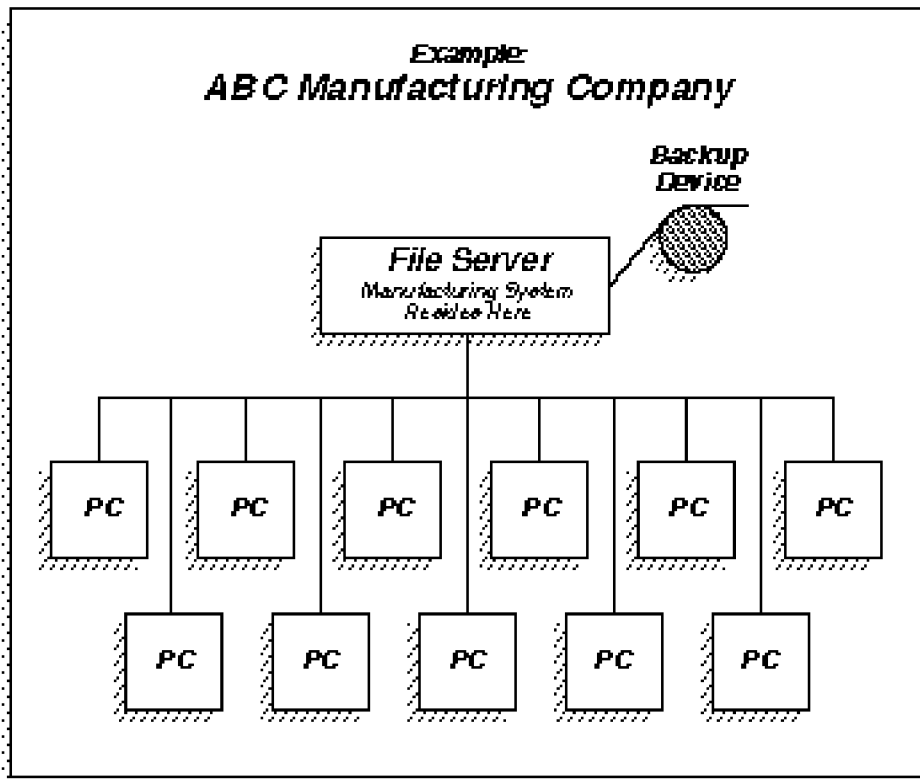
In the event that the volume where ServerStor or Windows resides is lost, you will not be able to choose the Rescue function button. In this case, you can use the McAfee Rescue disk to recover the lost volume. See [Chapter 5, "Restore Operations"](#) for details.

## The Pre-configured Librarian Database

The Librarian database is pre-configured for your environment, based on information you supplied at installation time. Your Librarian database is already set up to handle the Restore Any Day strategy, and your McAfee Rescue procedure is ready to capture information about your latest backup jobs. This default configuration should provide you with a basic data protection strategy for your system.

### Example: The ABC Manufacturing Environment

The following example describes how one company uses ServerStor to meet its data protection needs in a fictitious NetWare LAN environment. ABC Manufacturing makes bicycle parts from recycled scrap metal. ABC has its on-line manufacturing system and its accounting system on a NetWare 3.x LAN.

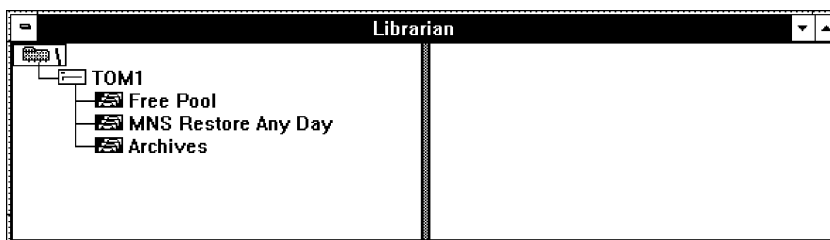


The manufacturing system software resides on the file server; records are stored on other servers. On the shop floor, several client PCs reside at points where assembled parts move along during the manufacturing process.

Workstation A, just set up to run ServerStor, is used by the network administrator to back up and restore files to file server F. The accounting system resides on server G.

## Viewing Your Pre-configured Librarian Database

Choose Librarian in the tool bar to display the Librarian window. The Librarian window as seen from ABC's Workstation A is shown below:



## Librarian Database Structure

The *hierarchy* depicted in the Librarian window represents the pre-configured Librarian database. This database is designed to organize and track each backup job you record in the Librarian database, each media cartridge used by a job, and each data set stored on a media cartridge. As you record backup jobs in the Librarian database, you'll notice this hierarchy expand as each object is added in its proper order. Objects in the hierarchy include, in descending order:

- The Librarian Database Root.
- The media group encompasses the entire pool of media cartridges that can be used by your installed backup device type.
- Job groups represent groups of media cartridges that are independently managed by ServerStor. Every backup job must be assigned to one and only one job group.

## **Librarian Database Root**

The Librarian database root symbol is shown highlighted in the upper left corner of ABC's Librarian window.

## **Media Group**

Directly below the root in ABC's Librarian window is another symbol that represents the media group corresponding to ABC's backup device. In your Librarian window, this media group encompasses the entire pool of media cartridges that can be used by your installed backup device type. (When you installed ServerStor, you selected your backup device type in the server-side Hardware Options screen.) ServerStor uses the device information associated with the media group to identify the location of your backup device.


## **Job Groups**

There are pre-configured job groups in your Librarian window in the media group:

- Free Pool
- Restore Any Day
- Archives

### **The Free Pool Job Group**

ServerStor creates a Free Pool job group under the media group to serve as a catch-all pool of media cartridges that you, rather than ServerStor, manage. ServerStor regards each media cartridge assigned to the Free Pool job group as eligible to be overwritten. Whenever ServerStor needs a free media cartridge for a new backup job, it provides you with the list of media cartridges in the Free Pool group. You must decide which of these cartridges to use. (Your system is pre-configured with one Free Pool job group, which you can see in the Librarian window.) If you don't want the data sets on a media cartridge to be overwritten, be sure to move it to one of the other job groups.

 *When ServerStor uses a cartridge from the Free Pool group as part of a job that uses tapes from another group, ServerStor automatically “moves” that tape to the appropriate group.*

## Restore Any Day Job Group


This job group provides the basis for the Restore Any Day strategy, which enables you to restore any file to its state on any day. ServerStor manages all of the media cartridges in this group for you; data sets are maintained for a default period of one month before they can be overwritten (you can change the length of time that data sets are maintained). Two pre-defined jobs are assigned to this job group, one for running Complete weekly backups of the volume where ServerStor resides, and one for running daily Differential backups.

## Archives Job Group

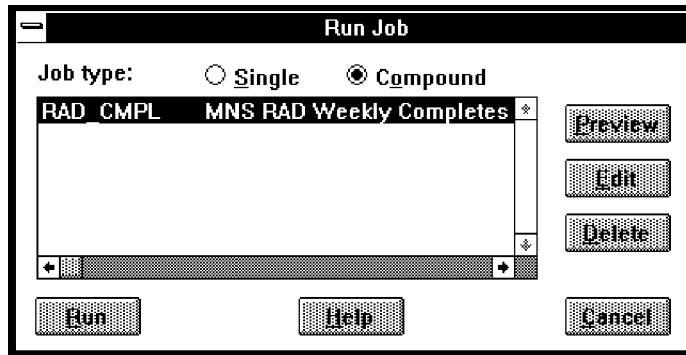
The Archives job group is for cartridges you never plan to overwrite.

You might, for example, use the Archives job group to keep track of your off-site media cartridges. Another (recommended) usage is to include in this job group any data sets on media cartridges imported from other ServerStor installations.

## Viewing Restore Any Day Pre-defined Jobs

 *You won't see the results of a job depicted in the Librarian window until the job has actually been run. After the job is run, the save set on the media cartridge is given a unique name and recorded in the Librarian database, along with date, the names of the media cartridges it used, the data sets and files copied.*


1. To view the Restore Any Day pre-defined backup jobs that are scheduled to run, access the Run Job dialog box. In the Tools menu, choose “Jobs” to display the Run Job dialog box:



2. Choose the Compound option button to display the compound jobs available to you.


A compound job consists of two or more single jobs.

3. Highlight either RAD\_CMPL or RAD\_DIFF, and click Edit.

 Both the Complete and the Differential jobs are scheduled to run at a default day and time. You can change the day and time with the Job Scheduler. For more information, see [Chapter 8, “Job Scheduler.”](#) For detailed information about using Restore Any Day, refer to [Chapter 4, “Backup Operations.”](#)

## Customizing the Librarian Database

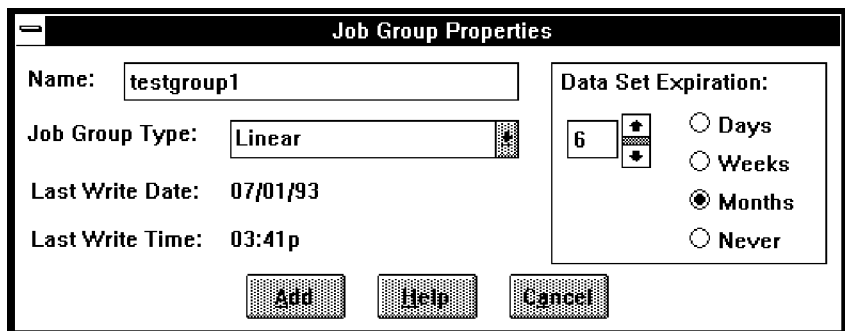
You can customize the Librarian database by defining additional job groups as needed. You can, for example, create a new job group to handle data protection for a particular file system in addition to your regular Restore Any Day strategy. This section explains how to define these groups. The two basic steps are viewing your installed job groups which define the sets of media cartridges you can use to run backup jobs or, if necessary, creating additional job groups.

 If you do not wish to use the installed Restore Any Day strategy, consult [Chapter 4, "Backup Operations"](#) for alternative backup strategies.

### Creating a New Job Group


Create a new job group whenever you need to define an exclusive pool of media cartridges to a particular group of related backup jobs. Your system is pre-configured with the same Librarian-managed job group that you can see in the Librarian window: Restore Any Day. All job groups that you create are managed by ServerStor, based on the media selection method that you assign when you create the job group. ServerStor knows when each data set can be overwritten, and keeps track of which media cartridge is to be used next.

1. To create a job group, open the Librarian window and highlight the media group.
2. Choose Create from the Edit menu. The Job Group Properties dialog box is displayed.




The image shows a screenshot of the "Job Group Properties" dialog box. It has a title bar with a minus sign and the text "Job Group Properties". Inside, there are several fields and a group box. The "Name:" field contains "testgroup1". The "Job Group Type:" field is a dropdown menu showing "Linear". The "Last Write Date:" field shows "07/01/93". The "Last Write Time:" field shows "03:41p". To the right is a "Data Set Expiration:" group box containing a numeric field with "6", up and down arrow buttons, and four radio button options: "Days", "Weeks", "Months" (which is selected), and "Never". At the bottom are three buttons: "Add...", "Help", and "Cancel".

3. In the Name text box, type the name of the Job Group. You can assign any name you wish, but do not use \ : or +. (You'll hear a beep if you type an illegal character.)
4. In the Job Group Type list box, click the scroll arrow to display available media selection methods: Linear and Tower of Hanoi; (Linear is the default). For this job group, select Linear.

 *For a complete explanation of Linear and Tower of Hanoi media selection methods, see [Chapter 3, "The Librarian and File System."](#)*

5. Under Data Set Expiration, select the button that corresponds to how long you want ServerStor to maintain the data sets on all media cartridges in this job group. In the example, "six months" was selected.


 *ServerStor assigns a cartridge based on the media selection method that you specify. There is no need for you to worry about which media cartridge to use for a backup; ServerStor does that for you. It uses a special algorithm for each media selection method, and prompts you for the media cartridge it needs.*

6. Choose Add. Note that the new job group has now been added below the media group in the Librarian window. You have now configured the Librarian database. You can now create a backup job.

## Changing to a New Backup Device Type

If you wish to change to a new type of backup device (e.g., a different type of SCSI tape drive), you do not need to re-install ServerStor. You can continue using the ServerStor Librarian that you used with your original backup device, by following this procedure:


1. Install your new SCSI backup device. For details, refer to your hardware manual.
2. Default to the directory in which ServerStor is installed. Type RES-QINST ↵ to bring up the server-side Main Menu. Choose item 2, Hardware Options.
3. Choose the Check Config button to reconfigure the settings for the new backup device. Close the Hardware Options dialog box.
4. Test your new backup device by defining and running a short backup job.

 *Warning: You will not be able to access your old media cartridges if your new backup device type is incompatible with the old.*

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# The Librarian and File System

## Basic Functions of Librarian

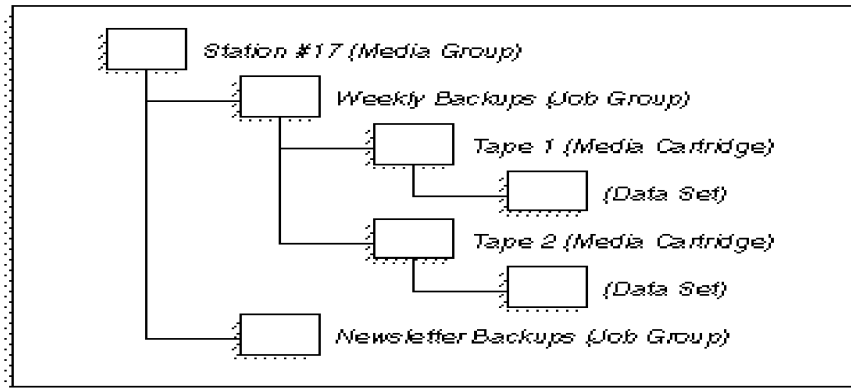
 *Externally label all your backup media cartridges. If you don't label your media cartridges, restoring lost data will be much more difficult, recovering from a server crash may not be possible, and the major benefits of having ServerStor will be wasted.*

The Librarian database helps you perform many different tasks as you manage both on-line and off-line storage of data. These tasks can be grouped under the following basic functions:

- Tracking files that have been backed up. The Librarian database keeps track of the servers, volumes, directories, subdirectories, and files that have been backed up. The database also tracks when data was backed up and the media cartridge location of your data.
- Organizing backup media. The Librarian database helps you to organize your backup media for particular purposes.
- Listing directories and files on a media cartridge. The Librarian database tells you what files are on a media cartridge. This is especially useful if you do not know what files are on a particular cartridge.

## Structure of the Librarian Database

The Librarian database is structured to keep track of data stored on media cartridges. It does this by organizing and tracking various *objects*. These objects include the backup jobs, media cartridges used by the jobs, and the data sets stored on the media cartridges. The Librarian database establishes a hierarchy that organizes the objects into a logical structure. This is explained in the next several sections. (Please refer to the diagram on the next page.)



### Data Sets and Media Cartridges

ServerStor refers to a single backup (no matter how small or large—one single file or an entire volume) as a data set. The media on which the backup is performed is called the media cartridge. For example, the data set stored on Tape 1 could be your Monday backup. The data set stored on Tape 2 could be Tuesday's backup.

### Job Groups

Data sets are recorded on media cartridges, and media cartridges are associated under job groups. You can think of a job group, therefore, as being a group of logically related media cartridges. In our example, Tapes 1 and 2 could be associated with the job group “Weekly Backups.”

You may define a job group with special media selection attributes. This will help you use job groups to set up (and automate if desired) several types of secondary storage strategies.

There are two basic types of job groups:

- **Free Pool.** ServerStor automatically creates the Free Pool job group at the time of installation. You may never delete or insert a Free Pool job group. When performing a backup, the Free Pool job group allows the use of any cartridge, as long as that cartridge is not currently allocated to any other job group in the current library. However, other job groups can “pull” cartridges from the Free Pool job group into their own if additional cartridges are required. ServerStor looks in the Free Pool job group when it needs a new media cartridge.

Any media cartridge in a Free Pool job group is eligible to be overwritten. When you no longer need a media cartridge, you can move it to the Free Pool job group. Similarly, if there is a media cartridge in the Free Pool you wish to ensure is never overwritten, it may be moved to the Archives Group.

The Free Pool job group also contains a chronological listing of its media cartridges. This listing scheme places the newest cartridges at the bottom of the list and the oldest at the top of the list. This allows you to see a Least Recently Used (LRU) list of cartridges in the Free Pool job group.


- **Librarian-managed.** When you create a Librarian-managed job group, the media cartridges assigned to that job group *cannot be used by any other job group*. ServerStor will manage the media cartridges in the Librarian-managed job group depending upon the media selection method you have chosen for the job group. A media selection method will determine which media cartridges are selected for a particular backup, how many media cartridges to use, and how long to keep the backups.

There are two Librarian-managed job groups created automatically at the time of installation:

- **Restore Any Day.** By default, this job group is targeted by two backup jobs which perform Complete and Differential backups. See “McAfee's Rescue and Restore Any Day” in [Chapter 4, “Backup Operations.”](#)
- **Archives.** This job group is intended for any backups you wish to keep indefinitely.

When you create your own Librarian-managed job groups, you can choose one of two media selection methods. (We'll tell you how to create job groups a little later in the section "Creating a Job Group.")

- **Linear.** Every linear job group requires you to specify how long you wish to maintain backed up data sets before overwriting them. Any media cartridge that you create with a backup job in a linear job group will be kept for the period of time (days, weeks, months) that you specify in the Job Group Properties dialog box. If you specify "Never," you will never overwrite any media cartridge in this group. (In effect, it becomes another Archives job group.)

 *The Restore Any Day and Archives created for you during installation are linear job groups.*

ServerStor tracks the media cartridges for you, prompting you for the proper media cartridge to use when performing a backup. You may decide to append to a media cartridge or overwrite it when the backup job is created. (This decision is made in the Backup Options dialog box; see "Backup Options Dialog Box" in [Chapter 4, "Backup Operations."](#)) If you elect to append, ServerStor will prompt you for the media cartridge that was used for the last backup performed in this job group. If the media cartridge is full, you will be prompted for another cartridge.

If you decide to overwrite, ServerStor will either use the eligible media already mounted in the backup device, or will prompt you for either a media cartridge in this job group that has expired (i.e., it is older than the time period you specified to keep it), or you will be prompted for a media cartridge from the Free Pool job group. You may also use a blank cartridge or any cartridge that is not in a Librarian-managed group.

As jobs are run against a linear job group, the media cartridges created are listed chronologically below the job group in the Librarian window with the oldest media cartridge at the top of the list. When it is time to overwrite a media cartridge, ServerStor prompts you to insert the media cartridge at the top of the list (the oldest—and only if it has expired), and the recycling process begins.

- **Tower of Hanoi.** The second media selection method is a backup strategy which uses the Tower of Hanoi media rotation. Its purpose is to allow the user with a very limited number of media cartridges to enjoy the benefits of data protection and archiving with a single backup strategy. Tower of Hanoi is explained in detail in the section "Tower of Hanoi" in [Chapter 4, "Backup Operations."](#)

## The Media Group

The media group is the highest level of the hierarchy in the Librarian database. The media group contains one or more job groups which, as we have noted, contain one or more media cartridges with data sets (backups).

---

## Creating Job Groups

As noted above, the basic structure of the Librarian database organizes backups into a hierarchy with the media group at the highest level.

You'll recall that ServerStor refers to a single backup as a *data set*. The media where the backup is recorded is called the *media cartridge*. Media Cartridges with a common purpose are associated under *job groups*. Finally, job groups are grouped in the *media group*.

When you first install ServerStor, the Librarian database is created for you. The Librarian database includes the media group representing your hardware, and it includes three job groups: Free Pool, Restore Any Day and Archives.

If you have not already done so, you may wish to read the section "job groups" (earlier in this chapter) to review the two basic types of job groups (Free Pool and Librarian-managed) and the two media selection methods (Linear and Tower of Hanoi) available to you.

This section takes you step by step in creating a job group (in addition to the default Free Pool job group that is automatically created when you install ServerStor.) To create a job group, perform the following steps:

1. Choose the Librarian button in the tool bar to open the Librarian window.
2. In the Librarian window, highlight the media group.
3. Select the Edit menu and choose "Create..."
4. The Job Group Properties dialog box for a Librarian-managed job group automatically appears, allowing you to set up specific attributes for the new job group.

The Job Group Properties dialog box consists of the following fields:

- **Name.** Enter the name you wish to give to the job group.

- **Job Group Type.** Offers you the choice of a *Linear* job group type or a *Tower of Hanoi* job group type. If you select Linear job group, the Job Group Properties dialog box will display the Data Set Expiration field.

The dialog box titled "Job Group Properties" shows the following fields and controls:

- Name:** MNS Restore Any Day
- Job Group Type:** Linear (selected from a dropdown menu)
- Last Write Date:** 07/02/93
- Last Write Time:** 10:19a
- Data Set Expiration:** A sub-dialog box containing:
  - A numeric field with the value "1" and up/down arrow buttons.
  - Four radio buttons: Days, Weeks, Months (selected), and Never.
- Buttons at the bottom: Add, Help, and Cancel.

- **Data Set Expiration.** This field is associated with Linear job groups only. Any media cartridge that you create with a backup job in a Linear job group will be kept for the period of time (days, weeks, months) that you specify in this field. If you specify "Never," you will never overwrite a media cartridge in this group.

If you select Tower of Hanoi job group, the Job Group Properties dialog box will display the Media Cartridges field.

The dialog box titled "Job Group Properties" shows the following fields and controls:

- Name:** T of H
- Job Group Type:** Tower of Hanoi (selected from a dropdown menu)
- Last Write Date:** 07/02/93
- Last Write Time:** 10:21a
- Media Cartridges:** A sub-dialog box containing:
  - A numeric field with the value "3" and up/down arrow buttons.
- Buttons at the bottom: Add, Help, and Cancel.

- **Media Cartridges:** This field is associated with Tower of Hanoi job groups only. Use this field to specify the number of cartridges for your Tower of Hanoi job group. (Refer to "Tower of Hanoi" in [Chapter 4](#), "Backup Operations" for information regarding the number of cartridges used.)
- **Last Write Date.** This field displays the last date information was added to the job group. (This field cannot be edited.)

- **Last Write Time.** This field displays the time of the Last Write Date. (This field cannot be edited.)

After making the appropriate entries in these fields, click one of two options:

- **Add.** Saves the job group name and entries you make in the above fields.
- **Cancel.** Closes the Job Group Properties dialog box. If you choose Cancel, none of the information entered in the above fields takes effect, and no new job group is created.

## Object Properties

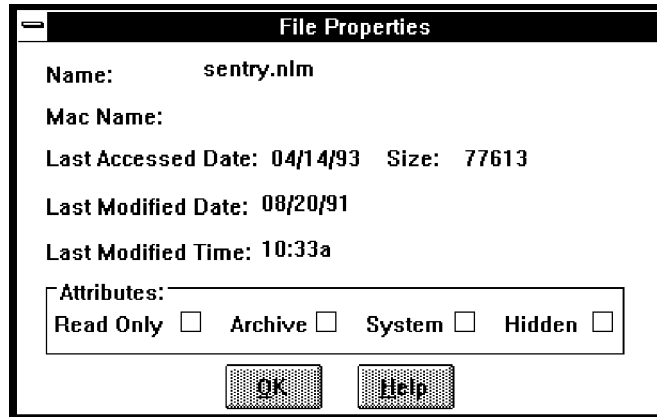
It's easy to get information about a file, directory, data set, media cartridge, job group, or the media group in your Librarian database. Highlight the object that you wish to know about from your File System or Librarian window, then select the Edit menu and Choose "Properties." This section shows you the dialog boxes and fields for any object you select from your Librarian database.

### File Properties Dialog Box

The File Properties dialog box gives you information about a file in the File System or Librarian. To access the File Properties dialog box, perform the following steps:

1. Choose the File System or Librarian button in the tool bar to open the desired window.
2. Double-click the icon of the appropriate job group to display the media cartridges associated with the job group. Double-click the icon of the appropriate Media Cartridge to display the data sets on the cartridge.
3. Double-click the icon of the desired data set to display the directories in the data set. Single-click the icon of the needed directory to display the files in the directory. Then highlight the file you want information about.

4. Select the Edit menu and choose “Properties” to display the File Properties dialog box.



The File Properties dialog box contains the following display fields (which cannot be edited):

- **Name.** Displays the selected filename.
- **Mac Name.** If a file was created with a Macintosh system and the name exceeds the DOS eight character limit, this field displays the Mac long name.
- **Last Accessed Date.** In the File System, this field displays the date that the selected file was last accessed. In the Librarian, this field is not displayed.
- **Size.** Displays the size of the file in bytes.
- **Last Modified Date.** Displays the date that the selected file was last modified.
- **Last Modified Time.** Displays the time that the selected file was last modified.
- **Attributes.** Displays whether the file attributes (Read Only, Archive, System, Hidden) are turned on or off.
- **OK.** This button closes the File Properties dialog box.

## Directory Properties Dialog Box

The Directory Properties dialog box gives you information about any directory in your File System or Librarian database. To access the Directory Properties dialog box, perform the following steps:

1. Choose File System or Librarian in the tool bar to open the desired window.
2. Double-click the icon of the appropriate job group to display the media cartridges associated with the job group. Double-click the icon of the appropriate media cartridge to display the data sets on the cartridge.
3. Double-click the icon of the desired data set to display the directories in the data set. Then highlight the directory you want information about.
4. Select the Edit menu and choose "Properties" to display the Directory Properties dialog box.



The Directory Properties dialog box contains the following display fields (which cannot be edited):

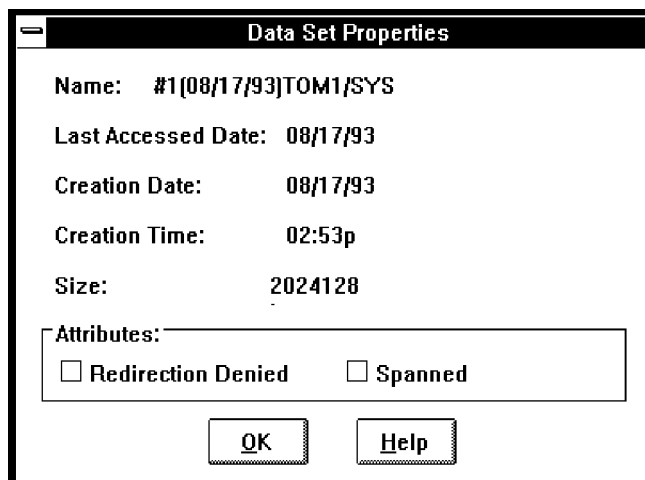
- **DOS Name.** Displays the volume letter and name of the selected directory.
- **Mac Long Name.** If a directory was created with a Macintosh system and the name exceeds the DOS eight character limit, this field displays the Mac long name.
- **Creation Date.** Displays the date that the directory was created.

- **Creation Time.** Displays the time that the directory was created.
- **Attributes.** Displays whether the file attributes (Hidden, System) are turned on or off.
- **OK.** This button closes the Directory Properties dialog box.

## Data Set Properties Dialog Box

The Data Set Properties dialog box gives you information about any highlighted data set contained on a media cartridge. To access the Data Set Properties dialog box, perform the following steps:

1. Choose the Librarian button in the tool bar to open the Librarian window.
2. Double-click the icon of the appropriate job group to display the media cartridges associated with the job group. Double-click the icon of the appropriate Media Cartridge to display the data sets on the cartridge.
3. Highlight the data set that you want to access information about.
4. Select the Edit menu and choose “Properties” to display the Data Set Properties dialog box.



The Data Set Properties dialog box contains the following display fields (which cannot be edited):

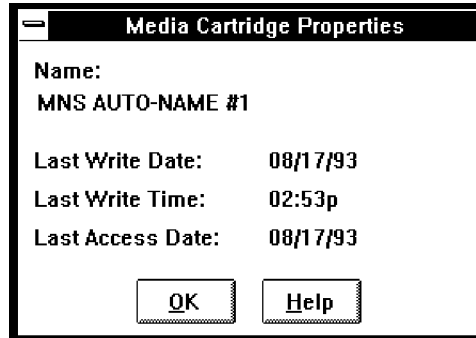
- **Name.** Displays the name of the job, the data set number, the date of the backup, and the volume name of the selected data set.
- **Last Accessed Date.** Displays the date that the selected data set was last accessed from the system.
- **Creation Date.** Displays the date that the selected data set was created on the cartridge.
- **Creation Time.** Displays the time of the Creation Date.
- **Size.** Displays the size (in bytes) of the data set.
- **Attributes.** Displays whether the file attributes (Redirection Denied, Spanned) are turned on or off.
- **OK.** This button closes the Data Set Properties dialog box.

## Media Cartridge Properties Dialog Box

The Media Cartridge Properties dialog box gives you information about any highlighted media cartridge within a job group and can be used to rename a media cartridge. To access this dialog box, perform the following steps:

1. Choose the Librarian button in the tool bar to open the Librarian window.
2. Double-click the icon of the appropriate job group to display the media cartridges associated with the job group.
3. Highlight the media cartridge you want information about.

4. Select the Edit menu and choose “Properties” to display the Media Cartridge Properties dialog box.



The Media Cartridge Properties dialog box consists of the following fields:

- **Name.** Displays the name of the selected media cartridge. This name can be changed at any time. (If you do change the cartridge label, remember to change the external label on the outside of the cartridge, too.)
- **Last Write Date.** Displays the date that the selected media cartridge was last written to.
- **Last Write Time.** Displays the time of the Last Write Date.
- **Last Accessed Date.** Displays the date that the selected media cartridge was last accessed from the system.
- **OK.** This button saves any changes made to the media cartridge name and closes the Media Cartridge Properties dialog box.
- **Cancel.** Closes the Media Cartridge Properties dialog box. If you choose Cancel, any name change entered in the name field does not take effect and the media cartridge reverts back to its previous name.

## Job Group Properties Dialog Box

The Job Group Properties dialog box gives you information about any high-lighted job group in your Librarian. To access the job group Properties dialog box, perform the following steps:

1. Choose the Librarian button in the tool bar. (You can also select the Window menu and then choose Librarian.)
2. Highlight the job group you want information about.
3. Select the Edit menu and choose “Properties” to display the Job Group Properties dialog box.

The Job Group Properties dialog box consists of the following fields:

- **Name.** Displays the name of the selected job group.
- **Job Group Type.** Displays the Media Selection *type* for the job group (Linear or Tower of Hanoi).

If you created the job group as Linear, the Job Group Properties dialog box will display the Data Set Expiration field.

**Job Group Properties**

**Name:** MNS Restore Any Day

**Job Group Type:** Linear

**Last Write Date:** 00/00/80

**Last Write Time:** 12:00a

**Data Set Expiration:**

1 [up/down arrows]

☐ Days

☐ Weeks

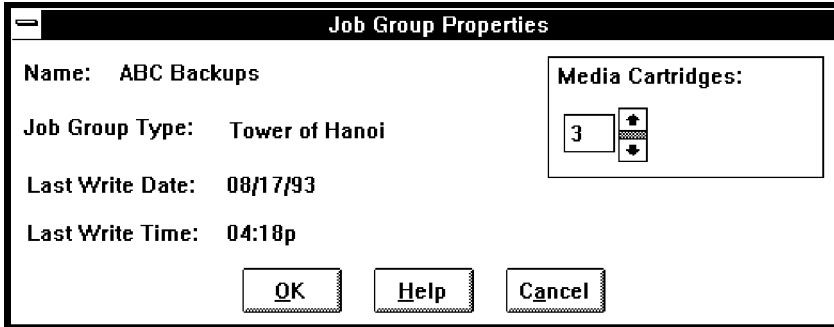
☒ Months

☐ Never


**Change** **Help** **Cancel**

- **Data Set Expiration.** This field is associated with Linear job groups only. Any media cartridge that you create with a backup job in a Linear job group will be kept for the period of time (days, weeks, months) that you specify in this field. If you specify “Never,” you will never overwrite a media cartridge in this group.

If you created the job group as Tower of Hanoi, the Job Group Properties dialog box will display the Media Cartridges field.



- **Media Cartridges.** This field is associated with Tower of Hanoi job groups only. Use this field to specify the number of cartridges for your Tower of Hanoi job group. (Refer to the section “Tower of Hanoi” in [Chapter 4, “Backup Operations.”](#))

 *If the job group you've selected is the Free Pool job group, neither the Data Set Expiration nor the Media Cartridges Field will be displayed.*

- **Last Write Date.** Displays the last date that information was added to the job group.
- **Last Write Time.** Displays the time of the Last Write Date.

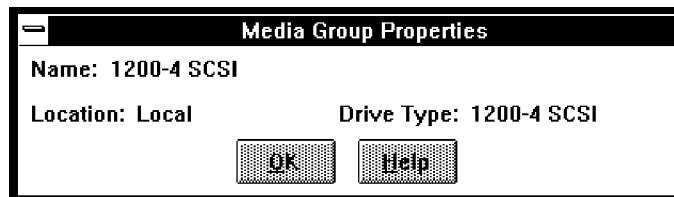
After you have made the appropriate entries in these fields, click one of two options:

- **OK.** This button saves any entries you made in the above fields and closes the Job Group Properties dialog box.
- **Cancel.** Closes the Job Group Properties dialog box. If you choose Cancel, none of the information entered in the above fields takes effect and the job group reverts back to the previous settings.

## Media Group Properties Dialog Box

The Media Group Properties dialog box gives you information about the media group in your Librarian. To access the Media Group Properties dialog box, perform the following steps:

1. Choose the Librarian button in the tool bar to open the Librarian window.
2. Highlight the media group.
3. Select the Edit menu and choose “Properties” to display the Media Group Properties dialog box.



The Media Group Properties dialog box consists of the following fields:

- **Name.** Displays the name of the media group.
- **Location.** Displays the location of the backup device attached to your system.
- **Drive Type.** Displays the backup device type selected for the media group.
- **OK.** This button closes the Media Group Properties dialog box.

## Viewing

The view of the Librarian database can be changed in two basic ways:

- Collapsing/Expanding the hierarchical view.
- Altering the level of detail and sort order of displayed files.

The first approach uses the **tree structure**. The applicable commands are chosen in the View menu:

- **Tree Expand Branch.** Use this command to display the structures within the media group. When you select “Tree Expand Branch,” you will be prompted to enter 1, 2, 3, 4, or “All” levels.
  - If you enter one level, you see the media group and the job groups within the media group.
  - If you enter two, three, four, or “All” levels, the tree is displayed with varying amounts of detail. That is, you see different levels of job groups, media cartridges, and data sets.
- **Tree Collapse Branch.** This command has the opposite effect of the Tree Expand command: it collapses all expanded branches allowing you to view only the media group.


The second approach uses file details and the sort feature. You can select the level of detail to be shown and view the files in a variety of sorted ways. In the View menu, select Name Only, All Details, or Partial Details. If you select Name Only, you will see file names only with no details displayed. If you select All Details, you see the following information displayed:

- Last Modified Date and Time
- Size
- Attributes

If you select Partial Details, a small menu is presented where you select any combination of the above three pieces of information.

In addition to generating an unsorted listing of files (just select Unsorted in the View menu), there are several ways to produce a sorted listing of files. Select the appropriate command in the View menu:

- Sort by Name. Files are displayed sorted by name in alphabetical order.
- Sort by Extension. Files are displayed sorted by file extension in alphabetical order.
- Sort by Size. Files are displayed sorted by file size in ascending order of size.
- Sort by Modified Date. Files are displayed sorted by the last modified date.


 *Selecting a sort method does not in any way rearrange your Librarian database. A sort method only gives you a temporary listing of selected directories and files in an order selected by you.*

## Tagging Files in the Librarian Database

It is possible to tag files and directories in the Librarian database for restoring and verifying. To do so, step through the various levels of objects until you reach the desired directories and files:

1. Double-click the icon next to the desired job group. This will cause the media cartridges associated with that job group to be displayed.
2. Double-click the icon next to the appropriate media cartridge. This will cause the data sets on that media cartridge to be displayed.
3. Double-click the icon next to the data set you wish to view. This will cause the directories in that data set to be displayed.
4. Click or double-click the icon next to the directory you wish to view as explained below:

If you single click the *icon* next to the directory, all the files in that directory will be displayed. You can then individually tag all the files you wish to restore or verify. As you tag each file, a check-mark will appear just to the left of the filename. If you double-click the directory *name*, all the files in that directory will be displayed *and* automatically tagged for viewing. You will see check-marks next to all the filenames.

 You can use the mouse to tag and un-tag files. With the mouse, drag over a group of files to highlight them. Then hold down the shift key while double-clicking the last file in the group. This tags (or un-tags) the whole group of files.

You can also use the "Tag/Un-tag" and "Tag/Un-tag All" functions to rapidly tag and un-tag files. Select the Edit menu and choose these commands when appropriate: "Tag/Un-tag All" will tag (or un-tag) all the files in a highlighted directory. "Tag/Un-tag" can then be used to un-tag a few files you don't want included in an operation.

## Locating a File

The Librarian database allows you to easily determine on which media cartridge a file is located. To access the Search Library dialog box, choose the Search button in the tool bar or select the Edit menu from the menu bar and choose "Search Library."

The Search Library dialog box consists of the following fields:

- **Search for.** Enter the name of the file you want to search for in this field. If you want to find out where certain files in a particular directory were backed up to, and you know the directory name, you can enter the file-name and the path of that directory in this field.

You can also use "\*" to search for all files backed up (from the selected volume) onto secondary media. The use of DOS wildcard characters is allowed.


**Example #1:** You want to find the locations of .DOC files in your library. Enter **\*.DOC** in this field.

**Example #2:** You want to find the locations of .BAT files in the \SYSTEM directory in your library. Enter **SYSTEM\*.BAT** in this field.

- **From volume.** Access the pull down list in this field to select the name of the volume to be searched. This is the assigned name given when you installed ServerStor. If you do not specify a volume, the default value is all volumes.
- **Include subdirectories.** This searches all subdirectories in the current path.
- **File date restriction.**
  - ❑ **None.** Select this option to search for the specified file(s) without any regard to the file's last modified date and time.
  - ❑ **Most recent.** Select this option to search for the specified file(s) with the most recent modified date and time.
  - ❑ **Range.** Use this field to specify the last-modified date range of the file(s) to be searched.


After you have made the appropriate entries in these fields, select the Scan button. This will cause the Librarian to search for any instance of the particular file entered in the "Search for" field.

- **File System Path.** After executing a Scan, the scan list box displays the files found during the scan, the date and time the files were last modified, and the size of the files. If you highlight a file's name, the complete system path for the file will be displayed in the File system path field.

 *There is a 100 file limit on matched files per volume.*

After you have highlighted a file in the list box, select the **View** button. This closes the Search Library dialog box and opens up the Librarian window which displays a highlighted directory location within the hierarchy, and also highlights the selected file (from the scan list dialog box) in the Librarian file view dialog box.

- **Close.** The button causes ServerStor to stop searching for the file(s) and closes the Search Library dialog box.

 ***externally label all your backup media cartridges.*** *If you don't label your media cartridges, restoring lost data will be much more difficult, recovering from a server crash may not be possible, and the major benefits of having ServerStor will be wasted.*

## **Speeding Up a Search**

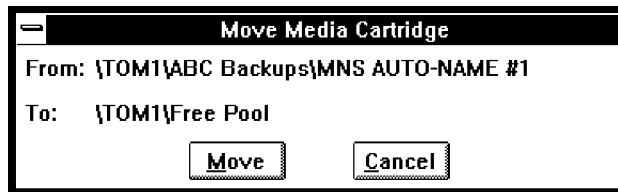
The more specific you make the entry in the “Search for” field, the faster the program can locate your file(s). For example: suppose you are looking for the file MAN.DOC, which resides in the librarian under \DOCS\JOHNB\ATE\MAN.DOC. If you type \\*.DOC in the Search For field and select the Include Subdirectories checkbox, the program will search all subdirectories below the root for the selected file. This may take some time.

The program will find your file faster if you furnish the file information in the following form: \DOCS\JOHNB\\*.DOC, and select the Include Subdirectories checkbox. The program will find your file even faster if he enters \DOCS\JOHNB\ATE\MAN.DOC. (Because you have entered a specific path and filename, you do not need to check the Include Subdirectories checkbox.)

## Moving a Media Cartridge

After you perform a backup, a media cartridge is created within the job group that you specified. ServerStor allows you to move the media cartridge to a different job group if you desire. To do so, perform the following steps:

1. Choose the Librarian button in the tool bar to open the Librarian window.
2. Double-click the icon of the appropriate job group to display the media cartridges associated with the job group.
3. Highlight the media cartridge that you want to move.
4. Select the Edit menu and choose “Move Media Cartridge” to display the Move Media Cartridge dialog box.




The Move Media Cartridge dialog box consists of the following fields:

- **From.** This field displays the name of the media group, job group, and media cartridge that you highlighted in the Librarian window.
- **To.** Enter the path of the media group and job group where you wish to move the media cartridge.

After you have made the appropriate entries in these fields, click one of two options:

- **Move.** Use this command to move the cartridge (as designated in the “From” field) to a different location (as designated in the “To” field).

- **Cancel.** Closes the Move Media Cartridge dialog box. If you close the Move Media Cartridge dialog box without moving the media cartridge to a different location, none of the information you entered in any of the fields takes effect—and the Move is *not* executed.

 *ServerStor offers an automatic way to move a media cartridge to the Free Pool job group. Just highlight the name of the media cartridge, select the Edit menu and choose "Move to Free Pool."*

## Deleting a Job Group or Media Cartridge


You can delete a media cartridge from a job group or a job group from the Media Group. To delete either of these objects, perform the following steps:

1. Choose the Librarian button in the tool bar to open the Librarian window.
2. In the Librarian window, highlight the media cartridge or job group you wish to delete.
3. Select the Edit menu and choose "Delete..." The Delete dialog box will appear.




The Delete dialog box consists of the following fields:

- **Yes.** Use this button to delete your job group or media cartridge.
- **No.** This button closes the Delete dialog box and cancels the Delete request.

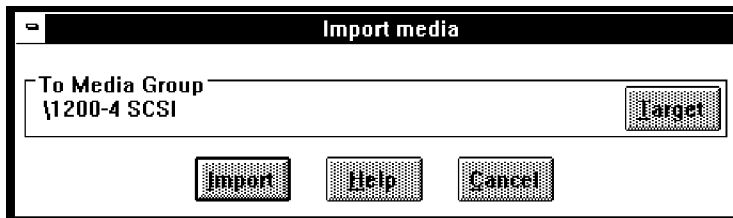
 *Deleting a job group also deletes from the Librarian ALL information pertaining to media cartridges and data sets that are associated with that job group. The data still exists on backup media, of course, but the Librarian will not be able to find it.*

## Importing Media Cartridges

If you backed up data using another ServerStor installation, ServerStor allows you to add these media cartridges to your Librarian database. With the Import Media dialog box, you can read a backup media cartridge and put the information from that cartridge into the Librarian database just as if the original backup operation had been performed under ServerStor.

 *To **import** a media cartridge is to read a backup media cartridge and put the information from that cartridge into the Librarian database just as if the original backup operation had been performed under ServerStor. The information imported will include the data sets on the cartridge; it becomes part of the Free Pool job group.*

The Import Media dialog box is invoked by selecting the Actions menu in the Menu and choosing "Import Media."




The Import Media dialog box consists of the following fields:

- **To Media Group.** Displays the media group name. If the media group name is not already displayed, click the Librarian window and highlight the media group. Click again the Import dialog box. The media group name will then be displayed in the "To Media Group" field.
- **Target.** Will open the Librarian window if it is not already opened.

After you make the appropriate entry in this field, you can click one of two options:

- **Import.** Performs the import action: the media cartridge and its data set(s) are automatically imported into the Free Pool job group. (You can later move the cartridge to another job group via the Move Media Cartridge dialog box.)

If the media cartridge already exists in the Library, you will be given the option of re-importing data on the cartridge over what is currently in the Library.

 *If you choose to leave the media cartridge in the Free Pool job group, the cartridge will be eligible for overwriting.*

- **Cancel.** Closes the Import Media dialog box and cancels the request for importing a media cartridge.


## The File System and Tagging

The File System in ServerStor is most frequently used to tag files for backups. To tag any file in your file system, follow these steps:

1. Double-click the icon next to the desired directory. This will display the subdirectories.
2. You may now click or double click the name of the appropriate subdirectory.

If you click the *icon* next to the subdirectory, all the files in that subdirectory will be displayed. You can then individually tag all the files desired for a media operation. Check-marks appear just to the left of tagged files.

If you double-click the subdirectory *name*, all the files in that subdirectory will be displayed *and* automatically tagged for a media operation. You will see check-marks next to all the filenames.

 *If you wish to automatically tag all the files in **all** the subdirectories of a given directory, double-click the name of the directory. A check-mark will be displayed to the left of the directory.*

*You can also use the "Tag/Un-tag" and "Tag/Un-tag All" functions to rapidly tag and un-tag files. Select the Edit menu and choose these commands when appropriate: "Tag/Un-tag All" will tag (or un-tag) all the files in a highlighted directory. "Tag/Un-tag" can then be used to un-tag a few files you don't want included in an operation. You can also tag all files within a directory by selecting "Tag/Un-tag All" from the Edit menu. Selecting "Tag/Un-tag All" again will un-tag all files.*

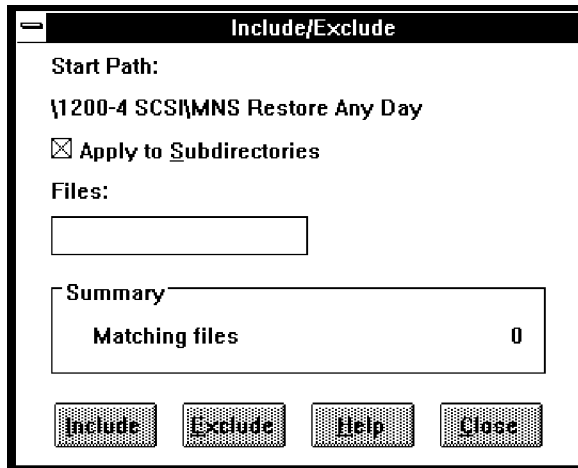
The File System is also used for other purposes, and some of these purposes aid you in your backups as well. Some of the File System functions include:

- Viewing the File System
- Updating Last Accessed Dates

The File System commands are used to manage the File System and are executed in the same manner as they are in managing the Librarian database.

## The Include/Exclude Dialog Box

The Include/Exclude dialog box allows you to define exact path specifiers for including or excluding files from the Librarian and File System operations. It is accessed by selecting the Tools menu and choosing "Include/Exclude."



The Include/Exclude dialog box consists of the following fields:

- **Search.** Specifies the path of the files to be specifically included or excluded in an operation.
- **Apply to Subdirectories.** Causes all subdirectories in the current path to be searched for any files matching the current specified field. If any files are found, they are designated for inclusion/exclusion.
- **Files.** Enter the names of files you want to include or exclude in your operation. (DOS wildcard characters are allowed.)

After making the desired entries in these fields, click one of three options:

- **Include.** This applies the selections to the files you have marked for inclusion.
- **Exclude.** This applies the selections to the files you have marked for exclusion.

- **Close.** Closes the Include/Exclude dialog box. If you close the dialog box without first applying your selections, the operation you execute does *not* include or exclude the files you selected.

---

# Backup Operations

## Choosing a Backup Strategy

With ServerStor you can perform two basic types of backups and apply restrictions to these backups. These backup types and restrictions are discussed below.

Types of Backups You Can Perform Using ServerStor	
Backup Type	Description
Complete	Used to back up all directories and files. This is a file-by-file backup; it is <i>not</i> a disk image backup. <i>In the event of a server crash, a Complete backup is essential for a recovery.</i>  The Complete backup may require numerous media cartridges to backup an entire server.
Partial	Used to back up selected directories and files.

Restrictions on Backups			
Restriction	Description	Advantages	Disadvantages
None	No restrictions are applied to the backup. (This is essential for disaster recovery!)	All directories and files selected will be backed up. Helps disaster recovery.	May take longer. May require more media cartridges.

Restrictions on Backups			
Differential	Used to back up all files that have changed since the last Complete backup.	Requires only a Complete restore and one Differential restore to restore a volume. Supported by the Rescue function.	May use more media cartridges than an Incremental backup.
Incremental	Also known as an Archive Bit set. Used for backing up all files that have changed since the last Complete or Incremental backup.	Uses fewer media cartridges.	Very limited backup. Makes recovery very difficult. <i>Not supported by the Rescue function.</i>
Date Range	Used to back up only those files within a designated date range.	Provides you with an extra copy of date-sensitive data.	Makes disaster recovery difficult. <i>Not supported by the Rescue function.</i>

## McAfee Rescue and Restore Any Day

As explained elsewhere in this manual, users who perform a Differential backup daily and a Complete backup weekly can recover their protected volumes from a catastrophic server crash by using the Rescue function. (Use the Protect button to add to the list of protected volumes.) Differential and Complete backups also give you easy access to copies of frequently changing files, and enable you to restore your server to any day within a given time period.

When you install ServerStor, you get a feature called Restore Any Day (RAD). This feature provides you with a job group called MNS Restore Any Day. This job group contains two compound jobs which automatically perform the needed Complete and Differential backups.


Restore Any Day is a linear job group that is created when ServerStor is installed. The two compound jobs (which are automatically scheduled) are:

- **RAD\_CMPL:** This compound job contains jobs that perform Complete backups of volumes protected by ServerStor.

Additional single jobs that perform complete backups of other volumes that you wish to protect can be added to the RAD\_CMPL compound job. These jobs are created to perform appended backups in order to save media cartridge space. Use the Protect button to modify this compound job.


- **RAD\_DIFF:** This compound job contains a single job that will perform a Differential backup of your installation volume and ServerStor-protected volumes. This job (INSTDIFF) effects an appended backup.

Additional single jobs that perform differential backups of other volumes that you wish to protect can be added to the RAD\_DIFF compound job. These jobs should be created to perform appended backups in order to save media cartridge space.

 *All jobs added to these compound jobs are automatically targeted to the Restore Any Day job group.*


By default, the RAD\_CMPL job is set to run on a weekly basis, and the RAD\_DIFF job is set to run on a daily basis. Also by default, all backups are saved for a period of one month. (You may shorten this period or increase it.)

Once the period for saving data has expired, the media cartridges become eligible for overwriting. You will be prompted for the media cartridge with data sets whose age exceed the time limitation. You may, if you desire, put in another cartridge if it is available.

 *To perform the Rescue function, restore a file, or restore your server to a given day, refer to [Chapter 5, "Restore Operations."](#)*

## **Protecting Additional Volumes**

When you install ServerStor, you are presented with the Rescue Setup menu which allows you to designate volumes to be listed. If, after your initial installation, you wish to update this list and add any unprotected volumes, choose "Protect" in the tool bar to display the Rescue Setup dialog box. For information on using this dialog box, see [Chapter 2, "Data Protection Strategy."](#)

 *To make a volume available to protect, make sure that you have logged on as SUPERVISOR or ADMIN.*

*Remember that the bindery and SYS volume are separate objects. You must back up the bindery **in addition to backing up the SYS volume.***


*NetWare 3.x (and later) users should note that each server has its own bindery. Network 4.x users should also note that the NDS (NetWare Directory Services) volume, a global services database for all the servers on the network, must be backed up—**in addition to** the other binderies and the SYS volume.*

## Append and Overwrite


As you perform backups, you will perform either appended or overwrite backups. Please keep in mind the following guidelines.

In **Rescue-managed job groups**, ServerStor tracks the media cartridges for you, prompting you for the proper media cartridge to use when performing a backup. You may decide to append to a media cartridge or overwrite it when the backup job is created. (This decision is made in the Backup Options dialog box; see “Backup Options Dialog Box” later in this chapter.) If you elect to append, ServerStor will prompt you for the media cartridge that was used for the last backup performed in this job group. If the media cartridge is full, you will be prompted for another cartridge. If you decide to overwrite, ServerStor will prompt you for either a media cartridge in this job group that has expired (i.e., it is older than the time period you specified to keep it), or you will be prompted for a media cartridge from the Free Pool job group. You may also use a blank cartridge or any cartridge that is not in a Rescue-managed group.

Any media cartridge in a **Free Pool job group** is eligible to be overwritten. When you no longer need a media cartridge, you can move it to the Free Pool job group. Similarly, if there is a media cartridge in the Free Pool you wish to ensure is never overwritten, it may be moved to the Archives Group. If you elect to append when using the Tower of Hanoi rotation scheme, **remember that the Tower of Hanoi does not support spanning**. The entire contents of an appended backup must fit on one media cartridge. If you perform multiple backups on the same day, the first backup should be an overwrite backup and the following backups should be appended backups.

 *Externally label all your backup media cartridges. If you don't label your media cartridges, restoring lost data will be much more difficult, recovering from a server crash may not be possible, and the major benefits of having ServerStor will be wasted.*

## Performing a Backup

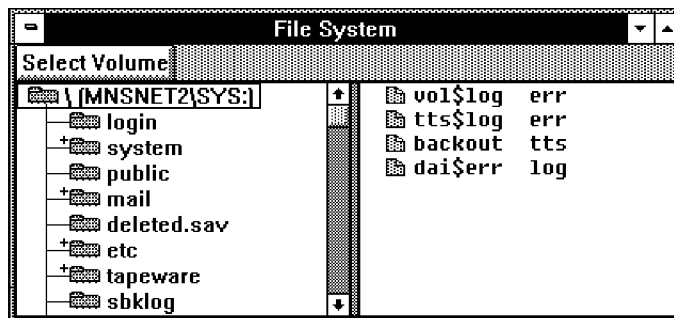
 *Target Service Agents (TSAs) are programs provided with NetWare that make proper communication on your file server possible. **You must load the TSAs (and the RESQMAIN program) at the server, before performing any of ServerStor's operations (backups, restores, verifies).** See Chapter 2, "Data Protection Strategy."*

### The File System Window


To access the File System window, perform the following steps:

1. Choose the File System button in the tool bar to open the File System window.

(You can also select the Window menu and then choose File System.) Either option presents you with the File System window.



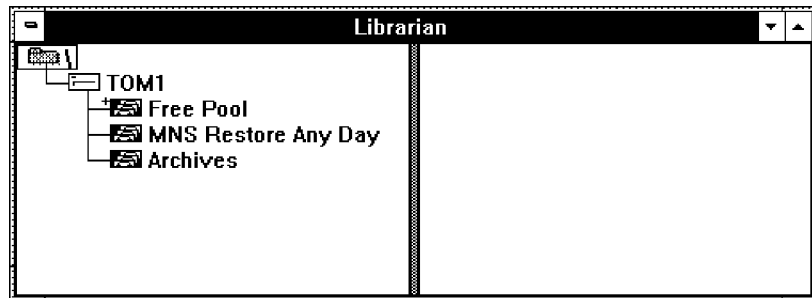
2. Select the volume you want to use from the list of volumes located at the top of the File System window. Once you specify the source volume to ServerStor, you will see the directories, subdirectories, and files you may want to backup.
3. Tag the names of the desired directories, subdirectories, and files to back up.

 *For complete information on tagging files and directories in the File System, see the section "The File System and Tagging" in Chapter 3, "The Librarian and File System."*

## The Librarian Window

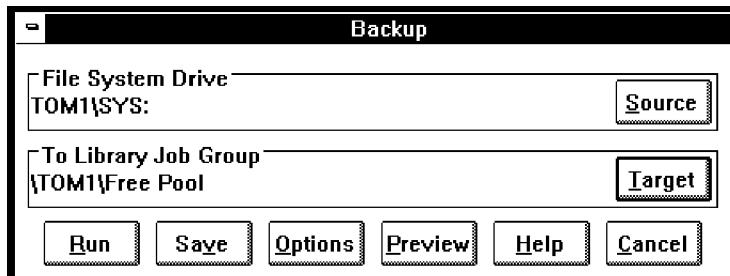
After you select the source volume and tag directories and files from the File System window, thus determining the *source* where files are backed up from, the next step is to determine the job group, or *target*, where files are backed up to. Selecting a job group is done within the Librarian window:

1. Choose the Librarian button in the tool bar to open the Librarian window. (You can also select the Window menu and then choose Librarian.) Either option presents you with the Librarian window.
2. Click the job group as the *target* where directories and files will be backed up.




## The Backup Dialog Box

1. Choose the tool bar's Backup button or select the Action menu and choose Backup. The Backup dialog box will appear.




The Backup dialog box consists of the following:

- **File System Drive.** This field displays the source volume (from a File System window) where files are backed up from.
  - Source. Clicking this button will open the File System window if it is not already opened.
- **To Library Job Group.** This field displays the target (from a Librarian window) Media and job group where files are backed up to.
  - Target. Clicking this button will open the Librarian window if it is not already opened.
- **Run.** This performs the backup operation. While the job is running, the Backup status dialog box is displayed. (This dialog box is discussed later in the chapter.)
- **Save.** If you intend to perform a particular backup operation multiple times, you can facilitate the process by performing a Save. ServerStor saves the information you have entered in the various fields (including the names of all files you have tagged in the File System window). When you choose the Save option, the Save dialog box appears and you are prompted to give the job a name. Then, in the future, you can go directly into the Run Job dialog box, select the job you want, and the backup operation is automatically executed.

 *You do not have to execute a backup operation when saving it. You can access the Backup dialog box, enter the appropriate information in the dialog box fields, and click the “Save” command. The backup operation is ready to be executed when you need it.*
- **Options.** Displays the Backup Options dialog box (described below).
- **Preview.** Displays the Job Preview dialog box (described later in this chapter).
- **Cancel.** Closes the Backup dialog box. If you close the dialog box without choosing the Run command, no backup operation takes place. If you close the dialog box without exercising the Save option, no information entered in any field is saved.

When the job is completed, the Backup Status dialog box is closed, the Librarian is updated, and the new data set is highlighted. If a problem occurs, a Job Error dialog box is also displayed. The Backup status dialog box is illustrated later in this chapter.


## Backup Options Dialog Box

 Options selected now in the Backup Options dialog box are for the specific backup job you are currently setting up. Options selected here do not affect backup defaults. If you wish to select options that will be applied to all backups, you may do so by accessing the Backup Defaults dialog box by selecting the Options menu and choosing Backup Defaults.

The Backup Options dialog box is accessed by choosing Options in the Backup dialog box. Backup Options consists of these fields:

- **Target Media.** This field offers you the choice of adding or overwriting data to a media cartridge.
  - **Append.** May cause data sets to be appended to the existing data on the media cartridge. (A new media cartridge might be chosen by the media selection algorithm.)

- ❑ **Overwrite.** May cause data sets to overwrite the existing data on the specified media cartridge. (Again, a new media cartridge might be chosen by the media selection algorithm.)

 *For guidelines on appending and overwriting media cartridges during backups, see “Append and Overwrite” earlier in this chapter.*

- **Backup restrictions.** Enter the type of backup you wish to perform.

- ❑ **None.** Use this type of backup to back up specifically tagged files with no restriction.
- ❑ **Differential.** Use this type of backup to back up all files that have changed since the last Complete backup. A Differential backup does not reset the archive bit.
- ❑ **Incremental.** Also known as a backup by Archive Bit. Use this type of backup to back up all files that have changed since the last Complete or Incremental backup.
- ❑ **Date range.** Enter the date range of files you would like to include in your backup operation.
- ❑ **Apply Global Filters.** Applies the selections you have made in the Global Filters dialog box.

- **Post Job Action.**

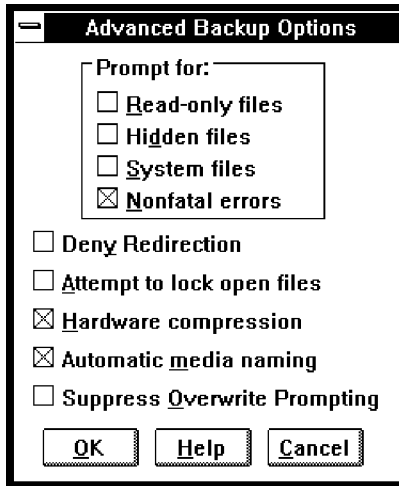
- ❑ **Update Library.** This field is selected as the default. If you deselect the Update Library box, your Librarian database will *not* be updated to show that these files were backed up. Backing up files without updating the Librarian is known as exporting data. This is done when you want to copy files for a reason other than backups (such as making a copy of a file for another user). For more information about the media group, see [Chapter 3, “The Librarian and File System.”](#)
- ❑ **Verify.** Compares cartridge and disk data after the backup operation. This box is selected as the default.
- ❑ **Clear Archive Bit.** The archive attribute is a bit that's associated with each file. ServerStor uses this attribute to keep track of files which have been backed up.

After you have made the appropriate entries in these fields, click one of three choices:

- **OK.** Applies the selections you have made in the above fields.

- **Advanced.** Presents the Advanced Backup Options dialog box.
- **Cancel.** Closes the Backup Options dialog box and resumes backup functions. If you close without clicking OK, no information you entered will take effect.


### Advanced Backup Options Dialog Box



The Advanced Backup Options dialog box is accessed by choosing Advanced in the Backup Options dialog box. Advanced Backup Options consists of the following:

- **Prompt for:**
  - ❑ **Read-only files.** Prompts you when ServerStor encounters read-only files during a backup.
  - ❑ **Hidden files.** Prompts you when ServerStor encounters invisible, or hidden files during a backup.
  - ❑ **System files.** Prompts you when ServerStor encounters system files during a backup.
  - ❑ **Nonfatal error.** Backup operation continues through certain error conditions (for example, open files) unless this box is checked. A list of files not backed up can be accessed by selecting the Tools menu and choosing “View Log.”

- **Deny Redirection.** Prevents files in a data set from being restored to other directories.
- **Attempt to lock open files.** During a backup, some files may be opened by another application. If this check box is not selected, and ServerStor cannot have exclusive access to this file, it will attempt to record-lock the open file. Some applications will fail at this point. Selecting this box causes the open file to be skipped during backup operations and written to the Rescue system log.
- **Hardware compression.** If your tape drive supports hardware compression, this option will cause the compression to take place.


 *Hardware compression differs from data compression in that the former will compress data in the tape drive while the latter will compress data before it is sent to the tape drive. Hardware compression has the advantage of reducing demand on your machine, i.e., it is not employed in compressing data while a backup is taking place. (Hardware compression is ON, by default, for backup devices that have the capability.*

*WARNING: If you have more than one backup device on a single controller and data compression is activated by a jumper on that backup device type, you must either (a) jumper them all for data compression ON, or (b) jumper them all for data compression OFF.*

- **Automatic media naming.** Activates the Media Auto-naming function. This will cause any unidentified tapes to be automatically assigned a unique name/number identifier. (See “Auto-naming” later in this chapter.) By default, this feature is ON.
- **Suppress Overwrite Prompt.** With this option ON, ServerStor will overwrite data on a media cartridge without notifying the user.

After making the appropriate entries in these fields, click one of two choices.

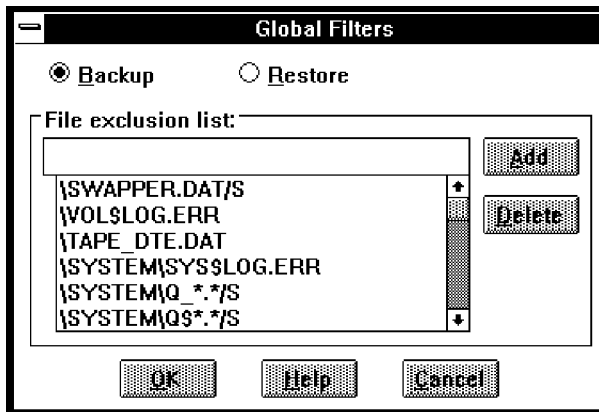
- **OK.** Applies the selections you have made in the above fields.
- **Cancel.** Closes the Backup Advanced Options dialog box and returns you to the Backup Options dialog box. If you close the dialog box without first clicking the OK button, none of the information you entered in any of the fields will take effect.

 Options selected in the Backup Options and Advanced Backup Options dialog boxes may be applied automatically to **all** backups via the Backup Defaults and Advanced Backup Defaults dialog boxes which are accessed by pulling down the Setup menu and selecting Backup Defaults.

## Global Filters Dialog Box

Use Global Filters to specify restrictions to a set of files that you have selected. These restrictions are in the form of an explicit list of files that are *never* to be backed up. Typically, the explicit exclusion list applies to all backups (and restores) you define and is used to exclude certain dynamic or system files.

To access the Global Filters dialog box, select the Tools menu on the Main Menu bar, and then choose Global Filters.



The Global Filters dialog box consists of the following.

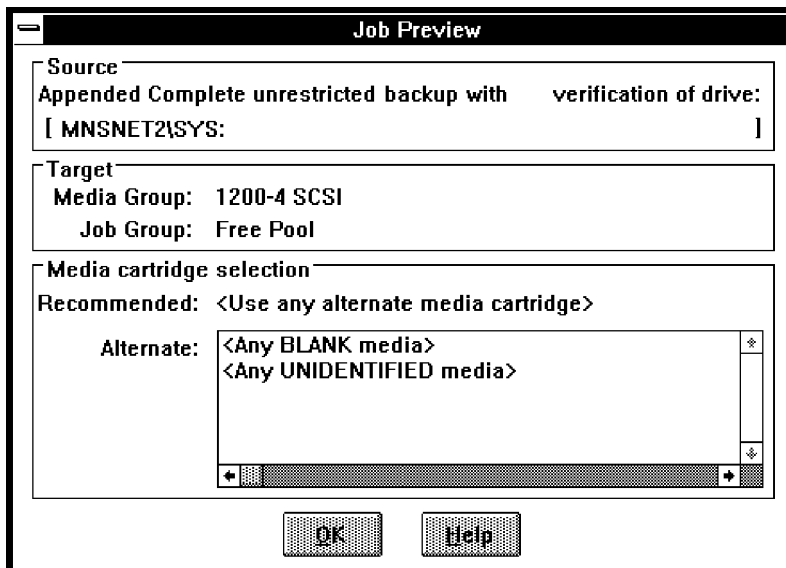
- **Operation.** Choose the operation for which the global filters will apply: Backup or Restore.
- **File Exclusion list.** Displays the list of files that are *never* to be included in an operation. You may enter the name of a file in the box at the top of the list. (To exclude a given file in subdirectories, add "/S" after the file specification.)
- **Add.** Adds the file you have entered in the edit box at the top of the list.

- **Delete.** Deletes any file highlighted in the File Exclusion list.

After you have taken the appropriate actions, you can click one of two choices:

- **OK.** Saves your file exclusion list for all future occurrences of an operation.
- **Cancel.** Closes the Global Filters dialog box. If you close the dialog box without clicking OK, any changes you made to the File Exclusion list will not take effect.

## Job Preview Dialog Box



The Job Preview dialog box is accessed by pressing the Preview button on the Backup dialog box. It consists of the following:

- **Source.** Displays the type of backup you selected in the backup restrictions field in the Backup Options dialog box. Also displays the volume containing the files selected for the backup.
- **Target.** Displays the job group you have selected for your backup.
- **Media Cartridge Selection.**

- ❑ **Recommended.** Displays the recommended media cartridges you should use for this backup.
  - ❑ **Alternate.** Displays other media cartridges you can use for this backup.
- **OK.** This button closes the Job Preview dialog box and returns you to the Backup dialog box.


## Backup Status Dialog Box

BACKUP			
Job:	Selective Backup Immediate		
Source:	TOM1\SYS		
Target:	MNS AUTO-NAME #1		
Directory:	/PUBLIC		
Files:	PCONSOLE.EXE		
	Estimated	Actual	Options
Files:	2088	675	<input checked="" type="checkbox"/> Verify files <input checked="" type="checkbox"/> H/W Compression
Kbytes:	46783	9991	
Time:	00:06:30	00:01:23	
Data Rate (MB/min):		7.03	
Progress:	<div style="display: flex; align-items: center;"> <div style="width: 21%; background-color: black; height: 15px;"></div> <div>21% Completed</div> </div>		
Status:	Processing files		<div>Abort</div> <div>Iconize</div>


The Backup Status dialog box is displayed during a backup operation. It contains the following fields:

- **Job.** Displays the name given to your backup job.
- **Source.** Displays the source (from a File System window) where files are backed up from.
- **Target.** Displays the target (from a Librarian window) media cartridge where files are backed up.

- **Directory.** Displays the directory that is currently being accessed.
- **Files.** Displays the name of the file that is currently being backed up.
  - **Data Rate (MB/min).** Displays the speed (in megabytes per minute) at which the backup is taking place.
  - **Estimated.** This column displays the estimated number of files from the selected source, their total size (in kBytes) and time to back them up.
  - **Actual.** This column displays the actual number of files that are backed up, along with the actual total size and time it took to back them up.
- **Verify files.** This field displays whether the verify option is activated.
- **Hardware Data Compression.** By default, ServerStor turns this hardware feature on if possible, and lets you know whether it's on.

 *If the data of the first save set on a data cartridge is compressed using hardware data compression, all appended save sets on that cartridge, and all cartridges spanned to from that cartridge, will also be compressed.*

- **Progress.** Displays what percentage of the backup job has been completed.
- **Status.** Displays the current operation of the backup.
- **Abort.** This button cancels the backup operation and closes the Backup Status dialog box.
- **Iconize.** Minimizes the Backup Status Dialog Box. Progress (percent completed) is displayed on the icon, which appears on the desktop.


 *If you have enabled the Rescue function—and we strongly recommend that you do so—then the Rescue disk will need to be updated when a Complete or Differential backup finishes. This is done automatically for you. If, however, you need to insert your Rescue disk into a floppy, you will be prompted for the Rescue disk when the backup job is completed.*

## Spanning

ServerStor has a *spanning* feature that allows you to back up data sets that are too large to fit on one media cartridge. When your first cartridge becomes full, ServerStor checks for available cartridges in other backup devices on the server. If it cannot find another available cartridge, you are prompted to insert another cartridge and your backup spans to the next cartridge. *This feature does not function with the Tower of Hanoi rotation scheme.*


## Auto-naming

If, during a backup, you use a media cartridge that has never been part of the Librarian (and is thus unidentified), ServerStor will automatically assign a unique name/number identifier to the cartridge.

 *When you use auto-naming, remember that you'll need to externally label each media cartridge with its automatically assigned name.*

The default name is **MNS AUTO-NAME #**, where “#” is replaced by the number assigned to the media cartridge by ServerStor. (Assigned numbers are sequential, beginning with 1.) You may change the default name by pulling down the Setup menu and selecting Media auto-naming. The Auto-naming Default dialog box will appear.

Each number is unique and will not be used again. Keep in mind, then, that if you have a media cartridge with a name/number that was assigned by ServerStor via the Auto-naming function, and you delete this media cartridge from the Library, the number will still not be used again for any new cartridges.

 *Remember that even with the auto-naming feature, you still need to externally mark the label information on the outside of the cartridge.*


## Skipped Files

If for any reason ServerStor was unable to back up (and therefore skipped) a particular file, the file's name is listed in the Rescue System Log. This file can be viewed by selecting the Tools menu and choosing View Log.

---

## Passwords

Supervisor passwords are encrypted for each of the servers on your network and are stored in the Librarian. When you perform a backup for the first time after installing ServerStor, you will be prompted for the supervisor's password.

 *If the supervisor's password is changed, you will need to go into ServerStor's Security Maintenance and update it. Security Maintenance is accessed by pulling down the Tools menu and selecting Security Maintenance. If you attempt to perform a saved job without having first updated the password in ServerStor's Security Maintenance, you will get a warning message to the effect that the supervisor's password for the server does not match the password in ServerStor's Librarian database.*

## Run Job

If you save a backup as a job, you can run it later without having to re-enter the parameters and options. To access the Run Job dialog box, choose the Run Job button.



The Run Job dialog box consists of the following fields:

- **Name box.** Displays the names of all the jobs you have saved and the two jobs that are part of the RAD feature. The jobs listed are either single or compound jobs, depending upon which option you select in the “Type” field as explained below.
- **Job Type.** Determines if the Name field will display single or compound jobs.
  - ❑ **Single.** A single job is *one* backup job that you have saved and named.
  - ❑ **Compound.** A compound job consists of a series of single jobs. Running a compound job will cause its single jobs to be executed sequentially. (This is a good way to backup multiple volumes.)

After you have made the appropriate entries in these fields, click one of five choices.

- **Run.** This button will cause the job highlighted in the name box to run.
- **Preview.** This button will display the Job Preview dialog box (see the section “Job Preview Dialog Box” found earlier in this chapter).

- **Edit.** This button will display the Edit Compound Job dialog box (described in the next section.) This option is not applicable to single jobs.
- **Delete.** This button will delete the job highlighted in the Name field.
- **Cancel.** This button closes the Run Job dialog box. No job will be run.

## Edit Compound Job Dialog Box

The Edit Compound Job dialog box is accessed by selecting Compound as the Job type and then choosing the Edit button in the Run Job dialog box.

**Edit Compound Job**

Name: RAD\_CMPL MNS RAD Weekly Complete [v] [New]

**Available Single Jobs:**

ABC JOB1	test
CMPL0000	MNS RAD We
CMPL0001	MNS RAD We
CMPL0002	MNS RAD We
CMPL0003	MNS RAD We
CMPL0004	MNS RAD We

[Add >>] [ << Remove ]

**Included Single Jobs:**

CMPL0003	MNS RAD We
CMPL0004	MNS RAD We
PROTECT1	CAD files (sele
PROTECT2	NC control file
PROTECT3	Emergency co

[OK] [Cancel]


The Edit Compound Job dialog box consists of the following fields and commands:

- **Name.** Displays the name of the job that will be edited in this dialog box.
  - ❑ **New.** Clicking this button will display the Job Name box in which you can enter the name of a new compound job and a description of that job.
- **Available Single Jobs.** Displays a list of all the single jobs that are available and can be added to the currently displayed compound job.
- **Included Single Jobs.** Displays a list of all the single jobs that are included in the currently displayed compound job.

- ❑ **Add.** Clicking this button will add a highlighted single job to the currently displayed compound job.

You can also add an available job by simply double-clicking the job name.

- ❑ **Remove.** Clicking this button will remove the single job highlighted in the Includes field.

 *A compound job will cause its single jobs to be executed sequentially. This is a good way to backup multiple volumes.*

*When you add a single job to a compound job, you can place it in any desired location within the compound job so that it runs before another job. This is effected with the highlight bar in the Includes box. If a job in the Includes box is highlighted, a job added to the compound job will be placed to run before the highlighted job. If the highlight bar is below the list of jobs in the Include box, the added job will be placed at the end of the list.*


After you have made the appropriate edits, click one of two choices:

- **OK.** Applies the edits you have made.
- **Cancel.** Closes the Edit Compound Job dialog box and returns you to the Jobs dialog box. If you close the Edit Compound Job dialog box without clicking the OK button, none of the edits you made will take effect.

## Tower of Hanoi Media Rotation

Few users need to keep a permanent record of all versions of any file, but many do need to have several recent versions of files easily accessible. The Tower of Hanoi Backup Group makes it possible to have many versions of a file on hand without having to keep a large number of cartridges on hand.


The Tower of Hanoi is a backup method that uses several cartridges on a rotational basis. The rotation of the media cartridges uses an algorithm that allows the user to backup several different versions of files with a minimum number of media cartridges. The algorithm causes the media cartridges to be rotated in such a way that most of your recent backups and fewer of the less recent backups are saved. The date of the oldest version moves forward as your backups progress. The time interval between oldest and newest backups will always be the same.

 *If you use the Tower of Hanoi media rotation scheme, structure your backups so that the same data volumes are backed up on each media cartridge.*

### 1024 Days


Each media cartridge in the rotation is accessed one-half as often as the preceding cartridge. With five cartridges being used for single daily backups, the date of the oldest version of a backup will be 8 days prior to the most recent. Eight cartridges being used for single daily backups increases the date horizon to at least 64 days and at most 127 days. Each additional media cartridge after eight causes the date horizon to increase dramatically. ServerStor supports up to 12 cartridges in a Tower of Hanoi rotation, giving you an effective date horizon of 1024 days. The oldest file would be three years old.

You can calculate the number of backups available for a given number of media cartridges by applying the following formula:  $2n-2$  = number of non-appended backups where  $n$  is the number of media cartridges.

 *Media cartridges may become worn out or ineffective due to their heavy usage. Replace frequently used cartridges on a regular basis. QIC cartridges are good for 2000 end-to-end passes. Helical-scan cartridges are good for 500 passes over any region of the tape. See the manufacturer's specifications.*

The table “Media Cartridge Rotation In Tower of Hanoi Backup” shows a representative user's environment in which six media cartridges are employed in a Tower of Hanoi Backup Group. You can see that according to this table the first media cartridge is used for the 1st, 3rd, and 5th, backups, etc.; the second cartridge is used for the 2nd, 6th, and 10th backups, etc.; the third cartridge is used for the 4th, 12th, and 20th backups, etc.

Media Cartridge Rotation In Tower of Hanoi Backup	
Media Cartridge Number	Backup Occurrence
1	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31
2	2, 6, 10, 14, 18, 22, 26, 30
3	4, 12, 20, 28
4	8, 24
5	16
6	32

 *The Tower of Hanoi rotation scheme does not support spanning. The entire contents of an appended backup must fit on one media cartridge. If you perform multiple backups on the same day, we suggest that the first backup be an overwrite backup and the following backups be appended backups.*


*The Tower Of Hanoi media rotation scheme is named after the Tower of Hanoi game. The rotation of cartridges mimics the motion of blocks in the game.*

## Backups As Part of Your Routine

To receive the most benefit from ServerStor, you should perform backups regularly. The frequency of your backups depends on how often your server is used. Generally, you should do a backup every day. That way you'll never lose more than a day's worth of data if your server fails. If data is critical and changes very quickly, you may want to back up more frequently.

Below are some guidelines for using ServerStor to protect your data.

1. Do a backup for each day your server is in use. For servers used daily, do a Complete backup weekly and at least a Differential backup on each of the other days. To ensure that you always do these backups, schedule them to run with the Job Scheduler dialog box (refer to [Chapter 8, "Job Scheduler"](#)).
2. Schedule backups at times when the server has little activity. If you find it difficult to schedule backups at such times, ServerStor informs you of any open files it skipped.
3. Prolong the life of your data by storing media cartridges in their protective cases. Read the information that comes in the data cartridge package for tips on using cartridges. Store cartridges away from magnetic fields, including power supplies, cables, and computer monitors. Try to store the media cartridges in a vertical position.
4. For best results, we strongly recommend that *tape drive* users clean the magnetic heads on your tape drive on a regular basis. Consult the tape drive's installation and operations manual.

 *Externally label all your backup media cartridges. If you don't label your media cartridges, restoring lost data will be much more difficult, recovering from a server crash may not be possible, and the major benefits of having ServerStor will be wasted.*

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# Restore Operations

If any of the following conditions occur, you may want to restore data.


- Data is deleted from your server.
- Data is corrupted on your server.
- You experience a hard disk failure.
- You want to revert to a previous version of the data.
- You replace your hard drive with a new hard drive.

This chapter contains basic information about data recovery operations. You should read this chapter and complete a few experimental restores to familiarize yourself with ServerStor's restore operations.

# How To Recover From a Network Server Crash

## McAfee Rescue

In the event of a catastrophic failure of any ServerStor-protected volume, you can automatically recover the data with your McAfee Rescue disk.

 *To review the procedure for creating a Rescue disk, see the installation sections in [Chapter 2, "Data Protection Strategy."](#) To ensure that all of your volumes are being protected by ServerStor, refer to the sections on the Rescue function and Restore Any Day, in [Chapter 4, "Backup Operations."](#)*


Each time you perform a Complete or Differential backup of an entire volume, and the backup is successful, the Rescue disk makes a notation of which cartridges have the last Complete backup and the last Differential backup.

During a backup operation the Rescue disk records the results of the backup job, which consist of a data set's date and time and the media cartridges used, and creates a restore job file on the disk which includes this information.

## Overview

Recovering with the Rescue function is done in three stages:

- Reinstall NetWare if necessary.
- If the SYS volume crashed, install ServerStor on it. (See [Chapter 2, "Data Protection Strategy"](#) for details.)
- Use the Rescue function to recover all volumes. We recommend you recover the Binderries or NDS volume first; and then the Rescue volume. That way, you'll have the option of Completing the recovery process from a client station (under Windows), if you prefer.

 *NetWare 3.x users should note that each server has its own bindery.*

*NetWare 4.x users: Instead of a Bindery for each server on the network, your network has an NDS (NetWare Directory Services) volume, a global services database for all the servers on the network. So you need only recover the NDS (one volume) instead of a separate bindery for each server.*

*If you decide to manually restore a set of binderies from an old backup, i.e., a backup with binderies different from your current binderies, you may generate errors in your network so that it does not operate properly: There will be a mismatch between objects that are called for now on the network and objects that existed at the time of the old backup. We recommend that you use the Rescue function and refrain from manually restoring the binderies or NDS.*

### Rescuing a Volume at the Server

If the disk volume where ServerStor and/or Windows was installed (typically SYS:) is the volume that crashed, you can restore that volume to its pre-crash state by performing the following steps:

1. Reinstall NetWare 3.x or 4.x on the SYS: volume, using a minimal setup and installation (See your NetWare documentation.)
2. Reinstall ServerStor.
3. Insert your Rescue disk into your floppy drive at the server where you installed ServerStor.
4. At the server console prompt, type :

```
LOAD <d>:RESQ ↵
```


**Where <d> is the drive you used for your Rescue diskette.**

5. The RESQ program will begin by copying files to the server. Then, you'll see a list of protected volumes. (These are the volumes you designated during the original client-side installation routine, or which you added since then.)

Type the number of the volume you want to recover. We recommend that you make the Rescue volume (by default, the SYS volume) the first one you recover. Then press the Enter key.

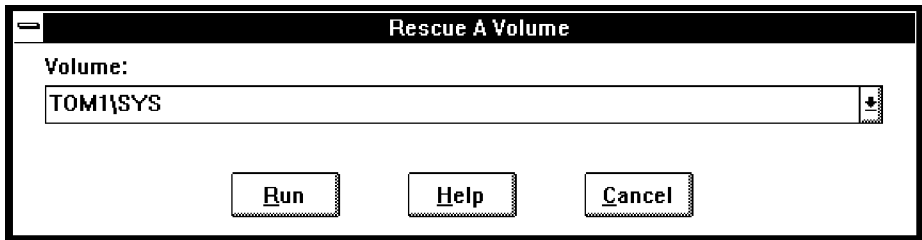
6. Now you'll see a list of the servers which currently exist on your network. These are possible target servers for the volume you're recovering. You can restore to the volume's pre-crash server by pressing the Enter key, or type the number of the server you want to redirect to. If the server list is too long to see on one screen and you want to view it again, press the Esc key.
7. You'll be prompted for your user name and password. Provide your user name for the server as you've re-installed it (typically, Supervisor or Admin). Then provide the associated password.
8. Next, you'll see a list of volumes. You can restore the data from the volume you're recovering to any of these targets. As before, press Enter to restore to the pre-crash volume, or type the number of the volume to which you want to relocate.
9. The next prompt lets you know that ServerStor is about to restore a volume. Type "y ↵" to continue.
10. The Rescue function now loads RESQMAIN and begins the restore. You'll be prompted for each cartridge (by label) as required. Press Enter after mounting each cartridge.
11. When the volume is restored, you'll see a message on screen that summarizes the work done.
12. Repeat this process for each volume you want to Rescue.

### Rescuing a Volume at the Client Station

 *Important: Is your newly-created password the same as the one you were using before the server failed? If you've changed passwords, remember to update ServerStor, using the Tools\Security Maintenance option, before trying to Rescue a volume or access the Librarian from ServerStor's Client-side interface.*


To restore *other* protected disk volumes (other than the disk volume where ServerStor and/or Windows is installed) to their pre-crash state, perform the following:


1. Choose the Rescue button from ServerStor's tool bar or select the Actions menu and choose Rescue a Volume. The Rescue a Volume dialog box appears:




2. Select the arrow in the "Volume" drop-down list box for a list of ServerStor protected volumes that can be recovered. Use the scroll bar to scroll through the list of protected volume names and select the volume name you wish to recover.

**Restore the bindery first (or NetWare NDS if you are recovering a 4.x server.)**

 *NetWare 3.x (and later) users should note that each server has its own bindery.*

 *NetWare 4.x users should also note that the NDS (NetWare Directory Services) volume, a global services database for all the servers on the network, must be restored—in addition to the other binderies and the SYS volume.*


 *If you decide to manually restore a set of binderies from an old backup, i.e., a backup with binderies different from your current binderies, you may generate errors in your Network so that it does not operate properly: There will be a mismatch between objects that are called for now on the network and objects that existed at the time of the old backup. We recommend that you use the Rescue function and refrain from manual restores of binderies.*

3. After you select the volume to restore, press the Run button to begin the restoring process.

4. As the restore process continues, Rescue will prompt you to insert the proper Complete and Differential media cartridges (if required) as needed.

## McAfee's Restore Any Day Method (RAD)

If you've been performing Complete backups weekly and Differential backups daily to the Restore Any Day job group, then you can restore an entire volume or any file to the state it was in on a particular day.

 *We recommend that you do **not** perform Incremental backups on any disk volume being protected by RAD. If you perform Incremental backups instead of (or in addition to) Differential backups, you may not be able to use the Rescue function to fully recover disk volumes.*

Follow the steps below to perform the Restore Any Day method.

1. Double-click the MNS Restore Any Day job group icon in the Librarian window to display a list of data sets within that job group.
2. Locate the Differential or Complete backup data set with the date you wish to restore the system to. (Hint: You can use the Search function to help identify the data set by locating specific file names, wild cards, and data ranges.)

**If the date you wish to restore the system to is that of a Complete backup, then a full restore of the Differential backup is not needed.**


3. If the data set you selected in step 2 is that of a Differential backup, you must first restore the last Complete backup prior to the date of the Differential. Otherwise, proceed to step 4.
4. After restoring the Complete backup data set, highlight the desired Differential backup data set and perform a full restore.

## Performing a Restore

With a little luck, you will never have to use the Rescue function to recover data. Instead, you'll be interested in performing regular, non-catastrophic restores. To do so, access the Restore dialog box: choose the Restore button from the tool bar or select the Actions menu and choose Restore.




The Restore dialog box has the following fields:

- **Source.** This text box displays the path, that you selected within the Librarian window, where the files are to be restored from. Along with the name of the selected Data Set, this path includes the name of the media group, the job group, and the media cartridge.  
  
* You can use the Search feature to locate a specific file or group of files you wish to restore. For more information about searching for specific files, refer to the section "Locating a File," in [Chapter 3, "The Librarian and File System."](#)*
- **Target.** This text box displays the path of the directory, that you select within the File System window, where the files are to be restored. If you wish to restore files to their original locations, be sure that this box contains only a volume name, colon, and backslash. (This specifies the root directory.) If you specify a target other than "root", you will be performing a relocated restore. For more details on relocated restoring, refer to the section "Relocated Restores" later in this chapter.

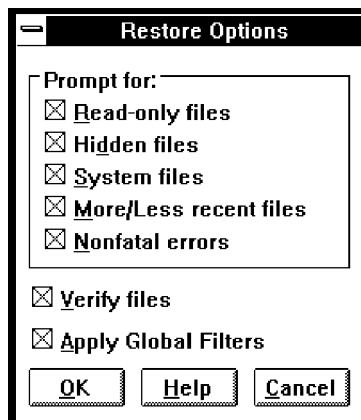
After making the appropriate entries in these fields, choose one of three choices:

- **Run.** Performs the restore operation. While the restore job is running, the Restore Status dialog box is displayed. (See the section “Restore Status Dialog Box” later in this chapter for more information about the status window.) If a problem occurs, a Job Error window is also shown.
- **Options.** Select this button to open up the Restore Options dialog box. Within this dialog box, you can select a variety of optional prompting, exclusion filters, verify, and error handling options to the files that are about to be restored. (See the following section, “Restore Options Dialog Box.”)
- **Cancel.** Closes the Restore dialog box. If you close the dialog box without choosing the Run command, no restore operation takes place.

 *If you perform a Complete backup weekly and a Differential backup daily, you are always ready to restore all of your data if necessary. With McAfee's Restore Any Day method, you can also restore your entire system or certain files to the state they were in on any particular day.*

## Restore Options Dialog Box

The Restore Options dialog box allows you to select a variety of options to files that are about to be restored. These options are applied *only* to the current restore operation about to be executed. If you wish to apply certain options to *all* restore operations, select the Setup menu and choose Restore Defaults. The Restore Options dialog box is accessed by choosing the Options button within the Restore dialog box.



The Restore Options dialog box consists of the following fields:

- **Prompting for.** (only if box is checked.)
  - ❑ **Read-only files.** Prompts you when ServerStor encounters read only files during a restore. This warning prompt allows you to either restore or not restore the file in question. If box is not checked, you are not prompted and files are restored.
  - ❑ **Hidden files.** Prompts you when ServerStor encounters invisible, or hidden files during a restore. This warning prompt allows you to either restore or not restore the file in question. If box is not checked, you are not prompted and files are restored.
  - ❑ **System files.** Prompts you when ServerStor encounters system files during a restore. This warning prompt allows you to either restore or not restore the file in question. If box is not checked, you are not prompted and files are restored.
  - ❑ **More/Less recent files.** Prompts you when ServerStor encounters files on your hard disk with the same name which have different dates or times than the files on the media cartridge. This warning prompt allows you to either restore or not restore the file in question. If box is not checked, you are not prompted and files are restored.
  - ❑ **Nonfatal errors.** Causes a warning prompt to be displayed for files with certain error conditions (for example, open files, disk write failures). If the box is not checked, you are not prompted and the file in question is skipped. An indication of why the file was skipped is written to the Rescue system log.
- **Verify files.** Compares media cartridge and disk data after the restore operation. This box is automatically selected as the default. If the box is not checked, the verify pass does not take place after the restore operation.
- **Apply Global Filters.** Select this box to apply the selections you make, in the Global Filters dialog box, to the restore operation. If the box is not checked, the selections you make in Global Filters are not applied. (See the section “Global Filters” immediately below.) ***This option does not affect restores of the Bindery or NDS volumes.***

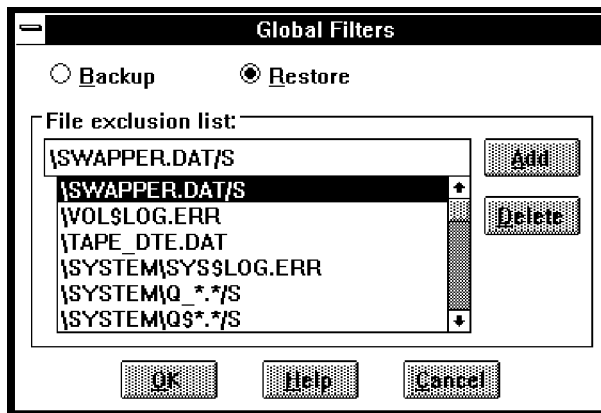
After making the appropriate entries in these fields, choose one of two choices:

- **OK.** Saves the selections you made in the above fields, and puts you back in the Restore dialog box.

- **Cancel.** Closes the Restore Options dialog box and cancels the modifications made within the Options dialog box.

## Global Filters

The Global Filters dialog box is used to help you perform restore operations in much the same way it is used in backup operations. This dialog box offers a way to *exclude* certain files in a restore operation. To access Global Filters, choose the Tools menu and select Global Filters. The Global Filters dialog box then appears:



The Global Filters dialog box consists of the following fields:

- **Options:**
  - ❑ **Backup.** Select this option to exclude files from a Backup operation.
  - ❑ **Restore.** Select this option to exclude files from a Restore operation.
- **File exclusion list.** Enter the names of the files you wish to explicitly exclude from your restore operation. The File exclusion list is applied only if the Apply Global Filters check box (located in the Restore Options dialog box) is checked.
- **Add.** Adds a file to the exclusion list.
- **Delete.** Deletes a file from the exclusion list.

- **OK.** Makes changes you have input, and continues the operation.
- **Cancel.** Continues without making any of the input changes.

## Restore Status Dialog Box

After you initiate a restore job, the Restore Status dialog box appears.

The screenshot shows a dialog box titled "RESTORE". It contains the following fields and controls:

- Job:** Restore Job
- Source:** MNS AUTO-NAME #1
- Target:** TOM1\SYS
- Directory:**
- Files:**
- Estimated** and **Actual** columns for:
  - Files:**
  - Kbytes:**
  - Time:**
  - Data Rate (MB/min):**
- Options:**
  - ☒ Verify files
  - ☒ H/W Compression
- Progress:** 0% Completed
- Status:** Positioning to end of recorded data
- Buttons:** Abort, Iconize

The Restore status dialog box consists of the following fields:

- **Job.** Displays the name of the restore job.
- **Source.** Displays the name of the media cartridge from the Librarian window where the files are being restored from.
- **Target.** Displays the volume letter and name where the files are being restored to.
- **Directory.** Displays the directory that is currently being accessed for restore.

- **Files.** Displays the file name that is currently being restored.
  - **Estimated.** Displays the estimated number of files from the selected source, along with their total size (in kBytes) and the time it takes to restore them.
  - **Actual.** Displays the actual number of files that have been restored as the operation progresses, the actual total size, and the time required to restore.
- **Data Rate.** Shows speed at which data is being restored, in MB per minute.
- **Options:**
  - **Verify files.** Displays whether the verify files option is activated or not.
  - **Hardware compression.** If your backup device supports hardware-based data compression, this option controls it. Default is ON.
- **Progress.** Displays how much of the restore job has been completed.
- **Abort.** Cancels the restore operation and closes the Restore status dialog box.
- **Iconize.** Minimizes the status dialog box and restore operation to an icon.

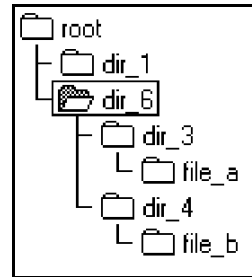
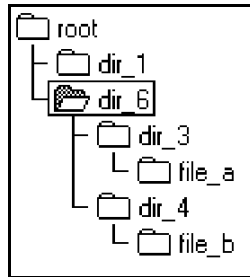
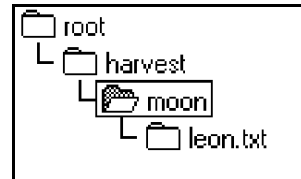
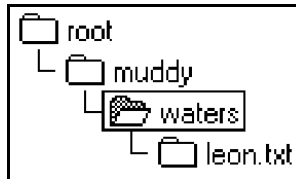
## Relocated Restores


ServerStor allows you to restore a single file, a group of files, or an entire directory from a Librarian data set, and transfer them to a different directory on your server. You select the redirection path by specifying the directory the file is contained in (the Librarian, or source) and the path where you want the file to be relocated to (the File System, or target). Follow the steps below to perform a relocated restore.

1. Open up the Librarian window and tag the desired files or directory within a single data set.
2. Open up the File System window and highlight the directory or subdirectory where you wish to redirect the files you selected in the Librarian.
3. Choose the Restore button from the tool bar. This action will open up the Restore dialog box.
4. In the Restore dialog box, you'll see two text boxes. The first text box is the Librarian data set, or source. The Librarian data set box contains the file or directory name and the path you tagged in the Librarian window. The second box is the File System path, or target. This box contains the path you selected in the File System window.
5. At this time, you may wish to choose the Options button to set any prompting options for the files that are about to be restored. Choosing the Options button displays the Restore Options dialog box. (For more information about Restore options, see the section "Restore Options Dialog Box" earlier in this chapter.)
6. After completing steps 1-5, choose the Run button in the Restore dialog box to initiate the relocated restore. Choosing Cancel closes the Restore dialog box. If you choose Cancel, none of the entries in the Librarian and File System text boxes takes effect, and the relocated restore will not occur.

## Examples of Relocated Restore Operations

In the first example, the file LEON.TXT has been tagged from the Library data set. Therefore, the source path is SYS:\MUDDYWATERS. To redirect the file to the subdirectory shown in the File System disk volume, the target path would be SYS:\HARVESTMOON.



 Keep in mind that the source path ends at the lowest directory in the directory tree that contains all the files and subdirectories you have selected to restore.

In the bottom example, the user has selected everything below Dir 2 for restore. (That is, \DIR1\DIR2 is the source path.) This actually encompasses only two files.

If these files are relocated to Dir 6, the result is as depicted in the bottom diagram.

---

# Options and Utilities

## Erasing a Media Cartridge

Erasing a media cartridge will remove all data sets contained on the cartridge. However, the blank cartridge remains in the Librarian and retains its name. It can then be moved to the Free Pool job group.

To erase all data from a media cartridge, perform the following steps:

1. Open up the Librarian window and highlight the media cartridge you want to erase.
2. Select the Actions menu and choose Erase. The Erase dialog box appears.



The Erase dialog box consists of the following fields:

- **Target.** This text box displays the name of the selected media cartridge you wish to erase, which includes the name of the Media and job group where the cartridge resides.
- **Run.** Executes the erase operation for the selected cartridge.

- **Cancel.** Cancels the request for erasing a cartridge and closes the Erase dialog box.

If you decide you don't need to erase the data from the cartridge displayed in the Target text box, you can press the Target button and select another cartridge from the library, or simply cancel the operation.

## Retensioning a Media Cartridge

The retensioning feature is designed only for backup devices that support retensioning. Before you activate this option, make sure there's a media cartridge mounted. (If there isn't, you'll receive an error message.)

### From the Console . . .

Start ServerStor by typing

**LOAD RESQMAIN ↵**

The RESQMAIN screen shows a list of Input Commands. To access the Retension function, highlight it by moving with the up arrow and down arrow keys; or use the Tab key. Then press the Enter key.

The retension operation begins immediately. An on-screen progress report generated by RESQMAIN indicates the cartridge is being retensioned. It also shows the currently active backup device's Device Number and SCSI ID number.

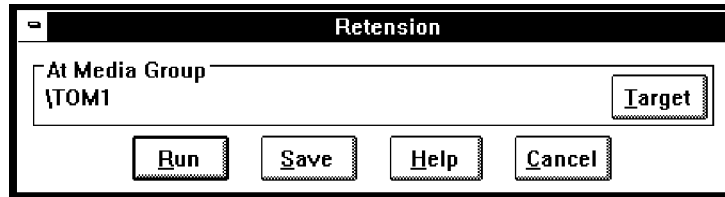
The progress report disappears when the operation is done.

### From the Client Station . . .

To retension a media cartridge, perform the following steps:

1. Open up the Librarian window and highlight the media group or backup device where a cartridge is to be retensioned.
2. Insert the desired media cartridge into the selected backup device.

3. Select the Actions menu and choose Retension. The Retension dialog box appears.

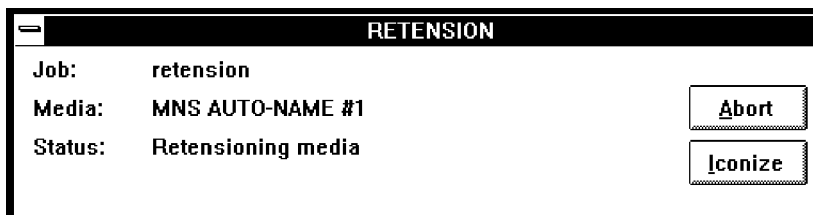


The Retension dialog box consists of the following fields:

- **Target.** This text box displays the name of the selected media group where a cartridge is to be retensioned.
- **Run.** Executes the retension operation for the media cartridge that is currently in the selected backup device. After choosing Run, the Retension Utility dialog box will appear.
- **Save.** Pressing this button displays the Save Job dialog box where you can save the Retension operation as a separate job with a unique name. This allows you the ability to add this Retension job to a Compound Job later on. (Refer to [Chapter 4, "Backup Operations"](#) for more information about the Save Job dialog box.)
- **Cancel.** Cancels the request for retensioning a media cartridge and closes the Retension dialog box.

## The Retension Utility Dialog Box

After pressing the Run button to execute a Retension operation, you are presented with the Retension Utility dialog box, as shown below



The Utility dialog box consists of the following fields:

- **Job.** Displays the job name given to a *saved* retension job.
- **Media.** Displays the physical location where a cartridge is being retensioned.
- **Status.** Displays messages about the retension job, such as initializing and tensioning. After the retension job has completed, you are presented with a small dialog box which displays the message “Retension Complete.”
- **Abort.** If you chose to run a Retension job and then decide to cancel the operation, press the Abort button.
- **Iconize.** Pressing this button minimizes the Utility dialog box to an icon.



*We recommend that you occasionally retension your media cartridges, to help ensure data reliability.*


## Backup Defaults

The Backup Defaults dialog box allows you to set up various backup operation defaults which will apply to *all* backup jobs, unless changed through Backup Defaults. These default settings can be changed for individual backup jobs by selecting the “Options” button in the Backup dialog box. Refer to the section “Backup Options” in [Chapter 4, “Backup Operations”](#) for more information about option settings for individual backup jobs.

To access the Backup Defaults dialog box, select the Setup menu from the menu bar and choose Backup Defaults. The Backup Defaults dialog box is displayed.

The Backup Defaults dialog box consists of the following fields:

- **Post Job Action.**

- **Update Library.** This check box is pre-selected as the default. If you deselect the Update Library box, your Librarian database will *not* be updated to show that these files were backed up. Backing up files without updating the Librarian is known as exporting data. You deselect the Update Library option when you want to copy files for a reason other than backups (such as making a copy of a file for another user). Typically, data is exported to a “non-managed” media group only. (For more information about media groups, see [Chapter 3, “The Librarian and File System.”](#))
  - **Verify.** Selecting this check box compares media cartridge and network file data after the backup operation. This box is selected as the default.
  - **Clear archive bit.** The archive attribute is a bit that's associated with each file. ServerStor uses this attribute to keep track of files which have been modified since the last Complete or Incremental backup. If the Clear archive bit check box is selected the bit is cleared. If unchecked, the archive attribute is not cleared. This box is selected as the default.
-  *ServerStor uses date range to determine what has been backed up. Nevertheless, we enable archive bit control to allow compatibility with other backup programs, which may use archive bit.*

- **Media auto-naming.** Generates a label for any media cartridge being overwritten, unless there is already a label and it appears in the current Librarian. *Activate* is turned on by default. If you turn the Activate option of and there is no name identified for the tape, you're prompted to enter a name.
- **Restrictions.** Enter the type of restriction you wish to apply to the backup job. The basic types of restrictions you can choose are explained below:
  - **None.** Select this option to back up specifically tagged files with no restrictions, or all files in the source volume if none are tagged. This box is selected as the default.
  - **Differential.** Select this option to back up all files that have changed since the last Complete backup.
  - **Incremental.** Select this option to back up all files that have changed since the last Complete or Incremental backup.
  - **Last Modified Date range.** Enter the date range of files you would like to restrict the backup operation to.
  - **Apply Global Filters.** Applies the selections you made in the Global Filters dialog box. (Global Filters can be accessed by selecting Tools from the menu bar and choosing Global Filters.) This box is selected as the default.

After you have made the appropriate entries in these fields, choose one of three command buttons:

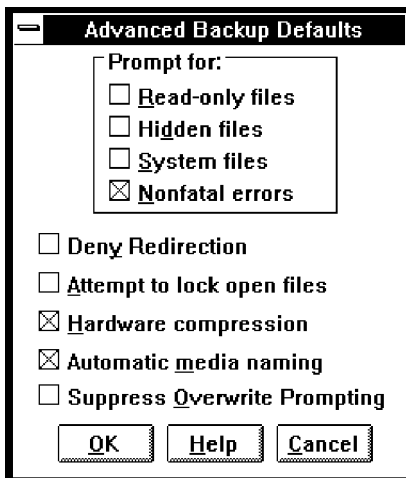
- **OK.** Applies the selections you have made in the above fields, and closes the Backup Defaults dialog box.
- **Cancel.** Closes the Backup Defaults dialog box without saving any of the information you entered in any of the fields.
- **Advanced.** The Advanced button presents you with the Advanced Backup Defaults dialog box, allowing you to set up a more elaborate series of backup operation defaults.

The Advanced Backup Defaults dialog box consists of the following fields:

- **Prompt for Nonfatal error.** Causes a warning prompt to be displayed for files with certain error conditions (for example, open files or network data read failures). If the box is not checked, you are not prompted and the file in question is skipped. An indication of why the file was skipped is written to the ServerStor system log.
- **Attempt to lock open files.** On multi-user systems, some files may be opened by another application. If this check box is not selected, and ServerStor cannot have exclusive access to this file, it will attempt to record-lock the open file. Some applications will fail at this point. Selecting this box causes the open file to be skipped during backup operations and written to the ServerStor system log.
- **Suppress Overwrite Prompting.** Prevents ServerStor from prompting you before it overwrites existing data on a media cartridge. Turn this option ON for unattended operations, to prevent operations from stopping.
- **Hardware compression.** Applies only to backup devices that have a hardware data compression feature. Default is ON. Turns on or off automatically if appending to a cartridge, matching the first save set on the tape.
- **OK.** Applies the selections you have made in the above fields and closes the Advanced Backup Defaults dialog box.
- **Cancel.** Closes the Advanced Backup Defaults dialog box without saving any of the information you entered in any of the fields.

## Restore Defaults

The Restore Defaults dialog box allows you to set up various restore operation defaults. To access the Restore Defaults dialog box, select the Setup menu and choose Restore Defaults. The Restore Defaults dialog box appears.



The Restore Defaults dialog box consists of the following fields:

- **Prompt for:** (only if boxes are checked.)
  - **Read-only files.** Prompts you when ServerStor encounters read only files during a restore operation. This warning prompt allows you to either restore or not restore the file in question. If this box is not checked, you are not prompted and files are restored.
  - **Hidden files.** Prompts you when ServerStor encounters invisible or hidden files during a restore operation. This warning prompt allows you to either restore or not restore the file in question. If this box is not checked, you are not prompted and files are restored.
  - **System files.** Prompts you when ServerStor encounters system files during a restore operation. This warning prompt allows you to either restore or not restore the file in question. If this box is not checked, you are not prompted and files are restored.


- ❑ **More/Less Recent files.** Prompts you when ServerStor encounters files on the network with the same name which have different dates or times than the files on the media cartridge. This warning prompt allows you to either restore or not restore the file in question. If this box is not checked, you are not prompted and files are restored.
- ❑ **Nonfatal errors.** Causes a warning prompt to be displayed for files with certain error conditions (for example, open files or network data read failures). If box is not checked, you are not prompted and the file in question is skipped. An indication of why the file was skipped is written to the ServerStor system log.
- **Verify files.** Compares media cartridge and network data after the restore operation. This check box is automatically selected as the default. If the box is not checked, the verify pass does not take place after the restore operation.
- **Apply Global Filters.** Select this check box to apply the selections you made in Global Filters to the restore operation. If the box is not checked, the selections you made in Global Filters are not applied.

After you have made the appropriate entries in these fields, you can choose one of two choices:

- **OK.** Closes the Restore Defaults dialog box and saves the selections you made in the above fields for future restore operations.
- **Cancel.** Closes the Restore Defaults dialog box without saving any of the information you entered in any of the fields.

---

# Special Networking Considerations

 *This chapter uses the same network terminology as Novell's NetWare documentation (for example, "supervisor" for the LAN administrator).*

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## General Guidelines

In backing up your LAN, it's important to be aware of some special considerations that make networks inherently different from stand-alone systems. Protecting network data is especially challenging because of the way data is stored on the file server and because of the diverse types of data involved.

Follow these general guidelines to ensure successful backup of your network data:

- Be sure that you have installed the hardware and software correctly, with a backup device physically attached to the file server. (See [Chapter 2, “Data Protection Strategy”](#) for details.)
- You must be logged onto the network as Supervisor to set up scheduled jobs or run manual operations.

Once these requirements are met, you can back up data from and restore data to the file server.


## General NetWare Support

The following ServerStor features provide you with full support in a NetWare environment. (Refer to the README.TXT file for additional information about NetWare support.)

- Preservation of file's Last Accessed Date.
- Update of NetWare's last archived date for all files backed up.
- Protection of NetWare file attributes, trustee lists, and user rights.
- Support of all NetWare name spaces.

## Keeping Track of Skipped Files

When you back up data on your LAN, ServerStor skips files that it finds open or locked. Skipped files are listed in the View Log dialog box. To access the View Log dialog box, choose “Tools” from the tool bar, then select “View Log.” (The skiplist is part of ServerStor's Librarian, and is available to multiple users from installed client stations.)

 *The network supervisor should examine the ServerStor system log after every backup operation has ended, to ensure that no important data has been skipped during the backup. (Exclusions will not show in the system log.)*

## Recreating Your File Server

The techniques described in this section can be used to rebuild your file server's data after a hardware failure. You can use these same methods to create a duplicate or backup server.

If you've been making Complete or Differential backups, this may mean restoring from two or more data sets. And the LAN administrator must also take the bindery or NDS information into account. (ServerStor facilitates this by backing up the bindery or NDS as a separate volume.)

There are two basic methods of recovering the file server: using the Rescue function, and manual recovery.

### The Rescue Function for Network Volumes


The Rescue function is an automatic disaster recovery method, enabling you to restore your entire network volume to its pre-crash state. To properly restore an entire server, you must *first* restore the bindery or NDS, then SYS volume (if necessary), *then* any other volumes. This ensures that the bindery files are restored before any other data.


### Manual Recovery Procedures

This section describes manual recovery procedures to follow if you decide not to use the Rescue function and disk. Each of these recovery procedures complements a different backup strategy. (Refer to the section "Choosing A Backup Strategy" in [Chapter 4, "Backup Operations."](#))

- Restoring from a Complete backup.
- Restoring from a Differential backup.
- Restoring from a series of Incremental backups.

Each of these procedures aims to preserve file ownership, to ensure that the complete data set has been restored, and to ensure that the most recent version of each file is copied to the new file server (where multiple versions exist on media).

 **IMPORTANT:** By choosing to recover your network manually, you are taking on a complex task, each part of which can be essential to the integrity of your network. We strongly recommend that you use the Protect, Rescue, and Restore Any Day functions — not manual recovery.

 **NOTE:** Use of these procedures may result in restoring data that had been deleted or groomed from the file server, and that is no longer needed. You may have to locate and remove some such data after recreating the file server. This is especially critical if disk space is at a premium (e.g., if “Disk Full” errors occur during recovery).

### Restoring from a Complete Selective Backup

If your standard method of backup is to perform a Complete Selective backup of the file server, recreating the file server is a relatively simple matter. After you've reinstalled NetWare, just complete the steps below. (See picture on next page.)


1. Restore the bindery or NDS (from its most recent backup) to the new server's SYSTEM directory.
2. Restore all files from the most recent Complete Selective backup.

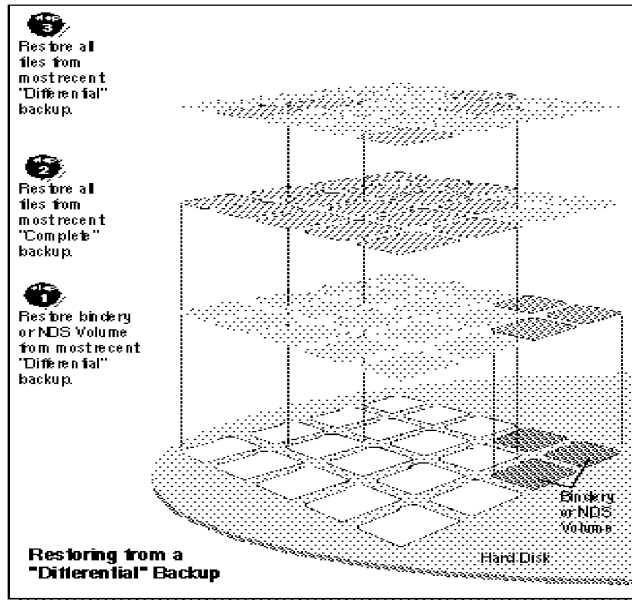
### Restoring from a Differential Backup

If you've chosen a “Differential Backup” option (refer to the section “Choosing a Backup Strategy” in [Chapter 4, “Backup Operations”](#)), you must locate your most recent Differential backup, and your most recent Complete backup.

After installing NetWare on the new server, complete these steps.

1. Restore the bindery or NDS.
2. Restore the most recent Complete backup.
3. Restore the most recent Differential backup cartridge. In effect, you're overwriting every file that has changed since the time you performed a Complete backup from step 2 (above), only this time you're restoring the most up-to-date versions available on a cartridge.

 If your most recent backups were a Complete and Differential backup, you can recreate your file server by using the Rescue function or the Rescue disk.



### Restoring from a Series of Incremental Backups

If you've chosen the strategy of Incremental backups, you must locate several cartridges: your most recent bindery or NDS backup; your most recent Complete backup cartridge; and every Incremental backup cartridge you've made since the time that the Complete Backup was performed.

After installing NetWare on the new server, complete these steps.


1. Restore the bindery or NDS.
2. Restore the most recent Complete backup cartridge.
3. Restore the earliest Incremental backup cartridge in the set (the one you made just after the Complete backup cartridge you used in step 2).

4. When this restore is complete, insert the next Incremental cartridge, and restore it the same way. Restore each of the Incremental cartridges in this way, in the order in which they were created. In effect, you're overwriting every file that has changed since the time you performed a Complete backup from step 2 (above), with increasingly more recent versions. When the last "Incremental" cartridge has been restored, you'll have added the most recent available updates.

## Introduction

The ServerStor Job Scheduler works like an alarm clock. It is a Windows utility that enables you to run the backup jobs you create and save in ServerStor during the hours when you are not at your workstation. It can also serve as an alarm clock to remind you of meetings and appointments. In this chapter, we discuss the options in the Job Scheduler dialog boxes then show you how they are used to schedule backups and to leave messages. We also discuss using the Restore Any Day (RAD) backup strategy that is available when you install ServerStor. RAD (see the section on the Restore Any Day Method in [Chapter 5, “Restore Operations”](#) for more information) includes predefined backup jobs in ServerStor and predefined alarm settings in Job Scheduler that start the backups automatically.

To activate Job Scheduler, open ServerStor and select **Setup/Activate Scheduler**.

 *If a check mark appears beside the Activate Scheduler option, the Scheduler was automatically added to the LOAD line in WIN.INI during installation.*

## Options

### Schedule Jobs Dialog Box

Click the Schedule button in the ServerStor Tool Bar, and choose Tools/Set Schedule to open the Schedule Jobs dialog box. Notice the four headings—Job, When, Message, and Events—and five buttons below the Events box—New, Test, Add, Chg, and Del. These four headings and five buttons are used to create and alter job schedules in Job Scheduler.

**Schedule Jobs**

Job file:

**When:**

9:52 AM Wednesday, February 17, 1993

**Message**

Type: **Announce**

Text:

☒ Beep

**Events:**

- 5:00 PM every Monday in every month
- 5:00 PM every Tuesday in every month
- 5:00 PM every Wednesday in every month
- 5:00 PM every Thursday in every month
- 5:00 PM every Friday in every month

\* Already occurred today  
\*\* Will never occur again

**New** **Test** **Add** **Chg** **Del**

### Job

The jobs you create and save in ServerStor are made available to Job Scheduler, and can be found under the Job heading. By clicking on an Event, the jobs that are part of that event appear in the Job field. Then click the arrow in the Job files box to display all the job. Select the job you wish to schedule. (Clicking on a job has no effect on the Events field.)

## When...

Under the When heading, you set the time, date and frequency for the schedule. The square clock is a button that opens the When dialog box where the details are worked out. The time and date next to the clock button are static. They show the schedule's time and date as set in the When dialog box. When you open the Schedule Jobs dialog box, the time and date displayed will be the time and date of the opening.

Choose the clock button to open the When dialog box. Notice it has two headings: Time and Date. Under these two headings, the time, date and frequency are established in the schedule.

The 'When...' dialog box is used to configure the timing of a scheduled job. It is divided into two main sections: 'Time' and 'Date'.

**Time Section:**

- Time: 04 :16 (with up/down arrows)
- AM / PM radio buttons (PM is selected)
- 'Now' button (disabled)
- 'OK' and 'Cancel' buttons

**Date Section:**

- Once:** (selected) with a 'Today' button (disabled)
- Every** [ ] (with up/down arrows)
- Every day**
- every weekday**
- every weekend**
- Recur:** [ ] [ ] (with up/down arrows)
- Day of the month:** [ ] (with up/down arrows)

Brackets on the right side of the Date section group the options: 'Once' and 'Every' are grouped together, and 'Every day', 'every weekday', 'every weekend', 'Recur', and 'Day of the month' are grouped together. The 'Today' button is also grouped with the 'Once' option.

## Time

This is the timer for the Job Scheduler alarm clock. Under this heading, you set the time you want your job to start. Your computer's clock is the reference clock.

- **Time text box.** This is the alarm setting. The time shown is the same as that in the Schedule Jobs dialog box and may be the time the Schedule Jobs dialog box was opened or the starting time of a selected schedule in the Events box. To change the time, click either arrow at the right of the box. This will scroll the minutes. When zero minutes is reached, the hour will scroll. You may scroll the hour by selecting the hour box and then clicking either arrow. The minutes will not be affected. You may also change the time by clicking the mouse pointer in the hour box and typing the starting time you want.
- **A.M./P.M.** These option buttons indicate the period of day you want the job to run. If you scroll the time past 12:00, the period will scroll, too. However, if you type the time, you must select the period. Be sure the period is correct for when you want to run the job.
- **Now.** Choosing the Now button will update the Time text box.

## Date

Under the Date heading, you design the interval your job is to run. Select one of the seven interval options listed. Selecting an option will highlight one or more of the options to its right. These options help define the date parameter.

- **Once.** Lets you schedule an Event to run only one time.
- **Every.** Lets you establish an interval in days (enter the number in the text box to the immediate right). The default for Every is 14 days. This means the Event will run every 14th day starting on the day listed in the calendar text box to the far right. The maximum interval you can enter is 255 days.
- **Calendar text box.** This option is activated when you choose one of the top two options. It is the first day you want the job to run. You may change the date by placing the cursor in the month, day or year box and clicking either arrow. Scrolling the date will change the month; scrolling the month will change the year. You may also type the date. The day beneath the box will reflect the date change.
- **Today.** Choosing the Today button will update the calendar text box.
- **Every day.** Runs the job everyday.
- **Every weekday.** Runs the job everyday Monday through Friday.

- **Every weekend.** Runs the job every Saturday and Sunday.
- **Recurs.** Allows you to choose the specific day in the specific week of the month. For example, you could run a Complete backup the Friday of every fourth week in every month. The first list box gives you the choice of the week of the month—1st, 2nd, 3rd, 4th, 5th, every, or last. The second list box gives you the choice of the days of the week.
- **Day of the month.** This option allows you to select a specific date of the month to run your job.
- **In month.** This option is activated when you select one of the lower five options to the left of the bracket. It is a list box that allows you to choose one of the twelve months or every month to run your job.
- **OK.** Choose the OK command button to save the choices you've made and returns you to the Schedule Jobs dialog box. Your choices will appear under the When heading.
- **Cancel.** Choosing the Cancel command button abandons the changes in the When dialog box and returns you to the Schedule Jobs dialog box. No changes are saved.

## Message

Under the Message heading you select the visual and audible signals that tell you a job is starting or is about to start. Some messages include the option to continue or cancel the job. The options under this heading—Type, Text, Beep, and Tune — allow you to define the message that will appear.

- **Type.** This list box allows you to select the kind of Message you want: Announce, Confirm,
- Countdown or Invisible.
  - **Announce.** A flag announcing the job is commencing. The announce message will remain on the screen until it is acknowledged but will not affect the job.
  - **Confirm.** A flag that gives you the option to continue or cancel a job. A Confirm will hold up the start of a job until you respond to the message.

- ❑ **Countdown.** Holds up the start of a job for a specific amount of time in case you wish to cancel. When the time runs out, it starts the job. The time limit is a default and can be set in the Options dialog box.
- ❑ **Invisible.** Turns off the Message box. The job will run but there will be no visual prompt. The beep is not affected.
- **Text.** In the Text box, you can write the message that will appear in the Message box when the alarm goes off. Just click the mouse pointer in the box and type.
- **Beep.** The Beep is the audible part of the message that goes off when the clock strikes. If you do not want the beep, click the check box in front of the word Beep. The default for Beep is on and this will turn the beep off for just the job you are scheduling. You can change the Beep defaults in the Options dialog box.
- **Tune.** This list box contains the tune titles you can select for the beep. If you have Windows 3.1 or better, your list will include .WAV file titles as well. You will need to install a sound playback card or Microsoft's SPEAKER.DRV file, a device driver for .WAV files. Microsoft's SPEAKER.DRV file is available on CompuServe or on the Microsoft BBS at (206) 637-9009. It is contained in a self-extracting archive called SPEAK.EXE.

The beep will repeat every 30 seconds until the Message is acknowledged or until the beep limit is reached. The limit is the total number of beeps allowed for each message and is set in the Options dialog box. You can stop the beeps before the limit is reached by pressing Esc.

- **Musical note button.** This button allows you to test a beep. Select a tune and click the musical note button and the tune will play.

## Events

The Events box lists all of the jobs that have been scheduled in Job Scheduler. They are listed as summaries of the When dialog box. (See the illustration below.) The first job is to run at 5 p.m. every Monday. The second job is to start at 5 p.m. every Tuesday. When you select a job in the Events box, the job parameters will appear under the other headings in the dialog box. You can change the parameters.

Job Scheduler keeps tabs on jobs that run. When a job finishes for the day an asterisk (\*) will appear in front of its Event listing. A job that has completed the term set in its parameter will have two asterisks (\*\*) in front of its Event listing.

## Buttons

The five buttons below the Event box—New, Test, Add, Chg and Del—allow you to change, replicate, test, save your changes, and delete existing jobs in the Event box. The New, Test and Add buttons are always available and can be used at any time. The Chg and Del buttons are available only when a job in the Event box is selected.

- **New.** When you choose the New button, the When dialog box is open with the current date and time. Other schedule parameters are not affected.
- **Test.** Allows you to test the schedule. It will display the Message, play the beep and run the job. If you have entered Job Scheduler from ServerStor, the Job Scheduler detects your interaction and displays an error message:

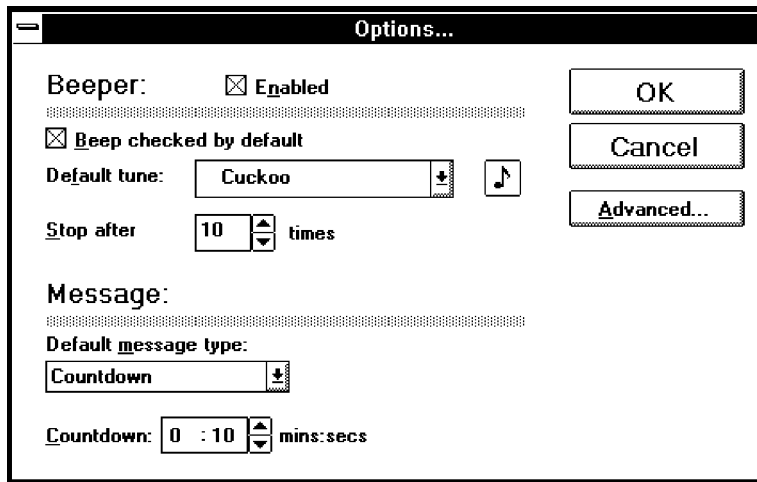
`Scheduled Jobs are waiting to run. . . .`

This message refers to ServerStor. ServerStor must be closed for Job Scheduler to run a job.

- **Add.** Replicates the selected job in the Event box. You can then tailor the highlighted job to suit other needs without sacrificing the original.
- **Chg.** This button becomes active only after you have selected a job in the Event box. It allows you to hold the changes you make to a schedule without leaving the Schedule Jobs dialog box. Chg does not save the changes you make permanently. Changes are saved when you choose the OK command button to exit the Schedule Jobs dialog box.
- **Del.** This button becomes active only when you select a job in the Event box. It allows you to delete the selected job. You may delete several events at once by:
  - Holding down the Ctrl key as you click each additional job with the mouse.
  - Holding down the Shift key and click the last job in the string of jobs you want to delete. This will capture all of the jobs in between.
  - Clicking the mouse on the first job and dragging it down without releasing the button.

## Default Settings

Job Scheduler gives you the flexibility to tailor some of the options in the Schedule Job dialog box and some of Job Scheduler's working parameters. These parameters are characterized as defaults, and may be accessed by choosing Options in the Control menu. Choosing Options opens the Options dialog box.



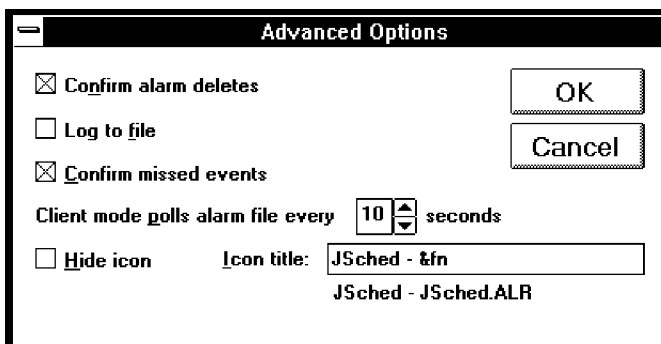
Notice the headings Beeper and Message and the option button, Advanced. The defaults in this dialog box are concerned with elements in Beeper and Message. The Advanced option button opens the Advanced dialog box.

- **Beeper.** The options under this heading are the defaults for the beeper.
  - ❑ **Enabled.** Allows you to turn off the beeper completely. When there is no X in this check box, the Job Scheduler beeper will not work.
  - ❑ **Beeper checked by default.** Activates the Beep check box in the Schedule Jobs dialog box. This turns the automatic enable on or off but leaves you the option to select either when you schedule a job. Job Scheduler is shipped with the beeper on.
  - ❑ **Default tune.** Allows you to choose the default tune for the tune list box in the Schedule Jobs dialog box.
  - ❑ **Musical note button.** Allows you to listen to the tune.

- ❑ **Stop after.** Allows you to determine how many times the beep will repeat. The beep is programmed to go off every 30 seconds until an operator responds to the message. A maximum of 999 beeps for 8 hours 19<Insert equation here> minutes is available.
- **Message.** The options under this heading are defaults for Message in the Schedule Jobs dialog box.
  - ❑ **Default message type.** Allows you to select the default message type for the Message type box.
  - ❑ **Countdown.** Allows you to establish the Countdown duration before the job is launched. The time box is divided into minutes and seconds. You can set it for 59 minutes and 59 seconds using the arrows.
    - ✍ Countdown cannot be tailored for specific schedules. When you establish the time, it becomes the default for all Countdown messages including those previously run under another setting.*
  - ❑ **OK.** Saves your changes and returns you to the Windows desktop.
  - ❑ **Cancel.** Abandons your changes and returns you to the Windows desktop.

### Advanced...

Choosing the Advanced button opens the Advanced Options dialog box.



- **Confirm alarm deletes.** Allows you to turn off the delete's confirm message that appears when you choose to delete a selected job in the Events box.

- **Log to file.** Creates and keeps a log file of Job Scheduler events in the ServerStor directory under JSCHED.LOG.
- **Confirm missed events.** If Job Scheduler is not open when a job is scheduled to run, that job will miss its appointment. By default, when the Job Scheduler is reopened, events missed since midnight will run. When “Confirm missed events” is turned on, the scheduler asks you for authorization before starting the missed jobs.
- **Client mode polls alarm file every.** This feature is disabled in this release of ServerStor.
- **Hide Icon.** Makes the Scheduler icon disappear.
- **Icon Titles.** Warning: do not use these features; they will prevent your scheduled jobs from executing.

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## Scheduling Jobs

Job Scheduler allows you to schedule the jobs you create and save in ServerStor to be run at your convenience. In this chapter we will discuss creating new schedules, altering existing ones, preparing your system to run the jobs, and the predefined alarms you can choose when you install ServerStor.

In this section we will use simple scenarios to show you how to create a schedule and how to alter an existing schedule.

In preparing to schedule a job in Job Scheduler, you should be guided by the following questions:

1. What job do you want to run?
2. When and how often do you want to run this job?
3. What kind of flag should signal the job is starting?

These questions correspond to the first three headings in the Schedule Jobs dialog box: Jobs, When and Message. They are answered when you schedule a job. We will use the following scenarios to demonstrate how these questions are answered and jobs are scheduled.

---

### Creating a Schedule

You have created and saved a Complete backup job in ServerStor. You want to back up everything on the network, every two weeks. Let's assume ServerStor is closed.

1. Double-click on the Job Scheduler icon at the bottom of the Windows desktop. This opens the Schedule Jobs dialog box. (Choosing the Schedule tool button in the ServerStor window will also open the Schedule Jobs dialog box.)
2. Click the Job files arrow under Jobs to open the Job files list box. Select the complete backup job you've created.

3. Choose the clock button under the When heading. This opens the When dialog box.
4. Change the time to read 11:30 p.m.
5. Since you want an interval of two weeks, select Every under the Date heading. The default is for 14 days, so you can leave it as it is.
6. Click the up arrow in the calendar text box until it reads the coming Saturday. This is the day your backup will start.
7. Choose OK to save your changes.
8. Click the Type options arrow to open the list box. Select Countdown.
9. Click the mouse pointer in the Text box. Type your message:  
  
**This is the two week complete backup.**
10. The Beep is enabled and Cuckoo is the default. Click the tune box arrow to open the list box. Select Bach.
11. Choose OK to save this schedule. A message box will appear:

**Alarm date has changed. Save it?**

**Choose Yes. This saves the schedule and puts you back on the Windows desktop. Next time ServerStor runs, it will copy the scheduler's updated schedule file.**

The default time for Countdown is 10 seconds. That means you will have 10 seconds to decide if you want to cancel the job once the Message appears. You may want to change this.

1. Click the Job Scheduler icon. Choose Options in the Control menu.
2. Change Countdown to 1 minute.
3. Choose OK to save.

## Altering the Schedule

When you select an event in the Event box, all of its parameters are displayed under the other headings. You can alter an Event's parameters using the buttons below the Events box and by changing the individual parameters under each of the headings. We will use the following scenario to show you how.

Suppose you have a report that is due the 15th of every month. You have created and saved a job file in ServerStor called Brutus, and now you want to schedule it to run when the report is done. You are already in the Events box, but have highlighted an already scheduled event.


1. Click the Add button below the Events box. This will replicate the highlighted event. You can make changes to one without altering the original.
2. Choose the When button (the clock) to open the When dialog box. The parameters shown will be the same as the schedule you've just replicated. They will need to be changed for the new job.
3. Change the time to 1:00 p.m. Doing this backup won't take long, and you will be available to insert the proper media cartridge.
4. Select the Day of the month option. Scroll the date box to 15.
5. Choose the OK command button.
6. Select Brutus from the Job files list box.
7. Select Confirm from the Type list box.
8. In the Text box type:

**special report backup. Load Brutus media cartridge.**


9. Choose the Chg button below the Events box to hold these changes without exiting the Schedule Jobs dialog box.
10. Choose OK to exit the dialog box. If you choose Cancel, Chg will be overridden and all your changes will be abandoned.

## Things to Remember when Using Job Scheduler

Job Scheduler makes your backup strategy more effective by running ServerStor jobs at times convenient for you. Since you are not going to be available, it is important that you prepare your system before you leave. The following is a list of things to do to ensure your jobs are run successfully.

 *When Job Scheduler is running a job, your workstation will probably be unattended, so no one will see the prompts for inserting tapes and other requirements, and the jobs you schedule will still be waiting for you in the morning when you come in.*

1. At the server, make sure all device drivers, SMDR, and TSAs are loaded, and that RESQMAIN is loaded.
2. Make sure the correct media cartridge is in your backup device, and is labeled correctly for the backup job you are running. (If you are not sure which media cartridge to use for the job that is scheduled, you can find out by choosing the Preview button in the Run Job dialog box in the ServerStor window.)

 *If you have more than one backup device on the server, make sure all the right tapes are in the right devices.*

3. Have your network's transport protocols loaded at the client station.
4. Access ServerStor in a way that preserves network security. That is, either
  - Don't log in, but you must have either NETX for VLMs loaded. If at installation time you indicated you want the Scheduler to run automatically, the Auto Login User can access ServerStor when the time comes. OR
  - Log in as the Auto Login User (See the section called "Creating the Master Scheduler Workstation" in [Chapter 2, "Data Protection Strategy"](#)), OR

- Log in as a user with restricted access, who can start ServerStor. The user must have access to SYS:\PUBLIC and the directory in which ServerStor is installed (making sure access to other areas is limited).
5. Make sure the Master Scheduler workstation is on, with Windows loaded and the scheduler on.
  6. Make sure ServerStor is closed (Job Scheduler cannot run your job if ServerStor is open).
  7. Make sure your server and backup device have been powered up.
  8. Make sure the Rescue disk is in the appropriate diskette drive on the Master Scheduler workstation. (Note: this is essential for RAD jobs.)
  9. If you are running more than one job, make sure they are part of the same job group and can use the same media cartridge. If a correct media cartridge is not recognized when the media is being validated, you will be prompted to change the media cartridge. The prompt will stay until you comply.
  10. (Optional) Schedule a message for yourself to remind you of the job that will be running later.

## Pre-Scheduled Jobs: RAD

The default jobs are scheduled for 5 p.m. If 5 p.m. is inconvenient, you can change the time or other parameters when you select the job in the Events box.

To maintain the integrity of the RAD backup, we recommend that you first run the Complete backup manually. You can do this from Job Scheduler:

1. Load a new media cartridge into your backup device.
2. Close the ServerStor window.
3. Double-click the Job Scheduler icon on the Windows desktop.
4. Select Scheduled RAD Complete (the “Friday” job) in the Event box. (It's called RAD\_CMPL.)
5. Choose the Test button under the Events box.
6. The Countdown message appears. You have 10 seconds to cancel the job before it starts.
7. ServerStor is opened.
8. The backup status box appears and ServerStor builds the directory (see the status bar at the bottom of the text box).
9. Next, ServerStor will try to validate the media cartridge. If auto-naming (default) is turned off, the Enter Media Name dialog box will appear. Provide a name, and continue.

When the backup has completed, the Librarian will be updated and the program will return to the Schedule Jobs dialog box. This media cartridge will be used for future jobs.

One restriction you may encounter is the expiration date for maintaining a data set. RAD is set up to maintain data sets for one month. During that time you may not overwrite the media cartridge data. RAD Complete backups are set up to overwrite data. You cannot reuse a media cartridge to do a Complete backup for one month. For the example above, this means that Friday, when the next Complete backup is scheduled, you must use a new media cartridge. (Refer to [Chapter 4, “Backup Operations”](#) for more information on overwriting and maintaining data sets.)

Differential backups are set to append data and are not affected by this restriction. We recommend you use a separate media cartridge for your weekly Complete backup and daily Differential backups. If you have a lot of data, you may need to span a Differential backup during the week.

## Creating Your Own Tunes

You can write your own tunes for Job Scheduler. The ditties used in Job Scheduler are contained in the JSCHEDN.INI file in the Windows directory, in a section called, appropriately enough, "Tunes." The tunes are written so that the name of the tune is followed by an equal sign and a string of numbers separated by commas. For example:

Cuckoo=45/16,0/16,42/16

The numbers tell the computer what note to play and how long to hold it. Each number is pitch/duration and represents a single note. The pitch, or tone, is the top number and corresponds with the chromatic scale (see illustration). A pause is denoted by a pitch of zero.

(♩=120.) 88

The duration is the length of a note as expressed as a fraction of a whole note where 1 equals a whole note. The larger the number, the shorter the duration. Thus, 4 in this system would be  $\frac{1}{4}$  of a whole note or a quarter note. Job Scheduler will always play the tune at 120 quarter notes per minute.

You can use up to 384 characters to define a tune.

## **adapter**

A hardware interface that allows communication between a host system (such as the server) and a peripheral device (such as the backup device). Formerly known as the “controller;” sometimes called “adapter board.”

## **Auto Login User**

A “dummy” user I.D. created by the ServerStor installation program. The Auto Login user has a secure password and sufficient rights to operate ServerStor for scheduled, automatic operations.

## **backup device**

Any hardware mechanism used for secondary storage (e.g., tape drive).

## **bindery**

A database maintained by NetWare, to keep track of users, groups, work groups, and other entities. Under NetWare 3.x, a bindery exists for each server. (See also: NDS)

## **compound job**

A job consisting of a series of named and saved Single jobs; running a Compound Job causes its single jobs to be executed sequentially.

## **data set**

A single backup recorded on a media cartridge.

**electronic label**

Identification and descriptive information that ServerStor marks on the recording medium. It's important to make sure that the media cartridge's external label matches the electronic label.

**external label**

The identification and descriptive information the user marks on the sticker affixed to the outside of a media cartridge. It's important to make sure that the media cartridge's external label matches the electronic label.

**Free Pool job group**

A pool of media cartridges that can be overwritten at any time; the Free Pool job group is automatically created in the media group.

**job group**

A set of media cartridges that are associated because they share a common purpose.

**job group type**

Method by which ServerStor manages the media cartridges in the job group; there are two job group types: Linear and Tower of Hanoi.

**job log**

A log file that contains messages about backup, restore, and verify jobs that were run. It resides on the server.

**label**

See “electronic label”; see also, “external label.”

**linear**

A job group type based upon a period of days that the user specifies to maintain data sets; once the period has elapsed for all data sets on a given media cartridge, the media cartridge can be overwritten.

**media cartridge**

An individually-mountable and uniquely machine-readable piece of media. (Typically a media cartridge is a tape cartridge.)

**media group**

A set of job groups that are associated because they share a common type of media format.

**NDS**

Under NetWare 4.x, a network-wide database for keeping track of users, groups, work groups, and other entities. (See also: Bindery)

**Rescue disk**

The diskette or local hard disk you specified (during ServerStor's client-side installation) as the source of volume recovery information. Default is a diskette in drive A:.

**Rescue drive**

See: Rescue volume

**Rescue function**

ServerStor's automated volume recovery process. Activated by the command "RESCUE" at the server, or by clicking the Client-side interface's Rescue button.

**Rescue volume (also, ServerStor volume)**

The location you specified for the Rescue Disk. Default is A:.

**single job**

One backup job that has been saved and named.

**SMDR**

Storage Management Data Requester. Under NetWare, a program that passes information between a storage management program or utility (such as ServerStor or SBACKUP) and a TSA. (See: TSA)

**Tower of Hanoi**

A job group type based upon the number of media cartridges specified by the user; cartridges are used in a sequence such that the period between backups gets progressively greater with age.

**transport protocol**

Memory-resident programs that facilitate network communications. Under NetWare 3.x, the transport protocols are IPX and NETX; under NetWare 4.x, the transport protocols are the VLM drivers.

**TSA**

Target Service Agent. Under NetWare, a memory-resident program (agent) that moves data between a specific server (target) and a storage management program or utility.

## Getting Started with On-line Help

ServerStor's on-line Help facility is available whenever the Help command button is displayed on the screen. You can also request ServerStor's on-line Help feature by using one of the following methods:

- Press the F1 function key at any time to access the Help file.
- From ServerStor's menu bar, select the Help menu and choose Index to get a listing of ServerStor topics. Choose an item from the list to obtain the help information window about that item.
- To get help on any of ServerStor's dialog boxes that are actively displayed on your screen, press the Shift and F1 keys simultaneously, or just the F1 key. This presents you with a window containing help information about the dialog box.
- To get help on an item in a menu, select the menu and highlight a particular item in that menu. Then press F1 to see a description of that item.
- To get help on a dialog box or the tool bar, place the mouse cursor anywhere on the dialog box or on any tool bar item and click the right mouse button.

## Context Sensitive Help

The on-line Help facility is also *context sensitive*. This means that you can request Help or access specific information about any of ServerStor's features, tasks, and commands by pressing the Shift and F1 keys simultaneously.

## How to Use the On-line Help Menu

In the following sections, we explain how to get on-line Help using your mouse or keyboard, brief descriptions of the Help menu items, and how to use Help to access information about ServerStor.

### Using Your Mouse to Get Help from the Help Menu

1. Select the Help menu in ServerStor's main application window and choose Index.
2. Choose the item you want information about, then click that item.

### Using Your Keyboard to Get Help from the Help Menu

1. Press the ALT key and the H key simultaneously.
2. Press the underlined letter for the menu item you want, or press the UP ARROW or DOWN ARROW key to highlight the item you want, and then press ENTER.
3. Select any of the command buttons in the Help window by simply pressing the underlined letter of that button.

If this is the first time you've used ServerStor's help facility, you might want to choose "How To Use Help" from the Help menu.

### Using the Index Command to List Topics


1. From the Help menu, choose Index or press the F1 key. This will display ServerStor's main index Help window on your screen.
2. Highlight the topic you want information about.
3. Click the selected topic, or, press the TAB key until you reach the topic you want, then press ENTER.

## Using the Help Window Search Command

The Search command in the Help window is an easy and convenient way to find the specific information you need. When you want help on a certain topic, you can select or type the name of the topic in the Search dialog box.

## Using the Help Window Search to Locate a Topic

1. From the Help menu, choose “Search for Help On” or press the F1 key to open Help, then choose the Search button. The Search dialog box will appear on your screen.
2. Select the word or phrase you want to search for. When you start typing, the list box automatically scrolls to those words that most closely match what you type.
3. Select the “Show Topics” text icon. This displays a list of topics at the bottom of the dialog box.
4. Select the topic you want to view, and then choose the “Go To” text icon. Information about the topic you select appears on your screen.

 *You do not have to type an entire word in the Search For box. The Help feature matches the characters you type as closely as possible to the available keywords.*

## Getting Help for ServerStor's Dialog Boxes

We've made getting help for ServerStor's dialog boxes as easy as possible. Below is a list of steps to take to get help on any of ServerStor's dialog boxes.

To request Help on any dialog box:

1. While using a dialog box, press the Shift and F1 keys simultaneously, or simply press the F1 key. A window describing the contents of the dialog box appears on your screen.
2. Place the mouse cursor on the dialog box and click the right mouse button. A help window for the dialog box will appear.

3. Press the Help button within a dialog box to display a help window for that box.

---

# When Files Are Skipped

## The ServerStor System Log File

Sometimes during a backup, restore or verify operation, ServerStor is unable to access a file. ServerStor may have skipped over the file during the operation for a variety of reasons. When ServerStor skips a file, the filename and a brief explanation of why the file was skipped are written to the System Log file. This can be viewed by selecting View Log from the Tools menu. (The default location of the file is SYSTEM\MSN\FSPN\SYSLOG.TXT.)

The explanations appear in a comment field that follows the filename. ServerStor always indicates the beginning of the comment field with a forward slash and asterisk (/\*). Because file space is limited, the explanations are very brief.

## **2000 There is no eligible media in any drives**

You have an ineligible media cartridge in a drive, or a drive is not functioning properly. Make sure you are using the correct media cartridge. Use the Media ID function in the Main Console screen of ServerStor.

## **2001 Can't lock the device for the current operation**

The device is currently being used by another application. Close the other application.

## **2100 No memory to complete request**

You have insufficient memory to perform the operation. Unload some other application or install additional memory.

## **2101 Can't load media engine: ResqENG.NLM**

The file ResqENG.NLM has been deleted, or, less likely, you have insufficient memory. Either unload some other application, or reinstall ServerStor.

## **2102 IT is NOT safe to unload ResqMAIN at this time**

A clean unloading of files cannot take place. Activity is taking place that ServerStor cannot stop; unloading at this time may cause your server to abend.

## **2401 Devices of different type not supported**

You are attempting to use incompatible devices, e.g., an FS1200 and an FS5000. See [Chapter 1, "Introduction"](#) for a complete list of supported devices.

### 2403 Target SMDR not loaded

Target Service Agents (TSAs) are programs that load SMDRs and make proper communication possible on the file server. You must load the TSAs before performing any ServerStor operation. See [Chapter 2, “Data Protection Strategy”](#) for information on installing and loading TSAs.

The Target Service Agents (TSAs) must be loaded before performing any operation in ServerStor.

### 2404 SMS error — TSA not loaded

The Target Service Agents (TSAs) must be loaded before performing any operation in ServerStor.

---

# Software Options

We've provided a set of powerful options for our most advanced users. With these tools, you can fine tune the way ServerStor uses memory, and thereby optimize the program's performance.

To access these options from the console of a server on which ServerStor has already been installed, follow this procedure:

1. At the server console prompt, type:

```
load RESQINST
```

and press the Enter key. This activates the install program.

2. You will now see the installation main menu. It features three options:

```
1) Advanced Software Options
2) Hardware Device and Adapter Options
3) Exit with Saving Software/Hardware Changes
```

Select option 1.

**Response:** You will see the following setting: Maximum Transfer Buffer Pool Size (KB). This setting determines the size of the cache buffer. Increases can result in increased performance. The minimum value is 128KB. Increases should be made in 16KB increments.

3. When you're through changing the options in menu item 1, choose menu item 3 (Exit). You'll be prompted to confirm the changes. Choose Y to save the changes. Your selections are stored in the file RESQNLM.INI.

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