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Retrospect®

USER'S GUIDE

Dantz Development Corporation, 4 Orinda Way, Building C, Orinda, California 94563 USA

Retrospect User's Guide, version 5.0, first edition

Dantz Development Corporation
4 Orinda Way, Building C
Orinda, CA 94563 USA

Standard Technical Support: 925.253.3050, tech_support@dantz.com
Customer Service: 925.253.3000, customer_service@dantz.com
General information (automated response): info@dantz.com
World Wide Web site: www.dantz.com

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CONTENTS

INTRODUCTION

Introducing Retrospect

Thank you for choosing Retrospect, the ultimate tool for safeguarding your valuable data.

For millions of users worldwide, Retrospect is the product of choice for ensuring reliable restores after a disaster. After all, restore is what backup is really for.

Retrospect does backup differently than other software. Unlike traditional Windows backup programs, Retrospect does not ask your computer "What files do you have that are new or changed and need to be backed up?" Instead, Retrospect takes from your computer a list of all the files and compares this list against all the files already in a backup set. If a file is already in the backup set, it doesn't need to be backed up again. The technology to perform this operation is called IncrementalPLUS™, and it's at the core of what makes Retrospect "better backup."

IncrementalPLUS offers other advantages as well, including the ability to have multiple backup sets. Since each backup is a complete set of all your files, you can restore everything from any one set. Proper backup requires having multiple backup sets, and only Retrospect offers this built-in capability.

In addition to IncrementalPLUS, Retrospect also offers the following advanced features:

• supports CD-R and CD-RW, hundreds of tape drives and tape libraries and removable cartridge drives such as Zip, Jaz, MO, DVD-RAM, and SuperDisk

• restores individual files, folders, or entire hard disks

• automation for unattended operations

• EasyScript™ feature simplifies automation

• compression to squeeze more files onto your media

• encryption and password protection for security

• flexible file selection criteria

• duplication of volume to volume (or folder)

• reporting shows recent backups and errors

• scalable network backup by adding Retrospect Clients for Windows 95/98/NT/NT Server, Windows 2000 and Macintosh computers.

Network Backup

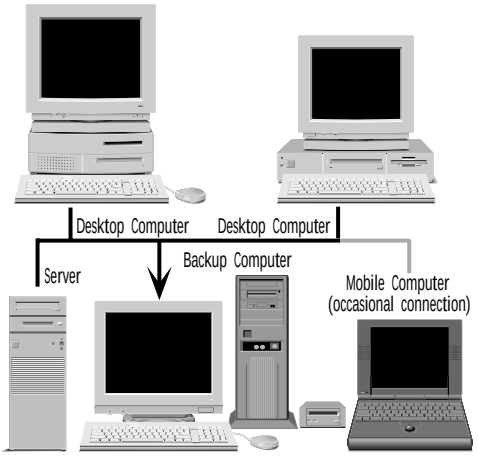
With Retrospect Clients, Retrospect provides a centralized backup solution for any network of Windows computers, including Windows NT Servers, as well as any mixed Macintosh and Windows network. It allows you to use a single computer with a storage device to back up Windows and Macintosh computers connected by a network. Users of the networked computers, the backup clients, do not require a backup application or their own backup storage device. Nor do they need to initiate backups themselves, as their files are automatically backed up by the backup computer. With Retrospect, you can schedule your network backups to run unattended—without your presence—during convenient times such as nights or weekends. You can use Retrospect with any network cabling method, as long as it uses the TCP/IP protocol.

How Retrospect Works with Clients

The backup administrator—that's you—installs the Retrospect client software on each of the client computers (also called clients).

The backup administrator designates one computer as the backup computer and installs the Retrospect application on it. This backup computer can be any networked computer with a suitable storage device. The backup computer does not have to be a file server, though Retrospect is often used on servers.

A backup computer with Retrospect can back up other Windows and Macintosh computers over a network. The administrator uses the Retrospect application to log in clients for use. After configuring the clients, the administrator can create and schedule scripts using client volumes as sources, as if the volumes were connected directly to the backup computer.



A backup computer with Retrospect can back up Mac and Windows computers over a network.

When you want to back up more computers on your network, you can purchase additional Retrospect Clients in packs of five, ten, fifty or one hundred from your local reseller or from Dantz at www.dantz.com.

Other Dantz Products

Dantz Development Corporation is a leading industry supplier of backup and archive software solutions. Dantz products satisfy all your backup requirements— reliability, performance, unattended operation, network compatibility, security, low administration costs, storage, and future growth—across a range of solutions from individual computer backup to network-wide backup on a large scale.

Retrospect Desktop Backup

Retrospect Desktop Backup is a complete backup application for any individual user backing up to any type of disk, MO, CD-R, CD-RW, Zip, Jaz, SuperDisk, or tape drive. Retrospect includes built in drivers for all backup devices, making it easy for anyone to start backing up immediately. Retrospect Desktop Backup runs on Windows 95 and 98, Windows NT Workstation, and Windows 2000 Professional computers. It is also available for Macintosh. As with every Retrospect product, it's scalable—simply purchase Retrospect Clients for every computer on your network that needs backup.

Retrospect Workgroup Backup

The Retrospect Workgroup Backup bundles Retrospect with twenty clients, allowing Retrospect to back up twenty other Windows 95 and 98, Windows NT Workstation and NT Server, Windows 2000 Professional and Server, and Macintosh computers from one location. This edition also allows backup to all tape libraries supported by Retrospect. As with every Retrospect product, it's scalable – simply purchase Retrospect Clients for every computer on your network that needs backup. Retrospect Workgroup Backup is also available for Macintosh.

Retrospect Server Backup

Retrospect Server Backup bundles Retrospect with 100 clients, allowing it to back up 100 other Windows 95 and 98, Windows NT Workstation and NT Server, Windows 2000 Professional and Server, and Macintosh computers on the network. It also includes advanced networking features useful for larger network configuration, such as the ability to back up over routers using subnet broadcast or direct IP addressing. This edition also allows backup to all tape libraries supported by Retrospect.

Retrospect Clients

Retrospect Clients allow Retrospect to back up other computers over the network. Adding Ret-

rospect Clients to Retrospect provides a centralized backup solution and allows you to use a single computer with a storage device to back up networked computers. With Retrospect, you can schedule your network backups to run unattended during convenient times such as nights or weekends.

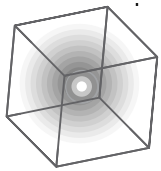
Retrospect Clients are available in packs of five, ten, fifty, and one hundred. All client packs include software for Windows 95/98/NT/NT Server, Windows 2000, and Macintosh computers.

About this Manual

If you just want to get started quickly with Retrospect, go to Chapter 1 • Getting Started. This manual talks about the features available in all versions of Retrospect, so you may not have a given feature (for example, advanced networking) in your edition. If you would like a more powerful edition, please contact Dantz at www.dantz.com.

This manual is divided into chapters devoted to a particular area of Retrospect. Appendices provide additional reference information, including a glossary defining the terms used throughout this manual and Retrospect itself.

This manual often mentions network operations with clients, but the information may not directly apply to you if you do not have Retrospect clients. Chapter 6 • Network Backup is devoted entirely to Retrospect clients.



CHAPTER 1

GETTING STARTED

- REQUIREMENTS
- INSTALLING RETROSPECT
- UPGRADING RETROSPECT
- USING RETROSPECT
- QUICK START

This chapter defines the hardware and system requirements necessary to use Retrospect, then explains how to install or upgrade the Retrospect software. It also shows how to start and leave Retrospect. Requirements and installation of Retrospect Clients are detailed in Chapter 6 • Network Backup.

The Quick Start section puts you into the thick of things right away by having you do two backups followed by a simple restore.

REQUIREMENTS

In order to run and use Retrospect, certain minimum requirements of hardware, software, and memory must be met. These requirements are listed below. Requirements of client computers are detailed in Chapter 6 • Network Backup.

Backup Computer

Retrospect requires the following backup computer hardware:

• Intel or compatible processor (Pentium or better)

• 24 MB RAM (32 MB or more recommended)

• Hard disk with 50 MB free space

• If you are going to use clients, you must have networking hardware and cabling functioning with the TCP/IP protocol, connected or routed to the network on which the backup computer operates.

Backup Device

Retrospect requires a suitable backup device. This can be a SCSI or ATAPI tape drive or library, CD-R, or CD-RW drive, or a removable disk drive such as Zip, Jaz, SuperDisk, DVD-RAM, and MO.

Dantz has an extensive testing procedure to qualify backup hardware devices supported by Retrospect. For the most up-to-date listing of supported drives, use the "Read Me" file's link to the latest read me file on the Dantz web site.

Software

Retrospect Desktop Backup requires Windows 95, 98, NT 4.0 Workstation, or Windows 2000 Professional.

Retrospect Workgroup Backup and Retrospect Server Backup require Windows 95, 98, NT 4.0 Workstation, NT 4.0 Server, or Windows 2000 Professional or Server.

• If you are going to use clients, you must have TCP/IP networking software installed and configured. For more information, see Appendix A.

INSTALLING RETROSPECT

Installing

1. Save all unsaved documents in other running application programs.

2. Under Windows NT or 2000, log in to the computer so that you have Administrator privileges.

3. Insert the Retrospect CD in the computer's CD-ROM drive, which automatically runs the Setup program.

4. Click Install Retrospect and follow the instructions of the Setup program to place the software on your hard disk, then choose its option to restart the computer, if necessary.

Installing Retrospect Clients

Installation of Retrospect Clients is detailed in Chapter 6 • Network Backup, which starts on page 83.

UPGRADING RETROSPECT

If you have received a limited version of Retrospect with a storage device or you have a less powerful version of the Retrospect Backup family, you can easily upgrade to a more powerful version of Retrospect.

To upgrade, choose License Manager from Retrospect's Window menu. Click Purchase and then click Web to visit the Dantz Online Store with your web browser.

Once you have received your upgrade's new license code, click Add in Retrospect's License Manager window and enter your new code, completing your upgrade.

USING RETROSPECT

Starting Retrospect

To start Retrospect, choose Retrospect from the Retrospect program group in the Start menu.

The first time you start Retrospect you must enter your application license code and then your name and, optionally, your organization.

Leaving Retrospect

Once the Retrospect application is started, you can leave it temporarily by clicking on a program window in the background, or by choosing another program from the Start menu or taskbar. This puts Retrospect in the background, and though it is not the active program, it will continue to perform its current operation, if any, and perform any scheduled operations which come up later.

To exit Retrospect entirely, choose Exit from its File menu. Before exiting, Retrospect informs you of the next scheduled operation, if any.

The Retrospect Directory

When you start Retrospect, the program displays its main window, the Directory.

You can access all areas of Retrospect through its Directory.

The Directory is like the tabbed folders in a drawer of a file cabinet. By default, the Immediate tab is shown and its name is in boldface to indicate that Immediate is the front-most tab. Click a tab to switch to a different tab in the Directory.

Each tab displays a brief summary of its contents at its top, with buttons along the left. To the right of each button is a description of its action. Each button's function requires additional steps and involves more windows or dialogs and buttons. This manual explains these functions.

QUICK START

This section introduces you to Retrospect's basic backup and restore operations and walks you through a tutorial in which you perform your own simple backups and a restore. Have your computer with a connected backup device and media ready.

You have yet to learn some of the terminology used in this section, but don't worry—it's not necessary to know these terms for this introduction. Just follow along.

Quick Backup

Start Retrospect. Click the Backup button. The following window appears.

The volume selection window. Additional volumes may appear, depending on your computer's configuration.

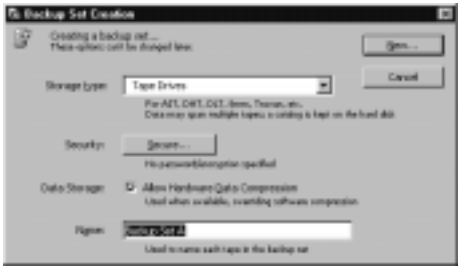
The window's scrolling area lists all available volumes. Click on the name of your hard disk to select it.

■ **NOTE:** Do not select a volume from a removable disk drive unless you are going to back it up to a different drive. This source volume must not be the same drive as the destination drive, which will be determined later.

The selected volume is highlighted in the list.

Click the OK button to accept the selected volume and proceed.

Retrospect needs to know which set of disks, tapes, or CDs will be the backup destination. If this is your first backup and there are no backup sets to choose from, Retrospect brings up another window to let you create a new backup set. If this is not your first backup, click the Create New button to bring up the following window.



The backup set creation window.

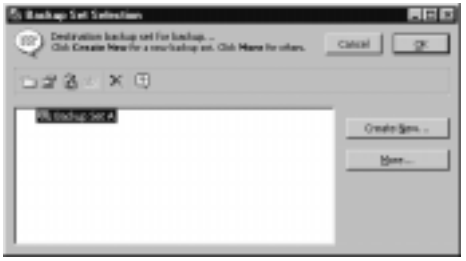
The first and most important thing to do with this window is set the backup set type. The combo box is set to the backup set type Retrospect considers most appropriate for the available backup devices. (The combo box is set to Tape Drives in the picture above.) Choose a type which matches your backup media, either CD-R (including CD-RW) discs, tapes, or disks. Do not choose the file backup set type, which requires more instruction than this quick tour can provide.

Next, enter a name for the backup set in the Name field, or just leave it as is with the default name.

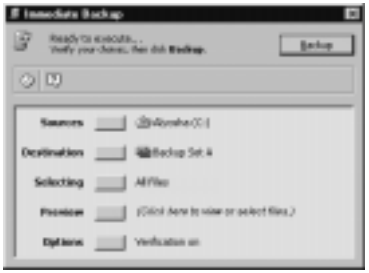
For this tutorial, ignore the security and data compression options entirely, then click the New button or press Enter. The next window lets you choose where to save the catalog file, a necessary element of the backup set.

■ **NOTE:** Do not save the catalog on a removable disk that will be used as a backup destination. Retrospect needs to access the catalog on a readily accessible volume, preferably the local hard disk.

Set the location then click the Save button or press Enter to save the file in the specified place. Retrospect returns to the backup set selection window, which lists available backup sets. The new backup set is automatically highlighted, so you do not have to select it.

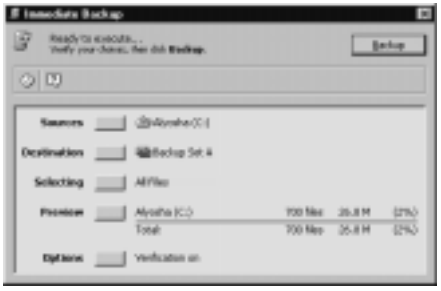


Click the OK button or press Enter. The next window appears.



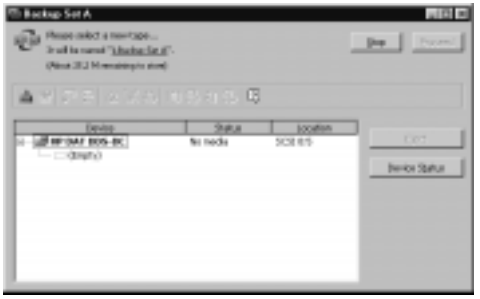
The immediate backup summary window, summarizing the most important aspects of the operation.

Take a moment to look at the various parts of this window, including the source volume you chose and the destination backup set you created. Click Preview to scan the volume and display the files chosen, then close the window which appears. The summary window lists the number and total size of the files to be backed up, which should be all of the files on the source volume.



The top of the window should say Ready to Execute. If not, Retrospect tells you what else it needs for execution. In this event, click the appropriate button to provide the necessary information.

Click the Backup button. A dialog asks whether you really want to execute the backup operation. Click OK. The next window appears. (It may differ slightly from the following example depending on whether you are using tapes, disks, or CDs.)

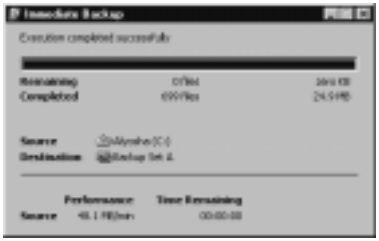


The media request window for a tapes backup set.

This window is asking you to choose a new piece of media for the backup.

▲ **WARNING:** Use only a blank disk, tape, or CD, or one with unwanted data, because any files on it will be permanently removed.

If you do not have a new or erased disk, tape, or CD in the backup drive, put one in. Select the new media in the window and click Proceed. Retrospect shows you a progress window while it backs up your files. Depending on your backup device capacity and the size of the files being backed up, Retrospect may request more media. When it is done, you see the following.



Congratulations on completing your first backup!

Quick Incremental Backup

Exit Retrospect. Make some duplicates of some files on the hard disk you backed up. (Make sure the names are different from the originals.) You can also make new documents with an application like a word processor. Do not make them complicated or make a lot of them; we need just

a few simple, changed files. For simplicity, do not save these files in a folder; place them on the top level of the same hard disk you just backed up.

Start Retrospect and click the Backup button. Retrospect goes directly to the immediate backup summary window because it already has the necessary information, which it is using from our first backup.

Click Preview, then close the window which appears and take a look at the file preview information in the summary.

Alyosha (C:)	705 files	27.2 M	(2%)
Total:	705 files	27.2 M	(2%)
Need to copy:	6 files	2,342 K	

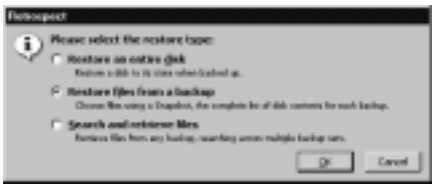
Retrospect compares all the files for this backup to all the files which exist in this backup set. If a file already exists and has not changed, Retrospect does not need to copy it. Because you made some new files, they are listed to the right of "need to copy." (This is known as an incremental backup.)

Click Backup, then OK. Close the execution window when the backup is complete. Congratulations on your first incremental backup.

Quick Restore

So we just backed up some files; now what? Let's assume we have lost some or all of those files and you need to recover them.

Open Retrospect and click Restore. Retrospect asks you to choose the type of restore you want to do.



We want to restore files from a backup, so set that radio button and click OK to move on to the next window.

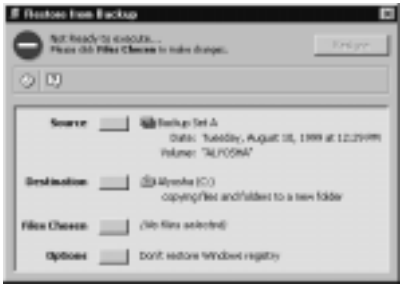
The restore Snapshot selection window.

In the top part of the window click the backup set. Retrospect then automatically selects the first Snapshot in the bottom portion of the window.

Selecting a backup set and Snapshot.

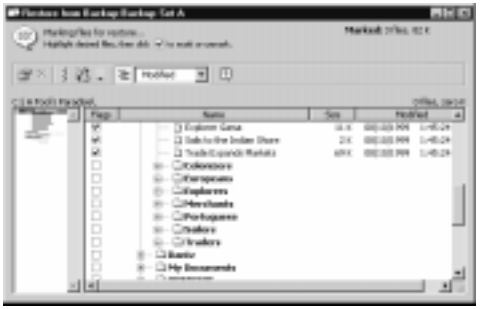
Click OK to move on, which brings us to the next window, in which we are asked to pick the location to which the backed up files will be restored.

Click on the name of your hard disk to select it as the volume to which you will restore. *Make sure the combo box is set to Retrieve Files & Folders,* then click OK. Retrospect briefly matches your Snapshot to the files in your backup set, then displays the summary window.



Check over the various parts of this window. Make sure the destination volume is correct and you are copying files and folders to a new folder. Note the part about the files chosen; none are selected, which is why the summary says the operation is not ready to execute. Click Files Chosen and a window opens, showing you the Snapshot of the files on the volume at the time of the backup.

Next, you must mark the files to restore. Locate the new files you made or copied after you did the first backup. The files should be on the top level of the hard disk, but you may have to scroll to see more files. To mark a file, click its checkbox. (Or, as a shortcut, just double-click a file to mark it.) To mark multiple files, select them and click any one of their checkboxes. Marked files have check marks next to them.



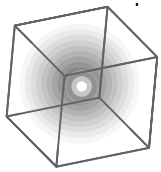
Go ahead and mark other files if you want. The upper right corner of the window shows the number and size of the files you have marked.

When you have marked your files, close the window. The Files Chosen information in the restore summary window reflects your new set of marked files.

▲ **WARNING:** Restoring may destroy data on the destination if you did not exactly follow the previous instructions. The restore destination window's combo box affects this. If you set it to restore entire disk or replace corresponding files, it may destroy data on the destination volume.

Click Restore. After the restore operation is complete, close the execution window and open the Windows Explorer.

On your hard disk Retrospect made a new folder named the same as your backup set. Inside your folder you will find the files you marked. Congratulations on your first restore.



CHAPTER 2

FUNDAMENTALS

- HOW RETROSPECT WORKS
- BACKUP SETS AND THEIR COMPONENTS
- BACKUP ACTIONS
- ADDING MEMBERS TO A BACKUP SET
- SNAPSHOTS
- RETROSPECT AND CLIENTS
- BACKUP SERVER

This chapter presents Retrospect's fundamental concepts. This manual and the program itself repeatedly refer to these basic ideas. Understanding these fundamentals is important and useful but not entirely necessary. Dantz designed Retrospect to be powerful and feature-packed, yet very easy to use for basic operations. Feel free to use Retrospect without reading this chapter, but your grasp of these concepts is an important milestone in learning to use Retrospect to its full potential.

HOW RETROSPECT WORKS

Retrospect's backup and archive operations copy files from a source and store them in a backup set. The source can be a hard disk, file server, CD-ROM, removable disk, or even a combination of multiple sources. The destination set can consist of tapes, CD-R or CD-RW discs, removable disks or optical cartridges (including DVD-RAM discs), or even a single file on a hard disk or server.

Retrospect uses an archival method of backup that ensures backed up files are not deleted or written over until you specify that to happen, so they stay on the CD, disk, or tape indefinitely. This is helpful, for example, if you have been working on an important document every day for the past month and you discover you have been making terrible mistakes for the past week. If you have been backing up every day Retrospect lets you retrieve a good version of the file from a week ago (or any point in time it was backed up). This is an important benefit of Retrospect not found in "disk mirroring" backup software.

IncrementalPLUS

This archival method of backup is unique to Retrospect and is called IncrementalPLUS. It is a key to how Retrospect gains reliability, speed and efficiency both locally and across a network. IncrementalPLUS works differently than normal incremental backups, and combines the speed of normal incremental backup with the reliable restores of full backups.

Every time you create a new file or change an old one, your computer marks the file as new or changed by checking the archive attribute. You can see this attribute if you view a file's properties from Windows Explorer. Under the General tab, you can see the archive attribute and you can check or uncheck it.

Other incremental backups ask your computer for all the files which have the archive attribute checked, back up only these files, and then uncheck the archive attribute of each file.

IncrementalPLUS is different. Instead of looking at only the archive attribute to determine which files are changed, Retrospect makes a list of all the files on your hard disk and compares that to a list of all the files currently in your backup set. Retrospect looks at every file's name, modify date, size, and creation date to determine if a file needs to be backed up. By not relying on the archive attribute, IncrementalPLUS ensures that all files which need to get backed up do get backed up.

IncrementalPLUS has a second benefit over normal incremental backups in that rotating between more than one backup set is very easy and reliable. Because incremental backups reset the archive attribute after each backup, if you try to do a second backup to another backup set, nothing gets copied. Because IncrementalPLUS is actually comparing your hard disk to what is already in a particular backup set, each backup set will contain all your files. If you lose one backup set, you can restore from any other.

Catalogs

Retrospect uses a separate catalog (stored on your hard disk) to keep track of the different generations of modified files in a backup set. The catalog lets you quickly search for files without having to actually search the backup media itself.

BACKUP SETS AND THEIR COMPONENTS

The basic building block of Retrospect is the *backup set,* which is a set of one or more disks, tapes, or CDs, or a file. Individual pieces of media (for example, tapes, CDs, disks, or cartridges) are *members* of a backup set.

The *catalog,* a file saved on your hard disk, is an index or table of contents of the files on the backup media of a backup set. The catalog lets you view the contents of a backup set without any of its media on hand. A catalog is required for all operations which copy files to and from a backup set. If a catalog is lost or damaged, Retrospect can rebuild a catalog from the media. Catalogs typically use four megabytes of disk space for every ten thousand files. Figure 2-1 below illustrates the composition of a backup set.

You may back up as many source volumes as you like to a single backup set. For example, you could have a single backup set as the backup destination for your computer's internal hard disk, your external hard disk, a file server, and a co-worker's hard disk on a computer with installed Retrospect client software.

Backup Set Types

Tapes

A *tapes backup set* uses tapes from a tape device such as a DAT drive, Travan drive, AIT drive, or DLT drive. Files are backed up to the tapes and the catalog is usually saved on the hard disk of the computer doing the backup. Chapter 3 • Hardware and the "read me" file provide more detailed information on tape drives.

Disks

A *disks backup set* uses ejectable media. For example, removable disks such as Zip, Jaz, SuperDisk, DVD-RAM, or MO. Files are backed up to the cartridges and the catalog is usually saved on the hard disk of the computer doing the backup. Chapter 3 • Hardware provides more detailed information on removable media drives.

CD-R

A *CD-R backup set* uses recordable compact discs with CD-R or CD-RW drives. Files are backed up to the discs and the catalog is usually saved on the hard disk of the computer doing the backup. Chapter 3 • Hardware and the Read Me provide more detailed information on CD-R and CD-RW drives.

This manual uses the term "CD-R" to refer to CD-R and CD-RW, which work nearly the same with Retrospect. The difference is that CD-R discs cannot be erased, while CD-RW discs can be erased and reused by Retrospect.

You cannot use a CD-ROM drive to restore from a CD-R backup set. Though the ability to write is not needed during restoring, a

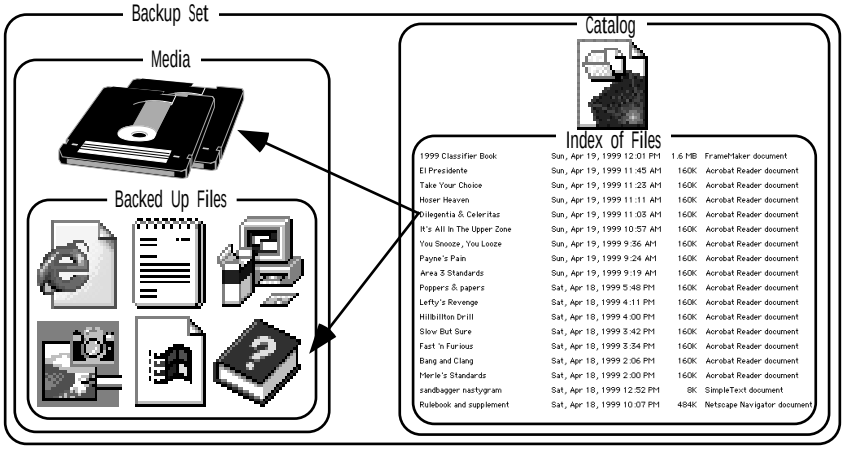


Figure 2-1: The backup set's catalog has pointers which locate the files on the media.

CD-ROM drive cannot recognize the Retrospect backup set format of a CD-R or CD-RW.

File

A *file backup set* differs from other backup sets because it does not use removable media. Rather, it combines the catalog and backed-up files into a single file stored on a volume. (This volume can be any disk drive other than a floppy disk, such as a hard disk, file server or shared disk, or removable disk, that you can access from the Windows Explorer and map to a drive letter.) Unlike the other types of backup sets, which require media dedicated only to backups, you can store a file backup set right alongside other files on a volume used for other purposes.

A file backup set can be no larger than the volume on which it is stored. You can decrease the amount of space used by a file backup set by using Retrospect's data compression option.

BACKUP ACTIONS

The main purpose of performing a backup is to copy files into a backup set. You can instruct Retrospect to perform three different types of backup actions, all using the same IncrementalPLUS technology. A normal backup adds every file not already in the backup set. A recycle backup erases a backup set and then adds every file not already in the backup set—in effect, all files. A new media backup creates a new backup set and copies every file not already in the backup set—again, in effect, all files.

Retrospect's default backup action, *normal*, does IncrementalPLUS backups for efficient backups without any extra effort on your part.

Normal

A *normal* backup, as its name suggests, is the action to use in most situations. It is a typical IncrementalPLUS backup, which saves media space by avoiding redundant files in a backup set. A normal backup copies only files which are new or newly-modified.

During a normal backup, Retrospect compares the list of files selected to be backed up against the list of files in the backup set's catalog, then copies only those files which are not already present on the media. When a normal backup is done to a new backup set, there are no files in the backup set, so everything selected from the source is backed up.

Normal Backup Example

A backup administrator creates a new backup set and does a normal backup to it with a new or erased medium in the backup device. Because no files exist in the new, empty backup set, Retrospect copies all the selected files to it. The next day the administrator does another normal backup to the backup set. Retrospect compares the selected source files to the catalog, then marks several new files and a few files which have changed since the previous day's backup. Only these new and changed files are added to the medium previously used with this backup set, or a new medium if the other fills to capacity.

Recycle

When Retrospect performs a *recycle backup*, it clears the catalog contents (if any) of the backup set so it appears no files are backed up. Then it looks for the first media member of the backup set and erases it if it is available. If the first member is not available, Retrospect uses any available new or erased CD, disk, or tape. Everything selected from the source is backed up to the backup set.

Recycle Backup Example

The backup administrator decides the catalog is getting too large after a week of normal backups to the backup set. She starts a recycle backup with the first media member in the backup device and Retrospect resets the catalog, erases the

files on the media, and copies all the selected files.

New Media

When Retrospect performs a *new media backup*, it makes a new backup set (with a name similar to the old one) using a new or erased CD, disk, or tape. This allows the original backup set and its catalog to remain intact for long-term storage in a safe place. The new backup set catalog and the new media member are each named with a number in sequence, such as "Office Net [001]" and "1-Office Net [001]", as Figure 2-2 below shows.

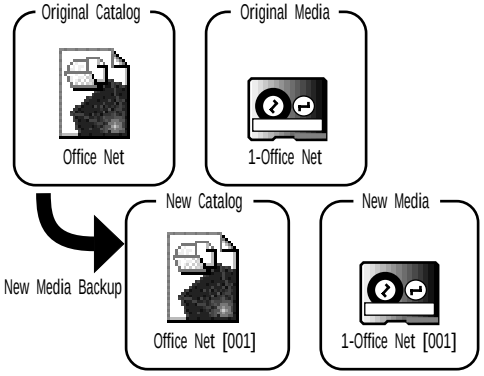


Figure 2-2: Naming a new backup set in a new media backup.

Retrospect updates references to the old backup set in scripts and schedules so they reflect the new backup set.

New Media Backup Example

The backup administrator wants to rotate a backup set off-site, so she starts a new media backup with a new or erased medium in the backup device. Retrospect creates a new backup set with a new catalog, and copies all the selected files to the media. The previous backup set remains intact and the administrator takes its media to a secure location off site.

New media backups are ideally used for rotating CDs, disks, or tapes for off-site storage,.

Additional Backup Action Examples

"Backup Strategies" in Chapter 8 • Management, offers several backup strategies which use normal, recycle, and new media backup actions. Study these strategies to see how it is possible to maximize backup safety and effectiveness by alternating among backup sets and rotating media off site.

ADDING MEMBERS TO A BACKUP SET

When a tape, CD, or disk fills with data Retrospect asks for a new one. It uses any available (that is, in the drive) new or erased media. If the media has the name Retrospect is looking for, Retrospect will erase and re-use it. To reduce the danger of unintentionally destroying data, Retrospect will never automatically use a medium with the wrong name if it has data on it. Retrospect uses the catalog to keep track of files and media, so you never have to think about which files are on which CDs, disks, or tapes of a backup set.

SNAPSHOTS

Because Retrospect does incremental backups, it may have several versions of a file scattered among several backup sessions within a backup set. For example, you may update your "Weekly Status Report" document every week, and because each update modifies the file, Retrospect backs up each one to your backup set. A flat list of all versions of all the files in the backup set would be very confusing. For this reason, among others, every time you back up Retrospect places a Snapshot of the source volume in the backup set.

A Snapshot is a list—you can think of it as a picture—of all files and folders on a volume when it is backed up. For each volume, one Snapshot is stored in the catalog and a copy of the same Snapshot stored on the backup medium (tape,

disk, cartridge, or CD). Following each successful backup or archive operation, the old catalog Snapshot is replaced but old media Snapshots remain untouched and Retrospect adds new Snapshots to the medium.

When you want to restore from a backup, you can tell Retrospect to use a Snapshot to restore the entire contents of a disk. Or, you can use a Snapshot as a guide to see the volume as it was at a given point in time when it was backed up, picking and choosing individual files to restore. Snapshots allow you to perfectly restore each volume to its exact state at the time of any completed backup.

Snapshots help Retrospect keep track of the volumes to which a file belongs. When Retrospect first backs up a volume to a new backup set, it copies the selected files and saves a Snapshot. When it subsequently backs up other volumes, it does not copy files which exactly match files already in the backup set. However, they are still noted in each volume's Snapshot. This efficient storage saves backup media by not redundantly copying exactly matching files.

You can retrieve Snapshots from media if you want to restore a volume, folder, or file as it was at any given backup.

Because a Snapshot represents a volume at a specific point in time, you cannot use a Snapshot to find multiple versions of a file throughout different backup sessions on different dates. However, Retrospect does provide an easy way of doing this, which is explained in Chapter 7 • Restoring, which starts on page 107.

RETROSPECT AND CLIENTS

The Retrospect application can back up any volume that can be accessed from the Windows Explorer or can be assigned a drive letter, whether it is a volume shared over a network or a drive connected directly to your computer. Retrospect Clients can extend the backup and restore capabilities of Retrospect to other computers on your network. A computer equipped with this software from Dantz is known as a Retrospect client computer, or simply a client. Retrospect Workgroup Backup and Retrospect Server Backup, which include the client software and licenses, can back up any client on the network without the need for installing file servers, starting file sharing, or mounting volumes.

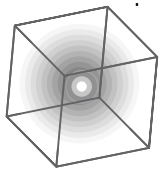
You can back up other computers on your network using Microsoft Networking, but this requires careful configuration of sharing, users, and permissions. Using Retrospect client software to back up the same computers is much simpler: you install the client software once, then if that computer is turned on (even if no one is logged in) you can back it up over the network.

At any time, you can add clients to your backup by purchasing Retrospect Clients. Dantz offers Retrospect Clients packages which include multiple licenses, for Windows or Macintosh.

BACKUP SERVER

Retrospect's Backup Server technology, which is explained in detail in Chapter 5, accommodates changing network and disk configurations. Because it is driven by the availability of volumes and their need for backup, a Backup Server is ideal for environments in which computers and hard disks, such as mobile computers and removable disks, irregularly appear on the network. When these clients are connected to the network, Backup Server will learn of their presence and back them up. Volumes are backed up to the best available backup set media, so Backup Server scripts give you greater freedom to use the media of your choice. Retrospect client users can even initiate backups of their volumes, an otherwise unavailable feature.

A Backup Server script is often best used in concert with regular backup scripts to produce a comprehensive backup strategy.



CHAPTER 3

HARDWARE

- ASPI EXPLAINED
- ATAPI EXPLAINED
- SCSI EXPLAINED
- SEEING YOUR BACKUP DEVICE
- CD-R AND CD-RW DRIVES
- REMOVABLE DISKS
- TAPE DRIVES
- TAPE LIBRARIES
- MEDIA LONGEVITY AND STORAGE

This chapter explains ASPI, ATAPI, and SCSI technologies used by Retrospect and gives summaries of the various CD-R and CD-RW drives, tape drives, removable disk drives, and other hardware devices Retrospect can use for backups. If you are already familiar with these terms you may skip the explanations and read the sections which apply to your particular hardware setup and backup device.

Retrospect uses hardware intensively. Its purpose is to transfer large amounts of data between a source volume, such as a hard disk, and a backup device, such as a tape drive, as efficiently as possible. If these hardware systems do not work correctly, Retrospect cannot do its job and cannot back up your data. For this reason you should understand how your hardware functions and how it relates to Retrospect.

ASPI EXPLAINED

ASPI (Advanced SCSI Programming Interface) is software which manages communication among peripheral devices. On a Windows operating system, this combination of integrated software is known as the ASPI layer.

Many peripherals include software that adds or modifies the ASPI layer with the setup program. Retrospect's setup program installs Adaptec Corporation's ASPI at your option, so you can use tape and CD-RW devices with Retrospect.

ATAPI EXPLAINED

ATAPI (ATA Packet Interface) is a standard for connecting peripheral devices such as CD-R drives and tape drives to a computer's IDE interface.

All ATAPI devices are internal on the IDE bus, or channel. There may be one or two devices per channel, numbered 0 and 1, known as the master device and the slave device, respectively. (ATAPI device numbers are set with jumpers or special cables.) Additional channels may have to be enabled through the BIOS.

Retrospect uses ASPI to communicate with ATAPI devices. Your computer must have ASPI installed to use Retrospect with an ATAPI drive.

SCSI EXPLAINED

SCSI (Small Computer System Interface) is a specification of mechanical, electrical, and functional standards which lets a computer connect and communicate with peripheral devices such as hard drives, CD-R drives, tape drives, and scanners. You can add SCSI capability to your computer with a SCSI host adapter, an expansion card.

SCSI connects a computer with peripherals by linking up to fifteen devices with SCSI cables plugged into SCSI ports. The devices are connected serially—one after the other—in a simple layout known as a daisy chain. Each device must have its own unique identifying SCSI address, or ID, numbered from zero to fifteen. (You set a device's ID number on the device itself.)

Both ends of a SCSI chain must be "terminated" to maintain the integrity of communication signals on the chain. This is done with a terminator, a device which plugs into an open SCSI port and acts as a kind of dead end of the chain. A SCSI card should have built-in termination, so you need only worry about terminating the other end of your SCSI chain. If you have an internally terminated or self-terminating SCSI device, it should be the last device of the SCSI chain (that is, at the end and the furthest device from the computer). To find out the termination requirements for your specific hardware setup, refer to your SCSI card's documentation and the documentation that came with each peripheral device.

Setting up a SCSI chain on your computer is easy. All you have to do is use the cables to connect the devices in the daisy chain fashion, give each device a unique SCSI ID number, and terminate the last device. You cannot have duplicate SCSI addresses on your SCSI chain.

Figure 3-1 on the next page shows an example SCSI chain of two external devices connected to a SCSI card in a computer.

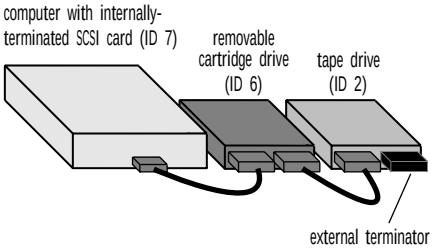


Figure 3-1: Each SCSI device is connected to the next one and has a unique ID number, with both ends of the chain terminated.

The IDs on your chain do not have to be sequential or in a particular order; the SCSI chain is not affected by the order as long as no devices share the same number.

■ **NOTE:** To ensure proper operation of your SCSI devices, always turn on each SCSI device on your chain before you turn on your computer, and do not turn them off until after you shut down your computer.

SEEING YOUR BACKUP DEVICE

To see available backup devices with Retrospect, click Devices from the Configure tab, then click the Device Status button. Retrospect scans the computer, and displays a window showing all ID numbers and their connected devices, if any.

The device status window.

Your computer may be configured with a combination of multiple SCSI and ATAPI buses. In the event of multiple buses, Retrospect's device status window lists additional ASPI buses and ID numbers.

For each address, Retrospect lists the device vendor, its product name, and its firmware version number. In the case of a device for which Retrospect has a special, Retrospect-internal driver, the driver is also identified, in boldface. In the case of a device for which Retrospect is not using its own driver, the words "(no driver)" appear.

With supported tape drives, tape libraries, CD-R, and CD-RW drives, Retrospect uses its internal drivers, listed in bold.

In the previous example, the Sony CRX100E model is shown as a recognized device. The "Sony CD-RW (1.45)" indicates Retrospect's internal driver version for this drive.

Retrospect does not have its own drivers for removable cartridge drives because it can already communicate with them through the operating system.

If your drive does not appear at all, refer to the troubleshooting information of Chapter 10 • Problems and Solutions.

To make sure Retrospect supports your drive, refer to the latest Retrospect "read me" file. The fact that Retrospect *recognizes* a drive does not always mean the drive is supported or qualified for use with Retrospect, although usually it is. If you are in doubt, contact Dantz Technical Support for confirmation.

When You Cannot See Your Backup Device

If you are backing up to removables, make sure you can see and access your removable drive in the Windows Explorer. If you cannot, refer to your drive's documentation for information on setting it up properly. When you can access it from My Computer, you should be able to see it in Retrospect.

If you are backing up to tape or CD-R, you must have ASPI installed. If you installed ASPI and set up a device properly but it is not listed, something is wrong with your setup.

First, make sure ASPI is installed correctly on your computer. Run the ASPI Check utility included on the Retrospect CD.

If it is an internally connected ATAPI device, make sure the cable is firmly connected and it is correctly set as either the master or slave device.

Also make sure your computer's BIOS is set to correctly enable all devices connected to the IDE bus. Refer to the documentation which came with your computer for more details.

For SCSI devices, make sure each device is turned on, the cables are securely connected, each device has a unique ID, and the SCSI chain is properly terminated. Do not rearrange devices on a SCSI chain unless each device and the computer itself are all turned off.

If your SCSI chain is not properly connected and terminated, or if there is an ID conflict, many different problems can result. The most harmless problem would be a device that does not appear in the device status list, which is immediately obvious. A more serious—yet subtle—problem could be a communication failure between the computer and the backup device, leading to data loss. The most serious problem would be damage to your computer or SCSI devices on the chain.

If everything is properly set on the SCSI chain, there is still the unpredictability of "SCSI voodoo," the cause of problems which theoretically should not occur because the "rules" of SCSI are being followed. SCSI voodoo may require you to rearrange the devices on the chain, change the termination, assign new IDs, or replace SCSI cables. (Short cables cause less problems than long ones.) In theory SCSI has well-defined rules and expected results, but in practice SCSI is an inexact science.

Fortunately, you are not likely to encounter SCSI incompatibility problems, but we want you to be aware they exist. Most SCSI devices allow for problem-free, plug-and-play use.

Drive Qualifications

Dantz maintains an extensive laboratory devoted to testing Retrospect with different backup devices. Nothing taxes storage devices more than backups so if there is a problem, DantzLab's intensive testing will most likely find it. Device manufacturers supply Dantz with pre-release versions of their devices so Dantz can identify problems before the devices are made available to the public. Refer to the "Read Me" file installed with Retrospect for the latest compatibility information and more specific details on supported devices.

If you have problems with Retrospect and your backup devices after you have confirmed you have a legitimate hardware and software installation, refer to Chapter 10 • Problems and Solutions, which starts on page 185. You may also contact Dantz for help. The Dantz Technical Support staff is up-to-date on the latest compatibility issues and can help identify the cause of your problem and suggest a solution.

Toolbar Commands for Seeing Devices

Ignore ID If you select an ID and click Ignore ID, Retrospect will not scan that ID when Retrospect is next opened after you quit. (This is not a feature you will need to use unless directed to do so by Dantz Technical Support.)

Rescan Clicking this button makes Retrospect scan ASPI addresses and display any changes since the window was initially opened.

RECORDABLE AND REWRITABLE COMPACT DISC DRIVES

Until recently, creating a compact disc required you to make an exact image of the desired CD on a hard disk then transfer the data from the hard disk drive to the CD-R drive in a single operation. While creating a CD, any interruption of data flow, such as a screen saver launching or new e-mail arriving, would cause the CD to fail to "master" properly, resulting in the loss of the entire CD. This unreliability made CD-R unsuitable for backup.

Dantz has overcome this challenge by using packet writing, a technology used in some CD-R and CD-RW drives, as specified in the Orange Book, a compact disc technical standards document. Packet writing allows incremental storage of files, making recordable CD technology appropriate for backup. Users can also reliably back up to a CD with data gathered from a network using Retrospect clients.

Format Compatibility

Retrospect requires that you use a supported CD-R or CD-RW drive for restoring files from CD backup sets. (For a list of supported drives, see the "Read Me" file installed with Retrospect.) Backup discs created by Retrospect are accessible only by Retrospect; they are not accessible from Windows and cannot be used with the Windows Explorer or other application programs.

■ **NOTE:** You cannot use CD-ROM drives to restore from CD backup sets.

CD-R and CD-RW Media

CD-R discs are write-once media which cannot be erased. Use care when choosing your CD-R backup set names and when deciding which files to back up.

CD-RW discs are rewritable and can be recorded over and over like floppy disks or removable cartridges. There is a limit to the number of rewrites, but you are not likely to encounter it with Retrospect.

This manual uses the term "CD" to refer to either a CD-R disc or a CD-RW disc, which work nearly the same with Retrospect. The difference is that CD-R discs cannot be erased, while CD-RW drives can erase and reuse CD-RW discs. This manual also refers to CD-R backup sets, which can, of course, be used with either type of CD media or drive.

CD media is generally available as 74-minute discs, offering a capacity of 610 MB.

Preparing CDs for Use

When Retrospect is executing a script unattended and requires a new disc, it will automatically use any appropriate disc that is erased or has the correct name. It is a good idea to prepare discs for use ahead of time by erasing them.

First make sure the device you want to use is listed in the storage devices window. If the device you want does not appear in the window, see "Seeing Your Backup Device" on page 29.

Retrospect requires the exclusive use of the CD drive and it will first eject any loaded, prerecorded (finalized) CD-ROM or audio disc from the drive. The drive's assigned drive letter is then reserved for Retrospect's exclusive use until Retrospect exits.

To prepare a CD, insert it in the drive and notice its name and description in the storage devices window.

The storage devices window.

Once a CD is loaded, its status appears.

Ready indicates the disc contains Retrospect data.

Erased indicates an empty disc, ready for use by Retrospect.

Write Protected means the disc is locked.

Content Unrecognized means the disc is not empty, but does not contain valid Retrospect data. (See “Content Unrecognized” on page 206.)

Wrong Version may mean the drive’s firmware is not supported. Or, it may mean the inserted disc was written to by Retrospect for Macintosh. Retrospect for Windows cannot read such discs.

Hardware Error indicates a device error has occurred.

Damaged Disc indicates that the disc was damaged during the previous backup. You may not be able to append to this disc.

Running and Busy indicate the drive is busy.

No Media indicates there is no disc in the drive.

Toolbar Commands for Preparing CDs

Device Status brings up a window listing ASPI bus ID numbers and their respective devices, if any. This window is explained in detail under “Seeing Your Backup Device” on page 29.

Properties displays information about the CD drive. If a disc is inserted, the properties window also displays information about it, including whether or not it is a member of a Retrospect backup set and its format.

Eject unloads the selected disc from its drive.

Erase erases the contents of the selected CD-RW disc. It is not available with CD-R discs.

Finalize is not implemented in the initial release of Retrospect. Dantz may implement the ability to finalize CDs in a subsequent release.

REMOVABLE DISKS

Though Retrospect is often used with tapes, it is just as effective when used with drives with removable media which are accessible as drive volumes from the Windows desktop, Windows Explorer, and other application programs. For the purposes of this software, a removable disk drive is a device that uses media which can be accessed with the Windows Explorer or from the Windows desktop. This includes Zip, Jaz, SuperDisk, DVD-RAM, and MO. Some drives require add-on drivers for support. (The drive vendors include these drivers with the devices.)

Before using Retrospect to back up to an ejectable drive you should be familiar with the procedures to insert, format, erase, and eject cartridges. In other words, you must know how to do with a removable disk everything you can do with a floppy disk.

Backup Sets

When you create a backup set to be used for backup to a disk or disks, you can choose a file backup set or a disks backup set. A disks backup set can grow continuously by spanning multiple cartridges, just as a tapes backup set can span multiple tapes. A file backup set cannot grow beyond the available space of its single disk or

cartridge, because the entire backup is stored in a single file.

When adding a disk to a backup set, Retrospect erases the previous contents, if any, of the disk. Backing up to a file backup set does not affect the other files on the drive to which you are backing up.

Formatting

Before you use an unformatted removable cartridge or similar disk with Retrospect, you must first format the disk from the Windows Explorer or a formatting utility. It is a good idea to format all of your cartridges using the same formatting method.

You must be able to copy files to and from the disk in Windows to use a removable disk with Retrospect.

Retrospect has several features for working with backup devices. These let you scan your computer to check devices, eject media from a device, erase media, and format media.

To perform any of these tasks, first click the Configure tab from the Retrospect Directory, then click the Devices button. This brings up the storage devices window.

▲ **WARNING:** If a hard disk appears ejectable and you are backing up to removable disks, be especially careful never to accidentally select the hard disk as a backup destination.

Preparing Removable Disks for Use

When Retrospect is executing a script unattended and requires a new piece of media, it will automatically use any appropriate media that is erased or has the correct name. It is a good idea to prepare disks for use ahead of time by erasing or reformatting them. Use the following functions to erase and format disks.

■ **NOTE:** For removable cartridges such as Zip, Jaz, SuperDisk, DVD-RAM, or MO, format with the software that came with your drive.

◆ **TIP:** For Windows NT and 2000, to avoid long delays while Retrospect erases disks, format your cartridges as NTFS volumes.

First make sure the device you want to use is listed in the storage devices window. If the device you want does not appear in the window, verify that it shows up in the Windows Explorer and then insert a disk.

To prepare a disk, insert it in the drive and notice its name and description in the storage devices window.

The storage devices window.

Once a disk is loaded, its status appears.

Ready indicates the disk contains Retrospect data.

Erased indicates an empty disk.

Content Unrecognized means the disk is not empty, but does not contain valid Retrospect data. With a removable disk, the unrecognized content likely is other files, which you may not want to lose. (See “Content Unrecognized” on page 206.)

▲ **WARNING:** When a floppy, Zip, Jaz, SuperDisk, or MO shows as Content Unrecognized, use caution. Any files on a disk are permanently removed when Retrospect uses the disk for backup.

Unloaded usually means a disk is in the drive but must be ejected and reinserted to be used.

Running and Busy indicate the drive is busy.

No Media indicates there is no disk in the drive.

Toolbar Commands for Preparing Disks

Device Status brings up a window listing ASPI bus ID numbers and their respective devices, if any. This window is explained in detail under "Seeing Your Backup Device" on page 29.

Properties displays information about the removable disk drive. If a disk is inserted, the properties window also displays information about it, including whether or not it is a member of a Retrospect backup set and its format.

Eject unloads the selected medium from its drive.

Erase erases the contents of the selected disk.

Format completely reformats the selected disk and is more time-consuming than Erase. Retrospect hands off the actual formatting to the Windows operating system. If this command does not properly format your removable disks, use your drive's formatting utility, not this toolbar command, to format your media.

TAPE DRIVES

Retrospect is all the software required to support most tape drives.

Tape drives operate differently from most other drives and devices you are probably familiar with. Unlike random access devices such as hard drives, floppy disk drives, and CD-ROM drives, tape drives are sequential access devices. Since the data reading mechanism cannot immediately go to the correct data position on the media, a tape drive accesses data more slowly than a disk drive (or similar random access device). It is just like fast-forwarding a music cassette to find your favorite song.

Sequential access media is inexpensive, has large capacity, and has a good sustained data transfer rate. Thus, tapes—being cheap, big, and fast—are particularly well suited for backups.

When you use Retrospect to back up a volume to a tape, the data is written sequentially from the beginning of the tape to the end. When you add backups to the tape, the data is appended where the previous data ends, until the tape runs out.

Neither the computer nor Retrospect will mount a tape or a map it to a drive letter when you put it in the drive, so do not expect the tape to appear on your Windows desktop. You cannot see it on the desktop or from the Windows Explorer to drag files to and from the tape like a disk volume. This is not bad because a sequential access device is not optimal for the type of file management you are likely to do with a mapped volume on the desktop. Though the technology exists to let you map a tape as a volume and use it like a disk, you probably would not want to do this for regular backups because of the performance issues discussed previously. Retrospect's system for backing up and restoring files to and from tapes is far more powerful, efficient, and reliable.

Tape Capacity

The actual amount of data that will fit on a given tape will vary due to many factors. A tape's capacity can be greatly influenced by the relative speeds of the backup computer and the tape drive.

If you back up a slow source (for example, a slow computer, a slow hard drive, or a shared volume on a network) to a fast tape drive, the tape capacity is reduced by the source's inability to supply a steady flow of data to the tape drive. (This is like dictating to an audio cassette recorder; you can record more words if you speak

quickly without pauses, but when you take a breath you are wasting tape because the recorder is still going, recording silence.) When the tape drive runs out of data while backing up, it must stop writing data, reposition the tape, and resume writing at the correct section of the tape. Each reposition reduces the capacity of the tape, and excessive repositioning can lead to accelerated device wear.

Do not be surprised if your tapes end up with less than their advertised capacities. Some tape drives are represented as being capable of higher capacities than the drives normally achieve in day to day use. The representations refer to the amount of data *before* it gets compressed by a tape drive with hardware compression capability—and they often assume generous compression rates. Hardware compression is explained below.

Compression

Compression, which can be done by Retrospect or a capable tape drive, conserves space on media by reducing the size of the data being backed up. Compression does not actually increase the media capacity—a given disk or tape can only hold a certain amount of data. Compression squeezes the original data to a more compact size before the data is put on the medium, allowing you to fit more of your files on a given tape.

Data compression hardware is common on tape drives. (The letters "DC" are often used in the name or model number of tape drives to indicate data compression capability.) Retrospect uses a drive's hardware compression whenever possible, automatically turning off Retrospect's software compression if necessary. It is faster to let the hardware compress the data than to have Retrospect compress it. The amount of compression achieved varies depending on the type of data being backed up. Text files, for example, compress well while applications and system files do not. Compression typically reduces data to half its original size.

Retrospect disables hardware compression when you use encryption because encrypted data compresses poorly. If you need to use encryption and compression together, use Retrospect's software compression option. Retrospect then compresses the data before encrypting it, which is not possible when hardware compression is used.

Tape Drive Mechanisms

Though you may buy your tape drive from one of many companies, the drive is actually built around a mechanism from one of several manufacturers. Typically, companies purchase bare mechanisms from manufacturers and put them in their own cases and packaging, and support the products with their own staff.

Popular types of tape mechanisms available are AIT, AME, DAT, DLT, DTF, DC6000, Exabyte, and Travan. In addition, many different robotic tape libraries are available for several types of these drive mechanisms. Each is briefly explained below. The "Read Me" file installed with Retrospect contains detailed information on various, specific drive mechanisms for each type of tape.

High speed, large capacity tape drives such as AIT, AME, DLT and DTF require a high performance environment. Best speed and capacity results are achieved with a fast computer platform, such as a Pentium III model. The most important performance factor is the speed of the source volume. If the source is too slow, the drive must frequently stop to reposition the tape while waiting for additional data. If the drive repositions too often, copy performance will decrease dramatically.

DAT

Four millimeter DAT tapes are popular backup media because of their high capacity, quick

speed, and relatively low media cost. Tapes written to by a given DAT drive can usually be read by DAT drives from another manufacturer, provided they use the same format and compression features.

The most common formats are Digital Data Storage (DDS), DDS-2, DDS-3, and DDS-4. A few drives use the DataDAT or DVDS formats, neither of which is compatible with the more common DDS format or its successors.

The different formats support different tape lengths and have different capacities. The following table shows the different tape lengths supported by the different DDS formats. It also shows the uncompressed capacity of each tape length when used on a drive of a given format.

	60m	90m	120m	125m	150m
DDS	1.2 GB	1.9 GB	not supported	not supported	not supported
DDS-2	1.2 GB	1.9 GB	4 GB	not supported	not supported
DDS-3	1.2 GB	1.9 GB	4 GB	12 GB	not supported
DDS-4	1.2 GB	1.9 GB	4 GB	12 GB	20 GB

DAT drives are made with and without hardware compression capabilities. If you wish to exchange DAT tapes with people who do not have compression drives, turn off Retrospect's hardware compression option when creating backup sets.

8mm

Eight millimeter tape drives using Exabyte mechanisms can store 2 to 7 GB of uncompressed data on a tape cartridge.

AIT/AME

Eight millimeter drives using Advanced Intelligent Tapes (AIT) or Advanced Metal Evaporated (AME) tapes are among the fastest tape drives available. Their mechanisms can store 12 to 50 GB of uncompressed data at very high speed when used under optimal conditions.

DLT

DLT drives are among the fastest tape drives available. Their mechanisms offer exceptional performance and 2.6 GB to 40 GB uncompressed capacity when used under optimal conditions.

DTF

Digital Tape Format (DTF) drives are among the fastest tape drives available. Their mechanisms store 12 or 42 GB of uncompressed data at extremely high speed when used under optimal conditions.

Travan

These tape drives have uncompressed capacities of 1.5, 2, 4, or 10 GB, depending on the tape cartridge used. Travan "NS" (Network Series) drives include hardware compression.

DC6000

These tape drives have uncompressed capacities of 120 MB to 25 GB. Tapes written by one drive can typically be read by another of equal or greater capacity.

A separate formatting step is not required, though the first time Retrospect uses certain DC6000 tapes, it performs a "long erase," which retensions the tape, erases all previous data, and determines the tape's format and capacity.

Cleaning Your Tape Drive

Regular cleaning of your tape drive is essential for reliable performance. Dirty drive heads are a major cause of tape drive problems and report-

ed media failures (error –206). Cleaning most tape drives is as simple as inserting a special tape cleaning cartridge and letting the drive clean itself. Refer to your drive's documentation for its manufacturer's cleaning recommendations. Retrospect's tape cleaning reminder preference (page 154) can remind you to clean your drive at the interval you specify.

Preparing Tapes for Use

When Retrospect is executing a script unattended and requires a new tape, it will automatically use any appropriate tape that is erased or has the correct name. It is a good idea to prepare media for use ahead of time by erasing or reformatting or retensioning tapes. Use the following functions to erase, retension, or format media.

First make sure the tape drive you want to use is listed in the storage devices window. If the device you want does not appear in the window, see "Seeing Your Backup Device" on page 29. To prepare a tape, insert it in the drive and notice its name and description in the storage devices window.

The storage devices window.

Once a tape is loaded, its status appears.

Ready indicates the medium contains Retrospect data.

Erased indicates an empty medium.

Content Unrecognized means the tape is not empty, but does not contain valid Retrospect data. Often, this happens when a compressed tape is inserted in a drive without hardware compression abilities. It also happens when you insert a tape written to by other backup software. (See "Content Unrecognized" on page 206.)

Wrong Version means the inserted tape was written to by Retrospect for Macintosh. Retrospect for Windows cannot read such tapes.

Write Protected means the tape is locked.

Hardware Error indicates a device error has occurred.

Unloaded usually means a tape is in the drive but is rewound and must be ejected and reinserted to be used.

Running and Busy indicate the drive is busy.

No Media indicates there is no tape in the drive.

Toolbar Options for Tape Drives

Device Status brings up a window listing bus ID numbers and their respective devices, if any. This window is explained in detail under "Seeing Your Backup Device" on page 29.

Properties displays information about the tape drive. If a tape is inserted, the properties window also displays information about it, including whether or not it is a member of a Retrospect backup set, its format and the hardware compression attribute.

Eject unloads the selected tape from its drive.

Retension winds the selected tape forward to the end and back to even out the tension and alignment with Travan and DC6000 mechanisms. (Other tapes are retensioned automatically during execution, and cannot be retensioned manually.) You should retension tapes if they have not been used in a long time or if the temperature or humidity of their storage environment has changed significantly.

Erase erases the contents of the selected tape, and—in the case of some tape drive mechanisms—conditions media to be reused.

Format completely reformats the selected tape and is more time-consuming than Erase. It is only supported by certain tape drives.

TAPE LIBRARIES

Not all editions of Retrospect support tape libraries, also known as loaders, autochangers, and autoloaders. Refer to Retrospect's "Read Me" file to see whether your edition of Retrospect works with tape libraries.

Retrospect Desktop Backup supports tape libraries up to and including eight slots. Retrospect Workgroup Backup and Retrospect Server Backup support all tape libraries.

A tape library is a hardware unit which mechanically moves tapes in and out of its drive mechanism from a magazine holding several tape cartridges. Tapes can be arranged in any order and Retrospect will determine which tape it needs to perform an unattended backup. Tape libraries are useful for large-scale network backups because they automatically change tapes when tapes fill up. Many tape libraries are available, each using one or more of the many available tape drive mechanisms. For more information, refer to the libraries' manual and the latest Retrospect "Read Me" file.

How Retrospect Works with Tape Libraries

Just after its power is turned on, or when its magazine is changed, a tape library goes through a process to determine which slots contain tapes. The library does not know the names of the tapes, only that they are present in the magazine.

When Retrospect needs information about each tape it scans the library to get the name or label of each tape. The library inserts each tape in turn, and Retrospect keeps track of the tape names and locations. Each time Retrospect is launched, or the library's door is opened, or the magazine is changed, the library's contents may change, so Retrospect must scan to keep current.

Magazine Memory

However, Retrospect has a unique feature called "magazine memory" that speeds up subsequent scans of the library. Each time Retrospect exits, it records the state of each slot and drive in the library and saves this information as one of ten tables in its configuration file. (The ten tables reflect the ten most recent library scans.)

You can think of saved library tables as a kind of educated guess in the hunt for the correct tape. This method greatly increases the odds of finding a tape on the first attempt if the locations of the tapes in the library's magazine remain relatively constant.

How Retrospect Searches for a Specific Tape in a Library During Unattended Execution

When Retrospect requires a certain tape, it first looks in any tape drive connected to the computer. If it is not there, Retrospect then looks at the first saved library table for the last known slot location of the tape and loads the tape in that slot. If this is not the correct tape, or if there is not a tape in the slot, Retrospect looks at the next-to-last library table for the tape, and so on until the tape is found or there are no more library tables in Retrospect's configuration file. If the tape is still not found, Retrospect then scans the remaining unknown tapes in the library in sequential order. Should this process complete without Retrospect finding the desired tape, Retrospect opens a media request window, demanding operator attention. (If you have enabled Retrospect's "media request timeout"

option, the media request window will eventually close, allowing any subsequent scripts to execute.)

When Retrospect requires a new piece of media, it automatically uses any appropriate media that is erased or has the correct name. It is a good idea to prepare media for use ahead of time by erasing, reformatting, or retensioning tapes.

How Retrospect Searches for a Specific Tape in a Library During Interactive Execution

During interactive operations (that is, not unattended) Retrospect waits at the media request window for the backup operator. Drag the requested tape from the magazine into the tape drive.

Import-Export Support

Some libraries come with a separate port that is used to load single tapes into and from the library's main magazine without opening the door. Retrospect uses the term "import-export slot" for this feature, which is also known as "Mail Slot," "I/E element," and "Call Slot." If the import-export slot is present and enabled in a library, Retrospect displays it as a separate slot at the top of the list of slots. You can drag and drop tapes from the source drive or any slot onto the import-export slot and the library will move the selected tape to the port. When you place a tape into the port, Retrospect displays "Media Available" next to the import-export slot and you can move it by dragging it to any slot or drive in the library.

Retrospect does not scan the import-export slot during unattended operation. Do not place a tape in the import-export slot if you want to use the tape in an unattended operation such as a scripted backup.

Preparing Tape Libraries for Use

To prepare a library, insert a loaded magazine and notice how the library, tape slots, and drives appear in the storage devices window.

Retrospect displays the status of the magazine slots, with varying degrees of confidence indicated by the icon and status or tape name. The following table explains these icons and states.

Icon	Status or Tape Name	Comments
	(Empty)	The slot has no tape. This is certain because the library always knows of its empty slots.
	(In Drive)	The slot has no tape because it was moved into the drive. This is certain because the library always knows from which slot it has moved a tape into the drive.
	(Unknown)	The slot has never been scanned by Retrospect.
	Name	The named tape was in the slot when Retrospect last scanned the magazine, but the status is unverified because the slot's content may have changed since then.
	Name	The named tape was in the slot when Retrospect last scanned the magazine, and is verified so because the slot's content could not have changed since then.

Toolbar Options for Tape Libraries

Properties displays various attributes of your library and contains a toolbar with the Magazine View command. Most useful for libraries with many slots, this lets you specify the number of

slots grouped together in the storage devices window (for example, slots 1-10, slots 11-20, and so on). You can expand and collapse the different slot groups with the + and – icons. The number you specify does not represent any actual physical grouping of slots or magazines; it is for display purposes only.

Scan Media cycles through all the tape slots in the library, moving each tape from slot to drive to learn the name of the tape.

Erase All erases each tape in each slot and drive in the library.

Eject Magazine ejects all media from the library. Use this command to reload a magazine with new media.

Cleaning Slot allows you to specify a particular slot in your library to hold a cleaning cartridge. Retrospect will not scan the specified slot when it routinely searches for media.

Retrospect does not have a function for automatically cleaning drives in libraries, but it does have a tape cleaning reminder feature. See "Media Maintenance Preference" on page 154. Refer to your library's documentation for the manufacturer's cleaning recommendations.

MEDIA LONGEVITY AND STORAGE

Media life depends largely upon how the media is stored and maintained. Proper storage avoids moisture, heat, and particulate contamination, which cause media deterioration, leading to loss of media integrity or loss of data itself.

Magnetic media's worst enemy is moisture. Optical media's worst enemy is heat, which causes distortion, and particulate matter, which causes scratches.

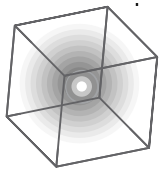
When media get moisture from a humid environment, it deteriorates. Heat can also cause problems. Keep media out of direct sunlight and away from heaters. Avoid extreme temperature changes. Airborne particulates such as dust and cigarette smoke can also harm media.

Tapes are unique in that they use lubricant. The tape media is lubricated, and after many passes over the drive's heads, tapes tend to fail because the lubricant has dissipated. You should be able to get a few thousand passes from a tape, but keep in mind each tape operation involves several passes.

A fire-proof safe in a climate-controlled building is an ideal media storage location. At the very least, keep the media in its original containers inside a cabinet or desk.

How Retrospect Works with Multiple Backup Devices

During an operation, Retrospect searches available backup devices for the appropriate medium. If the medium fills or Retrospect needs another medium for any reason, it searches available drives. This is useful, for example, to have one drive with the tape Retrospect expects and another drive with an empty tape for when the first tape fills during the night.



CHAPTER 4

IMMEDIATE OPERATIONS

- BACKUP
- ARCHIVE
- RESTORE
- DUPLICATE

Whereas previous chapters of this manual mostly touched on ideas and fundamentals, this chapter explains the actual features and use of Retrospect.

This chapter covers the steps you take to perform backup, archive, restore, or duplicate operations immediately upon your command, as opposed to scripted operations which automate these tasks.

If you are a casual user and you need only occasional backups, you can do fine with these immediate operations. However, network administrators who frequently back up multiple volumes are better off automating their tasks with scripts. Regardless of whether you plan to do immediate or scripted operations, this chapter is a good introduction to Retrospect.

You can also initiate operations by opening run documents and by choosing items from the Run menu. These features are derived from scripts, described in Chapter 5 • Automated Operations.

BACKUP

This section tells how to perform an immediate backup with Retrospect. At various points in the procedures, the text will direct you to other sections and chapters in which you will find additional information on performing more sophisticated backup operations.

The backup procedure described below (starting with "Preparing the Backup Media") is all you need to know to effectively back up all of your files. You can repeat the steps as needed to ensure the safe duplication of your valuable data.

There are three basic stages in backing up:

• Choosing the source volumes to back up

• Choosing the backup set in which to store the files (or creating a new backup set if none exists)

• Executing the backup

The first time you back up the contents of your hard disk, Retrospect backs up all specified files from the source volume to a backup set. In subsequent backups (unless you indicate otherwise), Retrospect backs up only those files which are new or which have changed since the last backup to that particular backup set. (This is also known as an incremental backup.) This means that if you back up frequently, fewer files will be copied in each backup session and backups will require less time, all else being equal. After a few backups, using Retrospect will become part of your work routine and will be only slightly more taxing than turning your computer on and off.

Preparing the Backup Media

Before you attempt to back up files with Retrospect, check that your backup device is properly connected to the computer and that your backup medium (tape, disk, or CD) does not contain valuable data that should not be overwritten.

Starting the Backup

When you start Retrospect the Directory shows the Immediate tab. If you are already using Retrospect, go to the Directory and click the Immediate tab.

Click the Backup button. If you previously set up an immediate backup, as in "Quick Start" in Chapter 1, Retrospect goes directly to the summary window. This is so you can easily initiate backups with only a few clicks. If you have not set up an immediate backup before, Retrospect automatically displays the volume selection window and will automatically take you to the other windows along the way, so ignore the instructions to click source, destination, and so on.

Choosing Source Volumes

In the backup summary window, click the Sources button to display the volume selection window. It lists all volumes currently available to be backed up, including your internal hard disk, any mounted removable disks or hard disks, any logged-in client volumes, and any connected network volumes from file servers. Because these volumes contain the files to be backed up, they are known as source volumes. Volumes used as sources for the most recent immediate backup are selected when the window opens.

The volume selection window.

Navigating Volumes

The volume list works much like the Folders pane of the Windows Explorer. It is organized hierarchically by My Computer, Backup Clients, and Source Groups. Click on the + icon to expose the contents indented under an item and click on the – icon to hide the contents. All aspects of the volume selection window, including navigating, organizing, and selecting, are fully explained under "Working with Volumes" in Chapter 9.

To Choose a Source Volume

In the volume list, click a volume to select it. To back up more than one volume, Shift-click or Control-click other volumes to make a multiple selection.

■ **NOTE:** Do not select a volume from a removable disk drive unless you are going to back it up to a different drive. This source volume must not be the same drive as the destination drive for backup media, which you will designate later.

When you have made your volume selection, click OK to continue setting up the immediate backup. The volume selection window closes and Retrospect returns to the summary window.

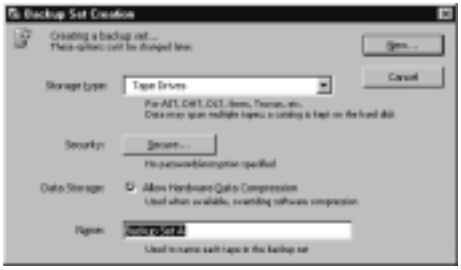
Choosing the Backup Set

In the immediate backup summary window, click the Destination button to display the backup set selection window, which lists available backup sets and has commands for working with them.

The backup set selection window.

Creating a New Backup Set

If no backup sets are listed in the backup set selection window, or if you do not wish to use any of those listed, click the Create New button to make a new backup set in the backup set creation window.

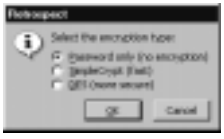


The backup set creation window.

You use this window to set the attributes which make up the backup set. *You cannot change the attributes of a backup set after it is created.*

Storage type The most important item in the window is the storage type, which specifies the type of media the backup set uses for this and future backups. Use the combo box to choose a backup set type which corresponds to your backup device—tapes, CD-R, disks, or an individual file on a hard disk.

Security Security lets you specify a password for accessing the backup set, with optional data encryption. Click the Secure button to bring up a dialog in which you determine the security options for the backup set.



The backup set security options dialog.

Password only prevents access to your backup set without a password. Stored data is not encrypted.

SimpleCrypt provides password protection and encrypts backup set data using Dantz's proprietary encryption format.

DES provides password protection and encrypts backup set data using the United States government Data Encryption Standard.

■ **NOTE:** Using encryption increases backup time. DES encryption is slower than SimpleCrypt, which provides adequate security for most needs.

▲ **WARNING:** If you forget your password you cannot access your data. There is no "magic key" or "back door" to circumvent the encryption. Not even Dantz Technical Support can help you.

If you leave Security alone the backup set will not have a password and will not use encryption.

Data Storage The backup set's Data Storage attribute lets you control whether to enable or disable hardware data compression in the backup device. It is usable only when the combo box is set to Tape Drives. When the Allow Hardware Data Compression checkbox is checked, Retrospect uses hardware data compression when you back up to this backup set on a drive which supports this feature. When the checkbox is not checked Retrospect does not use hardware data compression during backups to this backup set. Since you cannot simultaneously use encryption and hardware compression, this option will be disabled and appear grayed out if encryption is used by this backup set.

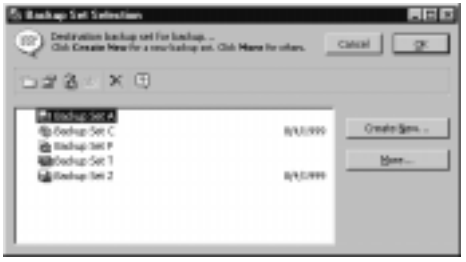
■ **NOTE:** If you need to use both encryption and compression, specify an encryption option in the security dialog, and use Retrospect's software compression option (page 140) when copying files to the backup set.

Name In the Name field, enter a unique and descriptive name for the backup set. For example, "Monday Complete Backup," "Accounting Backup," or "Friday Clients Backup." Retrospect uses this name to identify both the catalog file and the backup set media. Name backup sets carefully because they cannot be renamed. File backup sets, however, can be renamed with the Windows Explorer.

When the backup set description is complete, click New to create the backup set. A dialog appears, prompting you for a location to save the catalog file that keeps track of the contents of the backup set. If you are backing up to a file backup set, the dialog prompts you for a location to save the backup set. Specify a location for the catalog (your hard disk is best) or the file backup set (on the destination volume) and click Save.

■ **NOTE:** Do not save the catalog on a removable cartridge disk that will be used as a backup destination. Retrospect needs to access the catalog on a readily accessible volume, preferably the local hard disk.

Retrospect returns to the backup set selection window, where the new backup set is now listed as available for backup.



Listing an Unlisted Backup Set

If the backup set you want to back up to is not listed in the backup set selection window, click the More button and use one of its options to pick a backup set and place it in the list.

Selecting the Desired Backup Set

When the backup set you want to use is listed in the backup set selection window, select it and click OK to continue setting up the backup.

The Final Step

After you have specified the source volume to back up and the destination backup set to which it will be copied, the backup summary window appears.

The backup summary window.

Verify your choices for the various items. To change information, click the appropriate button.

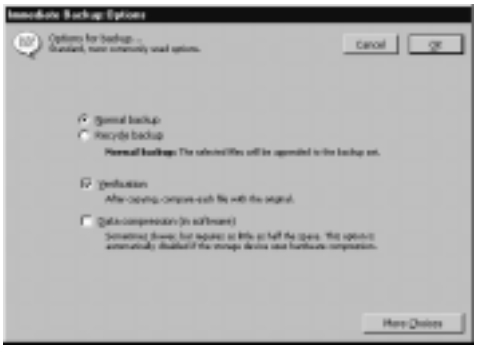
Sources lets you add or remove source volumes.

Destination lets you choose a different backup set as a destination.

Selecting lets you choose a selector, a kind of filter for selecting files and folders to be backed up. (Selectors are explained in detail starting on page 170.) We suggest you use the default selector, All Files, which marks all files on the source for backup.

Preview scans the source volume (or volumes) and determines which files need to be backed up by comparing the source files against the list of files in the backup set catalog. When the scan is complete, Retrospect opens a browser window to display a list of the files on the source volume marked for backup. You can use it to mark and unmark individual files and folders to be backed up. (Browsers are explained in detail under "Browsing" on page 166.) When you close the browser, the summary window shows figures for the selected files.

Options displays the basic options window in which you can specify the backup action (normal or recycle), and turn on or off verification and software data compression. Click the More Choices button to access many more options. Backup actions are explained under "Backup Actions" on page 22, and options are explained in detail under "Backup Execution Options" on page 140.

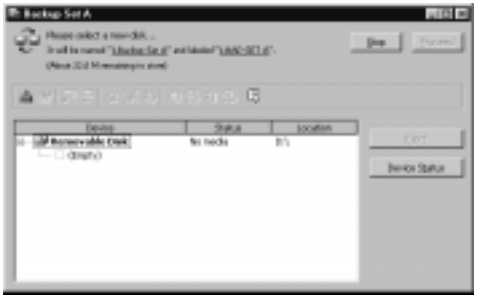


The immediate backup options window.

Executing the Backup

If Retrospect has the information it needs, it says "Ready to Execute" at the top of the backup summary window. If the information is incomplete, it says "Not Ready to Execute" and you must change one or more parts of the information, as described at the top of the window. When it is ready click Backup and a dialog asks you to confirm the operation; click OK.

If this is the first time you are backing up to a tape or other removable media, or if there is no medium in the backup device, Retrospect next displays a window with options for choosing the disk, CD, or tape for storing the files to be backed up. (It may differ slightly from the following example depending on whether you are using a tapes, disks, or CD-R backup set.)



The media request window.

▲ **WARNING:** Use only a blank CD, disk, or tape or one with unwanted data, because any files on it will be permanently removed.

Put in a blank tape, CD, or disk and click Proceed. Retrospect performs the backup, displaying the progress of the operation and the names of files as they are copied to the backup set. The execution status window also has Pause and Stop buttons for suspending or cancelling the backup.

The execution status window for an immediate backup.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log. (This log is accessible from the Windows menu and is described under "Viewing the Operations Log" on page 135.)

Planning Subsequent Backups

For subsequent backups, you can repeat the basic backup procedure as often as you want and even switch among multiple backup sets to maintain extra backups.

By default, Retrospect only backs up those files that have changed since the previous backup to a particular backup set.

Scripting a Backup

If you want to automate your backups so they can be performed while your computer is unattended, you can use Retrospect's scripting feature to set up and schedule backups.

When a backup summary window is active, you can click Schedule from the toolbar to save the immediate backup information and settings as a script. You can then use the script to accomplish automatic, unattended backup operations. See Chapter 5 • Automated Operations.

ARCHIVE

Archiving lets you move files from a volume to a backup set for off-line storage, freeing space on the volume.

To set up an archive operation, first click the Tools tab from the Directory, then click Copy.

In the dialog, select Archive and click OK. From this point on, the archive operation is set up just like a backup, as described starting on page 42. The only difference in preparation is the additional option of whether to move files, as described on page 140, which deletes the original files from the source after copying them to the destination. This frees space on the volume.

◆ **TIP:** Before you use the Move files option, first archive to a different backup set by copying without moving. This provides an extra mea-

sure of safety should one backup set become unusable.

Archiving, by default, does not match source and destination. That is, Retrospect does not compare source files to files in a backup set. This leaves the possibility of it copying redundant files during the archive operation. In this case, Retrospect is foregoing ultimate efficiency for the sake of archive integrity.

Be sure to read "Archiving Tips" on page 179 for other important information.

Scripting an Archive

When an archive summary window is active, you can click Schedule from the toolbar to save the archive information and settings as a script. You can then use the script to accomplish archive operations. See Chapter 5 • Automated Operations.

RESTORE

Retrospect allows you to restore an entire volume or restore selected files and folders from the most recent backup or any previous backup session within a backup set. You can either restore by using a volume Snapshot from a backup set, or by searching through one or more backup sets by file name or other criteria. You can restore individual files, multiple files, or entire volumes.

This tutorial focuses on two of the different methods of restoring files with Retrospect. If you need to restore lost files or a whole hard disk, see Chapter 7 • Restoring, which includes an overview of different situations and points you to restore instructions.

Snapshots

Retrospect's Snapshots make it easy to restore a volume to its exact state as of a given backup. A Snapshot is like a picture of the contents of a volume. It contains a list of all of the files and folders of a volume and the sessions during which they were backed up. Each time you back up a volume, its Snapshot is updated in the backup set catalog and the Snapshot is added to the backup medium.

To restore an entire volume or Subvolume, simply choose the Snapshot you want to restore—you do not have to manually locate and retrieve files from different sessions. A Snapshot allows Retrospect to get the files from a backup set in a single pass through the media, rather than inefficiently going back and forth on the media, even if the backup set contains multiple incremental backup sessions.

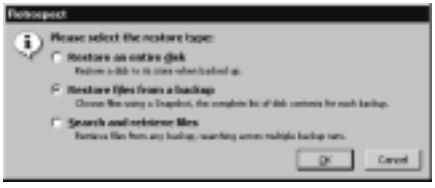
You can also restore individual files from a Snapshot. This is the easiest way to retrieve files that you know were on a volume during a given backup. If no Snapshot is available, you must define search criteria to choose which files to restore.

You can retrieve Snapshots from media if you want to restore a volume, folder, or file as it was at any given backup.

Restore by Snapshot

The process of setting up Retrospect for an immediate restore operation is done in much the same manner as setting up an immediate backup.

From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.



Select one of the top two restore methods which suits your needs.

■ **NOTE:** This tutorial explains only the first two choices in the dialog, which restore files by using a Snapshot. The searching restore method is explained in a following tutorial, "Restore by Search" on page 50.

Restore an entire disk does so using a volume Snapshot, restoring all files present on a disk at the time of a given backup. It replaces the contents of a disk and effectively recreates the volume in its backed up state.

For step by step instructions to restore an entire volume (for example, to replace a crashed disk) see Chapter 7 • Restoring.

Restore files from a backup does so from a Snapshot, restoring to a volume one or more chosen files present on a volume at the time of a given backup.

▲ **WARNING:** This tutorial may result in deletion of your files or erasure of your hard disk. Consider using the second restore method unless you have a blank hard disk or removable disk with which to experiment. Even the second restore method can delete files. Unlike backing up, restoring always gives you the potential to remove files.

After selecting the restore method, click OK.

In this window's top list, select the backup set from which to restore. (Use the More button if your desired set is not listed, or select a set you do not want to see here and press the Delete key to get rid of it.)

In the window's bottom list, select a volume Snapshot. The date and time when the volume was last backed up are listed to the right of the volume's name.

If your desired Snapshot is not listed, click the Add Snapshot button to select it from a list of all Snapshots in the backup set.

Selecting a Snapshot to add to the list.

When you select a Snapshot and click Retrieve Retrospect will obtain the older Snapshot from the backup set media (which may require you to insert media) and add it to the list in the restore source window.

■ **NOTE:** The Retrieve button is disabled when you select a Snapshot that is already available.

With your desired Snapshot selected in the restore source window, click OK to continue.

Select a volume on which you want Retrospect to place the restored files. This volume does not have to be the original volume from which the files were backed up; it can be a folder defined as a Subvolume or any volume mounted on My Computer or belonging to a client on the network. (Navigate through My Computer and Backup Clients outlines as detailed under "Containers" on page 163.)

Set the combo box to determine how Retrospect restores the files to the destination.

Restore entire disk makes the destination disk like your selected Snapshot. It *deletes all files and folders* on the destination which do not match those marked for restore in the Snapshot, leaving files untouched if they are identical to files marked for restore. It then copies remaining files and folders from the backup set, preserving the folder hierarchy. The destination volume is reorganized like the volume Snapshot, less files and folders not marked.

■ **NOTE:** To prevent the operating system from crashing, the Restore entire disk method does not delete the active Windows system, nor does it delete the "blessed" system folder of a Mac OS client.

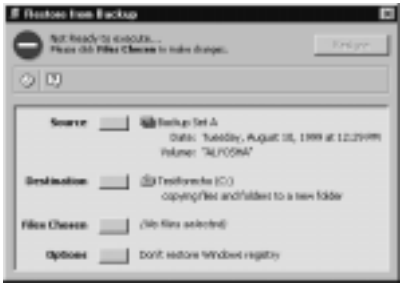
Replace corresponding files copies the marked files to the destination volume into the same folders. Corresponding files are overwritten, *even if they are newer*. Retrospect leaves files untouched if they are identical to files marked for restore, if the file names do not match those marked for restore, or if the path to those files is not identical.

Retrieve files & folders creates a new folder on the destination volume (giving the folder the name of the backup set), then copies files into this folder, preserving the folder hierarchy. Nothing is replaced or overwritten.

Retrieve just files creates a new folder on the destination volume (giving the folder the name of the backup set), then copies only the files into this folder. The folder hierarchy is not preserved. Nothing is replaced or overwritten. (Do not use this option to retrieve a large number of files or a whole volume.)

▲ **WARNING:** The Restore entire disk and Replace corresponding files methods may destroy data on the destination. If you choose one of these, be sure it is acceptable to erase or replace files on the destination volume.

After setting the destination restore method with the combo box, click OK to continue. Depending on the restore type and method, Retrospect may scan the destination volume and match files from the selected Snapshot. Then the restore summary window appears.



Restore summary, needing file selection criteria before the restore can continue.

Verify your choices for the Source, Destination, Files Chosen, and Options. To change information, click the appropriate button.

Source is the backup set and volume Snapshot from which you want to restore files. Click this button to use the backup set selection window to change the source.

Destination is the volume to which you want to restore files. Click this button to use the volume selection window to change the volume.

Files Chosen are the files you want to restore from the backup set. Click this button to use a browser to mark and unmark individual files and folders to be restored. Browsers are explained in detail under "Browsing" on page 166.

Options let you restore the Windows registry and update the modification dates of restored files, among other things. Click this button, then click More Choices to change these options.

Executing the Restore

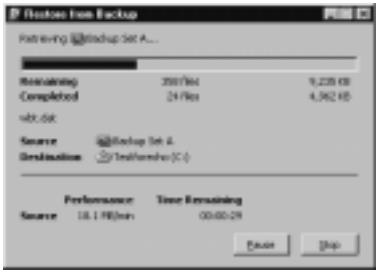
When Retrospect has the information it needs to do the restore, it says "Ready to Execute" at the top of the restore summary window. If the information is incomplete, it says "Not Ready to Execute" and you must change one or more parts of the information you gave it. When it is ready, click Restore and a dialog asks you to confirm the operation.

▲ **WARNING:** Restoring may destroy data on the destination. Be sure it is acceptable to replace the destination files with the source files.

Click OK to confirm.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media, it asks you for it in a window.

Retrospect performs the restore, displaying the progress of the operation and listing the names of files as they are copied from the backup set media to the destination. The Execution Status window also has Pause and Stop buttons for suspending the restore.



The execution status window for a restore.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log. (This log is accessible from the Windows menu and is described under "Viewing the Operations Log" on page 135.)

When you leave Retrospect and go to the Windows desktop, you can see the destination volume is changed to reflect the restored files. The level of change can be anywhere from a new folder on the volume or a completely restructured volume from an entire disk restore, depending on the destination restore method and options.

■ **NOTE:** A Mac OS client's Desktop needs to be updated after a large restore, such as an entire disk. Restart the Macintosh while holding down the Command and Option keys to rebuild the Desktop.

Scripting a Restore

When a restore summary window is active, you can click Schedule from the toolbar to save the immediate restore information and settings as a script. You can then use the script to accomplish restore operations. See Chapter 5 • Automated Operations.

Restore by Search

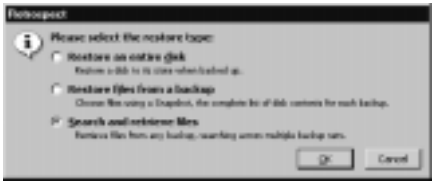
Whereas restoring by Snapshot lets you get files from a given backup, Retrospect has another

method of restoring which lets you retrieve one or more files regardless of when they were backed up. This is useful, for example, to get a document named "Financial Report" backed up on November 16, 1999, which is when you know the report file was saved with incorrect data and backed up after that date. Although you could browse the Snapshot to find the file, Retrospect's search facility is more efficient.

■ **NOTE:** Restore by searching does not restore NTFS permissions or AppleShare or Mac OS file sharing privileges. You must restore from a Snapshot to restore these permissions.

The process of setting up Retrospect for a restore by search is done in much the same manner as restoring by Snapshot.

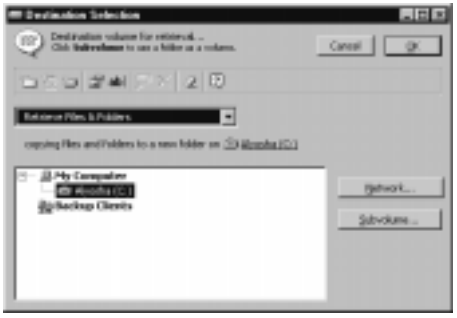
From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.



Click the bottom radio button and click OK.

The next window asks you to select the backup sets from which to restore.

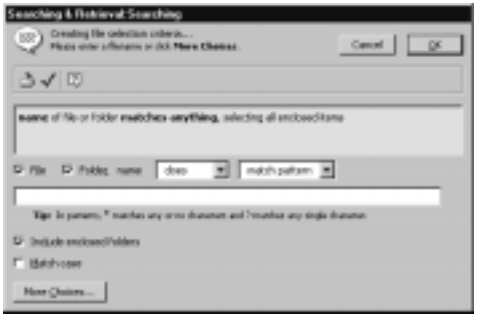
Select one or more backup sets. (Use the More button if your desired set is not listed.) Click OK to continue, which then brings up the following window.



Select the volume on which you want Retrospect to place the restored files, and choose a combo box item for the method by which they are to be retrieved.

■ **NOTE:** When restoring by searching, the methods "Restore entire disk" and "Replace corresponding files" work differently than when restoring from a Snapshot. Retrospect does not scan the destination volume to summarize the files it will be replacing.

After setting the destination restore method with the combo box (see page 49), click OK to continue. Retrospect puts up the window for defining file selection criteria.



If you want to select all files from the sources, leave this blank and click OK.

Use the controls and enter text to define the search criteria on file or folder names, or click More Choices to make a custom selector with other search criteria. This window is described in detail under “Finding Files” on page 168, and selectors are described under “Using Selectors” on page 170. When you have defined the search criteria, click OK, and Retrospect searches each backup set catalog before bringing up the summary window.

The searching and retrieval summary window.

Your file selection criteria are summarized next to Searching. Below that is an inventory of the files found by Retrospect.

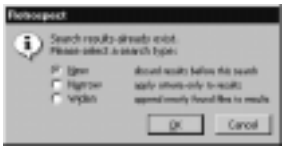
Browsing Chosen Files

Click Files Chosen to open a browser which lists the found files. You can manually unmark and mark these files for retrieval. (For details on using browsers, see “Browsing” on page 166.) Files with check marks will be retrieved when the operation is executed.

Depending on your search criteria, your browser may list more than one version of a particular file. For example, a given file may have been modified daily and backed up every day over a certain period of time and appear as follows.

Additional Searching

If the browser does not display the files you want, you can close it and return to the summary window to redefine the search criteria by clicking the Searching button. If you change the search criteria, Retrospect displays the following dialog when you close the selector window.



New replaces the results of the previous search with the results of the new search.

Narrow uses the new criteria to further restrict the selection.

Widen uses the new criteria to add files to the current selection.

Select a search type, then click OK to return to the summary window and repeat the process until you are satisfied with the chosen files.

Executing the Restore

If Retrospect has the information it needs, it says “Ready to Execute” at the top of the searching and retrieval summary window. If the information is incomplete, it says “Not Ready to Execute” and you must change one or more parts of the information you gave it. When it is ready, click Restore and a dialog asks you to confirm the operation.

▲ **WARNING:** Restoring may destroy data on the destination volume. When restoring by searching, the methods “restore entire disk” and “replace corresponding files” work differently than when restoring from a Snapshot. “Restore entire” effectively erases the destination volume before restoring files. “Replace corresponding” replaces files with the same names as those being

restored. Be sure it is acceptable to replace the destination volume or files with the source files.

Click OK to confirm.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media it asks you for it in a window.

Retrospect performs the restore, displaying the progress of the operation in the execution status window, which gives you buttons to pause or stop its execution.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log. (This log is accessible from the Windows menu and is described under "Viewing the Operations Log" on page 135.)

When you leave Retrospect and go to the Windows desktop, you can see the destination volume is changed to reflect the restored files.

■ **NOTE:** A Mac OS client's Desktop needs to be updated after a large restore. Restart the Macintosh while holding down the Command and Option keys to rebuild the Desktop.

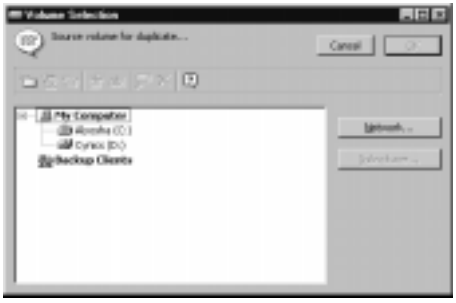
DUPLICATE

Retrospect allows you to duplicate files on a volume or among volumes. Files and folders are copied without compression or encryption in the standard file system format, which is useful when transporting data to other computers. However, Retrospect optimizes the duplication process by copying only your selected files and by copying only those files which do not already exist on the destination.

The duplicate feature is useful, for example, for a network administrator to do a user-accessible backup of a server or database to a hard disk.

◆ **TIP:** Subvolumes are useful tools for duplicates. For example, a network administrator can define an application folder on a server as a Subvolume and duplicate it for quick installation on a user's workstation.

Click the Immediate tab on the Retrospect Directory, then click the Duplicate button. The first window, Retrospect's familiar volume selection window, asks you to determine the source volume from which files will be copied.



Select the source volume and click OK. (For details on using the volume selection window, see "Working with Volumes" on page 162.) Retrospect next asks you for a destination volume and a method of placing the files on the destination volume.

Select a destination volume and choose a method from the combo box.

Replace entire disk *replaces the entire contents* of the destination volume with the selected files and folders of the source volume. Identical files already present on the destination are not duplicated.

Replace corresponding files *overwrites any matching files* existing on the destination volume which correspond to the selected files of the source, *even if the destination files are newer*. Retrospect leaves files untouched if their names and locations do not correspond to those files marked for duplication.

When you have selected the volume and set the combo box click OK. Retrospect brings up the duplicate summary window.

This window lists the source, destination, selection criteria, files chosen preview, and options associated with the duplicate operation. Each item has a button you can click to change the information as with backup and restore operations. You can use the various features for a highly specific duplicate operation, such as the following example summary.

Executing the Duplicate

If Retrospect has the information it needs, it says “Ready to Execute” at the top of the duplicate summary window. If the information is incomplete, it says “Not Ready to Execute” and you must change one or more parts of the information you gave it. When it is ready, click Duplicate and a dialog asks you to confirm the operation.

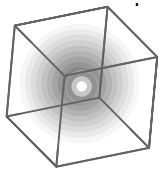
▲ **WARNING:** Duplicating may destroy data on the destination. Be sure it is acceptable to erase or replace files on the destination volume.

Click OK to confirm. An execution window shows the progress of the duplicate operation and gives you buttons to pause or stop its execution. When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred, you can find the offending files in the browser which appears, or see error details in the operations log. (This log is accessible from the Windows menu and is described on page 135.)

Scripting a Duplicate

When a duplicate summary window is active, you can click Schedule from the toolbar to save the immediate duplicate information and settings as a script. You can then use the script to

accomplish duplicate operations. See Chapter 5 • Automated Operations.



CHAPTER 5

AUTOMATED OPERATIONS

- OVERVIEW
- EASYSCRIPT
- SCRIPTED BACKUP
- SCHEDULING SCRIPTS
- EXECUTING SCRIPTS
- SCRIPTED ARCHIVE
- SCRIPTED DUPLICATE
- SCRIPTED RESTORE
- BACKUP SERVER SCRIPTS

You learned how to set up and execute Retrospect's immediate backup, archive, restore, and duplicate operations in Chapter 4 • Immediate Operations. This chapter shows you how to automate the process by using scripts, including Retrospect's unique Backup Server scripts. It begins with an overview, then describes EasyScript, which automates backup script creation.

OVERVIEW

Retrospect scripts are unlike programming scripts with which you may be familiar. A Retrospect script contains predetermined information for the various elements of an operation, such as the source, destination, and file selection criteria. This is the same information used in an immediate operation, but you can save it in a script for repeated use and unattended, automatic operation. When a script is run, or executed, Retrospect performs the operation using the predetermined information. You can run a script at your command or schedule times when Retrospect is to automatically execute a script. You should create a script for any procedure you perform on a regular basis.

Because Retrospect allows you to schedule your scripts to run automatically and unattended, you can choose operating times which are most convenient for you and for other users. Scheduling scripted backups ensures data is backed up consistently—all you have to do is make certain the computer is turned on and the proper media is in the backup device. Scripts are an important part of developing a backup strategy. (For more information on developing an effective backup strategy, see "Backup Strategies" on page 130.)

Another advantage of a scripted backup is that it requires less memory than an immediate backup, allowing you to back up more volumes in a single operation. For a scripted backup, Retrospect scans and backs up the sources one volume at a time, meaning the scripted backup requires only enough memory to store the scanned list of the largest source volume. For an immediate backup, however, Retrospect scans all sources before it begins copying files, meaning that it requires enough memory to store the scanned list of all source volumes.

This chapter's "Scripted Backup" section covers the basics of creating scripts. All other script types (such as archive, duplicate, and restore) use the same basic ingredients. Be sure to read the "Scripted Backup" section carefully because the other script sections build upon the foundation of that section, as the other script types are similar to backup scripts.

For information on managing and maintaining scripts, see "Maintaining Scripts" on page 150.

If you are not sure about what kind of script to make, but you know you want ongoing, unattended backups, EasyScript is probably for you.

EASYSCRIPT

EasyScript interviews you and uses your responses to set up a backup strategy and procedure for you or your network. EasyScript helps people who may be hesitant to create their own backup strategies and scripts. It simplifies creating backup sets, editing scripts, and scheduling. This section describes how to use EasyScript, though details are kept to a minimum because EasyScript is self-descriptive and easy to use.

Before you use EasyScript, you should be familiar with Retrospect's immediate backup (page 42) to better understand the EasyScript steps. Just doing the quick backup (page 13) is a good start.

Backup scripts are the only type of scripts created by EasyScript. If you need another type of script, such as a restore script or a Backup Server script, you must make it yourself because EasyScript cannot. See elsewhere in this chapter for complete instructions on creating scripts.

Overview

To start EasyScript when Retrospect is open, click the EasyScript button on the Automate tab. To exit EasyScript and return to the Retrospect Directory, click Cancel.

Navigating EasyScript

At any time while using EasyScript, you may click the Back button to go back to the information and options shown previously. Clicking Next accepts the options, if any, and takes you to the next set of information and options. Clicking Cancel exits EasyScript, rejecting any options or choices you may have made. Clicking the Help button presents additional information about the subject at hand.

Using EasyScript

When EasyScript begins, it puts up a window that tells you some general information. Click Next to begin.

Using Retrospect Backup Client Sources

EasyScript now wants to know whether you want to back up your whole network or just the computer on which you are using it. If you want to back up only your computer, click No. If you want to back up your computer and other networked computers using Retrospect Client software, click Yes. Click Next to accept your selected choice and continue. If you selected No, EasyScript explains what volumes it will use as sources.

List of Backup Clients

If you selected Yes, EasyScript asks you to confirm the client computers to use as sources. Currently logged in clients are shown in the scrolling list. (If necessary, manage clients using the Network and Configure buttons as described in Chapter 6 • Network Backup.) All clients logged in to Retrospect *when the script executes* are backed up by Retrospect. Therefore, after creating a script you can log in new clients and be assured they will be backed up by the script. Click Next to accept your selection and continue.

Backup Media

EasyScript now wants to know about the media your backup device uses. Click Tapes for any tape drive, click CDs for any CD-R or CD-RW drive, or click Removable disks for a drive that uses removable disk cartridges. (EasyScript does not use Retrospect's file backup sets.) Click Next to continue with your media selection.

Backup Frequency

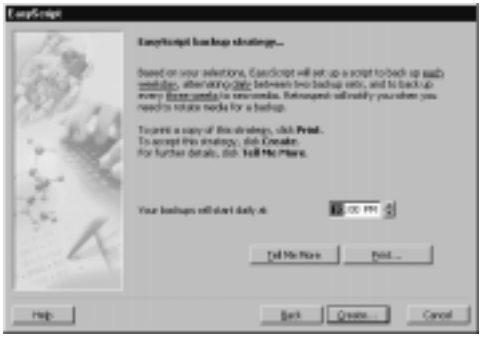
After you have chosen the backup media, EasyScript asks how often you wish to back up. Select Every day or click Once a week and choose a day of the week. Click Next to accept your choice and continue.

Rotating Media

EasyScript asks how often you wish to rotate the media. Rotating media lets you move media offsite for safekeeping and gives you other chances of recovery should one piece of media fail. Click Daily, Weekly, or No rotation, then click Next to accept your choice and continue.

Strategy Overview

EasyScript presents a summary of the backup strategy it came up with based upon your answers to its questions.



Read the strategy overview and if it is unacceptable click Back to go back and make changes or click Cancel to start over. If necessary, adjust the time of the day the backups occur. Click Tell Me More to learn the details of the strategy. Click Print to make a hard copy of the backup strategy. Study the strategy summary, and if you find it acceptable, click Create to accept the strategy.

Backup Set Creation

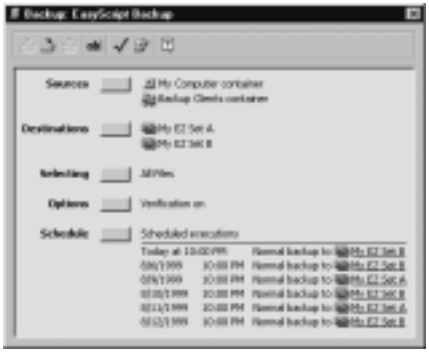
EasyScript must create catalogs for each backup set, so it asks you to name your backup sets. The backup set name is used for the catalogs and the disks, tapes, or CDs. When you have entered the backup set names, click New and save the catalogs on your hard disk. At this point, EasyScript makes and saves a script.

Final Overview

EasyScript presents a final overview with a reminder about media. You may click Done to return to the Retrospect Directory or click Open Script to view the script summary of the new script.

Script Summary

From the summary window, you may click on buttons to change the source volumes, destination backup sets, file selection criteria, execution options, and scheduled executions.



For detailed explanations of all these items and the summary window, see “Scripted Backup” which follows.

Additional EasyScript Scripts

As EasyScript always uses the same script name, it does not let you have more than one script created by EasyScript. If you want to make two or more EasyScript scripts, rename the first script from EasyScript Backup to something else. To learn how to rename a script, see page 151.

SCRIPTED BACKUP

This section takes you through the steps of creating a backup script. These steps are similar or identical to the steps of creating other scripts for archiving, duplicating, restoring, and so on. If you have never created a backup script, you should first read “Backup” on page 42. Follow its instructions so you are familiar with the various steps of setting up a backup.

Creating the Script

From the Retrospect Directory, click the Automate tab.

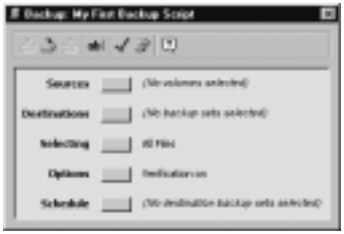
Click Scripts, which brings up the script editing window.

The script editing window.

Click the New button to create a new script. (If no scripts are defined, Retrospect first asks whether you want to use EasyScript; click No.) A dialog asks which type of script you want to make.

Select Backup from the list and click OK. Another dialog asks you to name the script.

Enter a name and click New. The script appears in its own window.



You will recognize that this script window is very similar to the immediate backup summary window, with information for the source volumes, destination backup sets, file selection criteria, and options. Schedule is a new addition not found in immediate operations. To change information, click the appropriate button.

Sources lets you add or remove source volumes.

Destination lets you choose one or more backup sets.

Selecting lets you choose a selector, a kind of filter for selecting files and folders to be backed up. Selectors are explained in detail in "Using Selectors," which starts on page 170.

Options displays the options window in which you can toggle verification and data compression. Options are explained in detail in "Execution Options," which starts on page 138.

Schedule lets you set the script to run at certain times or at regular intervals.

Setting the Source

Because this is a new script, Retrospect says "No volumes selected" in the script's window. Click the Sources button to get a window which lists sources, but is empty at this time since none are chosen yet.

■ **NOTE:** When no items are chosen, as is the case in a new script, Retrospect clicks the Add button for you to take you to the volume selection window.

Click Add to get the Volume Selection window and select a volume. (This is explained in detail in "Working with Volumes," which starts on page 162.) Click OK to add the volumes to the sources window. If you add more than one volume to the source list, you can drag them to rearrange them in the list. (Volumes will be backed up in the order they appear in the list, from top to bottom.) When the volume or volumes to be backed up are listed in the sources window click OK.

Setting the Destination

Retrospect needs to know the backup set to which you are going to back up. Because this is a new script, Retrospect says "No backup sets selected" in the script's window. Click the Destinations button to get a window which lists destinations.

■ **NOTE:** When no items are chosen, as is the case in a new script, Retrospect clicks the Add

button for you to take you to the backup set selection window.

If No Backup Sets are Listed Click Add. Retrospect brings up the backup set selection window to let you add a backup set. If none are known to Retrospect, it automatically clicks the window's Create New button. If you watch closely, you can see Retrospect quickly scan your computer, looking for suitable backup devices before it displays the backup set creation window. Use this window to make a new backup set, as described on page 14 and page 43. You can make Retrospect recognize other backup sets by opening them with the More button.

When Backup Sets are Listed Select one or more backup sets. You can have multiple destination backup sets so you can rotate among the sets for more safe and effective backups. When at least one backup set is listed in the destinations window, click OK.

Setting the Criteria

Retrospect uses all files as the default criteria for selecting files to be backed up. To change this, click the Selecting button and choose a different selector. Selectors are explained in detail under "Using Selectors," which starts on page 170. We suggest you use the default selector, All Files.

■ **NOTE:** Retrospect's All Files selector does not necessarily cause all the source files to be copied to the destination. It merely selects the files and, during a later stage of the incremental backup, Retrospect decides whether to copy them based on whether the selected files already exist within the backup set. Selected files not in the backup set are then copied to the destination.

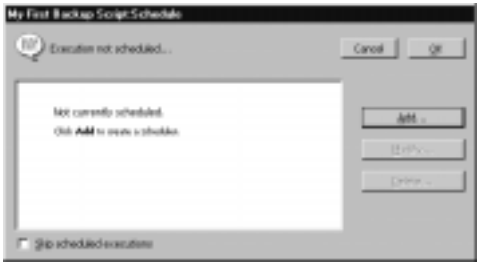
Unlike an immediate backup, you cannot manually mark and unmark files. This is because the script executes later and the volume contents can change between now and then.

Setting the Options

Click the Options button to display the options window in which you can toggle verification, data compression, and other options which are explained in detail under "Execution Options," which starts on page 138. Leave all options at their default settings for now.

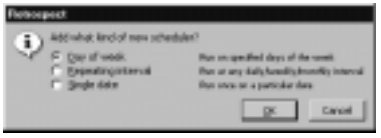
Setting the Schedule

If you want to execute this script only upon your command and in your presence, you do not need to schedule it for unattended execution. (Instead, make a run document or run it from the Run menu. For details see "Executing Scripts," which starts on page 67.) To set a time for the script to execute, click the Schedule button to get a window with a list of scheduled operations. (But because this is a new script, nothing is scheduled and the list is empty.)



■ **NOTE:** This section explains adding schedules to scripts. For details on creating the schedules themselves, see "Scheduling Scripts," which starts on page 64.

Click Add to get a dialog asking which kind of scheduler you want to make.

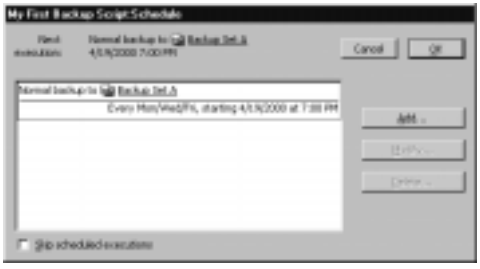


Select Day of week, Repeating interval, or Single date, then click OK. A schedule setup window appears.

The exact controls in the window depend on the type of schedule, but they are all basically similar and easy to understand. Use the controls to set the schedule. Use the Action combo box to set the backup action to either Normal Backup, Recycle Backup, or New Media Backup, which are explained under "Backup Actions" on page 22. If your script has more than one destination, use the To combo box to set the destination backup set for the scheduled execution. When you have set the various aspects of the schedule, Retrospect shows a description of the schedule at the top of the window.

Do Normal backup to Backup Set A Every Mon/Wed/Fri, starting 4/10/2000 at 7:00 PM

Click OK to return to the window listing the scheduled executions.

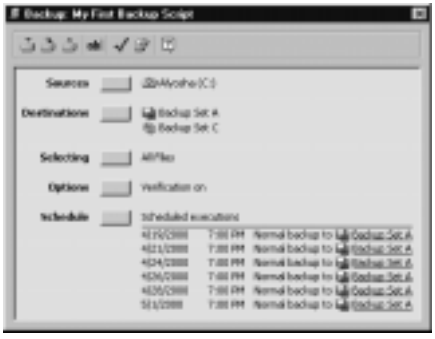


Your newly-created schedule is listed and, since it is the only one, is shown as the next to execute. This window also allows you to delete or modify existing schedules, or add more schedules.

■ **NOTE:** Do not feel obliged to schedule an execution; there are other ways to run scripts, as detailed in "Executing Scripts," which starts on page 67. If you want to delete the schedule you just made, go ahead and remove it so it does not intrude at a later time.

This part of the manual only touches on Retrospect's scheduling capabilities. Scheduling is explained in detail in "Scheduling Scripts," which starts on page 64.

Click OK to return to the script summary window.



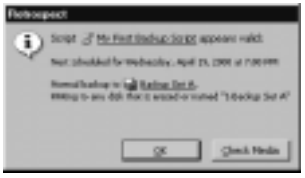
A script summary window.

If you used multiple sources, destinations, and schedulers, a custom selector, and changed some options, the summary window could have more elaborate information, such as the following example.

The script is complete. Click Save from the toolbar to save it. Once saved, the script is ready for execution upon your command or for scheduled automatic execution.

Checking Validity

While a script summary window is open, you can click Check from the toolbar and Retrospect informs you whether the script is valid, and shows the next action it will take with this script.



If the script is invalid, Retrospect shows why so you can edit the script to correct the problem.

In the dialog which says the script appears valid, click Check Media to have Retrospect examine the backup device, looking for the specified media member or click OK to return to the script summary window.

SCHEDULING SCRIPTS

Retrospect allows you to schedule a script to run automatically on specified days or on a repeating schedule, such as every two weeks. You can define multiple schedules for the same script and specify the kind of backup you want for each scheduled execution.

■ **NOTE:** Retrospect's Schedule preference (page 152) defines the time period during which scripts are allowed to execute. Scripts scheduled to execute outside this period will not run.

At the time you schedule a script, you must specify the backup set (if the script has more than one destination) and the type of backup action: normal, recycle, or new media.

Normal backup is a typical incremental backup. It marks for backup only files which are new, newly-modified, or new to the backup set.

Recycle backup clears the catalog contents (if any) of a backup set so it appears no files are backed up. Then it looks for the first media member of the backup set and erases it if it is available. If the first member is not available, Retrospect uses any available new or erased disk, CD, or tape. Everything selected from the source is backed up to the backup set.

New media backup makes a new backup set (named similar to the old one) using a new or erased disk, CD, or tape. The original backup set and its catalog remain intact for long-term storage in a safe place. The new backup set catalog and the new media member are each named with a number in sequence.

For further information, see "Backup Actions" on page 22.

Schedulers

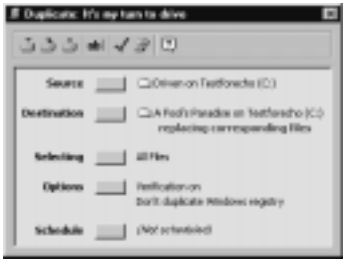
Retrospect provides three types of schedulers: day of week, repeating interval, and single date.

A script can contain any combination of one or more of these schedulers.

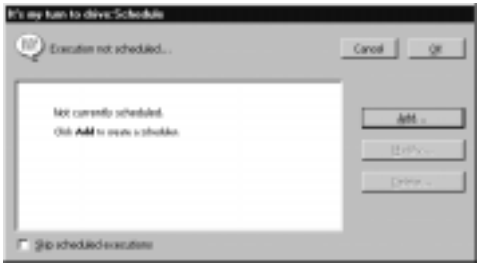
Creating a Script Schedule

Click the Automate tab in the Retrospect Directory.

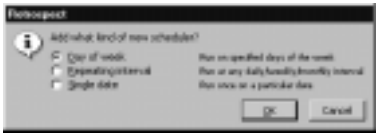
Click Scripts to display a window listing available scripts. Select the script you want to schedule then click the Edit button, which displays the script window.



Click Schedule and the script's schedule window appears with a list of its currently scheduled dates and times.



The list appears empty if the script is not scheduled. To add a new schedule, click Add, which brings up a dialog asking which kind of scheduler you want to make.



Click a radio button to select the kind of schedule you want to create, then click OK.

Day of week scheduler lets you define a schedule for one or more days of the week and specify a weekly repeating interval. For example, every Monday and Wednesday, every other week. Keep in mind that *a week starts on the Sunday of the week of the start date.*

Repeating interval scheduler lets you define a schedule that is repeated after a specified interval. For example, the last Friday of every month.

Single date scheduler lets you define a schedule for a single date and time. For example, April 19, 2000 at 6:00 A.M.

Common Scheduler Elements

All scheduler types have a few common controls and settings. These are the start date and time and the backup action and destination. Each is described below.

Start Date and Time

This determines the earliest time at which the first backup is allowed to occur. To change the start date and time, click on any individual part of the date or time. When the item is selected, type the new information or click the arrows to change the information. (You can also press the up and down arrows on your keyboard. Press the Tab key to move the selection among the different elements.)

Do not be misled by the start date; execution will not necessarily happen on that date because a week starts on the Sunday of the week of the start date. For example, with the start date of 4/19/2000 Wed, set to run on Sunday every two weeks, when you save the script on Tuesday, April 18, you might expect it to run Sunday, April 23 but it does not execute until April 30.

Observe the summary at the top of the window, which shows the actual date the script will first execute.

Backup Action Type and Destination

If the schedule is for a backup script, these additional settings are available in the scheduler.

From the Action combo box, choose Normal Backup, Recycle Backup, or New Media Backup.

If the script has multiple backup set destinations, use the To combo box to choose the backup set to be used for the scheduled execution.

■ **NOTE:** The backup set combo box is not displayed if only one backup set is specified in the script.

Retrospect allows you to have more than one backup set for a script so you can rotate media as part of your backup strategy. You specify the backup set for each schedule or execution.

Using the Day of Week Scheduler

The day of week scheduler window.

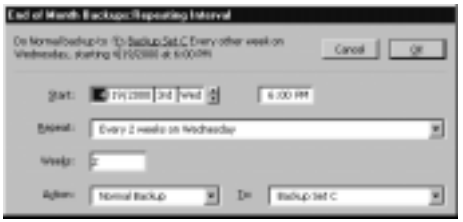
Set the start date and time, backup action, and destination as described previously under “Common Scheduler Elements” on page 65.

Click the checkboxes of the days of the week you want the script to execute.

Enter a number to use as the repeating interval for the weeks. For example, if you enter two and check Monday, the scheduler repeats every other Monday. Keep in mind that a week starts on the Sunday of the week of the start date.

When all of the settings are correct in the scheduler window, click OK.

Using the Repeating Interval Scheduler



The repeating interval scheduler window.

Set the start date and time, backup action, and destination as described previously under “Common Scheduler Elements” on page 65.

For weekly backups, the start date’s day of the week determines when future backups will occur. For example, if the Start date falls on a Monday, subsequent weekly backups will occur on Mondays. You can see the combo box change when you change the start day.

For monthly backups, the start date’s day of the month determines when future backups will occur. For example, if the Start date is the fifteenth of the month, subsequent monthly backups will occur on the fifteenth. If you specify a monthly backup on a date at the end of the month (such as the thirty-first), the backup will be run on the last date of the month for those months that do not extend to the requested date. For example, February usually has only twenty-eight days.

From the Repeat combo box, select the time unit (Days, Weeks, or Months) for the repeating interval. Type a repeat interval in the Weeks, Months, or Days field. The Repeat combo box changes to reflect the Repeat Interval you enter.

When all of the settings are correct in the scheduler window, click OK.

Using the Single Date Scheduler

The single date scheduler window.

Set the start date and time, backup action, and destination as described previously under "Common Scheduler Elements" on page 65.

Because this is a single date scheduler, the script will run once at the specified date and time, and no more.

When all of the settings are correct in the scheduler window, click OK.

Completing a Scheduler

Click OK in the script schedule window. The script summary window reappears and lists the next six scheduled events for the script.

Click Save from the toolbar to save it, then close the script window.

Scheduled Executions

Retrospect keeps track of all of your scheduled scripts and automatically executes them at the time you specified.

■ **NOTE:** Retrospect's Schedule preference (page 152) defines the time period during which scripts are allowed to execute. Scripts scheduled to execute outside this period will not run.

Retrospect checks the computer's clock and compares it to the next time a script is scheduled to run.

Retrospect is ever-vigilant about scheduled script executions. If a script is scheduled for automatic execution within the look-ahead time (normally twelve hours), Retrospect will not automatically quit (or shut down or restart, depending on a preference setting described on page 154). It instead remains open and waits to execute the script.

See "Controlling Executions," which starts on page 145, for related information.

EXECUTING SCRIPTS

Once you have created and saved a script you need to execute it to perform its intended operation. Retrospect gives you several ways of executing scripts and of pausing or halting their execution. Other methods of controlling operations in progress are discussed under "Controlling Executions," which starts on page 145.

Scheduled Execution

As you learned in the previous section, you can schedule times for Retrospect to automatically execute a script. Retrospect keeps track of all your scheduled scripts and automatically executes them at the time you specified. The script preview window (detailed under "Future Execution Schedule" on page 151) shows upcoming scheduled events.

Immediate Execution

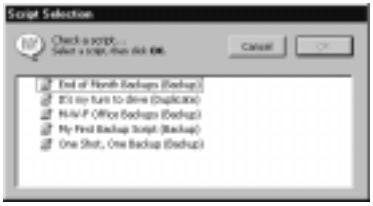
There are several ways to execute a script right away.

Run Menu

When you choose a script from the Run menu and confirm, Retrospect begins its execution.

Run Button

When you click the Run button from the Retrospect Directory's Immediate tab, Retrospect asks you to choose a script from a dialog.



Select a script from the list and click OK, then confirm its execution.

Execution

When you start a script using the Run menu or the Run button, Retrospect first presents an execution window.

If the script being run is a backup script, use the Action combo box to set the backup type to either Normal Backup, Recycle Backup, or New Media Backup, which are explained under "Backup Actions" on page 22. If you are not sure which to use, just use Normal. If the backup script has multiple destinations, use the other combo box to specify the backup set to which the files are to be copied.

Leave the Execute now radio button selected, then click Execute. Retrospect performs the scripted operation, prompting you for media if necessary, displaying its progress in the execution status window. The window also provides Pause and Stop buttons for suspending or cancelling the operation.

When the execution is complete, Retrospect informs you in the execution status window. Retrospect's unattended execution preference (page 154) determines what it does when the script is completed. By default, it quits when done. If any errors occurred you can find the offending files in the Browser which appears, or see error details in the operations log. (This log is accessible from the Windows menu and is described under "Viewing the Operations Log" on page 135.)

Run Documents

While learning how to immediately execute a script from the execution window, you may have noticed the radio button named Make a "run document". When this button is selected and you click Save in the dialog, then specify a location to save the file, Retrospect creates a special run document.

If you leave Retrospect and go to the desktop or Windows Explorer, you can see the file is a small Retrospect document. When you double-click (or otherwise open) the run document from the desktop or Windows Explorer, Retrospect executes the script.

To run several scripts sequentially, select the run documents and choose Open from the File menu. When you open several run documents at once, the scripts associated with them will run in alphabetical order by script name, regardless of the run documents' file names.

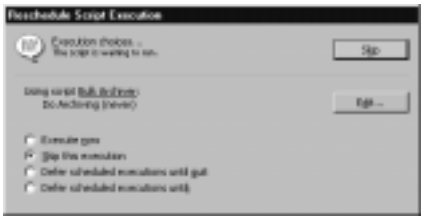
◆ **TIP:** You can create more than one run document for the same script, each specifying a different backup action and destination backup set.

Halting Execution

There are a few different ways to prevent execution or stop imminent execution of a script. To temporarily pause a running script, see "Execution Status Window" on page 145. To temporarily prevent a script from running, see "Skipping Script Execution" on page 151.

When a scheduled script prepares to run automatically, it counts down to execution. To

intercept it before it actually begins operating, click the Stop button in the countdown window. The execution choices window appears.



The execution choices window. Note the button shown here named Skip may also appear as Execute or Defer depending on the selected execution choice.

To cancel this execution of the script, select "Skip this execution" then click Skip.

To execute the script, select "Execute now" then click Execute.

To delay execution of the script (and all other scripts) until after you quit Retrospect, select "Defer scheduled executions until quit" then click the Defer button. You should defer a script when you do not want it to run while you are using Retrospect but you do want it to run after you quit.

To delay execution of the script (but no other scripts) until a future date, select "Defer scheduled executions until:" then set the date and time then click Defer. You should defer a script when you do not want it to run now but you do want it to run after a certain time.

To edit the script, click the Edit button.

Media Requests

When necessary with CDs, disks, or tapes backup sets, Retrospect prompts you to insert media by displaying the media request window. In most cases, Retrospect continues with the operation when you insert correctly named or erased media and click Proceed.

However, chances are you want a script to run unattended while you are away and unable to satisfy any media request from Retrospect. You can avoid this prompt if you insert the proper media member before you execute the script or before its next scheduled execution. Retrospect is very particular about media names for recycle and new media backups—if the inserted medium is not erased, its name must be the one requested in order for Retrospect to proceed without prompting you. When performing new media or recycle backups, erase the media in advance to be sure Retrospect will proceed automatically.

Should you ever wonder whether your backup device has the correct medium for the next script execution, you can have Retrospect check whether the correct backup set member is available. Check the script as described under "Checking Scripts" on page 150, and click the Check Media button.

When performing a normal backup, Retrospect requires the backup set's most recently used medium, though it will use a blank medium if the other medium was skipped. (See "The Options tab" on page 148 and "Media Request Preferences" on page 155.)

SCRIPTED ARCHIVE

The process of creating and using an archive script is almost identical to that of a backup script. Read "Scripted Backup," which starts on page 60, to learn how to create a backup or archive script. This section only explains the differences between the two script types.

An archive script is just like a backup script, but it has the added option of moving—rather than copying—files from the source to the archive media.

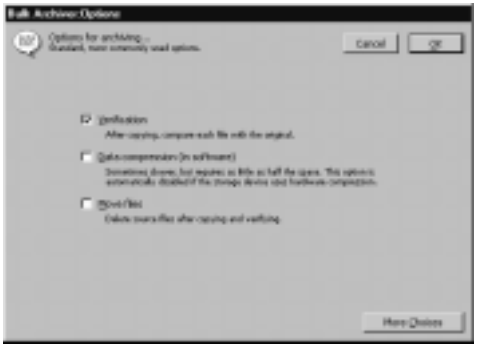
Archiving allows you to remove seldom-used files from a hard disk without permanently getting rid of them.

Archiving, by default, does not match source and destination. That is, Retrospect does not compare source files to files in a backup set. This leaves the possibility of it copying redundant files during the archive operation. In this case, Retrospect is foregoing ultimate efficiency for the sake of archive integrity.

Be sure to read "Archiving Tips" on page 179 for other important information.

Move Files Option

To set this option, click the Options button in the script summary window to get the archive options window.



Archive scripts have the matching option off by default, which results in archiving all selected files, regardless of whether they are already in the backup set. Unless you turn on the Move files option, matching is the only difference between archive and backup scripts.

When the Move files checkbox is checked, Retrospect copies the files to the backup set as usual and verifies them, then *deletes the files* from the original source volume or volumes. In the event the files do not exactly compare (Verification is on by default), the originals are not deleted.

◆ **TIP:** Before you use the Move files option, first archive to a different backup set by copying without moving. This provides an extra measure of safety should one backup set become unusable.

See page 140 for details on archive options.

SCRIPTED DUPLICATE

Duplicating means copying files among volumes, much like using the Windows desktop or Explorer to drag files or folders from one disk to another. Retrospect's duplicate function is intelligent, which makes it faster than the less sophisticated copy function of the Windows Explorer.

You can use duplicate scripts for doing unattended copying of hard disks, folders, or file server volumes. A duplicate script would be useful, for example, for copying a folder from a hard disk to a folder on a file server at the end of every week.

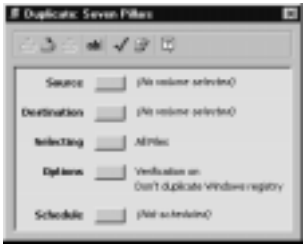
◆ **TIP:** Subvolumes are useful as sources or destinations for duplicating.

Making a duplicate script is much like doing an immediate duplicate operation. The main ingredients you specify are the volume from which to copy and the volume to which the files are to be copied.

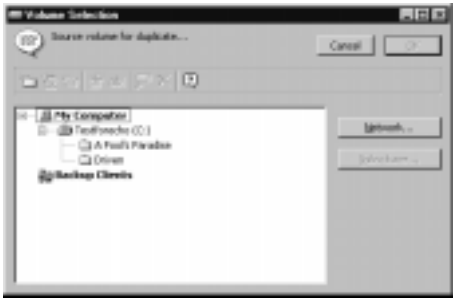
Creating the Script

From the Retrospect Directory, click the Automate tab, then click Scripts, which brings up the script editing window.

Click the New button to create a new script. A dialog asks which type of script you want to make; select Duplicate from the list and click OK. Another dialog asks you to name the script; enter a name and click New. The script appears in its own window.



Because this is a new script, Retrospect says "No volume selected" for the source. Click the Source button, then Retrospect's familiar volume selection window asks you to determine the source volume from which files are to be copied.



Select the source volume and click OK. (For details on using the volume selection window, see "Working with Volumes," which starts on page 162.)

There are also no volumes selected for the destination, so click the Destination button. In the window, select the volume to which to copy the files. Also choose an item from the combo box, which controls what happens to the existing contents of the destination drive.

Replace entire disk *deletes all files and folders* on the destination which do not match those marked for duplication, leaving files untouched if they are identical to files marked. It then duplicates remaining files and folders from the source, preserving the folder hierarchy.

Replace corresponding files copies the marked files to the destination volume into the same folders. Corresponding files are overwritten, *even if they are newer*. Retrospect leaves files untouched if they are identical to files marked for duplication or if the file names do not match those marked.

▲ **WARNING:** Duplicate operations can destroy your files. Destination items are replaced by those duplicated from the source, or deleted entirely. Verify this is acceptable before continuing.

Click OK to accept your destination choices. At this point, you have given the minimum information required for the script to run, but you may want to change some other script settings.

You can leave the default file selection criteria for copying all files from the source or click the Selecting button to apply a selector. (For details on selectors, see "Using Selectors," which starts on page 170.)

If you want to change one or more of the duplicate options, click the Options button. One such option is moving—rather than just copying—files from the source to the destination. (For details on duplicate options, see "Duplicate Execution Options" on page 141.)

To schedule the script, click the Schedule button and see "Scheduling Scripts," which starts on page 64.

Close the script window and save your changes.

You can now execute the script in any manner you wish. For details, see "Executing Scripts," which starts on page 67.

SCRIPTED RESTORE

Making a restore script is much like setting up an immediate restore operation. The main elements you specify are the backup set and

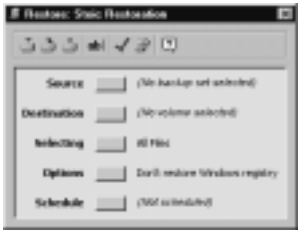
Snapshot to copy from and the volume to which the files and folders are to be restored.

A restore script would be useful, for example, in a student computer lab environment in which the hard disks are restored from a common source every night.

Creating the Script

From the Retrospect Directory, click the Automate tab then click Scripts, which brings up the script editing window.

Click the New button to create a new script. A dialog asks which type of script you want to make; select Restore from the list and click OK. Another dialog asks you to name the script; enter a name and click New. The script appears in its own window.



You will recognize this script window as similar to the immediate restore window, with information for the Source backup set, Destination volume, Selecting files, Options, and Schedule. To change information, click the appropriate button.

Source lets you choose a backup set and Snapshot from which to copy.

Destination lets you specify the volume to which to copy.

Selecting lets you choose a selector, a kind of filter for selecting files and folders to be restored. See “Using Selectors,” which starts on page 170.

Options displays the options window in which you can specify whether to restore the Windows registry or update modification dates of files, among other things. The default options suit most people but for more information see “Execution Options,” which starts on page 138.

Schedule lets you set the script to run at specific times or at regular intervals. See “Scheduling Scripts,” which starts on page 64.

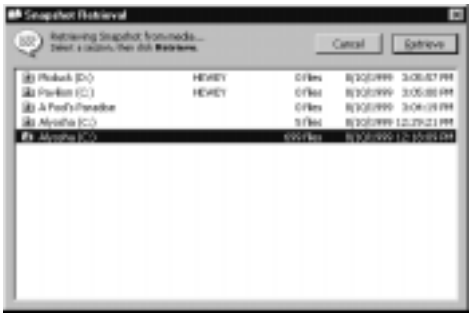
Setting the Source

Because this is a new script, Retrospect says “No backup set selected” in the script summary window. Click the Source button to get a window with a list of backup sets and Snapshots.

In this window’s top list, select the backup set from which to restore. (Use the More button if your desired set is not listed, or select a set you do not want to see here and press the Delete key to get rid of it.)

In the window’s bottom list, select a volume Snapshot. The date and time when the volume was last backed up are listed to the right of the volume’s name.

If your desired Snapshot is not listed, click the Add Snapshot button to select it from a list of all Snapshots in the backup set.



Selecting a Snapshot to add to the list.

When you select a Snapshot and click Retrieve Retrospect will obtain the older Snapshot from the backup set media (which may require you to insert media) and add it to the list in the restore source window.

With your desired Snapshot selected in the restore source window, click OK to continue. The backup set and Snapshot date, time, and volume name are listed in the script window.

Setting the Destination

Because this is a new script, Retrospect says "No volume selected" in the script window. Click the Destination button to get the volume selection window with its familiar volumes list.

As with an immediate restore (which you learned about in Chapter 4), select a volume on which you want Retrospect to place the restored files and set the combo box to determine how Retrospect restores those files to the destination. (See page 49.) Click OK to continue and return to the script summary window.

At this point, you have given the minimum information required for the script to run. You may also change the file selection criteria, change the options, or schedule the script. Close the script window and save your changes.

You can now execute the script in any manner you wish. For details see "Executing Scripts," which starts on page 67.

BACKUP SERVER SCRIPTS

Backup scripts are powerful and versatile, but in backup environments which change regularly, another kind of operation—Backup Server—may be better suited to your needs. A regular backup script copies specific volumes in a certain order to a designated backup set. If the backup environment changes and volumes or media become unavailable, the backup will not happen until its next scheduled time, if ever. This is why Retrospect includes Backup Server technology.

Backup Server Benefits

Retrospect's Backup Server technology accommodates changing network and disk configurations. Whereas a regular backup script follows a rigid schedule for its clearly defined source volumes and destination backup sets, a Backup Server script is driven by the availability of those resources and their need for backup. Source volumes are backed up in order according to need—that which was backed up least recently is first to be backed up. The volumes are copied to the best available backup set media, so Backup Server scripts give you greater freedom to use the media of your choice.

Backup Server scripts are ideal for environments in which computers and volumes irregularly appear on the network. For example, in an office that has ejectable disks and mobile computers which appear on the network at unpredictable times, the Backup Server recognizes the new volumes when they become available and backs them up. Client users can even initiate backups of their volumes, an otherwise unavailable feature.

Though Backup Server scripts can be used independently, it is often best to use them in concert with regular backup scripts to produce a comprehensive backup strategy.

How the Backup Server Works

You start with a Backup Server script, which is similar to other Retrospect scripts. The backup computer running the script becomes a Backup Server during its scheduled time of operation and is idle during its scheduled period of inactivity, when you may use it for other purposes. You may want to dedicate a computer to Backup Server operations during periods of activity and avoid running other programs while the Backup Server is active.

The Backup Server determines which backup media is available and makes a queue based on the most recent backups of the source volumes. The least recently backed up volume is moved to the head of the queue and other volumes are arranged in descending order according to the priority of need. Then the Backup Server examines the local computer and polls the network, looking for the volumes.

■ **NOTE:** Polling the network does not adversely affect network performance.

The Backup Server starts at the top of the volumes queue, determining the availability of each source volume and, if there is a choice, backing up each to its most suitable backup set. Retrospect moves the most recently backed up volumes to the bottom of the queue as it goes along. When it is satisfied that all available source volumes are backed up for the current backup interval, the Backup Server periodically polls clients on the network. Polling involves checking for volumes which have recently appeared, and checking whether any client users have requested backups of their volumes. This whole process ensures a volume in need of backing up gets it.

The Backup Server status window.

If allowed by the backup administrator and the Backup Server, a client user can, at any time, request to be backed up as soon as possible. When Retrospect next polls the client, it will recognize the ASAP request and back up the client.

When the Backup Server script's wrap up time is reached, Retrospect continues the current volume backup but will not start any new backups. When the script's stop time is reached, Retrospect halts the backup in progress, if any, and will not start any new backups until the script's next scheduled start time.

■ **NOTE:** The Backup Server uses only the normal backup action because recycle and new media backups are inappropriate for use with a Backup Server script.

When to Use Backup Server

Table 5-1 on page 75 compares a regular backup script to a Backup Server script.

See “Network Backup Strategies” on page 131 for descriptions of situations which are suited to a Backup Server and for instructions on implementing a strategy based on a Backup Server.

Managing Resources

With abundant resources (large storage capacity, fast network, and powerful backup computer with plenty of time to operate) and relatively few source volumes, the Backup Server can completely back up all volumes during its window of opportunity. However, with limited resources (small storage capacity, slow network, slow backup computer with little time to operate) and relatively many source volumes, the Backup Server is not likely to completely back up each volume during its given time period. Fortunately, Retrospect’s Backup Server effectively manages limited backup resources so that it eventually completes all of its backups.

Trust Backup Server to Do Its Job

Whether your setup is resource-lacking or resource-abundant, the Backup Server always backs up the volumes in order starting with those which need it most. For example, if you need to back up 100 client computers but you can do backups only during an eight hour period each night, chances are Retrospect will be unable to back up all 100 clients the first night before the script’s eight hours are up. Leftover volumes will be backed up the next night, and so on, until all 100 volumes are backed up. After the initial backups, the Backup Server will move more quickly through the queue as it performs subsequent incremental backups.

As the backup administrator, you do not have to separate the clients into different groups for different days based on your estimation of backup times. The Backup Server distributes the load over the scheduled time period.

The main thing to remember about the Backup Server is that all of the source volumes eventually are backed up with no additional effort on your part. In the worst case, the period of time between backups of a given volume will be too long for comfort and you must allot more resources.

If you want your volumes to be backed up more often than they are, you must allocate more resources to the Backup Server script. Increase the script’s operating time, use selectors to limit the files to back up, use a faster backup computer,

Feature	Backup Script	Backup Server Script
Destination Backup Sets	Copies to a single backup set as specified in the schedule or at execution. Fails if media is unavailable. Media rotation is scripted.	Copies to the most ideal available backup set in the destinations list. Automatic media rotation among multiple available backup sets.
Source Volumes	Backs up volumes in the order of the source list. If a backup fails, the next backup does not occur until the next time the script runs.	Backs up volumes in the priority order of their most recent backup dates. After each backup, the queue is re-evaluated, including previously unavailable volumes.
Schedule	Starts backup at a specific time and stops when the last source is completed. Optionally ends at a specific time.	Runs between start and stop times. Backups of available volumes occur as necessary.
Execution	One script runs at a time. Conflicting scripts run one after the other.	All Backup Server scripts run concurrently. Other scripts run as scheduled, but not while Backup Server backs up a volume.
User Requested Backups	No.	Yes.

Table 5-1: Standard backup scripts compared to Backup Server scripts.

or speed up your network. Setting up a second backup computer with the Backup Server handling half of your clients effectively divides the load in half for each backup computer.

Monitoring Progress

Periodically view the Backup Report (see page 134) to see which volumes were backed up by the Backup Server and their intervals between backups. Of particular interest is the "Elapsed Days" column which shows how many days have passed since each volume's previous backup.

■ **NOTE:** The interval between backups will tend to be smaller when the Backup Server is performing incremental backups after the first backup of each volume. Incremental backups require far less time for most volumes and thus can occur more often.

Deleting a backup event from the Backup Report causes the Backup Server to not consider that backup occurrence when it evaluates the priority of volumes to be queued for backup. Consequently, that volume is given a backup priority higher than its previous priority.

Interaction with Other Scripts

You can use multiple Backup Server scripts operating simultaneously to manage limited backup resources. You can use separate scripts with different schedules to give some volumes a higher backup priority.

For example, one script could run eighteen hours in a day, backing up volumes from the sales department. Another script could run six hours in a day, backing up volumes from the accounting department. The sales department would be more likely to get completely backed up, whereas the accounting department script may not complete all its volumes in a single six hour period. Still, these volumes would eventually get backed up because volumes in greatest need of backup are backed up before volumes which have more recent backups.

As another example, consider volumes which are available intermittently, such as removable disks and notebook computers. Another script could back them up twenty-four hours a day, because they are available at random times during the day. For further discussion of Backup Server strategies, see "Backup Strategies," which starts on page 130.

Other, non-Backup Server scripts scheduled for execution during the active operating time of Backup Server scripts can run without conflict. When a regular script wants to run while the Backup Server is backing up a volume, the Backup Server completes the backup in progress, then allows the other script to execute. When the regular script finishes, the Backup Server resumes where it left off. When a regular script is scheduled to run while the Backup Server is idle, it executes immediately.

Backup Server Tips and Techniques

Choose the Right Backup Server Computer

The computer you use for the Backup Server is important. Backup Server scripts work best on a dedicated backup computer that is not running other file serving or sharing software. The Backup Server can run effectively on faster Pentium computers, but, of course, a high-end Pentium III model helps get things done more quickly.

The Backup Server does not quit or shut down the backup computer when it is finished; rather, it waits idle until the next scheduled start time.

Use Containers as Sources

Use containers to specify sources in your Backup Server scripts, not individual volumes, especially when you back up clients. When you use containers, any new volumes added to a client are automatically included in backups. Also, using containers avoids a potential problem when backing up Mac OS clients under certain

conditions. When you select multiple volumes from a Mac OS client that is set to wait at shutdown and the script's client system option is set to shut down clients after backups, Retrospect will shut down the client after backing up its first volume. This prevents backups of the client's other selected volumes until the client is restarted.

Rotate Among Backup Sets

Create multiple backup sets and use them all as destinations in your Backup Server script. Rotate through the sets by inserting different media in the backup device each day. The Backup Server uses whatever media you inserted.

Introduce New Media

As with any backup strategy, rotate among different backup sets. The Backup Server makes this easy, as it allows you to insert different media at your leisure. Periodically do new media backups to introduce new media. Store old media off-site after each new media backup. Between new media backups, periodically do recycle backups to avoid catalogs eventually becoming cumbersome and to ensure fast restore operations should they be necessary.

When you want to rotate or introduce new media, do recycle or new media backups by executing regular backup scripts using the same backup sets used by your Backup Server scripts. You can schedule these, execute them from Retrospect's Run menu, or save them as run documents and execute them.

To manually set a backup set for a recycle or new media backup, configure the backup set and use media control. (See "The Options tab" on page 148.)

Monitor Media Availability

Because the Backup Server does not initially put up media request windows, you may not know when it does not have a legitimate medium available to it. When it needs media it shows "media" in the status column of the status window when viewing the Sources or Backup Sets tabs. Choose Backup Sets so the window shows which destination backup sets have media available and which do not. Insert media as needed.

If a backup set needs a new or erased medium and you have to erase one, stop the Backup Server, erase the medium from Configure› Devices, then start the Backup Server again.

Use Other Scripts to Complement the Backup Server

Retrospect can have multiple Backup Server scripts running concurrently, and it will manage the sources and destinations.

Other, non-Backup Server scripts can execute while the Backup Server is running. You can schedule them or run them at will using run documents. Other scripts can complement Backup Server scripts by starting recycle and new media backups, and by forcibly backing up volumes which do not get backed up by the Backup Server.

Tape Libraries

An automatic tape loading device with the Backup Server is a powerful combination. All tapes in the library's magazine are available for backup as backup set destinations. The Backup Server rotates between sets with no additional effort from you. It uses blank or erased tapes when a backup spans over two tapes, or when you set up a new media backup with Retrospect's media control options.

Allow Early Backups

By default, Backup Server scripts allow early backups. These occur when the Backup Server is polling through the list of possible sources and finds a client that has requested to be backed up as soon as possible. When a client user selects this option in his or her Retrospect Client control panel, the client software does *not* send a message to Retrospect on the backup computer.

Rather, Retrospect contacts clients as the Backup Server polls, which it does when it is not actually performing backups during its scheduled active time.

If many clients are due for backup, a client with a current backup may wait a long time before the Backup Server gets to it. Regardless of the client user's desire for backup ASAP, Retrospect backs up other clients which do not have current backups. Retrospect always polls starting with clients who need backups the most.

For more information, see "Allow early backup" on page 139.

Manage User Deferments

When a client user repeatedly defers his or her backups (as indicated in the operations log), you should make future backups occur at a time which is more convenient for the user, such as when he or she is not using the computer. Or, create a script with the countdown time option at zero to prevent the user from deferring execution.

Set Priority by Volumes

If certain critical volumes are not getting backed up as often as you would like, consider using multiple scripts with different schedules to give some volumes higher backup priority than others. Schedule the higher-priority volumes script to run for a longer duration than the lower-priority volumes script. With more time allotted to the higher-priority volumes, they are more likely to get completely backed up.

Set Priority by Files

If you find the Backup Server is not completely backing up all its sources, another way to set the backup priority is by files rather than volumes, though you can also do both. Use multiple scripts with different selectors to give some files or folders higher backup priority than others. For example, a higher-priority selector would include documents modified in the last seven days, and a lower-priority selector would include all files. Schedule the higher-priority script to run for a longer duration than the lower-priority script.

Creating a Backup Server Script

From the Retrospect Directory's Automate tab, click Scripts, then click New in the window which appears. The next dialog asks which type of script you want to make; select Backup Server and click OK. Enter its name and click New. The script summary window appears.

As with regular backup scripts, click Sources to add source volumes with the volume selection window and click Destinations to add destination backup sets with the backup set selection window. Click Selecting to apply a predefined or custom selector to the source volumes.

So far, these elements are just like those in regular backup scripts, but you will see Backup Server scripts are radically different in terms of options and scheduling.

◆ **TIP:** To back up multiple volumes from a single client, use a container for the source, not a multiple selection of volumes. See "Use Containers as Sources" on page 76.

Script Options

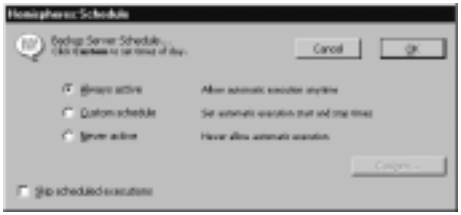
From the Backup Server script summary window, click Options to display the basic Backup Server options.

Click More Choices to see all of the available options categories and notice that many categories parallel those of regular backup scripts. Catego-

ries specific to Backup Server scripts are Interval, Countdown, and Polling. These are detailed in "Execution Options," which starts on page 138.

Setting the Schedule

A Backup Server script's schedule is one of the major differences between it and a regular backup script. From the script summary window, click the Schedule button. The following window appears.



Select a schedule:

Always active makes Retrospect run the script twenty-four hours a day, seven days a week.

Custom schedule brings up another window in which you can customize the script schedule. This is described below.

Never active prevents Retrospect from running the script.

Skip scheduled executions checkbox prevents the Backup Server from running until the time you specify.

Customizing the Schedule When you select Custom schedule and click Custom, you get the custom schedule window. Though similar to the Schedule Preferences window, it is specific to this Backup Server script rather than global to all Retrospect executions.

If the schedule was previously Always Active, all twenty-four hours of each of the seven days of the week are selected, as above.

To select a day of the week, click on it. Click and drag to select contiguous days of the week. Use the Shift or Control key and click or drag to select days without de-selecting the previous selection.

To change a time, click on it and type or use the control.

Start is the time at which the script begins.

Wrap up is the period of time (in hours and minutes) before the stop time, during which Retrospect should complete the current backup but not begin new backups.

Stop is the time at which Retrospect absolutely must halt this script's backups (until the next start time).

◆ **TIP:** You can also set times by dragging the icons on the hourly schedule bar, but you should first experiment by typing the times to see how these controls work.

When a time is changed, the hourly schedule bar changes accordingly to graphically represent the start, wrap up, and stop times of the script.

Each selected day has a scaled-down hourly schedule bar, though it does not have controls.

You can revert a customized schedule with the Always and Never buttons.

Using the Backup Server

Automatic Starting

When you save a Backup Server script, the Backup Server is enabled after the backup computer is idle (that is, no mouse movement, clicks, or keystrokes) for ten minutes. Retrospect starts the Backup Server when a script's scheduled start time arrives. If Retrospect is not open at the start time, it will open automatically.

Run Menu

After you have saved at least one Backup Server script, Retrospect's Run menu includes two previously unavailable items: Start Backup Server and Disable Backup Server. Choose Start Backup Server to manually enable the Backup Server, which will then run Backup Server scripts at their scheduled times of execution.

Choose Disable Backup Server from the Run menu to prevent any scheduled Backup Server scripts from executing until you later choose Start Backup Server or Enable Backup Server to re-enable the Backup Server.

Control Menu

When the Backup Server is running, Retrospect has a Control menu on its menu bar. Following is a list of its items and descriptions of their functions.

Lock Application is available when you have specified password protection from Retrospect by way of its security preference (page 153). It prevents access to Retrospect, requiring a password to "unlock" it.

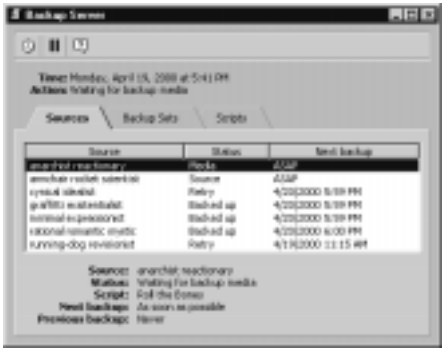
Stop on Errors makes the Backup Server halt when it encounters any error, rather than just logging the error and continuing.

Just Log Errors ensures the Backup Server continues operating when it encounters an error, rather than halting execution. You can find any errors which occur by viewing the operations log.

The Backup Server Control menu items parallel their counterparts of the Control menu available when regular scripts are running.

Status Window

When the Backup Server is running, the status window shows you what it is doing.



There are three tabs to examine.

Sources shows the source volumes from all running scripts.

Backup Sets shows the backup sets from all running scripts.

Scripts shows all Backup Server scripts.

Retrospect lists the status of each item under the status heading.

Blank means the Backup Server has yet to connect with the item.

Active means the script is functioning.

ASAP means the source will be backed up as soon as possible. This may be either because the client user initiated the backup or the client's most recent backup is older than the script's backup interval.

Backed up means the source volume has been backed up within the specified interval.

Deferred means the client user has intercepted and postponed the backup. Such user defermentsare entered in the operations log.

Inactive means the script was deactivated or its schedule does not currently permit it to run.

Media means the Backup Server cannot find the proper media for the item's backup set.

Ready means a source is currently being backed up or is about to be. It also means a backup set is ready as a backup destination.

Retry means the Backup Server failed to back up the source and will try again.

Scheduled means the source has never been backed up, but the administrator has scheduled a pending backup.

Source means the Backup Server cannot find the source volume.

Wrap up means a Backup Server script is in its wrap up period.

Click on an item to see more status information in the lower part of the status window.

Closing the Status Window

Click the Backup Server status window's close box to stop all scripts in progress. When one or more scripts are scheduled, Retrospect waits a period of time, then the Backup Server starts and executes scheduled Backup Server scripts. The wait period is ten minutes if you are still using Retrospect, or one hour if you quit Retrospect.

Deactivating a Script

Retrospect allows you to temporarily deactivate a Backup Server script so its sources are not included in the Backup Server's routine operations. When the Backup Server is stopped and later started, the script will be active.

To prevent a Backup Server script from executing, first click the Scripts tab. Then select the script from the list and click Schedule from the toolbar and in the dialog that follows select Never active and click OK.

Reactivating a Script To allow a deactivated Backup Server script to execute and include its sources in the Backup Server's routine operations, follow the same steps as deactivating but select Always active.

Scheduling a Backup of a Source

Retrospect allows you to schedule a backup of a source from a running Backup Server script. This lets you set a definite time for the Backup Server to back up the source, rather than wait for the Backup Server to back it up at its convenience. This is useful, for example, when the backup administrator knows a salesperson will be leaving the office with her notebook computer. The administrator can schedule that client for backup immediately.

To schedule a backup of a source, first click the Sources tab in the Backup Server status window. Then select the source from the list and click Schedule from the toolbar (or double-click on the source), which brings up the following dialog.

Use the controls to set the date and time to back up the source, then click OK. Retrospect changes the priority of the source in the Backup Server queue according to your scheduled time.

A backup scheduled this way is not remembered by Retrospect when the Backup Server is stopped.

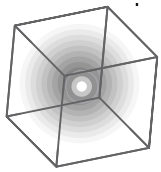
Resuming the Paused Backup Server

While the Backup Server is running, you can pause it by clicking the toolbar's Pause/Resume icon. The Backup Server automatically resumes after two minutes of mouse or keyboard inactivity.

To resume the paused Backup Server, click Pause/Resume from the toolbar.

Backup Server Runs Continuously

Unlike other scripts, when Backup Server scripts finish they do not take the action specified by the Unattended preference. For example, a Backup Server script will not quit when done. If you quit Retrospect, the Backup Server will automatically launch Retrospect when the next script is scheduled to start.



CHAPTER 6

NETWORK BACKUP

- OVERVIEW
- INSTALLING CLIENTS
- WORKING WITH CLIENTS
- UPDATING CLIENTS
- UNINSTALLING A CLIENT AND ITS SOFTWARE
- ADVANCED NETWORKING
- CLIENT USER PREFERENCES
- BACKING UP CLIENTS
- WORKING WITH WINDOWS CLIENTS
- FILE SYSTEM CONVERSIONS
- NETWORK BACKUP GUIDELINES

This chapter provides instructions on installing, configuring, and otherwise administering the client software that allows you to access networked Retrospect client computers from the backup computer. It also describes the options and controls at the hands of the user of the Retrospect client. In addition, this chapter explains how to back up these clients and includes information and worksheets for setting up efficient workgroup backups.

OVERVIEW

Retrospect allows you to use a single computer with a storage device to back up networked Windows and Macintosh computers equipped with Retrospect client software.

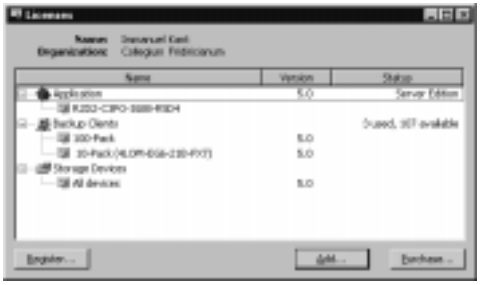
The backup administrator—that's you—installs the Retrospect client software on each of the client computers (also called clients). The backup administrator uses the Retrospect application to log in clients for use by the backup computer. After configuring the clients, the administrator can create and schedule scripts using client volumes as sources, as if the volumes were connected directly to the backup computer.

Licensing

Retrospect will work with as many clients as you have licensed. You can add licenses to support more clients.

Retrospect's license manager keeps track of your client licenses with the license codes you enter. Client license codes are included as part of Retrospect Workgroup Backup and Retrospect Server Backup editions, and are available separately in Retrospect Clients. You get additional codes when you purchase additional licenses.

To view current licenses, choose License Manager from the Window menu.



The Backup Clients container summarizes the quantities of used and available clients and lists client licenses you have added.

To add a client license, click the Add button and enter your new license code in the dialog that follows.

Client licenses are automatically added by the license manager when you log in previously licensed clients running Retrospect client software version 4.1 and earlier.

TCP/IP

If you are going to use Retrospect clients, you must have a functioning TCP/IP network. For more information, see Appendix A • Preparing TCP/IP Software.

Securing Clients

TCP/IP clients connected to the Internet are at risk, however slight, of unauthorized access. Assign passwords (as explained on page 87) to clients to prevent access by Internet users who have Retrospect.

INSTALLING CLIENTS

System Requirements of Windows Client Computers

To be backed up or otherwise accessed by Retrospect from the backup computer, the following is required of each networked client computer.

• Computer running under either the Windows 95/98, Windows NT 4.0, or Windows 2000 operating system

• Networking hardware and cabling functioning with the TCP/IP protocol, connected or routed to the network on which the backup computer operates

• Winsock 2.0 for Windows 95

You can install TCP/IP networking software from the Windows installation software. Winsock 2.0 is included with Windows 98, NT, and 2000, but Windows 95 requires the Winsock 2.0 Update from Microsoft. It is available free from Microsoft at:
http://www.microsoft.com/windows95/downloads/contents/wuadmintools/s_wunetworkingtools/w95sockets2/default.asp

Installing the Client Software on Windows Computers

Use the following procedures to install the client software on each Windows computer you want to back up over the network.

◆ **TIP:** For installing many clients on a network from a file server you can make a shared folder with the Retrospect Clients Setup application then run the Setup program from that folder instead of from the CD.

1. Save all unsaved documents in other running application programs.

2. Under Windows NT or 2000, log in to the client computer so that you have Administrator privileges.

3. Insert the Retrospect or Retrospect Clients CD in the client computer's CD-ROM drive. Click the Install Client button.

4. Follow the instructions of the Setup program to place the client software on the startup disk. Do not forget the password you provide. Restart the computer.

After Installation

When the computer starts up it automatically loads the client software. The client is now ready to be accessed from the backup computer, as detailed under "Working with Clients" on page 86.

Cloning Installations

You may wish to use popular disk cloning software to clone a client installation. After installing client software on a computer, you can use the computer as the master from which to create other cloned computers. Do not use Retrospect to access the newly-installed client before using it as the clone master. You must clone the master before you access it with Retrospect.

System Requirements of Mac OS Client Computers

To be backed up or otherwise accessed by Retrospect from the backup computer, the following is required of each networked Mac client computer.

• Mac OS-compatible, PowerPC-based computer with Open Transport

• Networking hardware and cabling functioning with the TCP/IP protocol, connected or routed to the network on which the backup computer operates

Installing the Client Software on Mac OS Computers

Use the following procedures to install the client software on each Mac OS computer you want to back up over the network.

◆ **TIP:** For installing many clients on a network from a file server, or for installing on computers without CD-ROM drives, you can make a shared folder on a server with the contents of the Retrospect Clients Installer application. Run the Installer program from that folder instead of from the CD.

To Install Retrospect Client Software on a Mac OS Computer:

1. Save all unsaved documents and quit other running application programs.

2. Insert the Retrospect or Retrospect Clients CD in the client computer's CD-ROM drive.

3. Double-click the Installer icon to launch the program.

4. Follow its instructions to place the client software on the startup disk. Do not forget the password you provide. Restart the computer.

■ **NOTE:** Use only basic alphanumeric characters (low-bit ASCII) in passwords for Macintosh clients. Macintosh high-bit characters do not correspond to Windows high-bit characters. For example, Luf$Luf00 is OK but Lüf•Lüføø will cause problems.

After Installation

When the computer starts up it automatically loads the client software. The client is now ready to be accessed from the backup computer, as detailed under "Working with Clients" on page 86.

WORKING WITH CLIENTS

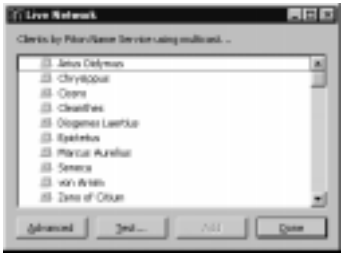
The Clients button on the Retrospect Directory's Configure tab lets you work with client computers.

Click the Clients button to bring up Retrospect's backup client database window.

The client database window.

The scrolling list shows all the client computers currently logged in for use with Retrospect, if any.

Click Add to bring up the live network window.



The live network window.

This window shows all the computers with client software Retrospect found on a specific network. By default, Retrospect uses its Piton multicast method of searching for clients in the local subnet. (A subnet is a group of local computers physically networked together without a router or gateway, though they may use a gateway to connect to other networks.)

Retrospect Desktop Backup and Workgoup Backup editions do not search for clients outside the local subnet. If you want to access clients outside the backup computer's subnet, upgrade to Retrospect Server Backup edition.

Retrospect Server Backup edition includes advanced networking features to access clients outside the local subnet using a variety of methods. These features are described under "Advanced Networking," which starts on page 91.

Logging in Clients

Adding a backup client to Retrospect's client database is necessary to make the client available for selection in backups and other operations.

A client running Retrospect client software version 4.2 or later is ready to log in to Retrospect as soon as the client software is installed and the computer is restarted.

A client running Retrospect client software version 4.1 or earlier must be "activated" with an activator code before you can log it in to Retrospect from the live network window. The

activator code is used by Retrospect's license manager as a license code.

The live network window is where you log in backup clients for use with Retrospect. To get there from the Retrospect Directory, click Add from Configure›Clients.

Adding a Client

Select a client in the live network window and click Add. Retrospect asks you for its password then logs in the client for use with Retrospect and opens the client properties window.

When you log in a client, Retrospect's license manager decrements the available pool of individual client licenses.

Configuring a Client

After you have logged in a client, you need to configure it. If a client is already installed but not logged in, you can select it in the live network window and click the Add button to log in and configure the client. If the client is already known but you need to reconfigure its settings, you can select it in the client database window and click Properties from the toolbar.

The client properties window is arranged with tabs like the Retrospect Directory. Each tab is a category of configuration options: General, Access, Tools, and Volumes.

General Tab

The General tab shows various information about the backup client and has an option to protect data over the network.

Name is the given client name.

Type is the operating system used by the client computer.

Version is the version number of the client software installed on the client computer.

A/C is the activator code of a backup client running 4.1 or older client software.

Priority is the priority setting the user has chosen in the client control panel. A 20% priority means the user has set the slider all the way to "User," giving other applications and tasks some of the computer's processing time that would otherwise be used for Retrospect tasks. A 100% priority means the client's priority slider is set all the way to "Backup," giving client tasks (namely, transferring files) all of the client software's processing time allotted by its operating system.

Security is the data security specified for this client computer. *None* means no password was installed and anyone using Retrospect on the network can log into this client. *Password* means a password must be entered in order to log in to this client. *Link Encryption* means the administrator has selected the "Link Encryption" general client option for this client. This means data from this client is being encrypted before being sent over the network. You cannot select the Link Encryption option unless you have a password.

Status indicates the client's availability for backups and other operations. *Not connected* means Retrospect has not yet established communication with the client. *In use* means the client is presently being accessed. *Connected* means the client is ready and available. *Locked* means the user at this client workstation has checked the "Read Only" access preference in the client control panel. The client can be backed up, but you cannot restore to it or delete files from it. *Busy* means the client is currently being accessed by a different copy of Retrospect on the network. *Turned Off* means the user at this client clicked the "Off" radio button in the client control panel. A client that is turned off is unavailable for operations until it is turned on manually or the client computer is restarted.

Echo time is the time delay, in seconds, experienced in communicating with this client (usually 0.0 to 0.2). If the network or client is busy, or you are using routers, the echo time could easily be higher without indicating a problem.

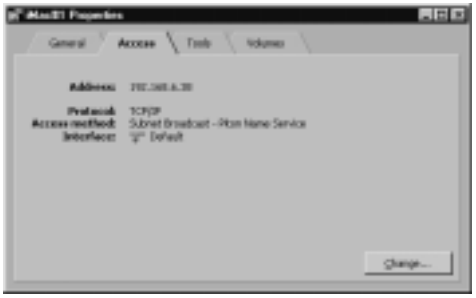
Speed is the transfer rate of the network connection between the backup computer and the client computer.

Clock offset is the difference in hours:minutes:seconds between the internal clocks of the client computer and the backup computer.

Encrypt network link, which is off by default, is only available if this client uses a password. When the checkbox is checked Retrospect protects against network eavesdropping by encrypting data transferred over the network then decrypting it before writing it in the backup set. (Client link encryption is distinctly different from backup set encryption.)

Access Tab

The Network tab summarizes the network access method for this client.



You can click the Change button to access the client in a special live network window. This may be necessary if the client has moved on the network or was reinstalled. Use the change network access window to redirect Retrospect to your desired client.

Tools Tab

The Tools tab lists the client name, whether it has a password, its clock offset (the time difference between the client computer clock and the clock of the backup computer), and the version number of the client software.

To change the client name, click Rename. (A dialog then asks you to enter the new name.) To add or change the password, click Set Password. (A dialog then asks you to enter the new password.) To change the time of the client computer to match that of the backup computer, click Sync Clock, which is not available when the client allows read access only (page 97). If the client version is old you can update it over the network by clicking Update. (A file selection

dialog then asks you to locate the Retrospect client software to use as the master from which to update. See "To Update an Individual Client Computer" on page 90 for detailed instructions.)

Volumes Tab

The Volumes tab lets you specify which volumes on the client computer are accessible to Retrospect over the network.

Client sources The setting of the combo box affects how Retrospect resolves client containers during operations. Usually you do not need to change it from its Client Desktop default.

• **Client Desktop** resolves to all volumes local to the client computer, except for floppy disks, shared volumes (such as file servers), read-only volumes (such as CD-ROMs), and empty volumes.

• **Startup Volume** resolves to the volume from which the client computer booted.

• **Selected Volumes** resolves to all volumes selected below in the list of remembered volumes.

Remembered volumes lists the client's volumes. Only the selected volumes will be available to Retrospect during operations. The selection determines which volumes appear in a volume selection list (such as for a backup script's sources). It also determines the volumes to which the client container resolves when the Client sources combo box is set to Selected Volumes.

Table 6-1 below uses the example of a client computer with several mounted volumes. It shows the volumes to which the client container resolves, respective to the different Volumes to Access settings.

Forgetting a Client

After a client has been logged in, there may come a time when you no longer need it and its volumes. (For example, a computer is no longer on the network.) In this case, you can tell Retrospect to forget it, which is the opposite of logging it in.

In the client database window, select the client and click Forget from the toolbar. Retrospect asks you to confirm this. By clicking OK, you are removing the client volumes from scripts and other lists in Retrospect. This only affects Retrospect on the backup computer in use at the time. It does not affect other copies of Retrospect running on other computers on the network, which remain logged in to the client as usual. Forgetting a client does not affect that client's existing backups.

Forgetting a client makes one more client license available in the license manager (page 84).

These volumes on a client computer…	…with this client sources configuration…	…resolves to these volumes.
	*Client Desktop*	Alyosha Beowulf Cynics
	Startup Volume	Alyosha
	Selected Volumes, with only Beowulf selected in the list of remembered volumes	Beowulf

Table 6-1: Examples of client container resolutions with different client sources configurations.

UPDATING CLIENTS

Updating Clients from the Backup Computer

There may come a time when you need to update older client software to take advantage of improvements in a newer version. You can update client computers individually, or update a group of client computers with a single command from the backup computer. When you update a client, it retains all of its current control panel settings.

You can update all Windows clients or all Mac clients at any time. It is a good idea to update all clients even if you know some of them are turned off. You can later repeat this operation without affecting the clients that are already updated.

To Update All Mac OS or Windows Clients

Go to the Retrospect Directory's Configure tab then click the Clients button. The backup clients database window appears, listing all client computers currently logged in for use with Retrospect.

The client database window.

Click Update All from the toolbar. Retrospect asks whether you want to update Windows or Mac OS clients. Select either type and click OK to continue. Another dialog appears, prompting you to specify the location of the most recent version of the Retrospect client software. Select a copy of the client update file on your hard disk or an update disk and click Open. Retrospect begins updating the client software on selected client computers.

■ **NOTE:** If a client computer has virus protection software installed, it may require confirmation at the client computer before allowing the update to continue.

When the update is complete, Retrospect reports the results in a dialog and the operations log. Click OK.

To confirm the status of each client update, open the operations log. (To do this click the Reports tab then click the Log button, or choose Log from the Window menu.)

Restart each client computer. The update does not take effect on a client computer until it is restarted.

To Update an Individual Client Computer

Go to the Retrospect Directory's Configure tab then click the Clients button. The client database window appears, listing all client computers currently logged in for use with Retrospect.

Select the client you want to update then click the Properties button (or double-click the client). The following window appears.

The client properties window.

Click the Tools tab.

Click the Update button. A dialog appears, prompting you to specify the location of the most recent version of the Retrospect client software. Select a copy of the client update file on your hard disk or an update disk and click Open. When the update is complete, another dialog appears.

Click OK. The update does not take effect on the client computer until it is restarted.

After Updating

When the computer starts up it automatically loads the updated client software. All user preferences remain unchanged.

UNINSTALLING A CLIENT AND ITS SOFTWARE

In the event that you would like to remove the client software from a computer, take the following steps.

Forget

Forget the client as described on page 89. This makes one more client license available in the license manager (page 84).

Uninstall

Windows (Under NT and 2000, you may have to log in with administrator privileges.) From the Start menu's Retrospect Client program group, choose the Retrospect Client Uninstaller to run the program. Follow its instructions to remove the client software from the computer, then exit when you are done.

Mac OS Remove the Retrospect Client control panel from the computer by placing the file in the Trash. Restart, then empty the Trash.

ADVANCED NETWORKING

The features described in this section are available only with Retrospect Server Backup edition.

Overview

Retrospect normally uses TCP/IP multicast addressing to access backup clients. This allows the live network window to list clients directly connected to the local network segment, or local subnet. You will need to use Retrospect's more sophisticated techniques of accessing clients if your network has routers between the backup computer and its clients, or if your backup computer has multiple network cards connected to different physical networks.

Retrospect Server Backup has the ability to use several different methods of accessing clients. It also lets you control the use of adapter cards in the backup computer.

Access Methods

Retrospect can either use the standard DNS and WINS directory services, or its own Piton Name Service based on TCP/IP.

Adding a client to the Retrospect client database also stores its access information for later use. When Retrospect tries to connect to the client for a backup, it resolves the access information

into its current IP address using the original access method.

On each client computer, Retrospect client software waits for queries from Retrospect on the backup computer. Just exactly how Retrospect gets in touch with the clients depends on the access method Retrospect is using.

Multicast

When you first open the live network window, the default access method is multicast. With this method, Retrospect sends out a multicast request to the listening client computers, asking them to respond with their identities. After you have added a client with this method, when Retrospect later tries to connect to the client for a backup, it handles IP address changes automatically by sending out another request to update its client database and connect with the proper client.

If you use a network analyzer to monitor the packets it sends with the multicast method, you will see Retrospect uses well-known port 497 for its communications. The packet format conforms to the proprietary Dantz protocol Piton (for PIpelined TransactiONs), which gives Retrospect much of its network speed and reliability. Multicast Piton Name Service uses the assigned address 224.1.0.38, which allows Piton to direct its queries only to those computers running Retrospect client software.

Multicast access is simple, requiring no configuration, but does not operate across routers. It works only in the local subnet.

Subnet Broadcast

The subnet broadcast access method allows you to access clients through virtually any network topology, including the Internet.

According to TCP/IP standards, every subnet has both a network address and a subnet mask, such as 192.168.6.0 and 255.255.255.0. Routers use these to identify the physical network to which computers are connected. Routers also support queries to all the computers on a particular subnet. Retrospect takes advantage of this ability for its subnet broadcast access method, using the same Piton protocol as for multicast access.

With Retrospect's subnet access method, you must define the address and mask of each subnet you wish to use, and update these configurations if your network changes.

Direct Access

You can use the direct client access method to add a specific backup client to Retrospect's client database. This method requires you to know the IP address or DNS or WINS name of each backup client. Do not use a numeric IP address for computers which get a dynamic IP address from a DHCP server, because Retrospect has no way to learn when the address changes.

Adding clients by direct access is most useful for a few clients; adding many might be tedious. One of the other methods would probably be better for adding numerous clients.

Using and Configuring the Different Access Methods

The first time you open the live network window Retrospect searches for clients in the local subnet using its multicast access method. Click Advanced to access the advanced networking features. The window expands with controls for the network interface and access method.

The advanced live network window.

Configuring Subnets for Broadcasting

You can define other subnets in which Retrospect searches for clients.

Click Subnet Broadcast to configure a new subnet to search. The first time you use this feature, no subnets are configured so no clients are listed in the live network window. Click the Subnets button. Also the first time, no subnets are configured so none appear in the configuration window.

Click Add, and in the dialog that appears, enter an IP address within the subnet and enter its subnet mask.

The IP subnet you defined appears in the subnet configuration window.

You can later add, modify, or remove subnets as needed.

Click OK to return to the live network window.

With the subnet broadcast access method selected, Retrospect searches your defined subnets and displays backup clients it found.

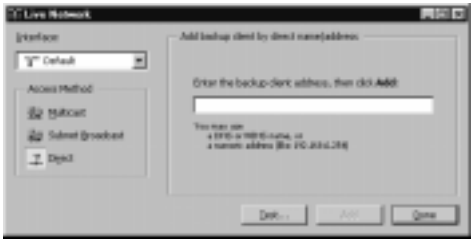
When you add a client with the subnet broadcast access method, Retrospect knows to look for that client in your defined subnets.

Each subnet you configure will be accessed by Retrospect when it searches for clients. This includes not only when this window is open, but also when Retrospect searches for a client in an operation.

You can define and use interfaces (explained on page 94) to limit the number of subnets to search for each client.

Directly Adding a Specific Client

In the live network window, click the access method button Direct. The client list is replaced with an entry box for you to enter the known IP address or DNS or WINS name of a client.



Enter the name or address and click Add. (Should it fail to connect to a client at the specified IP address, see “Troubleshooting” on page 186.) When it finds a client at the specified address, Retrospect asks you for its password

before logging it into the client database. When logged in, Retrospect displays its client properties window (detailed under "Configuring a Client," which starts on page 87).

Interfaces

Retrospect Server Backup's interface feature allows you to choose among multiple adapter cards and control networking options for groups of backup clients. For example, a custom interface lets you back up clients on different subnets without requiring backup data to cross routers, conserving network bandwidth.

Retrospect remembers the interface you used to add a client to the client database, and it will use the interface's settings for all access to that client. You can change the interface used for a client from the client properties window's Access tab.

When a TCP/IP-based program such as a web browser initiates a TCP/IP connection, it uses the "default" IP address of the computer to identify itself. Retrospect interfaces let you choose which address to use when your computer has more than one. The network adapter actually used to send packets is also affected by the TCP/IP configuration of the backup computer. See the Windows route command for more information.

Interfaces also allow you to group advanced options. For example, if you want one set of clients to have different timeout values than another set, you can create two separate Retrospect interfaces that both specify the same adapter, but have different timeout settings.

To Configure an Interface

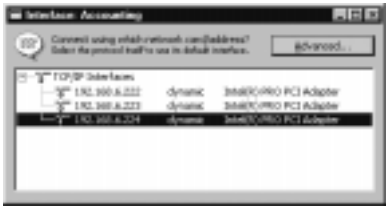
From the Retrospect Directory's Configure tab, click the Clients button to go to the client database window. Click the Interfaces button on the window's toolbar to open the interfaces window.

The interfaces window lists the Default interface and any other interfaces you have added.

Adding an Interface Click the New button and enter a name for the new interface. From this point, you are editing the interface as described below.

Editing an Interface Select an interface in the list and click the Edit button.

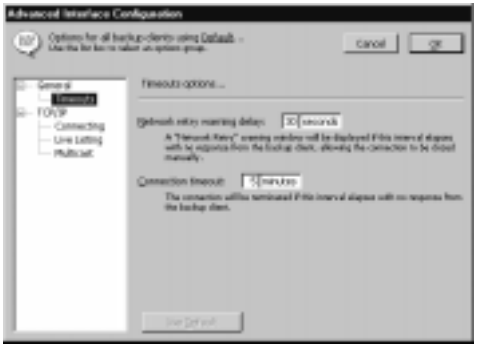
■ **NOTE:** Do not edit the Default interface until you are completely familiar with the options and their ramifications.



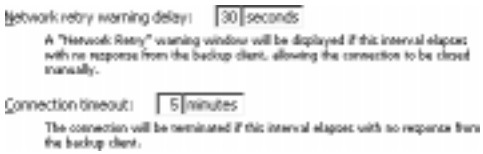
You must first select a TCP/IP interface, usually a network adapter card. It may use a static IP address or one dynamically assigned by a DHCP server. The Default interface always uses the computer's default TCP/IP address and you may not change it.

Configuring Advanced Options

Edit an interface and click the Advanced button to open the advanced interface configuration window.



The general options category has options for Retrospect's timeouts.



General timeout options.

Network retry warning delay Retrospect displays its network retry dialog when a client does not respond in the specified time period.

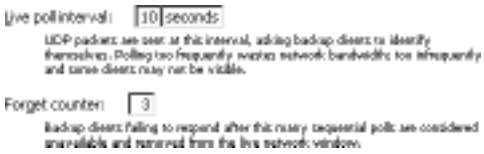
Connection timeout Retrospect terminates an established network connection with a client that does not respond in the specified time period. Retrospect ends the connection and reports error –519 (network communication failed). The operating system's TCP/IP itself might time out sooner, causing error –519 in less time than specified by the general connection timeout. Consider this value the maximum amount of time Retrospect will wait for a client to resume communication.

The TCP/IP options category has options for connecting, listing, and multicasting to clients.

TCP/IP connecting options.

Search poll interval When a client is unavailable at its last known address, Retrospect sends queries at this interval.

Search timeout Retrospect terminates its search for a known client when it cannot find the client in the specified time period. This may be further restricted by the Backup Server script polling options (described on page 139).



TCP/IP live listing options.

Live poll interval Retrospect broadcasts to clients at this time interval when it polls for clients in the live network window. If you configured multiple subnets for the interface, Retrospect divides the poll interval by the number of defined subnets.

Forget counter Retrospect removes a client from the live network window when it does not respond to the specified number of sequential polls. This does not affect clients already added to the backup clients database.

TCP/IP multicast option.

Multicast time-to-live Retrospect assigns this "time to live" number to multicast UDP packets. It is the maximum number of router hops a packet can make before it is discarded. An increase in the time to live number lets Retrospect search for clients on more subnets connected by IGMP capable routers. Routers which do not support IGMP will not forward the multicast UDP packets.

CLIENT USER PREFERENCES

Overview

After the client software has been installed, users of client computers can control some aspects of network backup operations with the Retrospect Client control panel.

You do not need to change any of the settings to perform backups. In most cases, the existing settings are the ones you will want to use.

The Retrospect Client control panel displays information about the client computer on which it is installed, including the user or computer name, the access status of the client, and a report about the last several backups.

The Windows client control panel, showing the Status tab.

The Mac OS client control panel.

Access Master Control

The On and Off radio buttons let you allow or deny network access to your client by the backup computer. When you install the client software and each time the client computer starts up, the control is on to allow access. When the control is turned off, the data on the client computer cannot be accessed over the network by Retrospect.

◆ **TIP:** To permanently prevent access to the client computer, uninstall the Retrospect client software as described on page 91.

Preferences

The Retrospect Client control panel has additional user preferences for managing client operations. Getting to the preferences is done differently under Windows and Mac OS.

Windows

Click the Preferences tab from the four at the top of the control panel.

The Windows Retrospect Client control panel's preferences.

Mac OS

Click the Preferences button.

The Mac OS Retrospect Client control panel's preferences.

Execution Preferences (Mac OS Only)

The execution preference settings allow client users to control how Retrospect interacts with the client computer.

Wait at Shutdown determines what happens when a client user chooses Shut Down from the Finder's Special menu. When this option is selected and Shut Down is chosen, the "waiting for backup" dialog is displayed until the backup takes place. By default, this preference is selected.

When this dialog is on the client Macintosh screen, the client user may click Restart to restart the client Macintosh, click Shut Down to shut it down, or click nothing and leave it for unattended operation. When the client computer is not used for thirty seconds, a screen saver appears until the user presses a key or moves the mouse to return to the dialog. When the backup computer finishes its operation with this client, it shuts down the client Macintosh.

Run in Background allows the backup computer to operate at the same time the client user is using the client Macintosh. If the checkbox is not checked, a dialog appears on the client during network operations. This preference is on by default.

When the dialog appears, the user of the client Macintosh can cancel the network operation to continue working or wait until the operation is finished. When "Run in Background" is checked, the dialog does not appear during backups, and the client user can set priority levels for local and network operations. See below for details.

Priority Preference

The priority preference allows the client user to make the client computer favor either the user's task at hand or the operation requested by the backup computer. (Under Mac OS, this applies only when the "Run in Background" execution preference is on.) Drag the slider and set it to somewhere in the range between "User" and "Backup." When the slider is set all the way to "User," the computer devotes more of its attention to its user, slowing Retrospect client operations slightly. When the slider is set all the way to "Backup," the client operation is given priority and the client computer is slightly less responsive to its user.

This setting has no effect until the client is actively communicating with the backup computer.

Under Mac OS, the Priority setting is ignored if the client Macintosh is displaying the "waiting for backup" dialog.

Access Restrictions Preferences

These preferences allow the client user to control access to the files and folders on his or her computer.

Read Access Only allows the client computer to be backed up across the network, but prevents writing by the backup computer. This means it cannot restore, move, or delete files on the client

computer, nor can Retrospect be used to rename volumes. The options “Set Volume Backup Date,” “Move Files,” and “Synchronize Clock” cannot be used on the client. This setting is off by default.

Private Files/Folders/Volumes makes any files, folders, or volumes designated as private unavailable to the backup computer. This preference is off by default. Select the checkbox and designate private items as described below.

To designate an item as private under Windows, click the Add button to enter a pathname in a dialog, then click OK. Add more pathnames to exclude more volumes, folders, or individual files. The privacy feature uses the literal pathnames you specify. If you move or rename a file or folder it may no longer be private. If you mount a volume to a different drive letter, its files and folders may no longer be private.

To designate an item as private under Mac OS, type a bullet (“•”, Option-8) at the beginning or end of its name (placing it at the end will preserve its sort order in the Finder). For example, you could designate the folder “Personal” as private by renaming it “Personal•”.

Notification Preferences

These two preferences allow client users to specify how they are informed about Retrospect network operations.

Notify after Backup directs the client to display a message after the completion of a backup or other operation. Clicking OK dismisses the message. By default, this preference is selected.

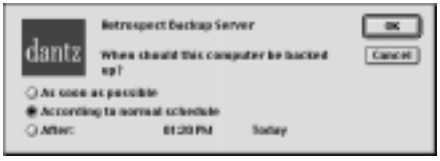
Notify if no Backup in n days directs the client to display a message after 9:00 a.m. if the client has not been backed up within the number of days specified in the entry box. By default, this preference is selected and the number of days is seven.

Controlling the Backup Server

Schedule

When the backup computer uses a Backup Server script the client user can control when the Backup Server should back up the client computer.

Mac OS Click the Schedule button to bring up the Backup Server control dialog.



Mac OS client Backup Server controls.

Windows Click the Backup Server tab to bring its controls to the front.

Windows client Backup Server controls.

These controls lets the user determine when the client computer can be backed up by the backup computer (using a Backup Server script). The user would normally use it to initiate a backup or defer a backup, but the user can also revert the Backup Server back to its normal schedule for this client.

As soon as possible makes the backup computer back up the client computer as soon as the Backup Server is available to do so.

According to normal schedule makes the backup computer back up the client computer at its regularly scheduled time in the Backup Server script. (This is the default.)

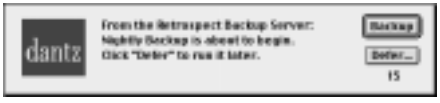
After prevents the backup computer from backing up the client computer before the specified time and date, up to one week from the present time. (Click on the time and date and type or click the arrows to change them.)

Click OK to accept the settings.

Execution

When the Backup Server is about to back it up, a dialog appears on the screen of the client computer.

Windows client Backup Server countdown.



Macintosh client Backup Server countdown.

The dialog gives the client user three ways to control the execution of the impending Backup Server operation:

• Waiting for the countdown to reach zero lets the Backup Server operate.

• **Backup** lets the Backup Server operate immediately.

• **Defer** lets the user set a later time for the backup to operate.

Deferring the Backup Server from a Windows client.

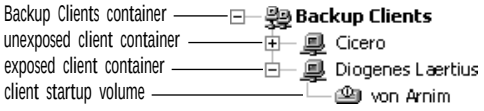
Deferring the Backup Server from a Macintosh client.

When a user defers, Retrospect makes an entry in the backup computer's operations log.

BACKING UP CLIENTS

You back up a client volume the same way that you would back up a volume directly connected to the backup computer.

When you set up an immediate or scripted backup, the volume selection window for the source lists available clients under the Backup Clients container and available client volumes under the individual client containers.



The Backup Clients container with some of its clients and a client volume.

When you set up an immediate backup or make a backup script you have a few different ways of selecting clients and client volumes in the volume selection window for the sources. You can select a client container, one or more specific volumes, or the Backup Clients container. We recommend using client containers or the Backup Clients container. Following are advantages of each method.

Selecting the Backup Clients container selects all individual client containers (described below) logged in at the time of the backup, including new clients you add later.

Selecting a client container selects volumes determined by a client general configuration

setting, which is explained in detail on page 89. Using a client container is simple and maintenance-free, as volumes which are renamed, replaced, or partitioned continue to be backed up with no administrator intervention.

Selecting individual volumes selects only those specific volumes, unlike containers. Retrospect continues to select volumes which are renamed but does not automatically adjust for new, replaced, or partitioned volumes. When the client configuration changes you may need to intervene. This way of selecting volumes is useful, for example, when you do not want to back up all volumes on a particular client.

Selecting folders or groups in your script selects whatever volumes and client containers are placed in the folder or group. This method simplifies script management by allowing you to control your sources in a single place, the Configure›Volumes window. Using folders in the Backup Clients container lets you better organize a large number of clients. Using groups lets you build lists of volumes and clients which should be backed up together.

For detailed instructions on selecting volumes, see under "Working with Volumes" in Chapter 9.

WORKING WITH WINDOWS CLIENTS

Fixing Microsoft Windows 95

Two different bugs in Microsoft's network software can cause Retrospect to report networking errors with Windows 95 clients. Microsoft has resolved both problems and free fixes are available for Windows 95. We strongly urge you to update your Windows 95 systems.

Windows 98, Windows NT 4.0, and Windows 2000 do not require any updates.

Windows 95 TCP/IP Fix

The hot fix for Windows 95 is installed by the client software Setup program. After installation, choose Run from the Start menu, then type:

C:\Program Files\Dantz\Retrospect Client\VTCPUPD

(Or type your different installation path.) Click OK. Follow the instructions in Microsoft's installer, then restart to complete the fix. Repeat for each Windows 95 computer.

Windows 95 Winsock Update

Microsoft's Winsock 2.0 update fixes another networking problem present in Windows 95. It is available free from Microsoft at: http://www.microsoft.com/windows95/downloads/contents/wuadmintools/s_wunetworkingtools/w95sockets2/default.asp

Windows Registry Backup

Retrospect backs up the Windows registry when Retrospect's option to do so is turned on (see "Windows System Options" on page 143) and the Windows folder is included in the file selection criteria. Take care to verify this option in your backups because the registry is necessary for restoring an entire crashed or damaged Windows computer.

Excluded Files

Retrospect excludes certain files from backups and does not show these files in browsers because they cannot or should not be backed up or restored. The files are active virtual memory swap files (.Swp or .Par and Pagefile.Sys) and some client software files.

Open Files

Retrospect cannot back up files which are open for writing on a Windows client. To avoid such problems you should close documents and applications on a client prior to backup.

Screen Savers

For best performance during a backup, do not use a processing-intensive screen saver on a Windows client computer.

FILE SYSTEM CONVERSIONS

Retrospect allows you to restore and duplicate data between computers which use different operating systems and file systems. Because no two file systems support identical attributes and file formats, copying files from one file system to another sometimes results in the loss of information.

Retrospect supports the following file system conversions with no loss of data:

• FAT (Windows) to HFS (Macintosh)

• FAT to NTFS (Windows)

• HFS to NTFS

Retrospect supports the following file system conversions with loss of extended information and/or data, as noted:

• HFS to FAT (Data fork of HFS files is copied; attributes, privileges, and resource fork are not.)

• NTFS to FAT (First data stream is copied, but all permissions and other NTFS data are not.)

• NTFS to HFS (Services for Macintosh data on an NTFS volume restores or duplicates without loss to Macintosh HFS volumes. When copying Windows NTFS data to HFS the first data stream is copied, but all permissions and other NTFS data are not.)

Illegal Characters in File Names

Mac OS file names can include several characters Windows does not allow in its file names. These illegal characters are /, \, :, *, ", <, and >. When restoring or duplicating Macintosh files to a Windows volume, Retrospect replaces each of these illegal characters with a hyphen (-).

NETWORK BACKUP GUIDELINES

This section provides information, advice, and worksheets to help you set up a workgroup backup using Retrospect.

In general, the same principles that apply to individual backups also apply to network backups of client computers. The major difference between an individual backup and a network backup is the amount of data, which may overwhelm storage limitations. As a consequence of the sheer amount of data and the often slower speed of network backups, time may also impose limitations. If you cannot back up the entire network in a single night, you may want to consider splitting the backup over several nights, backing up only documents, or using Backup Server scripts.

Although the information in this section can be applied to any local area network, the examples assume a basic Ethernet network installation. Most calculations will still apply if your network contains inter-network devices (such as routers or gateways), unless one or more members of the backup workgroup are separated from the rest by an inter-network device. Running backups through routers or gateways increases the time it takes to complete a backup.

Choosing the Backup Device

The capacity of the backup device is usually the most important consideration for automatic, unattended workgroup backups. There is no such thing as too much capacity for network backups. More capacity almost always means you can back up more files from more volumes from more client computers, broaden the criteria for selecting files to be backed up, increase the amount of time between media changes, and increase the number of backup sessions per piece of media.

If your backup device is not large enough, you will not be able to complete an automatic, unat-

tended backup because you will have to change the media before the backup is finished.

Choosing the Backup Computer

This section offers some advice on how to select the correct backup device and backup computer to suit your planned network backups.

You need not use a file server as the backup computer. Table 6-2 below lists various advantages of using a desktop computer or a server as the backup computer.

Deciding Which Computer to Use

Although the backup computer can be virtually any Windows-compatible model, consider using a computer with adequate power to perform your network backups. For example, if you are backing up a small number of client computers with small to medium capacity hard disks, a Pentium 200 should be able to do the job. However, if you are backing up large file servers and several client computers with thousands of files, a Pentium III would be more suitable. Following are some considerations.

The performance of the backup computer often determines the performance of the entire system. Generally, a higher performance computer supports a network backup of more data from a larger number of client computers.

Software compression and encryption increase CPU use significantly. If you are considering using either of these features, choose a model with a more powerful CPU, such as a Pentium III.

Make sure the backup computer has enough RAM to handle the network volume that contains the most files. The more files you have, the more RAM you need.

If the backup computer is not completing backups in its scheduled time periods or if you want volumes to be backed up more often than they are, you may need a faster backup computer or a faster backup device, if not both. You may find helpful information under "Managing Resources," which starts on page 75.

Encryption and Compression

Retrospect provides an encryption feature that lets you protect your data from unauthorized access as it is being backed up, and a compression feature that saves space on the backup device by compressing stored data. The decision to use one or both of these features can affect the type of backup device you choose. Keep in mind Retrospect's encryption and software compression can slow a backup, especially when using a computer with a slow CPU. A tape drive that supports compression will perform the task of compression itself, because it compresses data

Advantages of Desktop	Advantages of Server
• You can use the computer closest to you for easy access to the tape drive and Retrospect. • Avoids expense of a dedicated server. • You can select the computer best suited in terms of memory and speed. Retrospect can be run at night or on weekends, allowing normal use of the computer during work hours. • Allows your server to run at full speed for those who are accessing it while the backup is running.	• Optimizes your backup speed since servers are often a high performance model. • Takes advantage of the server's inactivity during the nights and weekends. • Gains added security for your backup sets if your server is located in a secure area. • Backs up large server disks using faster local transfer rates rather than the slower network transfer rates.

Table 6-2: Advantages of using a desktop computer or a server as the backup computer.

Feature	Description	Procedure	Implementation
Compression	Allows the backup device to store more files on its media.	Finds patterns in the data; the more patterns, the greater the compression.	If you have a compression drive, Retrospect leaves the task of compression to the hardware since it compresses data faster than Retrospect.
Encryption	Adds security to your backup.	Randomizes the appearance of data to prevent unauthorized access.	Retrospect always manages encryption.
Compression with encryption	Allows the backup device to store more files on its media and adds security to your backup.	Compression must take place before encryption.	Retrospect must perform both functions. If you have a compression drive, you must choose between using encryption or using hardware compression because you cannot use both. (Retrospect automatically disables hardware compression when you use encryption.)

Table 6-3: Comparison of compression and encryption.

faster than Retrospect. Use Table 6-3 to determine whether to use compression and encryption and whether a compression tape drive is appropriate to use as the backup device.

Device Capacity Worksheet

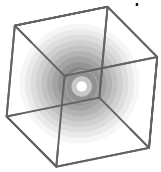
Use this worksheet to estimate the minimum required capacity of a backup device for your workgroup. The number you come up with for *G* is the minimum backup device media capacity for completing an unattended backup without having to change the media.

Item	Description	Amount
A. Total disk capacity *user-defined*	On a separate page, list your workgroup's computers and the disk size (in megabytes) of each. Work out the sum and enter it for *A.*	*A* =
B. Estimated data redundancy *user-defined*	Estimate how much data is redundant, which Retrospect backs up only once. If everyone in your workgroup uses the same applications, dictionaries, fonts, and so on, you might have as much as 60% (0.6) redundancy. If your network is average, enter 0.3 for 30%. Enter your estimate of the redundancy percentage *B,* expressed in decimal form.	*B* =
C. Reduction factor $C = 1 - B$	Subtract the amount *B* from 1 to get the data reduction factor. For example, if *B* is 0.3 the reduction factor is 0.7 (because $1 - 0.3 = 0.7$). Work out the difference and enter it for *C.*	*C* =
D. Reduced data $D = A \cdot C$	To estimate the actual amount of data you need to back up (before any compression) multiply the total disk capacity *(A)* and the reduction factor *(C).* Work out the product and enter it for *D.*	*D* =
E. Estimated compression *user-defined*	The compression rate depends on the files. Text files compress well; application files do not. The most compression you can hope for is 50% (0.5). Average compression to expect for network backups is 30% (0.3). If you do not plan on using compression, enter 0. Enter your estimate of the compression percentage *E,* expressed in decimal form.	*E* =
F. Compression factor $F = 1 - E$	Subtract the estimated compression *(E)* from 1. For example, if *E* is 0.35 (35%) then *F* is 0.65 (because $1 - 0.35 = 0.65$). Work out the difference and enter it for *F.*	*F* =
G. Required backup capacity $G = D \cdot F$	To get the minimum required backup device capacity multiply the reduced data amount *(D)* by the compression factor *(F).* Work out the product and enter it for *G.*	*G* =

Backup Duration Worksheet

Once you have determined the size of your backup device, use the worksheet below to determine the number of hours your network backup requires. If the total number of hours is less than twelve, a recycle backup is likely able to complete in a single night. If the total number of hours is more than twelve, you may need to examine alternative strategies, such as performing recycle backups only on weekends or backing up only documents and preferences. Alternative strategies are suggested under "Backup Strategies" in Chapter 8.

Item	Description	Amount
H. Backup capacity requirement $H = D$	For *H,* enter the total reduced data requirement from item *D* in the Device Capacity Worksheet.	*H* =
I. Verification multiplier *user-defined*	If you do not plan to use verification enter 1. Otherwise, start with 1.5, but if you are using software compression or encryption, increase it by 0.1 to 0.5; the slower the backup computer, the higher the number. Enter your verification multiplier for *I.*	*I* =
J. Total transmission $J = H \cdot I$	To get the total amount of data transmitted across the network multiply the backup capacity requirement *(H)* by the verification multiplier *(I).* Work out the product and enter it for *J.*	*J* =
K. Network throughput *user-defined*	Throughput rates vary according to the network cabling method. For 10BaseT, use 1200 MB per hour; for 100BaseT, use 2400 MB per hour. Enter the number of megabytes per hour for *K.*	*K* =
L. Adjusted network throughput $L = K(1 - .05n)$	Backing up through routers typically reduces performance so subtract 5% for each router. (Use *n* as the number of routers.) Work out the difference and enter it for *L.* If you are not using routers or bridges assign the *K* value to *L.*	*L* =
M. Hours required $M = \frac{J}{L}$	To determine the total number of hours required for the backup to complete divide the total transmission *(J)* by the adjusted network throughput *(L).* Work out the result and enter it for *M.*	*M* =



CHAPTER 7

RESTORING

- OVERVIEW
- RESTORING FILES AND FOLDERS
- RESTORING ENTIRE COMPUTERS
- RESTORING ENTIRE SERVERS

This chapter tells you what to do to recover your lost files and folders or restore an entire hard disk, under several different circumstances.

OVERVIEW

Everything you do with Retrospect is aimed at the ultimate goal of restoring files which have been lost or damaged. You may need to recover a few inadvertently deleted files or restore an entire computer that is no longer working. Following are sets of instructions to accomplish different restoring tasks.

Restoring Files and Folders

- To restore files from your latest backup, see page 109.
- To restore files from an older backup, see page 110.
- To restore files and folders by name or other searchable criteria, see "Restoring Files by Searching" on page 111.
- To restore files when you are not sure which backup set the files are in, see "Restoring Files by Searching" on page 111.
- To restore files and folders when you are not certain of their names, see page 113.
- To restore files and folders that you know you backed up on a particular date, see page 113.

Restoring Entire Computers

Use the following topics to restore entire computers.

- To restore an entire Windows computer, see "Restoring an Entire Windows Computer" on page 114.
- To restore an entire Windows computer from a backup that does not include all files, see "Restoring an Entire Windows Computer from a Partial Backup" on page 116.
- To restore an entire Windows client computer, see "Restoring a Windows Client" on page 117.
- To restore an entire Macintosh client computer, see "Restoring a Mac OS Client" on page 119.

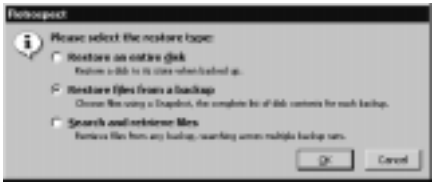
Restoring Entire Servers

Use the following topics to restore entire servers.

- To restore an entire NT server, see "Restoring an Entire NT Server" on page 121.
- To restore an entire Macintosh client file server, see "Restoring Mac OS File Servers" on page 124.

RESTORING FILES FROM YOUR LATEST BACKUP

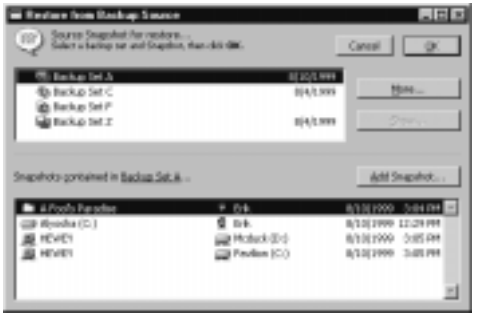
From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.



Select Restore files from a backup and click OK.

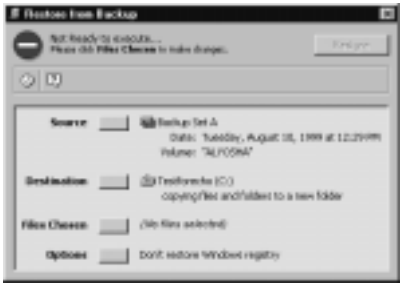
In this window's top list, select the backup set from which to restore. (Use the More button if your desired set is not listed.)

In the window's bottom list, select a volume Snapshot. The date and time when the volume was last backed up are listed to the right of the volume's name.



Select your desired Snapshot and click OK to continue.

Select the volume on which you want Retrospect to place the restored files. This volume does not have to be the original volume from which the files were backed up. Set the combo box to Retrieve files & folders and click OK to continue. Retrospect matches files from the Snapshot. The immediate restore summary window appears.



Restore summary, waiting for you to select files to restore.

Click the Files Chosen button to use a browser to find and mark the files you want to restore. (Click to select a file and press the Control key while clicking to select more files, then click the Mark button to designate selected files to be restored.) When you have marked the files, click Restore and a dialog asks you to confirm the operation. Click OK to confirm.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media, it asks you for it.

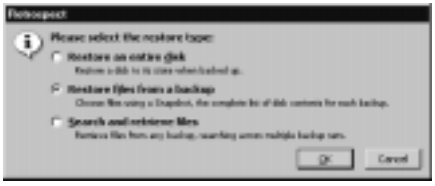
When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log.

If you leave Retrospect and explore the destination volume, you can see the its root level has a new folder, named the same as the backup set from which you restored. Within this folder are your restored files and folders.

RESTORING FILES FROM AN OLDER BACKUP

When you do not want the most recent files in the most recent backup, you can retrieve a Snapshot from an earlier date to restore a file or folder from an older backup.

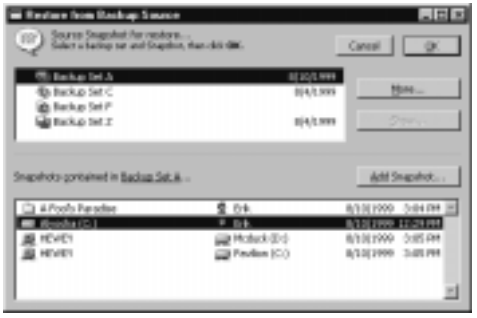
From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.



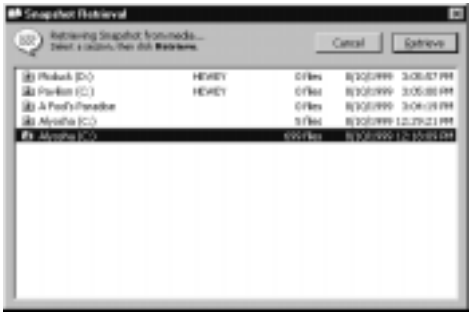
Select Restore files from a backup and click OK.

In this window's top list, select the backup set from which to restore. (Use the More button if your desired set is not listed.)

In the window's bottom list, you can see the volume's current Snapshot.



The older file you want does not exist in this current Snapshot, but you know it is in the backup set. Click the Add Snapshot button to select your desired Snapshot from a list of all Snapshots in the backup set.

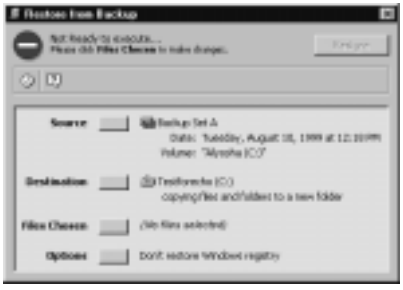


Selecting a Snapshot to add to the list.

When you select a Snapshot and click Retrieve Retrospect will obtain the older Snapshot from the backup set media (which may require you to insert media) and add it to the list in the restore source window.

With your desired Snapshot selected in the restore source window, click OK to continue.

Select the volume on which you want Retrospect to place the restored files. This volume does not have to be the original volume from which the files were backed up. Set the combo box to Retrieve files & folders and click OK to continue. Retrospect matches files from the Snapshot. The immediate restore summary window appears.



Restore summary, waiting for you to select files to restore.

Click the Files Chosen button to use a browser to find and mark the files you want to restore.

When you have marked the files, click Restore and a dialog asks you to confirm the operation. Click OK to confirm.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media, it asks you for it.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log.

If you leave Retrospect and explore the destination volume, you can see the its root level has a new folder, named the same as the backup set from which you restored. Within this folder are your restored files and folders.

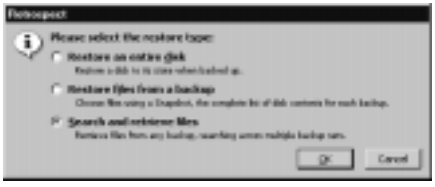
RESTORING FILES BY SEARCHING

Another way to recover older files is to set up a searching restore. This works best when you know the specific file attributes such as name and type, or you want to see all versions of given files so you can mark the ones you need. Searching lets you retrieve one or more files regardless of when they were backed up. This restore method also lets you search multiple backup sets at once, a convenient way to find files when you are not sure which backup set they were backed up to.

■ **NOTE:** Restore by searching does not restore NTFS permissions or Macintosh file sharing privileges. You must restore from a Snapshot to restore NTFS permissions.

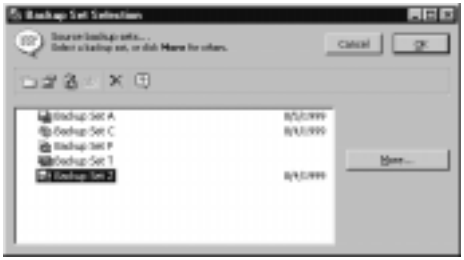
Preparing to Restore

From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.

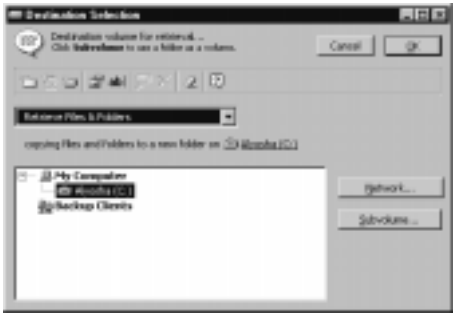


Select Search and retrieve files and click OK.

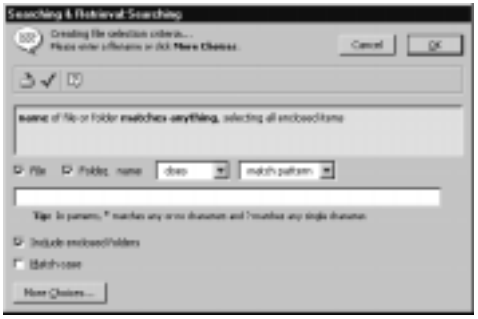
The next window asks you to select the backup sets from which to restore.



Select one or more backup sets, each of which will be searched. (Use the More button if your desired set is not listed.) Click OK to continue, which then brings up the following window.



Select the volume on which you want Retrospect to place the restored files, set the combo box to Retrieve files & folders, and click OK to continue. Retrospect puts up the window for defining file selection criteria.



Enter the name of the file you want. If you need to use more searching criteria, click More Choices to create a custom selector. (File selection criteria are detailed in Chapter 9 • Tools.)

After Retrospect searches, it summarizes what it found.

The searching and retrieval summary window.

Click the Files Chosen button to display a browser of the files found, which are all marked.

By default, Retrospect lists the name, size, and backup date, but you probably are looking for a certain modification date. To change the view setting, use the toolbar's combo box.

Unmark all files then mark the files you want to restore, close the browser, and click Retrieve. Click OK to confirm.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media it asks you for it.

If you leave Retrospect and explore the destination volume, you can see the its root level has a new folder, named the same as the backup set from which you restored. Within this folder are your restored files and folders.

RESTORING FILES WHEN YOU ARE NOT SURE OF THE NAMES

If you know part of a file's name, Retrospect can help you find it. Retrospect also lets you search for files by size, path, date, and many other attributes, so even if you haven't a clue about the file's name Retrospect can still help you find it.

Set up a searching restore according to "Restoring Files by Searching" on page 111. If you specify just part of the file's name in the searching window, Retrospect will probably find the file you are looking for, but may also find others.

◆ **TIP:** Leave the name field blank to find every file in the backup set.

If you do not know the file's name, click the More Choices button and create a selector to choose files by date, path, size, parent folder, client name, and several other criteria you know the desired file possesses.

After Retrospect searches, click the Files Chosen button in the summary window. In the browser window that appears, use the toolbar to sort the list of files and find files in the list. You can also find related files using the browser's cross reference feature: select a file in the list and click Cross Reference from the toolbar to find, for example, other versions of that file. (For more information see "Cross Reference" on page 168.)

Make sure only the files to be retrieved are marked, then close the browser window. Click Retrieve in the summary window to start restoring.

RESTORING FILES FROM A GIVEN DATE

Retrospect gives you a few different ways to recover files from a certain point in time. The process to choose depends upon when the files were backed up and what has happened to them since then. It also depends upon how much you know about the files you want and your knowledge of the backups.

A file in the current volume Snapshot may actually have been backed up long ago. Likewise, a file may not be in a current Snapshot because it was deleted from the source volume prior to the most recent backup, though the file is still available to restore. Finally, there may be multiple versions of a given file that was repeatedly modified and backed up over time.

One way to recover older files is to restore by Snapshot according to "Restoring Files from an Older Backup" on page 110. This works best when you know the files you are looking for were on a volume at a certain date and time. Use the older Snapshot that corresponds to the date of the files you are looking for. Browse the files chosen in the Snapshot and manually mark the ones you want to restore.

Another way to recover older files is to set up a searching restore according to "Restoring Files by Searching" on page 111. This works best when you know the specific file attributes such as name and type, or you want to see all versions of given files so you can mark the ones you need. Give Retrospect the criteria to search by; if you know the name, just enter it. Click More Choices if you need to create a custom selector.

To restore files that were *backed up* on a specific date, set up a searching restore according to "Restoring Files by Searching" on page 111. In the searching window, click More Choices and create a selector using a universal date condition. Set the date condition controls such that the summary reads "backup date is exactly" the date the file was backed up.

After Retrospect searches, click the Files Chosen button in the summary window to review the files selected for restore. Make sure only the files to be retrieved are marked. Click Retrieve to proceed.

RESTORING AN ENTIRE WINDOWS COMPUTER

These instructions assume your computer has encountered a disastrous data loss that cannot be easily remedied. Following are instructions on getting the computer back in working order.

The steps below, which should be taken only in the event of serious trouble, involve completely replacing the contents of your hard drive with a previous backup in which you backed up "all files." To restore from a partial backup in which you backed up only some of the files, follow the instructions under "Restoring an Entire Windows Computer from a Partial Backup" on page 116.

The steps below are not for a Windows NT Server that serves DHCP or WINS data. To restore a Windows NT server, see "Restoring an Entire NT Server" on page 121.

1. Restart and Try to Repair the Disk

Find the CD-ROM included with your computer or the emergency recovery disk. Restart your computer, and put in the disk or CD. When your computer has started from this disk or CD, run ScanDisk to examine your hard disk for problems. (You should also try other disk repair utilities if you have them.)

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat your hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still is not accessible from Windows Explorer, you probably need to reformat your hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard your data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up your repaired hard disk. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a full backup to an existing backup set, as the damaged drive might not have all of your files on it and you don't want to erase your previous backups.) Once you are sure you have redundant backups of your data, copy your backup set catalogs to a floppy disk, removable disk, or server.

4. Reformat the Disk

If the disk repair utility cannot fix the disk, you may have to erase or reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Erasing or formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should erase or format your hard disk, contact its vendor for assistance.

5. Re-install Software

Install new Windows operating system software on your newly-formatted hard disk. When it

asks you for the installation path, use “temp.” Restart from this volume.

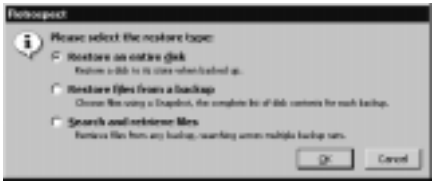
Install Retrospect to the new “temp” folder. If you copied your catalog files to floppy or removable disks, copy them back to your hard disk.

Start the Retrospect application and enter your license code when prompted. If you did not make copies or backups of your catalog files, recreate the catalog or catalogs from your backup media. (To do this, click Repair from the Tools tab, then choose the Recreate option that matches your media, as described on page 193.)

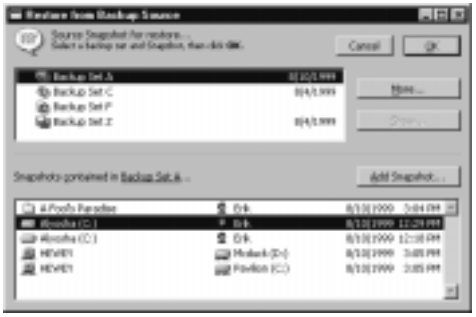
If you copied your catalog files from floppy or removable disks you must get Retrospect to recognize them. From the Configure tab, click backup sets, then click More and Open to add the catalogs to the list of available backup sets.

6. Restore from Backup

Now that your hard disk is working again and Retrospect is available along with your backup catalogs, you can restore your hard disk. From the Immediate tab, click Restore.

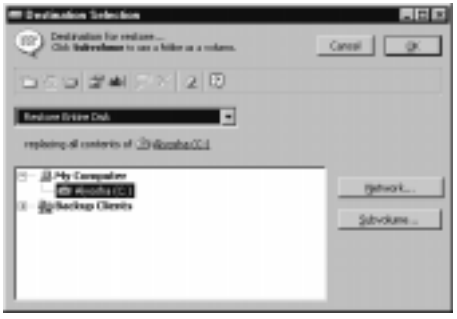


Select “Restore an entire disk” and click OK. A window appears for you to select the source from which to restore backed-up files.



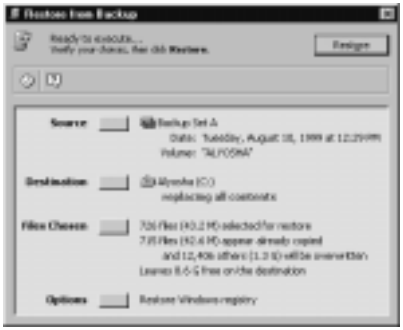
Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window appears for you to select the destination to which to restore files.



Destination selection window.

Because your whole hard disk was wiped out and needs to be completely restored, select it and leave the combo box set to “Restore entire disk.” Click OK to proceed. Retrospect matches files from the Snapshot then scans the destination and displays the restore summary window.



Restore summary.

Confirm the Windows system option to restore the registry is checked.

Put the first CD, tape, or disk from the backup set in your backup device and click Restore.

7. Restart

After Retrospect completes its copying of the files, exit Retrospect and restart the computer.

After it starts, place the “temp” folder in the recycle bin and empty it. Your computer is now ready to use.

RESTORING AN ENTIRE WINDOWS COMPUTER FROM A PARTIAL BACKUP

These instructions assume you have not been backing up all files, only a subset of files. To restore the whole hard disk when you have been doing “all files” backups, refer to page 114 of this document. To restore one or more files, but not the whole hard disk, refer to page 109 or page 110.

1. Get the Computer Working

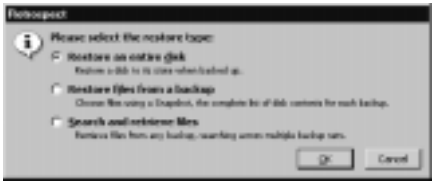
Follow steps one through four starting on page 114. Install new Windows operating system software on your newly-formatted hard disk. Eject any CDs and restart, which boots from the new operating system on the hard disk.

2. Get Retrospect Working

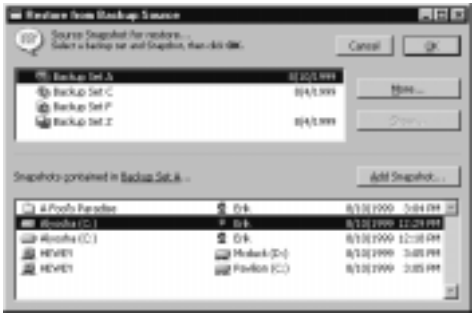
Install Retrospect from the Retrospect CD. If you copied your catalog files to floppy or removable disks, copy them back to your hard disk. Start the Retrospect application and enter your license code when prompted. If you did not make copies or backups of your catalog files, recreate the catalog or catalogs from your backups. (To do this, click Repair from the Tools tab, then choose the Recreate option that matches your media, as described on page 182.)

3. Restore from Backup

Now that your hard disk is working again and Retrospect is available along with your backup catalogs, you can restore your hard disk. From the Immediate tab, click Restore.



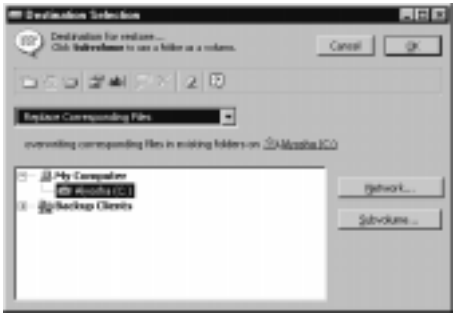
Select “Restore an entire disk” and click OK. A window appears for you to select the source from which to restore backed-up files.



Selecting a backup set and Snapshot.

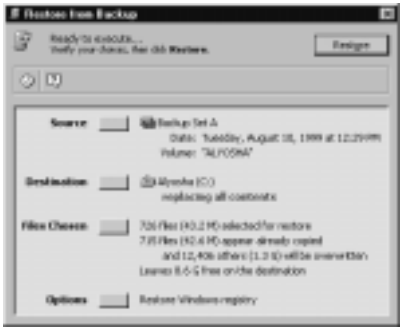
Select your backup set and its latest Snapshot of your hard disk then click OK. A window appears for you to select the destination to which

to restore files. (Use the More button to access the backup set catalog.)



Destination selection window.

Select your hard disk as the destination, and set the combo box to "Replace corresponding files." Click OK to proceed. Retrospect matches files from the Snapshot then scans the destination and displays the restore summary window.



Restore summary.

When you click Restore to proceed from the restore summary window, Retrospect restores the files you chose to back up. Because you did not back up all files your hard disk is not at the state of its last backup. For example, if you chose to back up only documents, you will have to install your applications.

RESTORING A WINDOWS CLIENT

You can restore files to a functioning Windows client computer by following instructions in previous sections of this chapter. In the event a Windows client computer crashes or suffers from other serious problems, you must take the following approach.

1. Restart and Try to Repair the Disk

Find the CD-ROM included with your computer or the emergency recovery disk. Restart your computer, and put in the disk or CD. When your computer has started from this disk or CD, run ScanDisk to examine your hard disk for problems. (You should also try other disk repair utilities if you have them.)

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat your hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still is not accessible from Windows Explorer, you probably need to reformat your hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard your data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up your repaired hard disk. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a full backup to an existing backup set, as the damaged drive might not have all of your files on it and you don't want to erase your previous backups.) Once you are sure you have redundant backups of your data, copy your backup set catalogs to a floppy disk, removable disk, or server.

4. Reformat the Disk

If the disk repair utility cannot fix the disk, you may have to erase or reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Erasing or formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should erase or format your hard disk, contact its vendor for assistance.

5. Re-install Software

Install new Windows operating system software on your newly-formatted hard disk. When it asks you for the installation path, use "WinTemp." Restart from this volume. (If you are going to restore a dual-boot system that includes NT, install NT and do the following steps from NT.) Assign a unique identifying computer name; do not use the same computer name as the client you are restoring.

Configure TCP/IP

Make sure the computer is properly set up for use with TCP/IP networking. (If you need help configuring TCP/IP see your network administrator and Appendix A • Preparing TCP/IP Software, which starts on page 218.)

6. Install Client Software

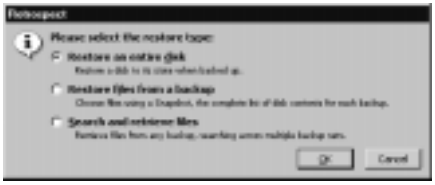
Use the Setup program to install the client software as instructed under "Installing the Client Software on Windows Computers" on page 85, but do not use the default path. Instead, install to the newly-created WinTemp folder. Restart the computer.

7. Prepare Client Database

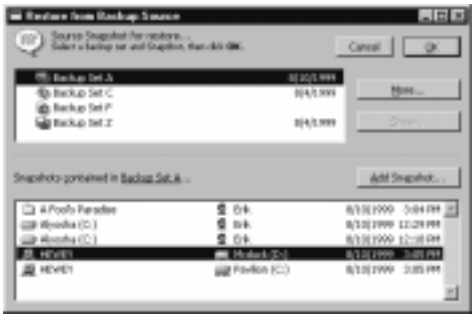
From the backup computer, log in the client.

8. Restore Files

Now that the hard disk is working again, you can restore the client from the backup computer, over the network. From Retrospect's Immediate tab, click Restore.

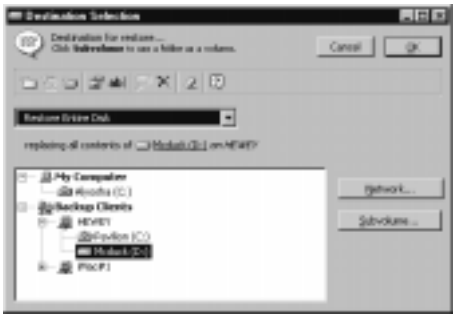


Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.



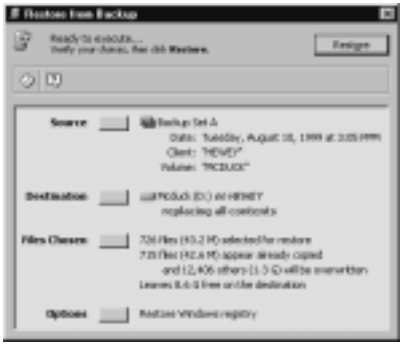
Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window appears for you to select the destination to which to restore files. Because the whole client hard disk was wiped out and needs to be completely restored, select it and confirm the combo box is set to restore entire disk.



Destination selection window.

Click OK to proceed. Retrospect matches files from the Snapshot then scans the destination and displays the restore summary window. Verify your choices for the Source, Destination, Files Chosen, and Options. Confirm the Windows system option to restore the registry is checked.



Restore summary.

Put the first CD, tape, or disk from the backup set in your backup device and click Restore.

9. Clean Up

Restart the client computer. Delete the temporary folder WinTemp. Forget the temporary client in Retrospect's client database.

RESTORING A MAC OS CLIENT

The following instructions tell how to restore an entire disk on a Mac OS client over the network.

You must first work at the client computer to get it operating with the network before performing the actual restore operation from the backup computer.

The steps below, which should be taken only in the event of serious trouble, involve completely replacing the contents of a client computer's hard drive with a previous backup in which you backed up "all files."

The steps below are not for a Macintosh that serves data via file sharing or AppleShare. To restore a server, see "Restoring Mac OS File Servers" on page 124.

1. Restart and Try to Repair the Disk

Restart the client Macintosh with an emergency startup disk or CD. When the client Macintosh has started up, open the Disk First Aid application from the CD and use it to examine the hard disk for problems. (You should also try other disk repair utilities if you have them.) Use the low-level verification or test function of the Drive Setup utility or your disk formatter to examine the hard disk for defects that other utilities will not find.

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat your hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still does not mount on the Desktop, you probably need to reformat your hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard your data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up the repaired hard disk. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a full backup to an existing backup set, as the damaged drive might not have all of your files on it and you don't want to erase your previous backups.)

4. Reformat the Disk

If the disk repair utilities could not fix the disk, you may have to reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should format your hard disk, contact its vendor for assistance.

To reformat the disk, use the formatting software that came with the hard disk.

5. Install System Software

Install new Mac OS system software on the newly-formatted hard disk. Restart from this volume. Rename the System Folder to "temp." Use the Date & Time control panel to set your local time and time zone, and, if necessary, change the Daylight Saving setting.

Configure TCP/IP

Make sure the computer is properly set up for use with TCP/IP networking. (If you need help configuring TCP/IP see your network administrator and Appendix A • Preparing TCP/IP Software, which starts on page 218.)

6. Install Temporary Client Control Panel

Install Retrospect client software on the Macintosh and restart it. It must be a TCP/IP client. Log this client into Retrospect.

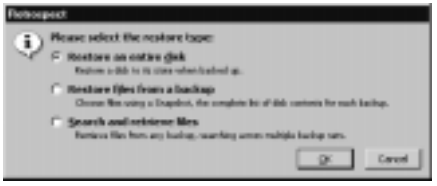
7. Prepare the Client Macintosh for Restore

Verify the client control panel's status is "Ready." For ideal restoring conditions, shut down the Macintosh so the Retrospect client shutdown dialog appears.

Leave the client Macintosh with this dialog; do not shut down or restart.

8. Restore Files

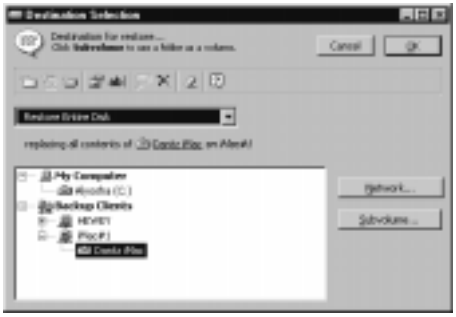
Now that the hard disk is working again, you can restore the client from the backup computer. From Retrospect's Immediate tab, click Restore.



Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.

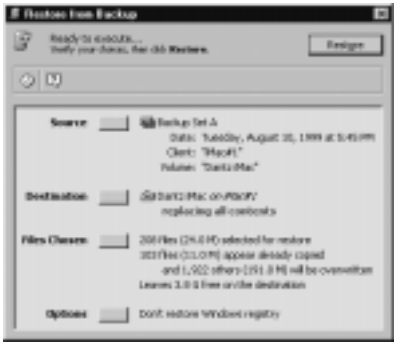
Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window appears for you to select the destination to which to restore files.



Destination selection window.

Because the whole client hard disk was wiped out and needs to be completely restored, select it and leave the combo box set to "Restore entire disk." Click OK to proceed. Retrospect matches files from the Snapshot then scans the destination and displays the restore summary window.



Restore summary.

Put the first CD, tape, or disk from the backup set in your backup device and click Restore.

9. Restart, Rebuild, and Discard

When the restore is completed, restart the client computer and rebuild its desktop by pressing and holding both the Command and Option keys while the Macintosh starts.

Discard the "temp" System Folder by dragging it to the Trash. (If you want to free up the disk space right away, empty the trash.)

◆ **TIP:** If you often restore clients consider setting up a hard disk with System software and a logged in Retrospect Client control panel. Connect this hard disk to the Macintosh you need to restore and you are well on your way to restoring more quickly.

RESTORING AN ENTIRE NT SERVER

This section assumes you took the steps to back up DHCP or WINS files as detailed under "Backing Up DHCP Server and WINS Server Information" on page 157.

These instructions assume your computer has encountered a disastrous data loss that cannot be easily remedied. Following are instructions on getting the computer back in working order.

The steps below, which should be taken only in the event of serious trouble, involve completely replacing the contents of your hard drive with a previous backup in which you backed up "all files." To restore from a partial backup in which you backed up only some of the files, follow the instructions under "Restoring an Entire Windows Computer from a Partial Backup" on page 116.

1. Restart and Try to Repair the Disk

Find the CD-ROM included with your computer or the emergency recovery disk. Restart your computer, and put in the disk or CD. When your computer has started from this disk or CD, run ScanDisk to examine your hard disk for problems. (You should also try other disk repair utilities if you have them.)

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat your hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still is not accessible from Windows Explorer, you probably need to reformat your hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard your data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up your repaired hard disk. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a full backup to an existing backup set, as the damaged drive might not have all of your files on it and you don't want to erase your previous backups.) Once you are sure you have redundant backups of your data, copy your backup set catalogs to a floppy disk, removable disk, or server.

4. Reformat the Disk

If the disk repair utility cannot fix the disk, you may have to erase or reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Erasing or formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should erase or format your hard disk, contact its vendor for assistance.

5. Re-install Software

Install new Windows operating system software on your newly-formatted hard disk. When it asks you for the installation path, use "temp." Restart from this volume.

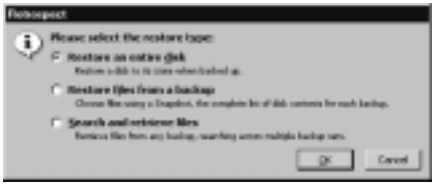
Install Retrospect to the new "temp" folder. If you copied your catalog files to floppy or removable disks, copy them back to your hard disk.

Start the Retrospect application and enter your license code when prompted. If you did not make copies or backups of your catalog files, recreate the catalog or catalogs from your backup media. (To do this, click Repair from the Tools tab, then choose the Recreate option that matches your media, as described on page 193.)

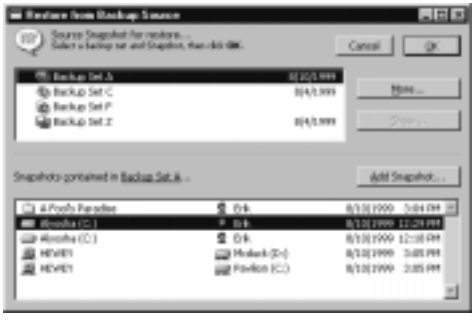
If you copied your catalog files from floppy or removable disks you must get Retrospect to recognize them. From the Configure tab, click Backup sets, then click More and Open to add the catalogs to the list of available backup sets.

6. Restore from Backup

Now that your hard disk is working again and Retrospect is available along with your backup catalogs, you can restore your hard disk. From the Immediate tab, click Restore.



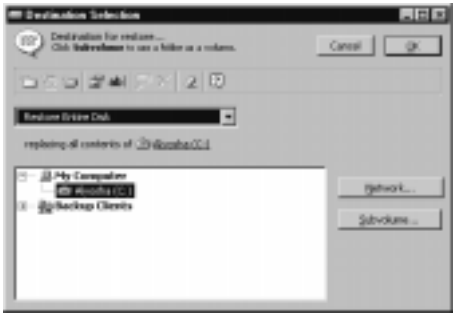
Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.



Selecting a backup set and Snapshot.

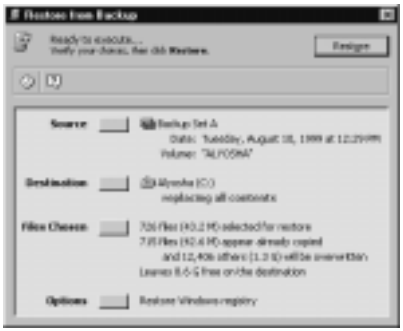
In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window ap-

pears for you to select the destination to which to restore files.



Destination selection window.

Because your whole hard disk was wiped out and needs to be completely restored, select it and leave the combo box set to "Restore entire disk." Click OK to proceed. Retrospect matches files from the Snapshot then scans the destination and displays the restore summary window.



Restore summary.

Put the first CD, tape, or disk from the backup set in your backup device and click Restore.

When Retrospect is done, follow step 7 below if you need to restore DHCP or WINS server data, or skip ahead to step 8, "Finish."

7. Extra Steps for DHCP or WINS Servers

If your NT Server also serves as a DHCP or WINS server and you set it up correctly for backup (page 157), you need to take the following steps to restore the DHCP or WINS server information.

After Retrospect completes its copying of the files, exit Retrospect but *do not restart* yet.

Restore the DHCP Database

Skip these steps if your NT server uses WINS.

a. Open Windows Explorer.

b. Navigate through the following folder path:

WinNT\ (restored system root)
  System32\
    dhcp\

c. Delete the contents of the dhcp folder.

d. Navigate through the following folder path:

WinNT\
  configbk\
    dhcp\
      Jet\

e. Copy the dhcp.mdb file from Jet to

WinNT\System32\dhcp\

f. Go to step 8, "Finish."

To Restore the WINS Database for Windows NT

Skip these steps if your NT server uses DHCP.

a. Open Windows Explorer.

b. Navigate through the following folder path:

WinNT\ (restored system root)
 System32\
  wins\

c. Delete the contents of the wins folder.

d. Navigate through the following folder path:

WinNT\
configbk\
wins_bak\

e. Copy contents of wins_bak to

WinNT\System32\wins\

f. Go to step 8, "Finish."

8. Finish

Restart the computer. After it starts, place the "temp" folder (your temporary Windows NT installation) in the recycle bin and empty it.

Your computer is now ready to use. If you took the extra step 7 to restore DHCP or WINS databases, DHCP or WINS Manager should work properly.

RESTORING MAC OS FILE SERVERS

This section describes how to use Retrospect to restore volumes shared by AppleShare or Mac OS file sharing. These operations require special procedures to ensure access privileges are intact after the volume is restored.

Partial Restore to an Undamaged Server

Access privileges are restored for a server only if file sharing was active when the backup was made *and* if file sharing is active during the restore operation.

If your server is undamaged and you need to restore only some of the files and folders from a backup (for instance, because somebody accidentally deleted some folders from the server), just follow one of the sets of instructions under "Restoring Files and Folders" on page 108.

Restoring an Entire Crashed or Damaged Server

Access privileges are restored for a server only if file sharing was active when the backup was made *and* if file sharing is active during the restore operation.

1. Restart and Try to Repair the Disk

Restart the client Macintosh with an emergency startup disk or CD. When the client Macintosh has started up, open the Disk First Aid application from the CD and use it to examine the hard disk for problems. (You should also try other disk repair utilities if you have them.) Use the low-level verification or test function of the Drive Setup utility or your disk formatter to examine the hard disk for defects that other utilities will not find.

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat your hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still does not mount on the Desktop, you probably need to reformat your hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard your data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up your repaired hard disk. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a full backup to an existing backup set, as the damaged drive might not have all of your files on it and you don't want to erase your previous backups.) Once you are sure you have redundant backups of your data, copy your backup set catalogs to a floppy disk, removable disk, or another server.

4. Reformat the Disk

If the disk repair utility cannot fix the disk, you may have to erase or reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Erasing or formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should erase or format your hard disk, contact its vendor for assistance.

To reformat the disk, use the formatting software that came with the hard disk.

5. Install System Software

Install new Mac OS system software on the newly-formatted hard disk. Restart from this volume. Rename the System Folder to "temp." Use the Date & Time control panel to set your local time and time zone, and, if necessary, change the Daylight Saving setting.

Configure TCP/IP Make sure the computer is properly set up for use with TCP/IP networking. (If you need help configuring TCP/IP see your network administrator and Appendix A • Preparing TCP/IP Software, which starts on page 218.)

6. Install Temporary Client Control Panel

Install Retrospect client software on the Macintosh and restart it. It must be a TCP/IP client. Log this client into Retrospect and name it Temp Client.

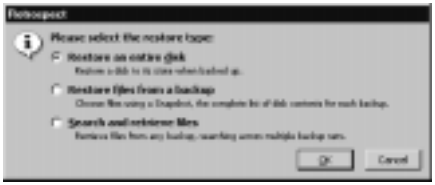
7. Prepare the Client Macintosh for Restore

Verify the client control panel's status is "Ready." For ideal restoring conditions, shut down the Macintosh so the Retrospect client shutdown dialog appears.

Leave the client Macintosh with this dialog; do not shut down or restart.

8. First Restore for Files

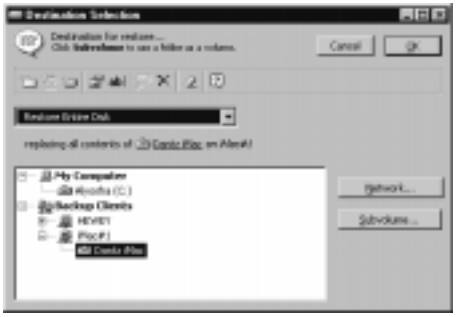
Now that the hard disk is working again, you can restore the server from the backup computer. From the Immediate tab, click Restore.



Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.

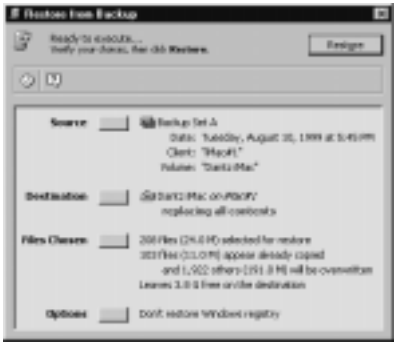
Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has the most recent backup of the hard disk prior to its repair. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window appears for you to select the destination to which to restore files.



Destination selection window.

Because the whole server hard disk was wiped out and needs to be completely restored, select it and leave the combo box set to "Restore entire disk." Click OK to proceed. Retrospect matches files from the Snapshot then scans the destination and displays the restore summary window.



Restore summary.

Put the first CD, tape, or disk from the backup set in your backup device and click Restore from the summary window.

Restart the Macintosh and discard the "temp" System Folder by placing it in the Finder's Trash can and emptying the Trash. Forget the Temp Client and log in the original client.

9. Second Restore for Privileges

If you are using AppleShare IP, start the AppleShare IP Web & File Admin application and AppleShare IP Web & File Server. If you are using AppleShare, start the AppleShare File Server and AppleShare Admin application. If you are using Mac OS file sharing, start file sharing.

Choose which volumes or folders you wish to share, then select the appropriate Owner and Group for root access privileges and set your desired options.

With sharing on, perform another restore operation with the same backup set, again using the Restore entire disk option. Retrospect performs a "smart" incremental restore, copying only a few files (or none if no files have changed), and then sets the access privileges. Retrospect may report sharing violation errors but they are not significant and you should ignore them.

Restart the server, and rebuild the Desktop by holding down the Command and Option keys until a confirming dialog appears.

10. Extra steps for AppleShare IP

After restoring an AppleShare IP server, you should perform the following steps before launching any of the server applications:

1. Open the Editor Setup control panel and let OpenDoc initialize, then close the control panel. (It may be necessary to manually launch OpenDoc.)

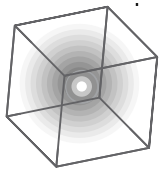
2. Launch AppleShare IP Web & File Admin and re-point the Web server to the restored web folder and welcome.html page.

3. If you are restoring a MacDNS server, launch MacDNS by double-clicking on the restored zone information file.

4. If you are restoring an AppleShare IP Mail Server and have been using the special Retrospect Event Handler to shut down the mail server for backup, create a new folder named "AppleShare IP Mail Folder" at the root level of the hard drive if there is not already one there. Move the backup copy of the AppleShare IP Mail Database from the restored "AppleShare IP Mail Backup" folder to the "AppleShare IP Mail Folder". If necessary, click OK to replace

any existing copy of the AppleShare IP Mail Database and start the AppleShare IP Mail Server.

Your server should now be up and running with all privileges intact.



CHAPTER 8

MANAGEMENT

- BACKUP STRATEGIES
- REPORTS
- EXECUTION OPTIONS
- CONTROLLING EXECUTIONS
- MANAGING BACKUP SETS
- MAINTAINING SCRIPTS
- PREFERENCES
- MOVING RETROSPECT
- CATALOG AND CONFIGURATION BACKUPS
- WORKING WITH FILE SERVERS
- WORKING WITH OTHER SOFTWARE

This chapter describes how to perform various tasks to manage backup sets and scripts, including viewing reports, and maintaining scripts. It offers several strategies for doing backups. It also offers advice on using Retrospect and shows some techniques for more effective backups, including tips on using Retrospect with other software.

BACKUP STRATEGIES

Introduction

This section suggests several strategies for backing up your computer or your entire network. Review each strategy and decide which will work best for your situation. Perhaps you will need to slightly modify a strategy to better fit your needs. Perhaps you will devise your own strategy which bears no relation to these suggestions. Realize these are but a few suggested strategies, and Retrospect's features allow an unlimited number of different strategies. Just remember the basic backup rules when you go about creating a backup strategy of your own.

Different backup actions are often integral parts of effective strategies. Know and understand them. They are described under "Backup Actions" on page 22.

Basic Backup Rules

While Retrospect is a powerful tool for safeguarding your data, it is most effective when you follow some basic backup rules.

Back up often because you cannot restore what is not backed up. For example, if your hard disk malfunctions today but you most recently backed it up a week ago, you have lost the data you have accumulated over the week. Retrospect is most effective when you back up everything and back up often, which is ensured by setting up scripts to automate backups.

Keep multiple backups of your data. Rotate among different backup sets when you make subsequent backups. Using more backup sets makes you less likely to lose data if you misplace or damage media.

Regularly introduce new media using new media backups, because having all of your backups on one media set leaves you too vulnerable. (If even one tape of a set is damaged, you no longer have a complete backup.) A benefit of new media in your backup strategy is that it is faster to restore from a few media members than to restore from a set that has many members and backup sessions. Retire old media on a regular schedule.

Always store at least one backup set off-site to guard against fire, theft, and natural disaster.

Back up the backup computer. You probably have put more time and energy than you realize into your Retrospect configuration and catalogs.

Take care of your backup media, which can easily be damaged by the environment. Media can also wear out after as few as several hundred uses. See "Media Longevity and Storage" on page 40 for further information.

Leave the Verification option on so Retrospect can confirm the backup data matches the original data.

Periodically verify your backups are working properly. Retrospect provides options and tools which allow you to compare data and verify media to ensure valid backups. It also creates logs and reports that detail backup successes and failures.

If you make a mistake or see a problem, do not panic. Instead, take a break and read Chapter 10 • Problems and Solutions. If you cannot find a solution, contact technical support.

Individual Backup Strategies

The three following strategies are useful for backing up a single computer. If you need to back up more than one computer, see "Network Backup Strategies" which follows.

Strategy 1—Run Documents

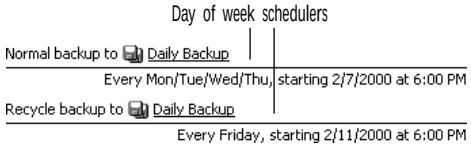
Create a backup script and make one recycle backup run document and one normal backup run document. (See "Run Documents" on page 68.) Execute the normal backup run docu-

ment daily or whenever you please, and every few weeks execute the recycle backup run document to keep your backup sets from becoming large and cumbersome.

To introduce new media for rotation with other sets or off-site storage, periodically configure the backup set to use new media, as described under "The Options tab" on page 148.

Strategy 2—Scheduled Script

Create a backup script and schedule it to run automatically. Add one day of week scheduler doing normal backups Monday through Thursday and another doing a recycle backup every Friday. The two schedulers look like this:



To introduce new media for rotation with other sets or off-site storage, periodically configure the backup set to use new media, as described under "The Options tab" on page 148.

Strategy 3—EasyScript

Use Retrospect's EasyScript, letting it set up a strategy based on its interview with you. EasyScript has different strategies optimized for the type of backup set you choose. Its disks strategy tends to conserve media, compared to its strategies for tapes and CDs. See "EasyScript" on page 58.

Network Backup Strategies

When you need to back up a network of client computers, you must decide which kind of backup scripts to use. Table 8-1 below lists situations which are suited to Backup Server scripts or regular backup scripts.

If you choose to use a strategy which includes the Backup Server, skip ahead to network backup strategy number five on page 133.

Strategy 1—EasyScript

Use Retrospect's EasyScript module, letting the program set up a strategy based on your needs. See "EasyScript" on page 58. Tell EasyScript you want to back up other computers on the network.

Strategy 2—Scheduled Script

Create a backup script. Change the script destination to use three backup sets. Add a day of

Situations Suiting Backup Server	Situations Suiting Backup Scripts
You have a backup computer dedicated solely to that purpose.	Your backup computer has other duties at other times.
You have too many clients with too much data to be entirely backed up in a single night.	Your scheduled backups are completed before the client computers are used in the mornings.
You find yourself trying to catch up with your backups, making special scripts and immediate backups for certain clients which are not completely backed up by your regular backup script.	Your scheduled backups are completed before the client computers are used in the mornings and unsuccessful backups are rare.
You have mobile clients and portable drive volumes which appear on the network at random times.	Your network includes only desktop computers, no removable disks or notebook computers.
You want Retrospect to back up to whatever media is in the backup device.	You always insert the correct media beforehand for unattended backups.

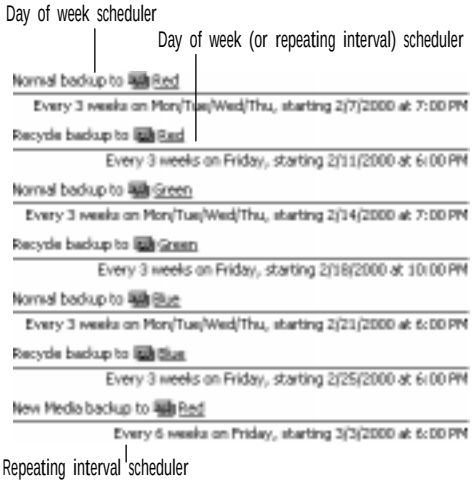
Table 8-1: Backup Server and standard script comparison.

week scheduler to run the script daily to a particular backup set, every three weeks. Add a similar scheduler to run the script daily to the second backup set, every three weeks starting one week after the first scheduler. Add a similar scheduler to run the script daily to the third backup set, every three weeks starting one week after the second scheduler. The three schedulers look like this:

This strategy does not include scheduled recycle and new media backup actions, so you should manually configure the backup sets for recycle and new media backups at appropriate times. See “The Options tab” on page 148.

Strategy 3—Scheduled Script with Recycle and New Media Rotation

Create a backup script. Change the script destination to use three backup sets. Add a day of week scheduler to run a normal backup Monday through Thursday to the first backup set, every three weeks. Add a day of week scheduler to do a recycle backup to the first backup set on Friday, every three weeks. Add similar schedulers for the second and third backup sets, but set their starting dates one and two weeks later, respectively. Finally, add a repeating interval scheduler to do a new media backup to one of the backup sets every six weeks. (After a new media backup take the old backup set media off site for safe keeping.) The schedulers look like this:



Strategy 4—Scheduled Script with Rotating Daily Backup Sets

Make a script with five backup set destinations, named Monday through Friday. Add five day of week schedulers to back up to each respective backup set. Add five repeating interval schedulers to stagger recycle backups every four weeks to each respective backup set, starting with Monday the first week, Tuesday the second week, and so on. But for Friday, make the repeating interval the last Friday of the month, doing a new media backup to the Friday backup set. (Take the old backup set media off site for safe keeping.) The schedulers look like this:

■ **NOTE:** When you schedule the new media backup, make sure it occurs at the same time as the scheduled Friday normal backups. When Retrospect encounters the new media backup scheduled for the same execution time as the normal backup, it executes only the new media backup. If you were to schedule them at different times, both backups would execute, which is undesired.

Strategy 5—Basic Backup Server

Create a Backup Server script backing up all client sources. Schedule it to work from 7:00 P.M. to 7:00 A.M. during the work week, so as not to interfere with the users during their workdays, and all the time during weekends. Set the backup interval so Retrospect backs up every twelve hours.

Strategy 6—Basic Backup Server Including Mobile Computers

Duplicate the basic Backup Server script described above. Make mobile clients its only sources. Remove these volumes from the original script. Schedule the new script to run twenty-four hours per day, with a backup interval of eighteen hours.

◆ **TIP:** Should you decide to implement a strategy which includes the Backup Server, read "Backup Server Tips and Techniques" on page 76. It includes information to help you devise a more effective strategy

Strategy 7—On-Demand Backup Server

Create a Backup Server script backing up all client sources. Leave the schedule always active so it works twenty-four hours a day. Set the backup interval option so Retrospect backs up every ninety-nine days. Leave on the script option to allow early backup. Except for the initial backups when this strategy is first implemented, and every ninety-nine days thereafter, clients are not backed up unless they request it from their control panels. This strategy requires that you clearly communicate the responsibility to the users and, ideally, is supplemented with a regular backup script.

REPORTS

Using Logs and Reports

Retrospect's Reports tab lets you monitor backup execution history and error messages by viewing three logs and reports. You may need to examine these to find out why an operation was unsuccessful in order to diagnose problems or provide information to Dantz Technical Support.

The Backup Report shows a detailed account of backup operations for each local and networked volume.

The operations log shows a record of each Retrospect operation, transaction, and event, and any errors that occurred.

The Contents Report shows the files that were actually backed up in a specific backup session.

To view any of these reports, first click the Reports tab in the Retrospect Directory.

Viewing the Backup Report

Click the Report button from the Reports tab to view the Backup Report, shown at the bottom of this page.

Unlike the operations log, to which Retrospect repeatedly appends new information, the Backup Report is completely updated each time a backup is performed. It allows you, as the backup administrator, to see, on a volume-by-volume basis, any problems with recent backups.

The example below shows how information appears in the standard Backup Report, which contains the following information.

The date and time listed below a volume are the date and time of the most recent backup of the volume.

User/Volume is the source volume name. Client computer names, if logged in, are also listed.

Elapsed Days is the number of days since the backup.

Errors indicates any errors that occurred for each backup. (Use the Find in Log command to isolate an error in the operations log.)

Backup Set is the name of the backup set of the most recent successful backup.

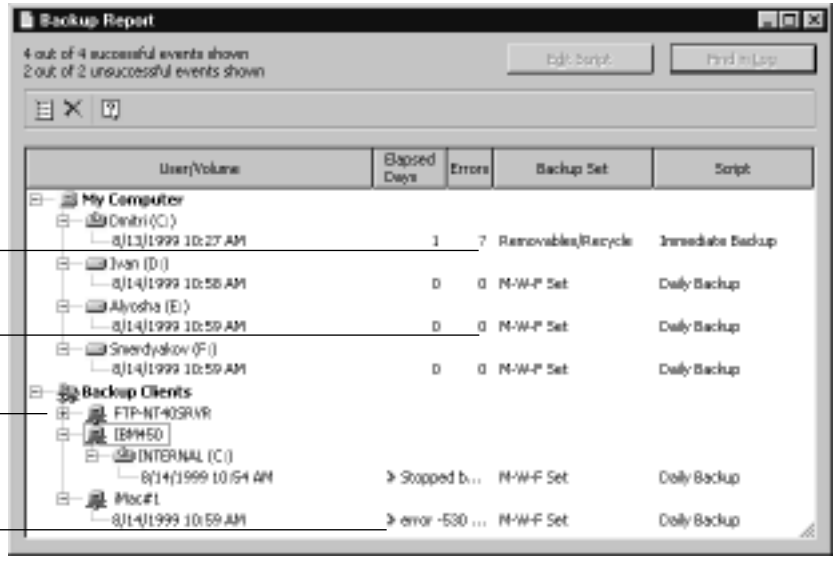
Script is the name of the script that did the most recent successful backup.

When the Backup Report is viewed in the performance data format (see "Changing the View" which follows), it contains the following additional information.

Duration shows the time duration of the backup, in hours and minutes. Large numbers may indicate sources with heavy backup needs.

MB is the amount of data, in megabytes, backed up from the volume.

MB/Min is the speed, measured in megabytes per minute, of the source's backup. Abnormally



Errors occurred, but the backup was completed nonetheless

No errors means the backup was a complete success

Lack of report events indicates the volume has never been backed up

"›" indicates the volume was not successfully backed up

slow performance may indicate problems with the network, backup device, or other hardware.

You can select a line in the report and open the script it refers to by using the Edit Script button. You can select a line in the report and click the Find in Log button to cross-reference the operations log. You can select any line listed in the report and clear it by choosing Clear from the Edit menu or by pressing the Delete key. If you clear a script or forget a backup set, that information is removed from the report. This may cause a volume to appear as if it were never backed up.

Changing the View

You can change various aspects of the Backup Report view and format. Click the Report Options icon from the toolbar to bring up a dialog in which you can make changes.

The view options are self-explanatory.

How the Backup Report Works

The Backup Report is a database of backup events. Each time Retrospect completes a backup it adds a new backup event to its database. For each combination of source, destination and script, it saves all unsuccessful backup attempts and the latest successful backup. When you forget a script (page 151), source (page 166), or backup set (page 148), Retrospect removes that item's backup events from the Backup Report database.

Forgetting Events

To remove events from the Backup Report, click the Forget Events icon from the toolbar. This brings up a dialog with which you can remove the following execution events from the report:

- All but the most recent successful backup
- All successful backups
- All unsuccessful attempts
- Events older than one week
- All execution events
- All Backup Server events

Backup Server (page 73) relies upon the Backup Report to determine when a volume was most recently backed up. If you delete a volume event from the Backup Report and that volume is a source in an active Backup Server script, Backup Server assigns a higher priority to the volume and will attempt to back it up sooner.

Finding in the Operations Log

Select a line from the Backup Report and click the Find in Log button to open the operations log with the corresponding action selected.

Editing a Script

Select a line from the Backup Report and click Edit Script to open the script window for the script which executed and created the event.

Printing or Exporting the Backup Report

To print the Backup Report, view it then choose Print from the File menu. If you have only a portion of the report selected, only that portion will print. If you have nothing selected, the entire report will print. To export the Backup Report to a text file, view it then choose Export from the File menu. A preference option, described on page 155, makes Retrospect automatically export the Backup Report.

Viewing the Operations Log

The operations log stores any messages that are generated during an operation such as a backup

or restore. You may need to review the log to find out why an operation was unsuccessful in order to diagnose problems or provide information to Dantz Technical Support.

To view the operations log click the Log button or choose Log from the Windows menu.

The example below shows how information appears in the operations log.

The log shows the following information for each successful operation.

Completed indicates the number and size of the files that were copied. If you used Retrospect's data compression feature, the log also shows compression achieved for this session.

Snapshot stored indicates the size of the volume Snapshot stored in the backup set.

Performance indicates the number of megabytes of information copied per minute. If the Verification option is turned on, additional performance figures are listed for comparing.

Duration shows the total time required to complete the operation. If you clicked Pause during the operation or there were delays while you inserted media, the waiting time is shown separately. The waiting figure includes time spent during tape drive locate functions and other required functions.

Finding Items in the Log

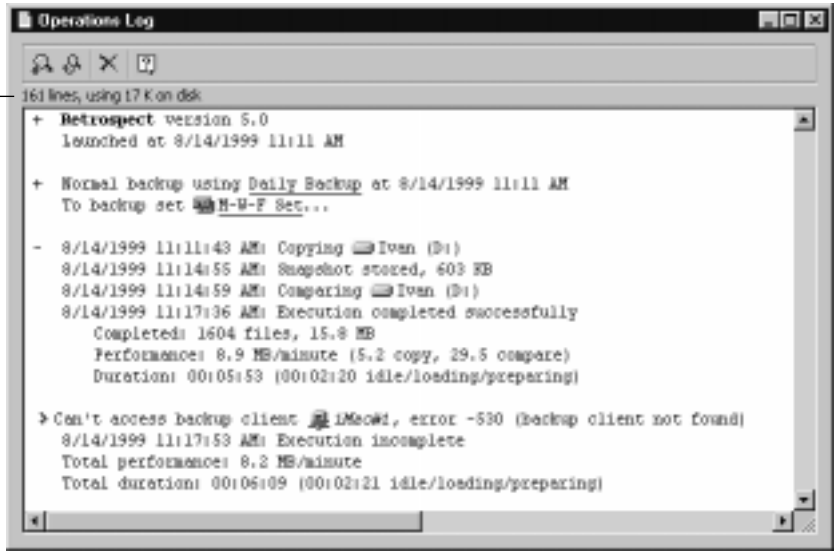
Retrospect has commands for finding items in the operations log. The operations log's window and the Edit menu have these commands.

Find Backward This toolbar command prompts you for the text you want to search for. When you click OK, Retrospect searches the log bottom-up (from the current selection) instead of top-down, because the latest operations are at the bottom of the log.

Find Again Backward After you have used the Find or Find Backward command, this toolbar command searches bottom-up for the text you previously specified.

Find This command on the Edit menu prompts you for the text you want to search for. When you click OK, Retrospect searches the log top-down from the current selection.

Find Next After you have used the Find or Find Backward command, this Edit menu command



continues the search from the current selection forward, or down. Upon reaching the end of the log, it continues searching from the beginning.

Find Prev After you have used the Find or Find Backwards command, this Edit menu command continues the search from the current selection backward, or up. Upon reaching the log's beginning, it continues searching backward from the end.

Clearing the Log

To delete the contents of the operations log, view it then click the Clear Log icon from the toolbar. You do not have to clear the log, because Retrospect removes old log entries as the log fills to its capacity, determined by the log size limit preference (page 155).

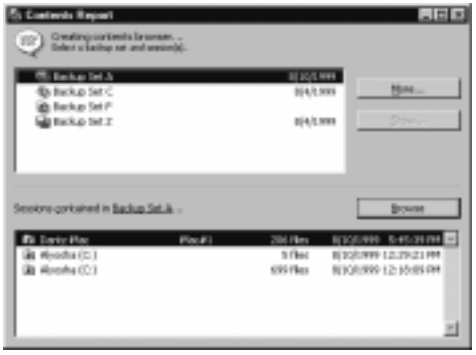
Printing the Log

To print the operations log, view it then choose Print from the File menu. If you have only a portion of the log selected, only that portion will print. If nothing is selected, the entire log will print.

Viewing Backup Set Contents

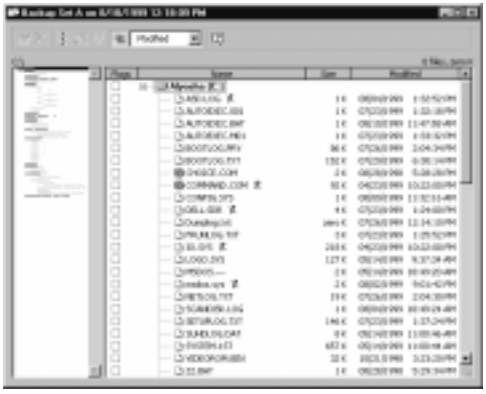
Retrospect can report files copied to a backup set during a specific backup or archive session.

To view the contents of a backup set, first click the Reports tab from the Retrospect Directory, then click Contents. The following window appears.



In the upper list box, select the backup set you want information about. (Click More to open another catalog to add to the listed backup sets.) After you select a backup set the lower list box displays the backup sessions contained within the selected backup set. In the lower list box, select the backup session or sessions you want to review.

At this point, you can choose Export from the File menu to export the list to a text file, or click Browse. When you do the latter, a browser window appears listing the files and folders which were backed up during the session or sessions you selected.



A browser reporting backed up files.

You can print the file list, export it to a text file, search for specific files, get the properties of a specific file, or change the view format from the browser window's toolbar. You can view brows-

er windows for multiple sessions at the same time by performing the same steps and selecting multiple sessions. When exporting, Retrospect exports the fields in the following order, regardless of the view format: file name, size, create date, create time, modify date, modify time, backup date, backup time, Mac OS type, Mac OS creator, backup set, and path. For information about using the browser window and menus, see “Browsing” on page 166.

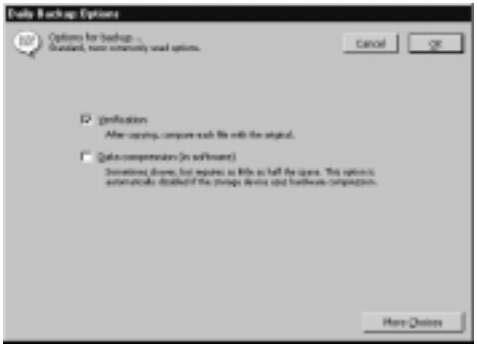
EXECUTION OPTIONS

Retrospect has many options you can set to determine how your backup, duplicate, copy, and restore operations are executed. For example, you could set a backup script to turn on software data compression and synchronize client computer clocks. You can set options while setting up an immediate operation or while editing a script. Execution options are local rather than global, so they apply only to the current operation or script, not to all operations and scripts.

Retrospect also has global program preferences which affect execution, described under “Preferences” on page 152.

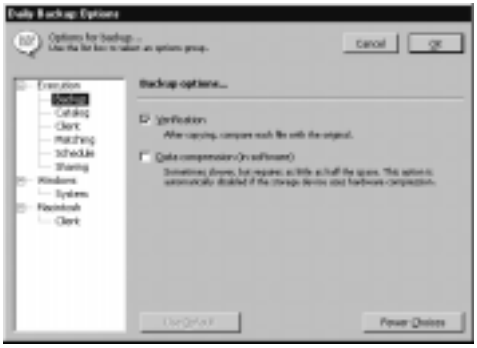
Setting Options for an Immediate Operation or a Script

Begin the immediate operation, or edit the script. Once you reach the summary window click the Options button. A window appears listing the basic options for the operation you are performing. The following example shows the basic options initially available for a backup script.



The basic options window of a backup script, showing options for the Backup category.

If you click More Choices, the window changes to show a list of option categories, as shown below.



The extended options window of a backup script.

You can display the options for each category by clicking the category name in the list.

To turn an option on or off, click its checkbox or radio button. Some options use time and date controls, and others let you enter numbers or text. If any options in a category have been changed from their default settings, the category name is shown in boldface. Clicking Use Default reverts all visible options to their default states. Clicking Fewer Choices returns you to the basic Options window.

When you have finished setting options, click OK.

The options for each category are described in detail below.

Backup Server Interval Options

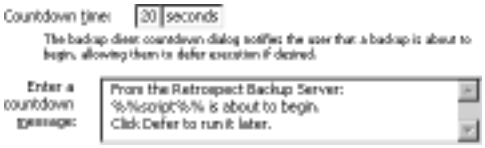
This options category is available only with Backup Server scripts, which are explained under "Backup Server Scripts" in Chapter 5.

Back up every: n days/hours This time interval, which is one day by default, specifies the minimum time between backups. Each source is backed up when possible, according to the priority of need, but not more often than this interval unless the client user initiates a backup.

Allow early backup When this option is on, which is the default, client users may initiate backups from their Retrospect Client control panels, overriding the backup interval. A request for an early backup does not necessarily immediately move the user's volume to the top of the priority list. Other sources are taken care of before Backup Server polls the client and learns of the early backup request, at which time Backup Server backs up the client source volumes.

Backup Server Countdown Options

This options category is available only with Backup Server scripts.

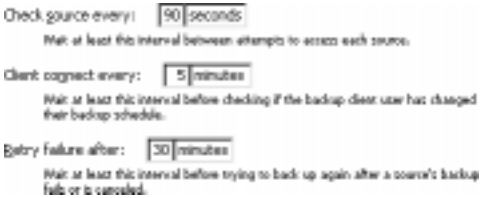


Countdown time: n minutes/seconds Retrospect gives client users advance notice of when a backup is about to begin, counting down the time specified here. Enter a number here and set the time units to seconds or minutes. (Enter zero to make Retrospect skip the countdown.) When it is going to back up a source from a client computer, Retrospect puts up a dialog on the client. This dialog displays the countdown message (see below) and offers buttons to defer the backup to a later time or bypass the countdown and immediately begin backing up. If the client user does not take any action Retrospect backs up when the countdown reaches zero.

Countdown message The text in this box is shown to a client user when a backup is about to begin, according to the countdown time option. Retrospect will replace the text "%%script%%" with the name of the script it is executing.

Backup Server Polling Options

This options category is available only with Backup Server scripts.



Check source every: n seconds Retrospect uses this time interval, which is ninety seconds by default, to check whether a source is available for backup. Retrospect does not check sources while a backup is in progress.

Client connect every: n minutes/seconds Retrospect uses this time interval, which is five minutes by default, to access a client to check whether the user has changed the backup schedule or requested an early backup. Retrospect does not connect to clients while a backup is in progress.

Retry failure after: n minutes/hours After a backup has failed or was canceled, Retrospect waits at least this long, thirty minutes by default, before again trying to back up a source.

Backup Execution Options

This options category is available with backup operations and Backup Server scripts.

Normal backup Only available with immediate backups, this option makes Retrospect perform a normal incremental backup, as described under “Normal” on page 22.

Recycle backup Only available with immediate backups, this option makes Retrospect perform a recycle backup, as described under “Recycle” on page 22.

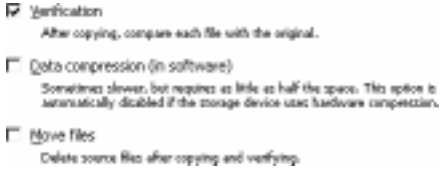
Verification Verification ensures files are copied correctly by comparing files in the backup set with the original source files after the backup is performed. If the backup set spans multiple tapes, CDs, or cartridges in the session done with verification, you must reinsert all members to which data has been written. Although verification increases the time it takes for a backup to complete, it ensures that information is correctly written to the backup set. This option is on by default.

Data compression (in software) Data Compression saves space in the backup set by compressing files before copying them into the backup set. Files are automatically decompressed back to their original state when restored. Compression savings achieved during an operation are reported in the status window and the operations log. The amount of compression savings you can expect depends on the types of files you are compressing. Text files compress substantially; application and system files do not. Backups using data compression are slower than those without, as are restores.

When copying to a tape device that has built-in compression, Retrospect automatically turns off software compression in favor of the faster hardware compression. Retrospect uses its built-in compression filter to identify files that are already compressed (such as those compressed with a utility such as WinZip) so it will not attempt to re-compress them with software data compression. The Data Compression option is off by default.

Archiving Execution Options

This options category is available only with archiving operations.



The archiving options include Verification and Data compression, as with backups (page 140) and Move files. An archive is just like a backup unless you move files.

Move files This option deletes files from the source volume after they have been copied. If verification is turned on and the files do not match exactly, the originals will not be deleted. Do not turn on the move files option without also turning on the verification option. You should perform at least one additional verified archive, backup, or duplicate before deleting files from the source. Retrospect cannot move files from a client computer if its Retrospect Client control panel has been set to allow read access only. By default, this option is off. Also see the related option “On Move, don’t delete empty folders” (page 141).

Duplicate Execution Options

This options category is available only with duplicate operations.

Verification Same as with backups (page 140).

Update backup report When this option is checked, Retrospect treats the duplicate operation like a backup and adds or changes information in the backup report.

Files Execution Options

This options category is only available with duplicate, archive, and restore operations.

Move files This option, which is only available for duplicate operations, deletes files from the Source volume after they have been copied. If verification is turned on and the files do not match exactly, the originals will not be deleted. Do not turn on the move files option without also turning on the verification option. You should perform at least one additional verified archive, backup, or duplicate before deleting files from the source. Retrospect cannot move files from a client computer if its Retrospect Client control panel has been set to allow read access only. By default, this option is off. Also see the related files option below.

On Move, don't delete empty folders This option is only available for archive and duplicate scripts and operations. It keeps folders that become empty as a result of the move instead of automatically deleting them. By default, this option is off.

Update modify dates This option is only available for restore operations. It causes Retrospect to set the modification date and time of restored files to the current date and time. By default, this option is off.

Transfer Execution Option

This option is available only with backup set transfer operations, whether scripted or initiated with the Copy command from the Tools tab.

Copy Snapshots This option transfers all of a backup set's Snapshots to the destination catalog and media. This option is on by default.

Retrieval Execution Options

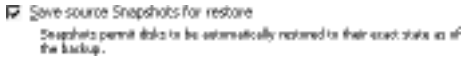
This options category is only available during an immediate restore by searching for current or older files.

Only most recent versions Of files which match the search criteria, Retrospect uses only those most recently added to the backup set. It ignores files from older sessions. By default, this option is off, which makes Retrospect use matching files from older *and* most recent sessions.

Minimal folder structure Restores files to their original folders, in the minimum required hierarchy. Empty folders are not restored. This option is off by default.

Catalog Execution Option

This option is available with all types of operations except duplicate and restore.

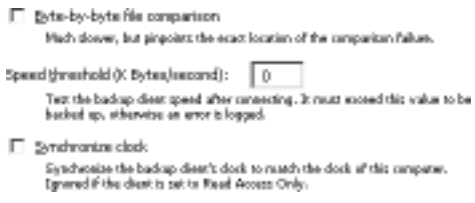


Save source Snapshots for restore This option directs Retrospect to save a volume Snapshot to the catalog, replacing the old Snapshot, if any, and to save another copy of the Snapshot onto the backup media. By default, this option is on.

Snapshots are an important, fundamental feature of Retrospect, described in detail under "Snapshots" on page 23. Turning off this option has consequences described on page 202.

Client Execution Options

This options category is available with all types of operations except restore, and these options apply only when backing up Retrospect client computers.



Byte-by-byte file comparison This option overrides Retrospect's fast client compare, verifying files the same way Retrospect does for local backups. When this option is turned off, Retrospect uses a faster, checksum-based technique to verify copied files. Both methods reliably compare backed-up data to the original files. By default, this option is off and you should keep it off.

Speed threshold This option, which is available only with scripts, is useful for preventing backups which would be too slow. The number you enter here determines the minimum acceptable rate at which the client computer is accessed. If Retrospect finds the network or client is not working fast enough it will terminate the operation and log an error. Retrospect checks the client speed only once, as an operation starts. This option is useful, for example, for preventing the Backup Server from trying to back up a notebook computer volume when its user dials in to connect with the LAN.

Synchronize clock This option sets the date and time on each client computer to match the clock on the backup computer. This is useful to get times and dates to agree and is especially useful when changing to and from daylight savings time. Retrospect cannot synchronize a client computer's clock if its Retrospect Client control panel has been set to allow read access only. By default, the synchronize option is off.

Matching Execution Options

This options category is available with all types of operations except duplicate and restore.

Match source volumes to catalog This option directs Retrospect to identify previously backed up files during normal backups. Retrospect compares the files on the source volume to file information in the backup set catalog. The Windows file matching criteria are name, size, creation date, and modify date. The Mac OS file matching criteria are name, size, type, creator, creation date, and modify date. Retrospect considers a file already backed up if all of these criteria match. When you view the preview browser while setting up an immediate backup, files that have already been backed up are preceded by a diamond symbol (◆). By default, this option is on (except for archives) and you should keep it that way unless you have a specific need to change it.

Don't add duplicates to backup set This option works with the "Match source volumes to

catalog" option to prevent previously backed up files from being added to the backup set again. Select both of these options when you want to perform a standard incremental backup; that is, you only want new or modified files copied to the backup set. If this option is deselected, Retrospect adds all files, including previously backed up files, to the backup set every time a Normal Backup is performed. By default, this option is on and you should keep it that way unless you have a specific need to change it.

Match only same location This option is only available if "Match source volumes to Catalog" is selected. It makes Retrospect more strictly match otherwise "identical" files from a source to a destination. (Normally, files are considered identical files when they have the same criteria described above under "Match source volumes to catalog".) This option adds another criterion; files must also come from the same volume.

By default, this option is off and you should keep it that way unless you have a specific need to change it.

Schedule Execution Option

Click Schedule to define a time period during which this script may execute. The default schedule reflects the global schedule preference, described under "Schedule Execution Preferences" on page 152.

Sharing Execution Option

This option is available with all types of operations except restore and transfer.

Off by default, it is enabled here to show the default time and message.

Lock out volumes during backup This option disconnects users connected to the backup computer (through Microsoft Networking to a Windows 98, Windows NT, or Windows 2000 computer) and prevents them from using a shared volume during backup. When you check this option, you can enter a warning message that is displayed to users before they are disconnected. (Windows NT users automatically receive warning messages. Windows 98 users receive warning messages if they are running Winpopup.exe; Windows 95 users do not receive warning messages.) You can also specify how many minutes advanced warning users will be given. This option will lock out users only if you are running Retrospect on the server itself; it does not apply to clients. By default, this option is off.

Windows System Options

This options category is available with all types of operations except restoring by searching and backup set transfers. The specific options change according to the operation. No option in this category affects Macintosh clients.

Back up registry is available with backups and archives. This option, which is on by default, causes Retrospect to back up the Windows registry when the Windows folder is included in the file selection criteria. It stores the registry in the Snapshot and it must be restored with a restore method using the Snapshot.

Back up security information is available with backups and archives. This option, which is on by default, causes Retrospect to back up the security information of NTFS volumes. It stores the information in the Snapshot and it must be restored with a restore method using the Snapshot.

Clear archive attribute is available with backups and archives. This option, which is on by default, causes Retrospect to clear the archive flags of files on the source volume when it copies them to the destination.

Duplicate registry is available with duplicate operations and is effectively the same as the registry backup option described above, except it is off by default.

Duplicate security information is available with duplicate operations and is effectively the same as the security information backup option described above.

Restore registry is available with restore-by-Snapshot operations but not restore-by-searching operations. This option causes Retrospect to restore the Windows registry when the Windows system volume is restored. This option is on by default when you select "Restore an entire disk" in the initial restore dialog and off by default when you select "Restore files from a backup."

Restore security information is available with restore-by-Snapshot operations but not restore-by-searching operations. This option, which is on by default, causes Retrospect to restore the security information of NTFS volumes.

Set archive attribute is available with all restore methods. This option, which is on by default, causes Retrospect to set the archive flags of files on the destination volume when it copies them from the backup set.

Macintosh Client Options

This options category is available with all types of operations except restore. No option in this category affects Windows clients.

Set source (volume's/folders'/files') backup time These options, not available with duplicate operations, record a backup time for each source volume, folder, or file. (The Mac OS keeps track of the creation date, modification date, and backup date for each file, folder, and volume.) Using these options allows you to create selectors based on the "backup time," which is the moment execution begins. Retrospect cannot set the source backup time on a client computer if its Retrospect Client control panel has been set to allow read access only. By default, the volume option is on and files and folders options are off.

■ **NOTE:** When matching files for incremental backups, Retrospect does not use the backup time stamp. It uses more sophisticated and flex-

ible criteria, as introduced in "How Retrospect Works" in Chapter 2.

Never shut down/Shut down when done This option specifies how Retrospect handles the Finder's Shut Down process on a client Macintosh after Retrospect is done with its operation. The desired behavior only happens when the client Macintosh is waiting for backup as described under "Wait at Shutdown" on page 97. Shut down when done completes shut down unless the client is scheduled for another operation within the look-ahead time period (see "Schedule Execution Preferences" on page 152). Never shut down prevents this particular operation from shutting down the client. By default, this option is set to Shut down when done.

CONTROLLING EXECUTIONS

Retrospect gives you many options to control operations in progress. For example, you can pause or stop an operation, view additional volume and performance details, and switch between interactive and unattended modes. These options are available once execution of an operation begins.

You can use any one of following methods to begin an operation:

• Initiate a backup, restore, or duplicate from the Immediate tab.

• Initiate an archive or backup set transfer from the Tools tab.

• Run a script immediately using the Run menu or the Immediate tab.

• Open a run document from the desktop or Windows Explorer.

• Wait until a scheduled script begins automatic execution.

When an operation is in progress, Retrospect displays the execution status window and the Control menu. When necessary, Retrospect displays the media request window.

Controlling Backup Server Executions

Though many of the features described in this section apply to both regular scripts and Backup Server scripts, this section is intended for use with regular scripts. Backup Server scripts have their own, unique features for controlling executions, which are described under "Using the Backup Server" on page 80.

Execution Status Window

The execution status window.

The execution status window is available during all file transfer operations and contains the following features:

The Pause button temporarily suspends the current operation. Click Continue to resume the operation.

The Stop button halts the current operation, bringing it to a premature end.

Control Menu

The Control menu is available during all file transfer operations and contains the following command items.

Show Log displays the operations log. See "Viewing the Operations Log" on page 135.

Run Interactively switches the execution to interactive mode. In this mode, the "When Done" options in the Control menu are dimmed and Retrospect always remains open after execution.

All Immediate and Tools operations default to interactive mode.

Run Unattended switches the execution to unattended mode. During executions in this mode, the "When Done" options in the Control menu are available and determine what Retrospect does after execution. All automatic executions, run documents, and scripts launched from the Run menu default to unattended mode. In this mode only, Retrospect automatically searches library slots for media. (See "How Retrospect Searches for a Specific Tape in a Library During Unattended Execution" on page 38 for details.)

Stop on Errors tells Retrospect to report errors by pausing execution and displaying a dialog. Retrospect will resume execution if possible after the OK button is clicked.

Just Log Errors tells Retrospect to report errors to the operations log, but continue execution if possible. The Run Control general preference determines the default for this menu option.

When Done determines what Retrospect will do when completing the current operation in unattended mode: Stay, Quit, Log off, Restart, or Shut down. These commands are not available in interactive mode. The Unattended general preference determines the default for this menu option.

Retrospect will not quit, log off, restart, or shut down (depending on the preference setting described on page 154) if another script is scheduled for automatic execution within the look-ahead time (as determined in the Schedule preferences). Retrospect remains open and waits for the script to execute.

Media Requests

When necessary, Retrospect prompts you to insert media by displaying the media request window. In most cases, Retrospect continues with the operation when you insert correctly named or erased media and click Proceed. Because file backup sets do not use media, Retrospect never makes media requests when operating with file backup sets.

You can avoid this prompt if you insert the correct medium before you execute the backup. So it does not overwrite valuable data, Retrospect is very particular about media—they must be blank or erased, or their names must exactly match the requested names in order for Retrospect to proceed without prompting you. When performing new or recycle backups, consider erasing the media beforehand to be sure Retrospect will proceed automatically without your attention.

The media request window has a Stop button which halts execution of the currently running operation, bringing it to a premature end. It also has an Eject button which unloads the selected medium from the backup device. (Some devices require you to manually eject their cartridges.)

The media request window's toolbar includes the following commands.

Device Status scans communication buses available to ASPI and lists the ID numbers and their corresponding devices.

Properties summarizes drive and medium information in a window.

Eject unloads the selected tape, CD, or disk from its drive. (Some devices require you to manually eject their cartridges.)

Retension runs the selected tape forward and backward to even out the tension and alignment. Retensioning applies only to some types of drive mechanisms.

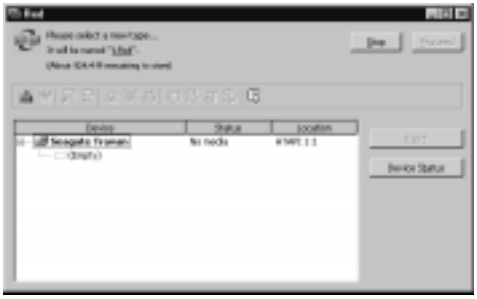
Format uses the operating system's formatting utility for a removable disk, or formats a tape.

Erase erases the contents of the selected tape or disk and, in the case of some types of drive mechanisms, conditions media for reuse.

Library commands (Scan Media, Erase All, Eject Magazine, Cleaning Slot) are available for tape libraries. These are detailed in Chapter 3 • Hardware, under “Preparing Tape Libraries for Use” on page 39.

New Medium Request

When Retrospect says, “Please choose a new” medium, it wants a blank medium or one it can erase.



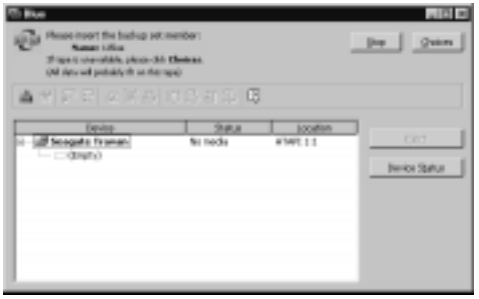
The media request window asking for a new tape.

When there is a medium in the drive and you click the Proceed button, Retrospect erases and names the media then continues with the operation using that medium.

■ **NOTE:** Retrospect may ask you to confirm before erasing a medium which appears to belong to another backup set. It will not allow you to erase a member of the backup set currently in use.

Specific Member Request

When Retrospect says, “Please insert” a specific medium, it wants that member of the backup set currently in use.



The media request window asking for a specific member of a backup set.

You should insert the requested medium, but if it is unavailable you can click the Choices button to handle the situation. The media choices dialog asks the action to take. These choices are as follows.

Missing tells Retrospect to designate the requested member as permanently unavailable from the backup set. Retrospect will ask for a new member and, if possible, copy the missing data to it during the next backup or archive.

■ **NOTE:** Select Missing only when you have permanently lost or damaged the requested member. It is not appropriate for other situations.

Skip tells Retrospect to skip the requested member and ask for a new member. Data on the requested member remains intact. Effectively, you are saying, “Stop copying to this member and start copying to a new medium.” This is useful when a member is nearly full and you think it may not make it through a complete unattended backup before Retrospect fills it and asks for a new medium.

▲ **WARNING:** Do not select Skip when you have lost or damaged the requested CD, disk, or tape, or you may lose your data. Select Missing instead.

For more information on media requests, see “Retrospect refuses to use the inserted tape, CD, or disk.” on page 189.

MANAGING BACKUP SETS

Retrospect allows you to pre-configure catalogs and backup sets for later use or perform maintenance operations on backup sets which already exist. To configure catalogs and backup sets first click the Configure tab from the Retrospect Directory.

Configuring Backup Sets

Click backup sets and the backup set selection window lists available backup sets and has commands for working with them.

Adding Backup Sets

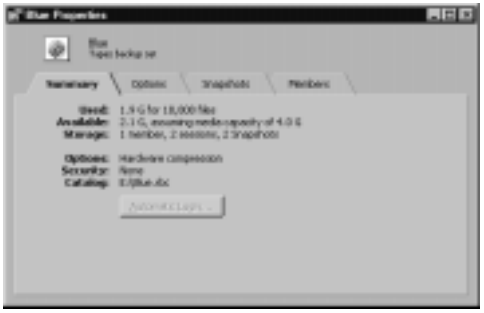
If your backup set does not appear in the backup set selection window, click More then Open to locate its catalog file.

Removing Backup Sets

To remove a backup set from the backup set selection window’s list, select it and choose Forget from the toolbar or press the Delete key. Forgetting a backup set does not affect the contents of the backup set, nor does it delete its catalog file. However, it does remove the backup set from any scripts which use it.

Backup Set Configuration

Select the backup set to configure and click OK. The backup set configuration window appears.



The backup set configuration window, showing its Summary tab.

The window is divided into three or four tabs: Summary, Options, Snapshots, and Members.

The Summary tab displays general information about the backup set, which is self-explanatory for the most part. “Storage” summarizes the number of media members and sessions in the backup set and the Snapshots in its catalog. “Available” shows how much space remains on the current member, assuming a media capacity specified by you from the Options tab. “Catalog” shows the path to the location at which the backup sets’s catalog is stored.

The Options tab has buttons for catalog compression, configuring password access, and controlling future media for this backup set.

The Catalog options allow you to compress the catalog file, saving space on your hard disk. Retrospect compresses catalogs when doing various operations with backup sets.

The Password options allow you to choose the level of password protection of your secure backup set. Password options are not available if you did not specify encryption or password protection when you created the backup set.

The Media Action button allows you to set how the media will be handled the next time you perform a backup to this backup set:

• Normal makes no changes, as with Cancel.

• Recycle erases and reuses the media, in addition to erasing the catalog. This is known as resetting the backup set.

• New Media creates a new backup set that expects a new medium. For more information on backup actions, see page 43.

• Skip requests a new member to add to the current backup set. Skip is useful when the current member (CD, tape, or cartridge) is almost full and you wish to get a complete, unattended execution without changing media.

The Capacity button allows you to change Retrospect's estimate of your tape or CD capacity. The capacity estimates are used for display purposes only and do not affect how much data Retrospect will copy to a medium because it always uses all available space. Leave the default (automatic) to let Retrospect estimate the capacity, unless your media consistently get higher capacity than Retrospect estimates. To see the actual capacity, click the Members tab. Doing this for a few of your backup sets which have full tapes or CDs will give you a good idea of the useful capacity of your media.

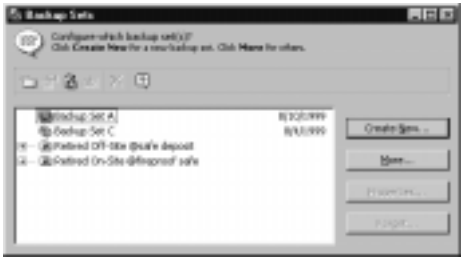
The Snapshots tab shows the latest volume Snapshots in the backup set catalog. You can remove Snapshots from the catalog by clicking the Delete button. A deleted Snapshot will be replaced when its volume is next backed up. You can add Snapshots to the catalog from the media by clicking the Add button. For details, see page 48 in the immediate restore instructions.

The Members tab shows the members of the removable media backup set. If a backup set member is no longer available (for example, it is lost or damaged), you can designate it as permanently unavailable by clicking Set Missing. This causes Retrospect to copy the missing files during the next backup or archive to this backup set.

Managing Large Numbers of Backup Sets and Catalogs

When you have to manage a large number of backup sets and their catalogs, such as with network backups, there are a few things you can do to keep things organized.

One thing you can do is to use folders in the backup set configuration window. To create a folder, click the New Folder icon from the toolbar.



Move your inactive backup sets (that is, those no longer used for backups) into the folders. Name the folders to match the physical location of the media, such as an on-site safe or an off-site safe deposit box.

Label individual media and the containers in which they are stored.

Set up a duplicate script to automate copying your catalog files from the backup computer to a different hard disk. Include the catalogs in your backups, with their parent folder defined as a Subvolume. You can find more tips under "Catalog and Configuration Backups" on page 156.

MAINTAINING SCRIPTS

This section provides instructions for various tasks you may need to perform in maintaining the scripts you have created. Maintenance tasks include:

• Checking script settings to confirm a script is ready for unattended operation;

• Modifying script settings, such as sources, destinations, or the schedule;

• Duplicating a script to create a similar one;

• Renaming a script;

• Deleting a script;

• Previewing and modifying the script execution schedule;

• Skipping script execution until a later date.

To perform any of these tasks, first click the Automate tab in the Directory.

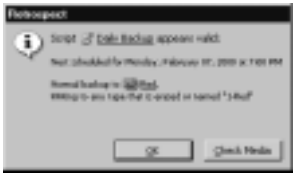
Checking Scripts

Before leaving Retrospect to run a script unattended, it is a good idea to confirm the script is ready for unattended operation. When appropriate, a script check also tells you what media Retrospect will request when the script runs.

To check a script, click Check from the Directory's Automate tab and a dialog appears, listing the available scripts.

The script checking dialog.

Click the script you want to test and click OK. Retrospect checks the script definition to make sure that a Source and Destination have been properly defined. A message informs you if the script is missing necessary information. If the script is complete, a message appears telling you the script is ready.

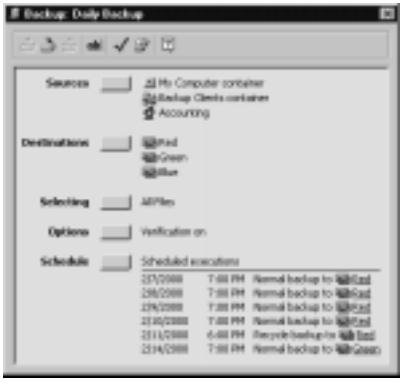


■ **NOTE:** The information presented in this dialog varies with the backup set and active media member.

Click OK to return to the Retrospect Directory, or click Check Media to have Retrospect check whether the desired backup set member is available.

Modifying Script Settings

You can change any of the choices you made in creating a script—you can choose different source volumes or destination backup sets, change the file selection criteria, the options, or the schedule. You can modify a script from the script summary window by clicking the buttons and choosing different settings.



The script summary window shows the script's current settings.

Modifying script settings is done just like creating them. For further explanation, read Chapter 5 • Automated Operations. For details

on using selectors to set the criteria, see “Using Selectors” on page 170. For details on Options, see “Execution Options” on page 138. For details on using schedulers, see “Scheduling Scripts” on page 64.

Duplicating, Renaming, or Deleting a Script

You can base a new script on an existing one by duplicating a script and then modifying the settings of the duplicate. Existing scripts can also be renamed or permanently deleted.

To duplicate, rename, or delete a script, first click the Automate tab in the Retrospect Directory. Then click Scripts to display the list of scripts. Next, click the desired script to select it before issuing one of the commands described below.

Duplicate

Click Duplicate from the toolbar. Retrospect asks you to name the new script; type a name and click New. The new script is added to the list.

Rename

Click Rename from the toolbar. Retrospect asks you to give the script’s new name; enter a name and click Rename. The script is renamed in the list. You can also rename a script when its script summary window is active.

Delete

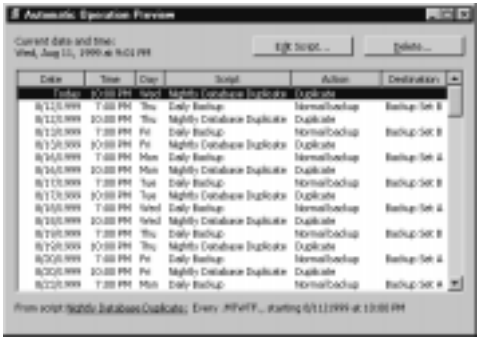
Click Forget from the toolbar. Retrospect asks for confirmation; click OK to confirm. The script is removed from the list and its scheduled executions are eliminated.

If you do not want to receive a confirmation message when you delete or duplicate scripts, press and hold the Shift key as you issue these commands.

Future Execution Schedule

You can view the script execution schedule to see when each script is scheduled to run. You can also modify the execution schedule by deleting scheduled events or by editing a script and changing its schedule.

Click Preview from the Automate tab to view the execution schedule for all scheduled scripts. (The following example shows a typical schedule.)



The scheduled event preview window.

Deleting

To delete a scheduled event and all prior events for its scheduler, click the event to select it then click Delete. The event and all prior events for its scheduler are removed.

Editing

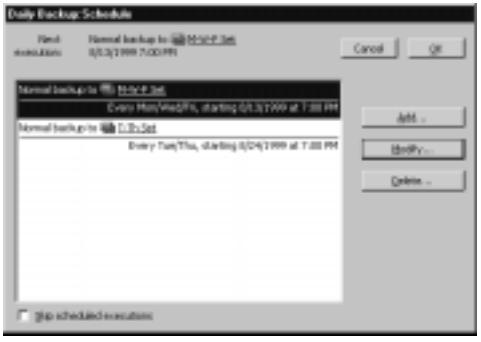
To edit the script associated with an event listed in this window, click the event to select it then click Edit Script. The script summary window appears, and you can click the Schedule button to modify the schedule. For details on modifying schedules, see “Scheduling Scripts” on page 64.

Skipping Script Execution

If you do not want a script to run for a period of time, you can turn the script schedule off and specify when it is to be turned on again. This is useful, for example, if your office closes a week

for holidays and nobody will be there to change media in the backup device.

To skip script execution, click Scripts from the Automate tab to display the list of scripts. Select the desired script then click Edit. The script summary window appears. Click Schedule. Retrospect lists the currently scheduled dates and times for this script.



Click the Skip scheduled execution checkbox at the bottom of the window. A date and time field appears at the bottom of the window.

Set the date and time at which the script is to again be allowed to execute, then click OK. Retrospect ignores execution events prior to the date.

■ **NOTE:** When multiple schedulers are shown in the script schedule window, the selected scheduler is not the only one skipped by this feature. It skips *all* the scheduled executions for this script.

PREFERENCES

Use the following steps to set general program behavior for Retrospect. This section provides steps for setting these preferences and a detailed description of each option.

Setting Preferences

Click the Special tab in the Retrospect Directory, then click the Preferences button and the preferences window appears.

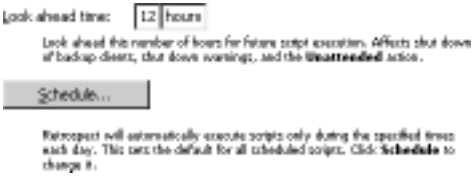
The preferences window.

The list on the left contains the category options. The options for the selected category appear on the right. Click to select your desired preferences category in the list. Select or deselect options by clicking their checkbox or radio button controls, or enter text or numbers where necessary.

■ **NOTE:** If you change the default setting for an option, the category name will appear in bold in the list.

When you have finished setting options, click OK.

Schedule Execution Preferences



Look ahead time: ***n*** **hours** defines the number of hours Retrospect looks ahead for scheduled script executions. This affects what happens when you begin to shut down the backup computer or a Macintosh client, and what

Retrospect does when it completes an unattended operation. (For details see “Notification Alerts Preferences” on page 155, “Macintosh Client Options” on page 144, and “Unattended Execution Preferences” on page 154, respectively.) The default preference is twelve hours.

Schedule lets you define the default time period during which scheduled non-Backup Server scripts are allowed to execute. This affects all such scripts which do not have custom schedules (page 143). The default schedule is twenty-four hours a day, seven days a week.

Customizing the Schedule

When you click Schedule you get the weekly schedule window. Though similar to the Backup Server custom schedule window, it applies *only* to scripts other than Backup Server scripts.

By default, all twenty-four hours of each of the seven days of the week are selected, as above.

To select a day of the week, click on it. Click and drag to select contiguous days of the week. Use the Shift or Control key and click or drag to select days without deselecting the previous selection.

To change a time, click on it and type or use the control.

Start is the earliest time at which scheduled executions may begin.

Wrap Up is the period of time (in hours and minutes) before the stop time, during which Retrospect should complete the current operation but not begin new operations.

Stop is the time at which Retrospect absolutely must halt scripted operations (until the next start time).

◆ **TIP:** You can also set times by dragging the icons on the hourly schedule bar, but you should first experiment by typing the times to see how these controls work.

When a time is changed, the hourly schedule bar changes accordingly to graphically represent the start, wrap-up, and stop times.

Each selected day has a scaled-down hourly schedule bar, though it does not have controls.

The Always and Never buttons set the daily operating time to twenty-four hours and none, respectively.

Security Execution Preferences

Protect allows you to specify a password that must be entered to start Retrospect manually, though it does not interfere with automatic script execution. If a user enters three incorrect passwords an error is recorded in the operations log. By default, there is no password protection.

When protection is added Retrospect enables the Lock Application item in the Run menu. Choose this item to force Retrospect into locked, unattended mode to prevent someone

from interrupting executions. Click the mouse or press a key to enter the password and unlock the application.

Unprotect lets you enter the password and remove the protection from the Retrospect application. Unprotect appears only when protection is added.

Unattended Execution Preferences

Enable Retrospect Launcher service registers the launcher application as a service so it is always running. This allows the auto-launch preference explained below and alert preferences described on page 155. It is on by default.

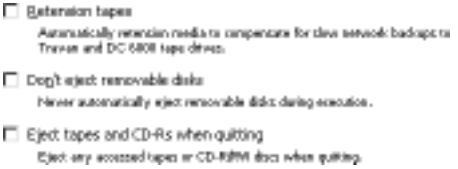
Automatically launch Retrospect automatically starts Retrospect when a scheduled script is waiting to execute. By default, this preference is turned on.

Stay in Retrospect, Quit, Log off, Restart, and Shut down determine what Retrospect does when a script is completed and no additional scripts are scheduled in the specified look ahead time. (See “Schedule Execution Preferences” on page 152.) By default, this preference is set to Quit.

Media Erasure Preference

Minimal erase confirmation skips the confirmation message that normally appears when you proceed with a backup operation and Retrospect needs to erase the media. By default, this preference is turned off.

Media Handling Preferences



Retension tapes winds a tape forward to the end and back to even out the tension and alignment. (This applies only to Travan and DC6000 drives.) By default, this preference is turned off.

Don’t eject removable disks prevents Retrospect from ejecting removable disks when it needs other media in operations. By default, this preference is turned off.

Eject tapes and CD-Rs when quitting does so with tapes and CD-R or CD-RW discs when Retrospect exits. By default, this preference is turned off.

Media Maintenance Preference

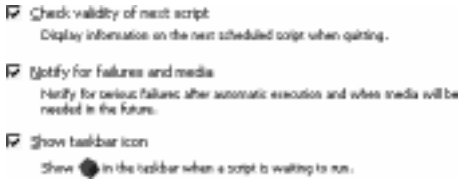
Show tape drive cleaning reminder does so at the specified interval of hours of tape drive use. The reminder appears as a note in the log and as a notification dialog after you exit Retrospect. If you never quit you will never get a reminder. By default, this preference is on, with an interval of fifteen hours. Use your drive vendor’s recommended cleaning interval.

Media Request Preferences

Media request timeout specifies a period of time for Retrospect to wait for media during execution. When the time elapses, the execution stops and Retrospect proceeds according to the next scheduled event. This preference is off by default, so it never times out.

Automatic skip to blank media makes Retrospect use an erased tape, CD, or disk for subsequent normal backups when the current member of the backup set is not available. For example, select this option and leave an erased tape in the drive when the current tape of the backup set is almost full. Then you need not wait for the old tape to fill and be prompted to change tapes. When this option is not selected, Retrospect always prompts for the most recent member of the backup set until it becomes full. By default, this preference is turned off.

Notification Alerts Preferences



Check validity of next script does so when you quit Retrospect. It automatically verifies and displays information about the next script scheduled to execute. By default, this preference is turned on.

Notify for failures and media displays an alert message if errors occur during the automatic execution of a script. It also displays an alert message when CDs, tapes, or disks will be needed in the future. By default, this preference is turned on. This option is only available if you the "Enable Retrospect Launcher service" unattended execution preference (page 154) is on.

Show taskbar icon displays the Retrospect application icon in the taskbar when a script is ready to execute. By default, this preference is turned on.

Notification Logging Preferences

Log size limit (K Bytes) maintains the operations log size within the limit you set in the field provided. You can set the limit anywhere between 32K and 9999K. When the log reaches the limit, the oldest portion of the log is deleted to keep its size within the limit. The default size is 1024K.

Export the backup report produces or updates a backup report file after each execution. The file, which is stored in the folder with the Retrospect application, is tab-delimited text containing all the information from the Backup Report. See "Viewing the Backup Report" on page 134 for more information on how to export it manually.

MOVING RETROSPECT

If you would like Retrospect on a different backup computer, you must do a little more than just install Retrospect and the backup device on the new machine. You must move other files to keep the preferences, clients, catalogs, scripts, and schedules intact.

Install Retrospect

The first thing you must do is install Retrospect on the new computer. Be sure to use the install-

er program; do not just copy it to the new machine because Retrospect may need files and folders installed by the installer program.

Move Catalogs and Configuration

Copy the catalog files (with name extensions .rbc and .rbf) and the configuration file (Config_5.dat) from the old backup computer to the new computer.

Initialize Catalogs

Next, you must force Retrospect to take notice of your catalogs. The easiest way to do this is to select all of the catalogs in the Windows Explorer, and drag them onto the Retrospect application icon. Retrospect opens a backup set configuration window for each catalog, causing it to recognize the catalogs.

Mediating Client and Local Volume Changes

Moving a Retrospect Network Backup Computer

If you have moved Retrospect and its components to a new backup computer and you want to back up either or both the old computer and the new backup computer, you must perform a few extra steps.

Previously Networked Volume is Now Local
You used to be able to back up the volumes from the new computer using Retrospect client software, but now that is no longer necessary since its volumes are now local. Forget the client. Edit the sources in any Retrospect scripts which used client volumes from the new computer and add the volumes which are now local.

Previously Local Volume is Now on a Client
You used to be able to directly back up the local volumes of the old computer, but now you must install Retrospect client software on that machine to access its volumes with Retrospect from the new backup computer. (See Chapter 6 • Network Backup.) After installing and configuring the client, add its volumes to the scripts. Use the volumes database's Forget command (page 166) to get rid of the remnants of the previously local volumes. Forgetting volumes removes them from the volumes database and any scripts which use them.

CATALOG AND CONFIGURATION BACKUPS

Part of your backup strategy should be to back up your backup computer. The most simple way to do this is to include the computer in your backup scripts. The most important files to back up are Retrospect's backup configuration file (Config_5.bak) and your catalogs for tape, removable and CD-R backup sets (.rbc files).

Catalog Backups

Catalog files are important adjuncts to backup sets, but face the same risks as your files since they often share the same hard disk. If you lose your catalog files, Retrospect cannot restore any files until the catalogs are recreated, which can be a lengthy process. For this reason, back up your catalog files as well as your regular files.

Configuration Backups

Retrospect's configuration file contains your client database, scripts, schedules, preferences, custom selectors, and other important information. Retrospect uses the configuration file, named Config_5.dat, in the folder in which the Retrospect application resides. Each time it exits, Retrospect automatically saves a backup copy of Config_5.dat in a file named Config_5.bak. You should back up this file regularly. If your active configuration file (Config_5.dat) is ever lost or becomes corrupt, replace it with the backup file renamed as Config_5.dat then launch Retrospect.

You can use the Windows Explorer or Retrospect to back up catalogs and your configuration file. Just periodically copy them

to another volume, such as a removable disk or file server, to help you recover from a disaster more quickly. Set up a Retrospect duplicate script to automatically copy your catalogs and config_5.bak file to a folder on another volume. Use the Retrospect Files selector to select appropriate files, and schedule the script to run daily, when your other backups are complete.

If you back up your backup computer to multiple backup sets, your catalogs and configuration are automatically covered in case of a disaster. Each set contains backups of all other sets' catalogs. Alternatively, if you have several large catalogs, consider backing them up to their own dedicated set to help recover from a disaster or lost catalog faster.

WORKING WITH FILE SERVERS

Retrospect is compatible with Windows NT Server and Apple's various servers. Retrospect can back up files from any server to which the backup computer has access via Windows Explorer.

Backing Up a Server to Move its Contents

If you are going to back up a server to move its contents (for example, you have a more powerful computer to be the new server) you should make two separate verified backups. Verification, which is on by default, ensures the integrity of the data; having two backups will not leave you stranded if one fails for some reason.

Backing Up DHCP Server and WINS Server Information

Retrospect does not back up certain active DHCP and WINS server files from Windows NT Server. You can back up these busy files by using a technique recommended in the Microsoft Windows NT Server 4.0 Networking Guide (a part of the NT Server 4.0 Resource Kit). If you need to back up a Windows NT server running DHCP or WINS, take the steps described below to make these files available for Retrospect backups.

To Back Up the DHCP Database for Windows NT

1. Start the registry editor, Regedt32.exe.

2. Navigate through the following path:

```
HKEY_LOCAL_MACHINE
 System
  CurrentControlSet
   Services
    DHCP Server
     Parameters
      Backup Database Path
```

3. Change the Backup Database Path entry to "\%SystemRoot%\configbk\dhcp".

4. Exit the registry editor and restart the computer. The DHCP Manager now copies its files to the backup folder once per hour.

5. Do your regular Retrospect backups, making sure they include the configbk folder in the Windows NT folder.

To Back Up the WINS Database for Windows NT

1. Use the WINS Manager to set the Backup Database path to \%SystemRoot%\configbk\.

2. Exit the WINS Manager. The WINS Manager now copies its files to the backup folder every three hours.

3. Do your regular Retrospect backups, making sure they include the configbk folder in the Windows NT folder.

To Restore the DHCP Database for Windows NT

See "Restoring an Entire NT Server" on page 121 of Chapter 7 • Restoring.

To Restore the WINS Database for Windows NT

See "Restoring an Entire NT Server" on page 121 of Chapter 7 • Restoring.

Backing Up Mac OS File Servers

This section describes how to use Retrospect to back up volumes shared by AppleShare or Mac OS file sharing. These operations require special procedures to ensure access privileges are intact after the volume is restored. Restoring servers is detailed under "Restoring Mac OS File Servers" in Chapter 7.

General Overview

Shared volumes maintain access privileges that determine which users and groups of users can see and change files and folders. These privileges are active only when the server is running and the volume is shared.

To retain access privileges for a server, file sharing must be on during the backup. During a subsequent restore operation, Retrospect reassigns privileges to the same users and groups that were active during the backup. Otherwise, any privileges for the restored and retrieved folders revert to the volume owner or server administrator.

AppleShare IP Mail

Apple recommends stopping the AppleShare IP Mail Server before backing up the AppleShare IP Mail Database. You can accomplish this with a special AppleScript, which shuts down the Mail Server and lets Retrospect duplicate the Mail Database folder. This inactive copy can then be backed up by other Retrospect scripts, even when the Mail Server is running. For more information on how to maintain the AppleShare IP Mail Database refer to the AppleShare IP Manual.

WORKING WITH OTHER SOFTWARE

No program is an island. Among the thousands of other popular software programs available for Windows, there are but a few which can cause problems with Retrospect or which require special attention. These programs are described below.

Read the contents of the "read me" file installed with Retrospect. It may contain late-breaking information on software which requires special attention for use with Retrospect.

DriveSpace Compression

If any of your Windows clients are using Windows 95's or 98's DriveSpace automatic hard disk compression utility, you should take a few steps to streamline your backups. Your scripts should include your normal working drive even though it is a compressed "virtual" drive. Retrospect backs up the files on the compressed drive, though they are, in reality, stored in a single, large file on the "host" drive. Your scripts or the client control panel, or both, should exclude the storage file or the host drive to avoid redundancy and waste, as the individual files within the storage file are backed up from the compressed drive. Backing up the host drive's storage file, which is nearly as big as the whole hard disk, would slow backups and waste backup media. Further, you cannot restore that file, so backing it up is useless.

To have Retrospect exclude all DriveSpace storage files, make a selector condition that excludes file names which start with "DRVSPACE.0". (That is a zero at the end.)

To have a client prevent Retrospect from accessing a DriveSpace host drive, use the client control panel's Access tab to designate as private the host drive. Click Private Files/Folders/Volumes then click Add and enter the host drive letter and a colon (for example, "H:").

Programs Which Do Not Update File Dates

Some programs may save some files without updating the file modification dates and times, which is a transgression of normal file handling procedures.

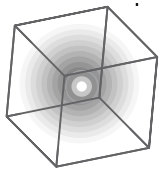
This poses a problem with Retrospect because it optimizes backups by backing up only one file when it finds multiple files with the same name, size, creation date, and modification date. When you use software which changes a file without updating its modification date, the file does not appear changed to Retrospect so it does not get backed up (unless you do the following).

To back up files used by the above-listed software, you should take the following steps to ensure complete backups, allowing complete restores.

Try to keep all of the files and folders related to a particular program within a single folder, and declare each such folder a Subvolume (page 164).

Make a script, separate from your regular backup script, with its own, unique destination backup set. Use these new Subvolumes as sources and disable matching (page 142) or schedule recycle backups (page 22). This script always copies all the files in the Subvolumes to the backup set.

To restore your data, always use the “Restore an entire disk” option to restore the Snapshot of the Subvolume to a new, empty Subvolume.



CHAPTER 9

TOOLS

- WORKING WITH VOLUMES
- BROWSING
- USING SELECTORS
- COPY OPERATIONS
- MAINTENANCE AND REPAIR

Retrospect has a number of features which go above and beyond the basics required for backup and restore operations. Your knowledge of these features is not essential to use Retrospect, but knowing them allows you to work with the program faster and more efficiently.

WORKING WITH VOLUMES

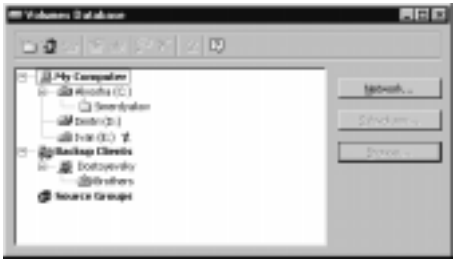
A volume is the operating system's representation of a random-access storage device, such as a hard disk drive or partition, removable disk, or CD-ROM. It can also be a file server on the network. A volume is the basic storage unit containing files and folders. Retrospect uses volumes as sources for backups and other operations and helps keep track of files with volume Snapshots.

Volume List Windows

Many Retrospect operations use the volume selection window for you to select one or more volumes for the operation at hand.

The volume selection window for an immediate backup.

Though some features may not be available for some operations, this window is very similar to the volumes database window.



The volumes database window.

Using either window is fairly straightforward; you click on the volumes you want, then click a button or toolbar icon to proceed or act on the selected volume. However, the volumes database window's list is organized for and includes controls for more involved navigation and selection of the listed volumes.

To practice the techniques described here, open the volumes database window by first clicking the Retrospect Directory's Configure tab, then clicking the Volumes button.

The volumes listed in the scroll box are organized in an outline format similar to that of Windows Explorer.

Outline Controls

In a volume list window, the + and – icons on the left work just like those in the Windows Explorer. Click on a + icon to show the contents of its container or folder. Click on a – icon to hide the contents of its container or folder. A volume does not have this control unless it has one or more defined Subvolumes.

Selecting

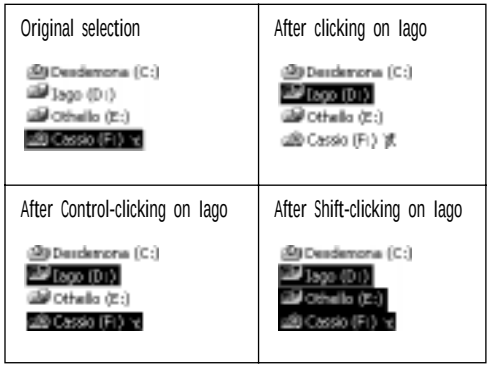
In a volume list window, you click on a volume to select it. This deselects any other selected volumes.

Press and hold the Control key and click a volume to select it without deselecting any currently selected volumes. You can make a multiple non-contiguous or contiguous selection this way.

Press and hold the Shift key and click a volume to select all volumes listed from the current selection to the Shift-clicked volume. This is called a contiguous multiple selection.

Some operations do not allow multiple selections. (For example, you cannot restore to multiple volumes.)

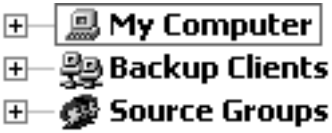
Following are examples of these selection methods.



These methods of making individual and multiple selections work throughout Retrospect, not just in the volume list.

Containers

In a volume list, volumes, clients, and groups are organized under the three containers My Computer, Backup Clients, and Source Groups.



You could back up every hard disk and removable disk attached to the backup computer, and every client logged into Retrospect, simply by selecting the My Computer and Backup Clients containers as sources.

My Computer

The My Computer container holds drive volumes. This may include the internal hard disk, an inserted removable disk, external drives, and file servers.

When you select the My Computer container itself, you are instructing Retrospect to select all such volumes on the backup computer, except for floppy disks, shared volumes (such as file servers), CD-ROMs, and empty volumes.

The following table shows some examples of My Computer container selections and the volumes to which they resolve. (For example, if the selection were used in a backup operation, the resolved volumes would be backed up.)

Using this selection...	...resolves to these volumes
	Capulet Montague
	Capulet

Backup Clients

The Backup Clients container holds client computers which are logged in to Retrospect. Clients themselves contain one or more volumes, which are made available according to how they are configured with the Volumes tab of the client properties window. For details, see Chapter 6 • Network Backup.

Source Groups

The Source Groups container holds volumes grouped together for better organization. Groups, which you define, do not contain the actual volumes themselves, but aliases which are shortcuts to actual volumes (which are in My Computer or Backup Clients). For example, you could make an Accounting group containing the volumes from the accounting department. Later when you are creating a backup script, instead of tediously selecting each individual accounting volume, you can just select the Accounting group and Retrospect knows you mean all of the volumes within that group. Source Groups are not available in volume lists of duplicate and restore operations.

Creating Groups To create a new group, click New Group from the toolbar. After you enter its

name in the dialog, the new group appears under the Source Groups container. Any items that were highlighted when the group was created will belong to the new group.

Adding Volumes to Groups You can drag any item from the My Computer and the Backup Clients containers into a group.

Arranging Group Items You can drag any item out of one group and into another group. You can drag an item to a different location within its group to rearrange the order of the group.

Removing Groups You can remove an unwanted group or item by selecting it and clicking Forget from the toolbar or pressing the Delete key.

Folders

You can make folders to help organize the information which appears in the volume list window. For example, while setting up a backup you can select a folder as a backup source and Retrospect will use the volumes in the folder. These folders are specific to Retrospect and do not appear outside the program.

When you make a folder in the volume list it does not make an actual folder on an actual volume. When this manual mentions folders, it generally means those actual Mac OS or Windows folders, except within the context of containers and the volume list, as described here.

Creating Folders

To create a folder, click New Folder from the toolbar. Retrospect asks which type of folder you want, which determines whether it is in the My Computer container or the Backup Clients container. After you make your choice and give it a name, the folder, identified by the  icon, then appears with the volumes in the list. You can drag it to reposition it in the list.

Arranging Folders

You can drag any volume into or out of a folder to better organize the list of volumes.

Just like folders on a hard disk, folders are useful for hiding numerous items to avoid cluttering your work space. For example, if you are administering a large number of clients, you can arrange them in a logical order by placing the individual volumes into their respective department folders, such as Accounting, Engineering, and Manufacturing. You can then select a folder in a volume selection window and Retrospect selects all the volumes within the folder.

Removing Folders

You can remove an unused folder by selecting it and clicking Forget from the toolbar or pressing the Delete key. However, you must move its contents out of the folder before you forget it.

Subvolumes

A Subvolume is a folder on a volume you define to work like a volume for use within Retrospect. After a folder is designated as a Subvolume it can be specified as a source or destination for Retrospect operations. Subvolumes have no function outside Retrospect and their mere existence does not affect a volume's files and folders in any way.

If you only want to back up files in a single folder, specifying a Subvolume (instead of specifying a volume and using a custom selector) reduces the file scanning time, minimizes the number of files displayed in a browser, and reduces the needed amount of memory.

Retrospect treats a Subvolume as another volume on your system. Once it has been defined as

a Subvolume, do not remove or rename the folder. If you do, Retrospect will not be able to locate the Subvolume.

Specifying Subvolumes

In a volume list, select a volume, then click Make Subvolume from the toolbar or click the Subvolume button in the window. A dialog appears, listing folders at the top level of the selected volume.

The Subvolume definition dialog.

You can specify any folder on the selected volume as a Subvolume, including folders nested deep within the folder hierarchy. Select the folder you want to specify as a Subvolume and click Define. (To define the folder name currently displayed in the combo box as a Subvolume, click Use.) The Subvolume folder, identified by the icon, then appears with the volumes in the volume list.

Redundancy

If you specify both a Subvolume and its parent volume as Sources, they will be treated as separate objects. However, operations involving the parent volume will include the contents of the folder designated as a Subvolume.

Discarding Defined Subvolumes

To discard a Subvolume definition, select the Subvolume and click Forget from the toolbar or press the Delete key. Forgetting a Subvolume does not affect the contents of the original folder or any file you may have already backed up from it.

Adding Network Volumes and Subvolumes

To add a network volume to the volumes database, click the Network button. Navigate through the network to your desired server volume or folder, then select it and click the Add button.

Volume Utilities

In the volumes database window and volume selection windows, the toolbar has commands for defining and forgetting Subvolumes and for renaming, ejecting, erasing, and getting information about listed volumes.

◆ **TIP:** Click the right mouse button in the volume list to pop up a menu of commands equivalent to the those on the toolbar.

Make Subvolume

To define a folder as Subvolume, select its parent volume and click Make Subvolume or press Control-U. Use the dialog as detailed previously under “Specifying Subvolumes”.

Properties

To determine an item’s properties, click Properties or press Alt-Enter. With a server volume, the properties toolbar has a command to save the user name and password for automatic login.

Rename

To change the name of a volume or Subvolume, select it and click Rename or press Control-R. Enter a new name in the dialog which follows.

Eject

To eject removable media from a drive, select its volume name and click Eject or press Control-J.

Forget

To remove a volume or Subvolume from the list, select it and click Forget from the toolbar. Currently active volumes, such as your hard disk or an inserted cartridge, may not be forgotten. Forgetting an added server forgets its defined Subvolumes.

Erase

To erase the contents of a volume, select it and click Erase or press Control-E. Be careful; this command permanently removes all files from the volume.

Browsing

The volumes database window has a Browse button which is not found in the similar volumes selection window. To view and work with the contents of a volume, select the volume and click the Browse button to open a browser. Browsing a volume is explained in detail in the following section.

BROWSING

Browsers are Retrospect's powerful tools for viewing, selecting, and manipulating files and folders on your source and destination volumes. From within Retrospect, browser windows provide file management facilities similar to those in the Windows Explorer, and include other features not available in the Explorer.

Browsers "unfold" the contents of a volume so you can work with all of its contents all at once. This lets you easily select multiple files within different folders. You can also view browsers in a flat-file structure, without the folder hierarchy.

Browsers allow you to see the files chosen for backup, restore, duplicate, and copy operations. You can also use browsers in a "stand-alone" manner to view and manage the contents of volumes. In backup, restore, duplicate, and copy operations, browsers show you which files have been chosen by the selector you designated and allow you to mark and unmark files.

You can open any number of browser windows, including different browsers for the same volume. You can also leave browser windows open while performing other Retrospect operations and switch back and forth between browser windows and other Retrospect windows.

In each browser window, Retrospect has a toolbar. It has commands for finding, selecting, and managing folders and files in the browser listing. These commands are described later in this chapter.

Viewing a Stand-alone Browser

To view a stand-alone browser of a volume, go to the Retrospect Directory's Configure tab and click Volumes. The volumes database window appears, listing the names of available volumes. Select a volume, then click Browse. Retrospect scans the selected volume, then displays a browser window listing all the folders and files contained in the selected volume.

To view a stand-alone browser of a backup set, see "Viewing Backup Set Contents" on page 137.

Viewing a Browser from an Operation

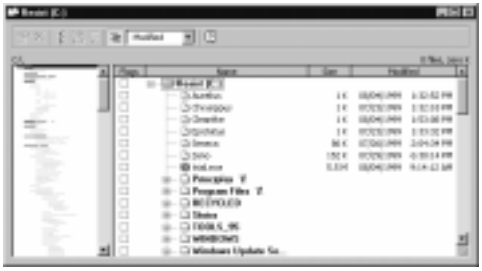
To view a browser within an immediate backup, restore, duplicate, or copy operation, click the summary window button named either Files Chosen or Preview. Retrospect displays a browser window for each source.

Browsers and Scripts

You cannot use a browser within a script because scripts are meant for unattended execution at a later time. Using a browser would not be useful because a volume's contents are likely to change between the time you edit the script and the time the script is executed.

About Browsers

A browser window displays a hierarchical file list of folders and files in the selected volume.



A browser window.

At the top of the list (and at the highest level of the hierarchy) is the name of the volume. Folders have + and – controls to their left; click + to show the contents of the folder. Click – to hide the contents of the folder. Open folders have different icons,  , than closed folders,  .

Folder contents hidden (left) and exposed (right).

The scrolling folder index on the left of the window provides a thumbnail view of the folders on the volume. Click on the folder index to display the associated file list on the right side of the window. The pathname of the current selection is shown above the index. Tick marks in the folder index indicate the location of selected items in the file list. Index lines appear grey for unopened folders or black for open folders.

A highlight count in the upper right corner of the window indicates how many files are highlighted and shows their total size.

Selecting Files and Folders

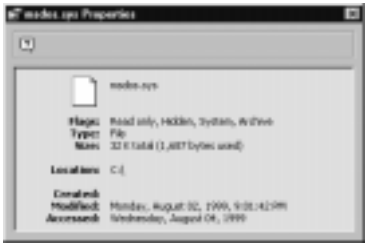
In a browser window, you select files and folders on which to perform operations. Select files by clicking on entries in the file list. Drag through the list or Shift-click to select a range of files or folders. Control-click to select or deselect non-contiguous items. Select all items by choosing Select All from the Edit menu. Double-clicking a file both selects (highlights) and marks it. Marking is described below, under "Marking Files and Folders."

Getting Additional Information

Retrospect provides a Properties command you can use to view information about the selected files and folders.

To View Information About Files or Folders

From a browser, select the files or folders for which you want more information, then click Properties from the toolbar. A properties window appears for each selected file or folder, displaying additional information.



The properties window.

Marking Files and Folders

A marked file or folder is one that is designated to be used in some way (for example, backed up, archived, duplicated, or restored). When performing operations, Retrospect marks files according to the rules of the selectors in the search criteria, but you have no way of knowing which files are marked unless you use browsers. In addition to simply viewing a list, you can manually mark and unmark files and folders within a browser.

You mark files and folders in a browser by selecting them and clicking the checkbox to the left of a file or folder. Click a checked checkbox to unmark the item. You can also mark and unmark files and folders by double-clicking them.

To mark or unmark an item without affecting the highlighting of other items, press and hold the Control key while clicking.

By marking or unmarking a folder you perform the same operations on all the files (and folders) contained within that folder. For example, to specify a single folder for backup, you would double-click on the volume name at the top of the file list to unmark all of the files, then scroll to the folder you want to back up and double-click the folder icon to mark it and its contents.

The browser window's toolbar provides additional commands for highlighting and marking in the window.

Highlight Marks highlights marked files. If you click or double-click an item without holding the Control key you may end up unhighlighting marked items. This command is useful for re-highlighting them.

Cross Reference allows you to locate files in the same hard disk or session which are related to a specified file. Specifically, Cross Reference finds duplicate files, older versions of the same file, and even files which have been renamed but were originally from the same file. This command highlights, but does not mark, cross-referenced files.

Selecting View Formats

The browser window's toolbar command Hierarchical/Sorted View changes how Retrospect displays the contents of a volume.

The hierarchical format displays files and folders in the same hierarchical structure in which they are stored on the volume. This is the default layout that Retrospect uses when you first open a browser window.

The sorted files format displays all files stored in the selected volume as a single "flat file" list, discarding any folder designations.

For both types of browser layouts, the toolbar's combo box allows you to specify the type of file information displayed in the browser window. It always displays flags, name, and size. For the final piece of information you can choose from modification date/time, backup date/time, and attributes.

With the sorted files layout, you can choose the sort criterion of the list by clicking on a column heading. Clicking it a second time reverses the sort order. Retrospect normally sorts the files in ascending order. For example, if sorting by size is specified, the browser lists the smallest files at the top of the list and largest files at the bottom.

Finding Files

The Edit menu has a Find item that you can use to locate specific files or folders (but not empty folders) on the volume.

The Find window (showing fewer choices).

This basic find window considers a file or folder name as the primary search criterion. Click More Choices to build a custom selector to use other criteria. The window that appears is identical to the selector details window you use to build Retrospect selectors. For more information on using the Find window to build search conditions, see "Using Selectors" on page 170.

In the text entry field, type the text to use in your criteria. It is not case-sensitive unless you click the Match case checkbox.

Use the File and Folder checkboxes to consider or disregard files and folders while searching. When you consider folders, check "Include enclosed folders" to select all enclosed items of found folders, including files nested in other folders.

Use the "does/does not" combo box to control the search logic. "Does" is inclusive; "does not" is exclusive. For example, if you choose "does not," and perform a search on file names, Retrospect selects all the files and folders whose names do not contain the search text.

Use the other combo box to specify where the search text is positioned within the name. You can specify that the search text be located at the beginning (start with) or end (end with) of the name, or contained somewhere within a name (contain). You can specify that the name exactly match the search text and no additional text (match). Or you can specify that the name matches a pattern (match pattern) of the search text. When matching a pattern, you can use the wildcard character ? to match any single character, and use the wildcard character * to match multiple characters.

After you edit the search criteria in the find window and click OK, Retrospect highlights all files and folders that meet the search criteria. You can then mark the highlighted files for use in your operation.

Printing or Exporting a File List

Any time a browser window is active, you can print the contents of the file list or export it to a file. To print, choose Print from the File menu. If you use Page Setup to reduce the printing size, Retrospect will print a browser in more than one column to save pages. To export to a text file, choose Export from the File menu. Retrospect exports the fields in the following order, regardless of the view format: file name, size, create date, create time, modify date, modify time, backup date, backup time, Mac OS type, Mac OS creator, backup set (if any), and path.

Copying and Pasting Selections

You can copy selections between browser windows. When you copy a selection, only the file and pathname information is copied, not the files themselves. This feature is useful for copying selections from a stand-alone browser window into a browser window opened during a Retrospect operation such as restore.

■ **NOTE:** You cannot paste a copied selection into any other applications or documents.

To Copy Selections Between Browser Windows

Make your file and folder selection then choose Copy from the Edit menu. Open (or bring to the front) the appropriate browser window for the same volume, then choose Paste from the Edit menu. Retrospect pastes the selection into the new browser window, highlighting only the same files and folders (in the same folder hierarchy) which were selected and copied in the other browser window.

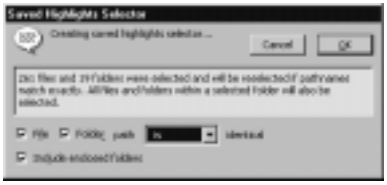
Saving Selections as a Selector

You can also save file and folder selections as a selector that you can use to reselect files for future Retrospect operations on the same volume, including backups and restores.

■ **NOTE:** Before you save a selection as a selector, consider creating a custom selector as described under "Using Selectors" on page 170. You can easily review and modify custom selectors at any time. A selector created with a browser's Save Highlights command cannot be reviewed or modified once it has been defined.

To Save Selections as a Selector

Select the files/folders you want to apply to a selector then click Save Highlights from the toolbar.



The saved highlights selector creation window.

The window that appears tells you how many files were selected and will be selected by this selector if pathnames match exactly. Use the combo box to control whether the saved selector is inclusive or exclusive. This window also includes file and folder options similar to those in the find window, as detailed under "Finding Files" on page 168.

Click OK then enter a selector name to save your new selector.

Rescanning a Volume

You can update the contents of the browser window by choosing Refresh from the File menu. This is useful, for example, if you make changes to the volume (for example, in the Windows Explorer or another browser window) while the volume's browser window is open.

The Refresh item appears in the File menu only when Retrospect is working with a volume directly. For example, you can not rescan a volume when you are browsing a backup set.

Deleting Files

Retrospect browsers have a Delete command to remove files from a volume, which is like placing a file in the Windows desktop's Recycle Bin and emptying it.

■ **NOTE:** Retrospect does not allow you to delete files from a backup set.

To Delete Files

Select the file or files you want to delete in the file list then click Delete from the toolbar. A dialog appears, asking you to specify whether you want to remove the selected files only or remove the selected files and any empty folders that may result from the file deletions. Make your choice, then click OK. Retrospect permanently deletes the selected files from the volume.

▲ **WARNING:** A delete command may not be undone with the Undo command, nor may a file be pulled from the Recycle Bin. When a file is deleted, it is gone.

The browser window toolbar has Delete enabled only when Retrospect is working with a volume directly. For example, you can not delete a file when you are browsing a backup set.

USING SELECTORS

Selectors let you choose files based on almost any criteria, including name, date, type, or size. For example, you can create a selector that will choose all text documents modified after October 17, 1999.

■ **NOTE:** Retrospect's selectors do not select empty folders.

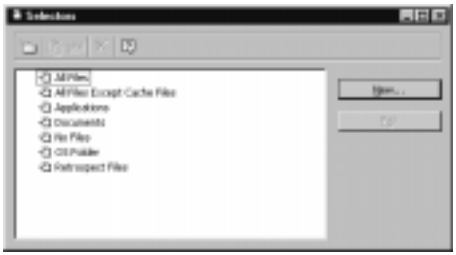
Retrospect allows you to create and save any number of selectors, which you will typically use with scripts to fully automate and customize your backup operations. You can also use Retrospect's built-in selectors. For more information on using selectors in scripts, see Chapter 5 • Automated Operations.

■ **NOTE:** You do not need to use a selector for backing up incrementally. When you do a normal backup, Retrospect automatically performs an incremental backup—copying only files or folders that have been created or modified since the last backup to each backup set.

The Selectors Window

You create and modify selectors through Retrospect's selectors window.

To display the selectors window, first click the Special tab in the Retrospect Directory, then click Selectors. The selectors window lists all of the predefined and user-defined selectors.



The selectors window showing Retrospect's built-in selectors.

The selectors window has two buttons for working with the selectors.

New creates a new selector.

Edit allows you to add new conditions or modify existing conditions for a selector.

The selectors window includes a toolbar. Its items are as follows.

New Folder makes a folder container for organizing selectors.

Duplicate makes a copy of the currently highlighted selector.

Rename lets you change the name of the currently highlighted selector.

Delete removes the currently highlighted selector.

◆ **TIP:** Click the right mouse button in the selectors list to pop up a menu of commands equivalent to the those on the toolbar and the buttons in the window.

Built-in Selectors

Retrospect includes several built-in selectors, with predefined conditions for selecting files.

Some selectors and selector conditions function differently with Windows volumes and Mac OS volumes. Examine a selector's details for more information.

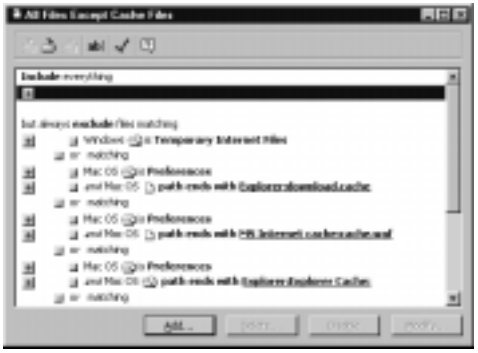
The selectors window lists all the selectors, including the built-in selectors All Files, All Files Except Cache Files, Applications, Documents, No Files, OS Folder, and Retrospect Files.

All Files is the default selector used for immediate operations and scripts. You should use this selector to ensure complete backups.

■ **NOTE:** A file that is marked by a selector will not necessarily be copied to the destination. All copying operations (such as backups) using selectors are "smart," or incremental, because of Retrospect's matching feature. For each selector, there is the implied meaning of "select this file, but do not copy it if it already exists in the destination."

You can easily incorporate these selectors into your own scripts. You can view these selectors to better understand them, and you can even modify them to suit your needs. Do not modify the built-in selectors until you have some experience creating your own. In fact, it is instead better to duplicate a predefined selector and modify the copy.

To view a built-in selector, click on it to select it in the selectors window and click Edit (or just double-click the selector), which brings up a window with the selector's condition details. For example, edit All Files Except Cache Files to display the following window.



The selector details window.

In addition to viewing the selector, this window also lets you modify it to make your own custom selector, explained below.

Selector Conditions

You build a selector by adding conditions for including or excluding files or folders which meet the selection criteria. As you build the selector you can add and relate multiple conditions, and even use logical operators to create sophisticated criteria for file selection.

To view selector conditions, in the selectors window click on a selector then click Edit. The selector details window appears, displaying two distinct areas for adding conditions; one for conditions which include files or folders for an operation, and one for conditions which exclude files or folders.

The + buttons underneath the Include and Exclude headings bring up the conditions window.

The conditions window from the selector details window.

Along the left of the conditions window, Retrospect lists universal, Windows (FAT/NTFS), and Mac OS (HFS) conditions. The universal conditions work with all supported file systems and the others are limited to their respective file systems. You can build your own selectors from these conditions as follows.

Attributes (universal) uses read-only and hidden attributes, in addition to Retrospect's marked and matched attributes.

Client Name (universal) uses the name from Retrospect's client database as the condition.

Date (universal) uses creation, modification, or backup dates as conditions. Windows operating systems do not implement a true backup date for files; they instead use an archive attribute. When the archive attribute is on, one is to assume the file has changed since its last backup and needs to be backed up.

File System (universal) uses the source volume's file system as the condition. Choose Universal for the file system to disregard the file system.

Login Name (universal) uses file sharing owner, group or login names as the condition.

Name (universal) uses the name of the file or folder as the condition.

Selector (universal) uses another selector as the condition.

Size (universal) lets you specify file or folder size as the condition.

Volume Name (universal) uses the name of the volume as the condition. For Windows volumes, this is the volume label shown in its properties, not the drive letter.

Attributes (Windows) uses archive and system flags as conditions. You do not have to use archive flag conditions in selectors to perform incremental backups; Retrospect does incremental backups by default. For more information see "How Retrospect Works" in Chapter 2.

Date (Windows) uses Windows-specific date attributes as conditions.

Drive Letter (Windows) uses the source volume drive letter as the condition.

Path (Windows) uses the path to the file or folder as the condition. Folder hierarchy is delineated by the "\" character.

Special Folders (Windows) uses certain system-defined folders, such as the volume root and profiles, as conditions.

Attributes (Mac OS) uses file attributes (file busy, alias, name locked, stationery, or custom icon) as the conditions.

File Kind (Mac OS) uses file creator and type as conditions.

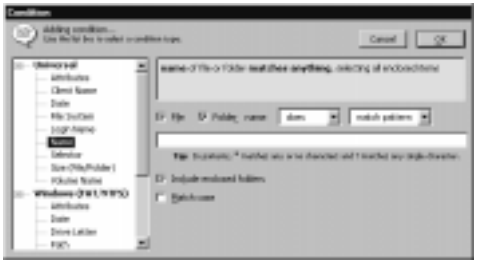
Label, Icon Color (Mac OS) uses a file or folder's label as a condition. The Label menu or submenu in the Finder contains seven labels (and colors, if your monitor displays colors or shades of gray) and the "None" option. Each checkbox in this window corresponds to a specific item position in the Label menu and not to the actual color or label name.

Path (Mac OS) uses the path to the file or folder as the condition. Folder hierarchy is delineated by the ":" character.

Special Folders (Mac OS) uses certain system-defined folders, such as the volume root and control panels folder, as conditions.

Condition Details

Each condition type has its own controls for entering and specifying details for the condition. For example, the universal name condition window is as follows.

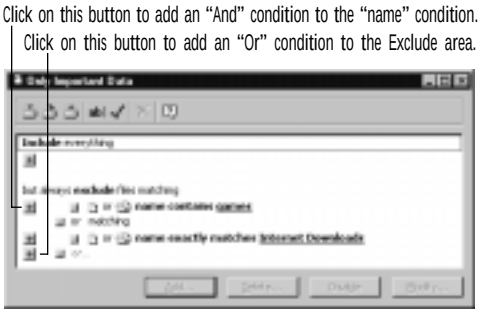


When you add or change a condition it appears in the selector detail window.

You can add multiple conditions to a selector by clicking the + conditions buttons. The location of the + button determines the relationship between the conditions; it may add a condition with the And operator or may add a condition with the Or operator. When you click a + button to open a condition window, the window shows its operator type so you know whether you are And-ing or Or-ing a new condition.

The And operator allows you to combine conditions so that a file or folder must meet the combined conditions before it is selected. Each condition uses an And operator, except each final condition of the Include and Exclude areas.

The Or operator allows you to build conditions where a file or folder must meet at least one condition—but not necessarily all conditions—before it is selected. The last condition under each Include and Exclude area always uses an Or operator.



To gain a better understanding of how this works, follow along with "Creating a Custom Selector" on page 174 and experiment with conditions on your own.

Condition Examples

Table 9-1 below shows an example of a custom selector and its effect when applied to some files.

Precedence

Exclude statements always take precedence over Include statements when Retrospect applies the selector. For example, if a selector has a statement which includes the Profiles folder and a statement which excludes the OS Folder, the files in the Profiles folder will not be marked.

Creating a Custom Selector

Retrospect allows you to quickly build selectors that can perform the most sophisticated file and folder selection. In this example, we create a custom selector which will exclude certain applications and a folder called "Games" from backup.

Creating a New Selector

From the Directory's Special tab, click the selectors button, then click New. Retrospect prompts you to name the new selector. This example uses "Unwanted games and apps" but you can enter a name of your own.

Using this Selector	On these Files	Marks these Files
Include files matching name contains something or matching name contains nothing or...	nothing can survive in a vacuum some things I'd like to say something for nothing something more to give	nothing can survive in a vacuum something for nothing something more to give
Include files matching name contains nothing and name contains something or...	nothing noble in your fate something breaks the silence something for nothing	something for nothing

Table 9-1: Examples of custom selector conditions and their effects.

After typing the name, click New. Retrospect displays a selector details window for the new selector. Notice the window name is the selector name.

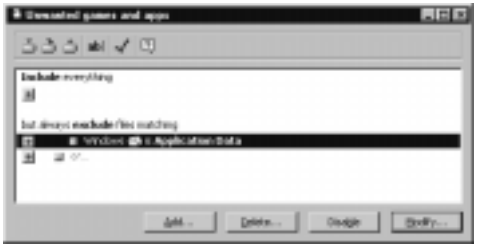
The contents of the scroll box in this window specify the conditions the new selector uses to mark files or folders.

Excluding Files

Click the + button beneath the exclude heading to add a condition. In the condition window that appears, select the Windows special folders condition. Retrospect displays the following window.

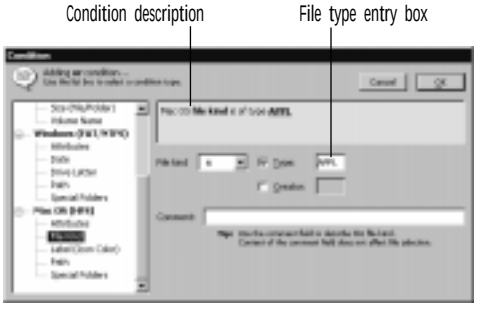
The selector condition window showing Windows special folders condition controls.

This window lets you specify a type of special folder on Windows volumes as a condition. Select Application Data and click OK. The selector details window now reflects our new condition.



At this point, the selector excludes the application data folder on Windows volumes. We are ready to add a second condition.

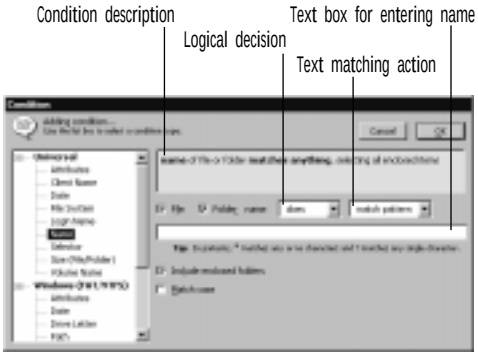
Click the second + button below the exclude heading, which has the word "or" next to its handle icon. In the condition window that appears, select the Mac OS file kind condition. Retrospect displays the following window.



The selector condition window showing Mac OS file kind condition controls.

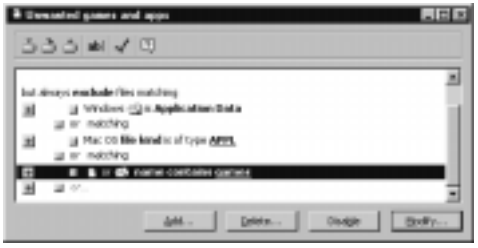
This window lets you specify a file type and/or creator as a condition. The default file kind is a generic application with the type "APPL." Since this is the condition we would like to use in this example, click OK. The selector details window now reflects our new condition.

We are ready to add a third condition. Click the lowest + button beneath the exclude heading and in the condition window select the universal name condition.



The condition window showing universal name controls.

Choose contain for the text matching action and enter “games” in the text box. Leave the other controls as they are. Click OK to return to the selector details window.



Because we added this condition from the lowest + button, Retrospect added the condition to the selector with the Or operator. (Or and And operators are explained on page 173.)

At this point, the selector excludes the contents of the Windows application data folder, all Mac OS applications, and any folder containing the word “games.”

You could save this selector and use it in scripts or immediate operations, including browsing.

Selector Toolbar

The selector details window includes a toolbar with the following commands.

Save

This saves the selector using its current name, replacing what was last saved.

Save As

This lets you save the selector using a different name. Enter the new name in the dialog which follows, then click Save. The original selector remains as it was when it was last saved.

Revert

This lets you discard your current changes to a selector and revert it back to its original state.

Rename

This lets you change the name of the selector. Enter the new name in the dialog which follows, then click Rename.

Check Selector

This lets you test your selector by applying it to a volume. Retrospect asks you to select a volume for browsing with your selector. Do so and it opens a browser window with the files that match the selector criteria marked with checks.

If the correct files are marked, the selector is working correctly and you can begin using it for immediate operations or in scripts.

If the files that are marked are not the correct ones, you need to modify your selector and check it again. You may need to add conditions, delete conditions, or modify the conditions. Pay

close attention to the And and Or operators which may affect the results of your selector. When you have finished modifying your selector, save it and check it again to see if the correct files are now marked. Repeat this process as needed until your selector is working correctly.

Printing a Selector

You can print the contents of selector details windows to keep for reference. To print a selector window, edit the selector and choose Print from the File menu.

Using a Selector in a Script

Once you have created a custom selector, you may use it in any script or operation. Here is how to use one in a backup script:

1. Follow the normal steps to create your script. See Chapter 5 • Automated Operations if you do not know how to make a script.

2. In the script summary window, click Selecting.

3. Select your selector from the window's list.

4. Click OK to return to the script summary window.

5. Close and save your script.

The selector will be applied the next time the script is executed.

Modifying a Selector

Any condition that appears in a selector details window can be modified. After you modify a condition, Retrospect returns to the selector details window, where you can add new conditions or modify existing conditions.

To open a selector from the selectors window, click on the selector you want to modify then click Edit (or just double-click the selector). Retrospect opens the details window for the selector.

To edit a selector's existing condition, select it and click Modify, or just double-click the condition line (except on the + and  icons). In the condition window, you can modify its options and controls. Click OK to accept the changes to the condition.

To add a new condition, click a + icon. (Remember, the + next to the  handle with the grayed-out "or..." adds an "Or" condition, while the other + icons add an "And" condition.) A condition window appears, providing options and controls for the type of condition you chose. Make the appropriate choices and settings in the window then click OK to add it to the selector. The condition window closes and the selector window now displays the new condition.

Disabling Conditions

At any time, you can disable a condition within a selector. When a condition is disabled, it has no effect on file selection and will remain inactive until it is enabled. This feature is useful when a selector becomes very complex and you want to resolve problems by testing parts of it.

To disable a condition, first open a selector and select the condition you want to disable. Click Disable and Retrospect disables the selected condition, displaying it in grayed out text to identify it as inactive.

You can restore a disabled condition by selecting the condition and clicking Enable.

Moving Conditions

Within a selector details window, you can move a condition by dragging the  handle that accompanies the condition description and dropping it at a new location within the window's scroll box.

You can drag any condition to a new location, either in the same group or another group or heading. For example, if you added a name con-

dition under the Include heading, you can change the same condition to an exclusionary condition by dragging it beneath the exclude heading.

When you move a condition, its outline follows the hand cursor, indicating the new location for the condition. Release the mouse button when a new outline appears in your desired destination. After you drop it, Retrospect moves the condition to the new location, inserting it before the outlined destination condition.

To copy the condition, press and hold the Shift key while dragging. Dragging an "or matching" heading moves the entire group. Shift-dragging an "or matching" heading copies the group.

■ **NOTE:** Be careful to pay attention to the operator type (And or Or) of what you are dragging; moving it may change the operator.

Removing Conditions

At any time, you can remove a condition from within a selector.

To delete a condition, first open a selector and select the condition you want to remove. Click Delete and confirm to remove the selected condition from the window.

Deleting a Selector

If you no longer need a selector you can delete it through the selectors window.

To delete a selector, click on the selector to be removed from the list to select it, then click Delete from the toolbar or press the Delete key. A dialog appears, asking you to confirm the deletion; click OK. Retrospect deletes the selector.

Duplicating a Selector

Sometimes, you will want to duplicate a selector so that you can make slight modifications to fit your needs. For example, you may want to modify a copy of one of Retrospect's built-in selectors but leave the original untouched. You can make a duplicate through the selectors window.

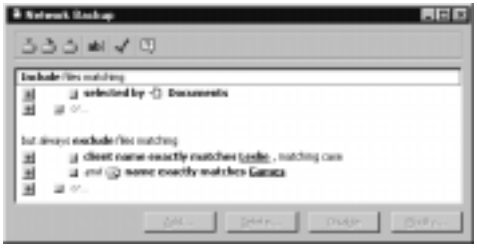
To duplicate a selector, click on the selector to be duplicated from the list to select it, then click Duplicate from the toolbar. A dialog appears, providing a field for entering a new selector name. Type a new name and click New. Retrospect creates an exact copy of the selector, using the name you provided in the dialog.

Selector Examples

Following are examples of selectors and explanations of each.

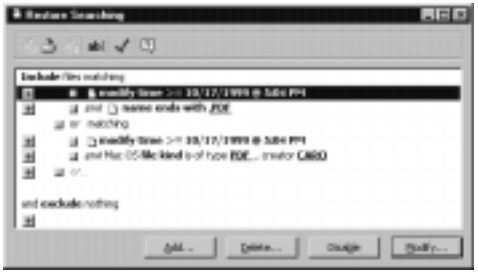
Network Backup Selector

This selector marks all documents to be backed up, except for files in a folder named "Games" on Leslie's client computer. In this example, the backup administrator knows that Leslie has a large folder with games that do not need to be backed up.



Restore Searching Selector

This selector uses a date condition to search for an Acrobat PDF document file that was modified on or after October 17, 1999 at 5:04 P.M. It uses a name condition to find it on a Windows volume and uses a file kind condition to find it on a Macintosh volume. This selector is a good example of how, during an immediate restore operation, you could have Retrospect find a file when you forgot its name. Even though you do not know the exact file name, you know the file was last saved after a certain date and time.



Client Restore Searching Selector

This selector searches for a named file that was created on a particular client user's computer. In this case, the name of the file is "Dissertation" and client's name is "Neil." This selector could be used during an immediate restore operation.

COPY OPERATIONS

Retrospect has two different specialized operations to move files off a volume or move files among backup sets. Archive lets you move files from a volume to a backup set for off-line storage. Transfer lets you copy files from one backup set to another.

To set up a copy operation, first click the Tools tab from the Retrospect Directory.

Archive

Click Copy from the Tools tab. A dialog asks you to choose the type of copy operation you wish to perform.

Leave the Archive radio button selected, then click OK. From this point on, the archive operation is set up just like a backup, as described starting on page 42. The major difference is the additional option of whether to move files, as described on page 140, which deletes the original files from the source after copying them to the destination.

Archiving, by default, does not match source and destination. That is, Retrospect does not compare source files to files in a backup set. This leaves the possibility of it copying redundant files during the archive operation. In this case, Retrospect is foregoing ultimate efficiency for the sake of archive integrity.

Scripting an Archive

When an archive summary window is active, you can click Schedule from the toolbar to save the archive information and settings as a script. You can then use the script to accomplish archive operations. See Chapter 5 • Automated Operations.

Archiving Tips

Media Plan for the long term. Archive to two or more backup sets and maintain an off-site copy of your archived data. Always store media according to manufacturer's guidelines. See "Media Longevity and Storage" on page 40 for further information. Periodically transfer your data to new media to ensure storage integrity. Do not use device-specific options such as hardware compression, because your next backup device may not support features of an older model.

Planning Define an archiving system and follow it every time. Only archive files in specific folders, or modified within a specific date range.

Force users to make a decision on what is to be archived by moving data to a specific location. Never archive data without telling users what was removed.

Before you use the Move files (delete after copy) option, first archive to a different backup set by copying without moving. This provides an extra measure of safety should one backup set become unusable. If you have only a single archive medium and it is lost or damaged, you will have lost all of your data. Be sure not to recycle, lose, or damage your archive media.

Verification Always use verification. If you do not use verification and hardware problems occur when archiving, your data may not be correctly copied to the media.

On-line Archiving To archive documents in place, compress them in a file backup set that you store on your hard disk. This way they take up less room, but are still on-line.

Transferring Files Between Backup Sets

Retrospect's backup set transfer facility can copies one or more files from one or more backup sets to a single backup set. One possible use is to copy all files from a tape backup set to a CD-R backup set. Another possible use is to copy a few selected files from your backup set to a new, encrypted backup set for your business partner.

Because transferring does not match files, you cannot transfer incrementally from one backup set to another. All files that meet the selection criteria will be copied by Retrospect, regardless of whether they already exist in the destination backup set.

The transfer facility does not have a preview feature. You must rely on selectors instead of picking and choosing files by hand.

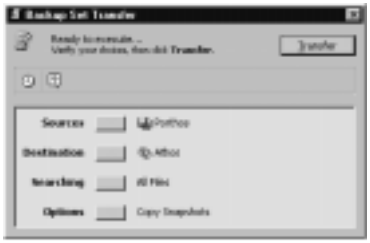
To copy files between backup sets, you must have a separate backup device for each backup set, even if both backup sets are on the same type of media. In the case of file backup sets the need for separate backup devices does not apply.

If you do not have separate drives for each backup set, you can first copy files temporarily to a file backup set on a hard disk and then copy them from the file backup set to the destination backup set.

To copy files between backup sets, click Copy from the Tools tab. The following dialog appears.

Click Transfer and click OK. The backup set selection window appears, asking you to choose one or more backup set sources from which to transfer.

Select one or more source backup sets, and click OK. Another backup set selection window appears, this one asking you for the one to which to transfer. Select a destination backup set, and click OK. Another window asks you to choose file selection criteria for selecting the files to transfer. Specify search criteria and click OK. (For details on using selectors, see "Using Selectors" on page 170.) The backup set transfer summary window appears.



The backup set transfer summary window.

Check that the summarized information is correct.

Transfer Options

If you want to change the default transfer settings, click the Options button in the summary window. The options are described under "Transfer Execution Option" on page 141.

Scripting a Transfer

When a transfer summary window is active, you can click Schedule from the toolbar to save the transfer information and settings as a script. You can then use the script to accomplish transfer operations.

Transfer Execution

When you are ready to proceed and Retrospect says "Ready to execute" at the top of the window, click Transfer and a dialog asks you to confirm the operation; click OK. Retrospect performs the transfer operation, displaying its progress in the execution status window. Retrospect may ask you to insert media.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred, you can see their details in the operations log (which is accessible from the Windows menu and is described under "Viewing the Operations Log" on page 135).

MAINTENANCE AND REPAIR

This section provides instructions for maintaining and repairing catalogs and media by performing the following tasks:

• Update catalogs that are out-of-date or "out of sync".

• Recreate catalogs that are missing or damaged. (If it produces "chunk checksum" errors, it is damaged.)

• Repair damaged file backup sets.

• Verify backup set media integrity to confirm that all files are readable.

To perform these tasks, first click the Tools tab from the Retrospect Directory.

Updating a Catalog

When to Update a Catalog

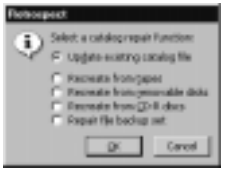
Update a backup set's catalog when Retrospect reports a "catalog out of sync" error while operating with the backup set. You must update the catalog to synchronize it with the media or you will be unable to use the backup set.

A "catalog out of sync" error indicates Retrospect was unable to update the catalog the last time it copied data to this backup set—possibly because of a crash or power failure. This error may also be caused by a full disk or by a lack of memory.

■ **NOTE:** If, after updating a catalog, you continue to get "out of sync" errors when using the backup set, do not attempt to repair the catalog again. You must skip to new media, reset with a full or new backup, or create a new backup set. See page 205 for more information on the error message.

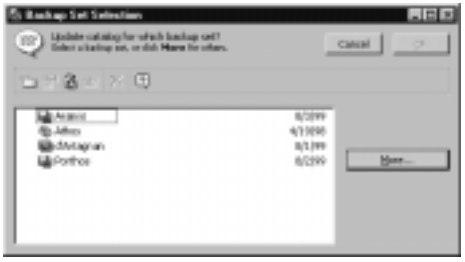
To Update a Catalog

To update a catalog, click Repair from the Tools tab. The following dialog appears.



The catalog repair dialog.

Select Update existing catalog file then click OK. The following window appears.



Select the backup set to update then click OK. Insert the backup set member requested by Retrospect.

Retrospect recatalogs the backup set, informing you of its progress with the execution status window. When Retrospect finishes recataloging a particular member of a backup set it asks whether there are any more members to recatalog.

If there are no more members because you have already given Retrospect the final medium in the backup set, click No to complete the recataloging. If there are more members in the backup set, click Yes. Retrospect continues to ask you for additional backup set members until you click No or Done.

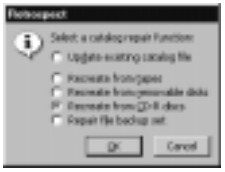
The execution status window informs you whether the update was successful. If the operation was not successful, refer to the operations log for additional information.

Recreating a Catalog

When to Recreate a Catalog

Because you cannot use a backup set unless it has a catalog file, you should recreate the catalog whenever the original catalog file is lost or damaged. If the catalog file is unavailable, you can have Retrospect recreate it by reading each piece of media in the backup set. Recreating may take a long time, depending on the amount of data in the backup set.

To recreate a catalog, click Repair from the Directory's Tools tab. The following dialog appears.



Select one of the Recreate functions then click OK. For a tape, disk, or CD-R backup set, the following window appears.

The media selection window.

In the media selection window, Retrospect requests the first media member of the backup set. If you do not have the first member, insert any other member of the backup set to be recataloged. Click OK when you have inserted the medium.

If you are recreating a catalog for a backup set that is still known by Retrospect, it asks whether you want it to recognize the recreated backup

set instead of the known backup set. Click OK to replace the known backup set.

Next, if the backup set is encrypted, Retrospect asks for its password. Enter the password and click OK.

Specify a location to save the recreated catalog file in the dialog which follows.

Retrospect recatalogs the backup set, informing you of its progress with the execution status window. When Retrospect has finished recataloging a particular member of a backup set it asks whether there are any more members to recatalog.

If there are no more members because you have already given Retrospect the final medium in the backup set, click No to complete the recataloging. If there are more members in the backup set, *even if one or more members are lost or damaged*, click Yes. Insert the requested member of the backup set, or if you do not have it, click Choices and a dialog asks you what happened to the member.

The choices dialog.

If you have already given Retrospect the final medium in the backup set, click Done. If you do not have the requested backup set member, or if it is damaged, click Missing.

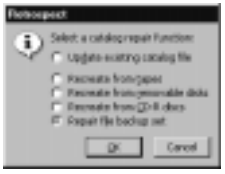
Retrospect continues to ask you for additional backup set members until you click No or Done.

The execution status window informs you whether the recreation was successful. If the operation was not successful, refer to the operations log for additional information.

■ **NOTE:** After Retrospect informs you the recataloging was successful, you should edit the scripts which used the backup set and add the newly-recognized, recreated backup set as the destination within each script.

Repairing File Backup Sets

To repair a damaged file backup set, click Repair from the Tools tab. The following dialog appears.



Select Repair file backup set and click OK. Retrospect displays the backup set selection window.

Locate the file backup set that needs repair and click Open. A message asks you to confirm the backup set repair. Click Yes to repair the backup set.

A status box shows how the repair is proceeding. When it is complete, you are returned to the Retrospect Directory. If the repair was not successful, the execution status window reports errors occurred and you can find them in the operations log.

Incomplete Catalog Repair

When you stop a cataloging operation, the following dialog may appear.

Revert stops recataloging and allows you to continue updating the catalog from the current

medium later. (To continue later, use the Update existing catalog function.)

Save should be used when you do not wish to try to catalog any more data from the current medium. All data cataloged so far should be retrievable. (To continue later, use the Update existing catalog function.) Recataloging will resume with the next CD, disk, or tape, if there is one. If you back up more data to the backup set after using this option, Retrospect will ask for a new medium, treating this one as full.

Verifying Media Integrity

Retrospect can check all files on your backup set media to make sure that they are readable, then report files lost or damaged by media failure. For example, if Retrospect informs you that the file you just retrieved is damaged, you may want to verify the backup set media to ensure that other files are intact.

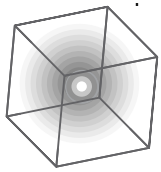
Verifying media does not mean Retrospect compares the files on the media with the original files. It only verifies that the files on the backup set media are readable.

To verify media integrity, click Verify from the Tools tab. Retrospect displays the backup set selection window. Select the backup set to be verified, and click OK. If the backup set is a CD-R, disks, or tapes backup set, Retrospect asks you to insert each backup set member as it is needed.

If you do not have the requested backup set member, but have more members of the backup set to verify, click Choices then Missing, then insert the next requested piece of media.

After verifying the last available member of the backup set, Retrospect displays a final status window, which tracks the number of files verified. If there are errors, a browser displays the files that could not be verified and you should examine the operations log for additional information.

■ **NOTE:** Consider backing up unverified files to a new backup set.



CHAPTER 10

PROBLEMS AND SOLUTIONS

- TROUBLESHOOTING
- COMMON QUESTIONS
- ERROR MESSAGES
- TECHNICAL SUPPORT

This chapter offers solutions to problems you may encounter with Retrospect and its clients. In the next few sections, we present general troubleshooting help, answer frequently asked questions, and introduce you to the same troubleshooting techniques Dantz Technical Support uses to solve problems.

"Troubleshooting" includes common problems encountered during installation and backup and restore operations and offers explanations and solutions. "Common Questions" presents frequently asked questions. These questions do not involve error messages and are more general than the troubleshooting problems. "Error Messages" provides a numerically ordered list of error numbers with detailed explanations. "Technical Support" offers troubleshooting techniques and procedures for getting help.

Each section is organized in the order of the steps you take during installation and log in of clients, and by the steps Retrospect takes during operation and shutdown. It is not necessary to read these start to finish, as the information herein is more for reference than for tutoring. Feel free to go directly to the area that best applies to your situation.

TROUBLESHOOTING

Most problems encountered while using Retrospect fall into a few general categories. Dantz Technical Support follows some basic troubleshooting procedures for each of these categories. With a little effort, you can learn how to troubleshoot many problems on your own. This section outlines those procedures and shows you the most common problems and their treatments.

We recommend that you keep notes of your troubleshooting efforts. Even if you are unable to resolve a problem right away, your notes can establish a pattern of behavior to help us both understand the problem. If, after reading this section, you find you are still unable to solve a problem, contact Dantz Technical Support. Your troubleshooting notes will allow us to get to the heart of the problem more quickly.

Troubleshooting Road Map

The first step in troubleshooting a problem is to isolate the problem by identifying exactly when and where it occurs. Knowing when an error occurs gives you a fixed point of reference to help you solve a problem. Retrospect has different phases of operation. For example, a backup typically includes scanning, matching, copying, and verification phases in that order. If you can determine the problem happens while matching, you are on your way toward solving it. The situations described over the next several pages are listed in the likely order in which they would occur.

Client Configuration Issues

A client in the local subnet or in another Retrospect-configured subnet does not appear in Retrospect's live network window, or appears intermittently.

Use the Test button in the live network window to see if the client is on the network.

Open the Retrospect Client control panel on the client computer and check whether the client software was loaded at startup and whether it is turned on. (If the client software was not loaded, refer to page 212.) Check that its status field says "Ready" or "Waiting for first access." If it is a Mac OS client check that it is actually a TCP/IP client and that it does not say "AppleTalk" next to its version number.

Make sure the client computer is connected to the network and its network settings are correct. See Appendix A • Preparing TCP/IP Software.

Should these measures not work, see "Testing and Pinging to Verify TCP/IP Communication" on page 194. If the backup computer and client ping successfully yet the client still does not appear, your network may not fully support TCP/IP and UDP. Passive networking hardware, such as hubs and bridges, may not forward network information Retrospect needs to work with TCP/IP clients. Retrospect Server Backup's advanced networking lets you directly add a client by its DNS name, WINS name, or IP Address (page 93) and may skirt around the problems and let you work with a client.

After taking the appropriate measure you may log in the client.

A Windows client is not visible to Retrospect, but it returns an IP ping, and the Test button produces error –541.

Retrospect may not see a computer running client software version 1.1 and which has TCP/IP Dial-Up Networking installed. Even though the computers will respond to ping troubleshooting, the Windows client does not appear in Retrospect's live network list, and adding directly produces error –541. Update the client software to version 5.0.

A client outside the local subnet does not appear in Retrospect's live network window.

The live network window shows only clients Retrospect found in a specific network with a specific way of searching for clients.

Retrospect Desktop Backup and Workgoup Backup editions only access clients connected to the backup computer's local subnet. Retrospect Server Backup can also access clients directly anywhere on the network by using an IP address, DNS name, or WINS name. It can also access clients on any network segment you define. See "Advanced Networking" on page 91.

The advanced networking direct access method fails to connect with the client at the specified IP address or name.

Make sure the client computer is connected to the network and its network settings are correct.

Open the Retrospect Client control panel on the client computer and check whether the client software was loaded at startup and whether it is turned on. (If the client software was not loaded, refer to page 212.) Check that its status field says "Ready" or "Waiting for first access."

Make sure the IP address you are using is current. If the client is using dynamic IP addressing its IP address may have changed. It is not a good idea to directly add a dynamic address unless it has a long-term lease. Use the subnet broadcast access method instead.

If you are using the client's DNS or WINS name try using its IP address.

Use the Test button in the live network window to see if the client is on the network.

Ping the computers to check whether they are correctly communicating with TCP/IP. See "Testing and Pinging to Verify TCP/IP Communication" on page 194.

There may be a "firewall" between the client's network and the backup computer's network, restricting outside access. Contact the network administrator.

The advanced networking direct access method added the wrong client.

Make sure the IP address you are using is current. If the client is using dynamic IP addressing (for example, DHCP) its IP address may have changed. Use the subnet broadcast access method instead. Also see "Common Questions" on page 196.

Backup Issues

Immediate backups and scripted backups differ in the way they are started and what they do when they are done. Otherwise, both follow the same procedure after starting: scanning, matching, requesting media, copying, comparing, and then closing.

Retrospect fails to automatically launch to execute a scheduled script.

There are a few reasons why this can happen:

• **Confusion About Start Date** The date you expect a script to run may not be its actual start date. See "Start Date and Time" on page 127.

• **Incorrectly Scheduled Script** Check the list of future scripted operations to confirm that Retrospect has the same schedule you expect your scripts to run. To do this, click Preview from the Retrospect Directory's Automate tab. Check that you have not set a limited schedule of possible execution times with the Schedule preference (page 152).

• **Autolaunch Preference Not On** Check that the unattended execution preference "Automatically launch Retrospect" (page 154) is turned on.

Retrospect crashes while it is being launched.

The Config _5.dat file may be damaged. Move it out of the Retrospect folder (the folder in which the application resides) and try launching again. If this solves the problem, place that suspect configuration file in the recycle bin. (Retrospect creates a new configuration file using the default settings.) If you have a recent backup of this drive and do not want to recreate your scripts and settings and log in clients again, try restoring an earlier version of the Config _5.dat file from a backup.

Retrospect reports an error during scanning or matching.

There may be a problem with the volume being scanned. In this case, Retrospect reports a specific error in the operations log. Look up the error number under "Error Messages" on page 205.

Retrospect does not see the backup device.

If your device is a removable cartridge drive (such as Zip, Jaz, SuperDisk, DVD-RAM, or MO), check that the media is fully inserted and that the volume is accessible from the Windows Explorer.

All devices should be connected before launching Retrospect. Verify the drive is properly connected and terminated then make sure it is turned on. If other devices on the communications bus are off, turn them on and restart. Use Retrospect's Device Status (from Configure›Devices) to review your ID settings. For a SCSI device verify it has a unique SCSI ID number.

A tape or CD-R drive does not appear in the storage devices window.

Go to Configure›Devices and check the device status. If the driver name listed for your device does not appear in boldface, some other software loaded a driver inappropriately, keeping Retrospect from using its own driver. Determine which other device driver is loading and disable it.

All devices should be connected before launching Retrospect.

Make sure ASPI is installed. Run the ASPI check utility from the Retrospect CD. If it reports ASPI is not fully installed on your computer, run the ASPI installer from the Retrospect CD. For more information about ASPI, see "ASPI Explained" on page 28.

Under Windows NT, if the ATAPI miniport driver is disabled Retrospect will not see the ATAPI bus. You must enable the miniport driver by editing the registry key at the path:

\\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Aspi32\Parameters

Set the ExcludeMiniports value data to empty so Retrospect sees all buses.

If you have a new drive model, it may not be supported by the version of Retrospect you are using. To find out if a newer version of Retrospect is required for this drive, first refer to the latest "read me" file, then contact Dantz Technical Support and be ready to describe what information for this drive appears in the device status window.

Retrospect reports "the drive can't be used because no drive letter is assigned" for a CD-R drive that has an assigned drive letter.

Under Windows NT, if the ATAPI miniport driver is disabled Retrospect reports the CD-R drive does not have an assigned drive letter.

You must enable the miniport driver by editing the registry key at the path:

\\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Aspi32\Parameters

Set the ExcludeMiniports value data to empty so Retrospect sees all buses.

Retrospect can't use the inserted disk or tape because it is "busy."

There are several possible causes.

• You saved the disks backup set catalog on a disk that is a backup set member. Catalogs must be saved on different volumes. Move the catalog to your hard disk and drag it on top of the Retrospect application icon to force Retrospect to recognize it.

• You are using the disk as both a source and destination, which is illogical and not allowed. For example, you are trying to back up the 2-Dunsinane volume to the Dunsinane backup set, of which 2-Dunsinane is a member.

• Some other software may be creating or using files (which may be invisible) on your backup disk. Likely suspects are compression programs; see the latest "read me" file for conflicts and workarounds.

• The drive may be malfunctioning. Contact the drive vendor for assistance.

• The tape, disk, or CD may be damaged. Designate it as missing (pages 147, 149) and use a new medium.

Retrospect refuses to use the inserted tape, CD, or disk.

Retrospect has a system for recognizing tapes, CDs, and disks and for adding them to backup sets. If Retrospect is not automatically using the tape or disk you think it should, carefully read the text that appears in the media request window. It explains what media Retrospect needs.

You may not have inserted the exact tape, CD, or disk required by Retrospect. Check that the name of the medium you are inserting exactly matches the requested name. If the name is the same and Retrospect does not proceed with the operation when you insert the medium, you probably have two pieces of media with the same name and are inserting the wrong one. This can happen if you switch tapes, CDs, or disks when you perform a recycle backup to a particular backup set.

Retrospect may require new media. Insert the medium you want Retrospect to use, wait for it to appear in the window, and then click Proceed. Retrospect will not use media that is part of a known backup set, as detailed below. It will automatically use any media that is erased or correctly named.

Retrospect asks for a new CD, disk, or tape, but then complains "You can't use '1-Birnam Wood', it already belongs to a backup set!"

This is a feature designed to prevent accidental erasure. If you are sure you want to erase this tape, disk, or CD and use it for the current backup, click Erase from the toolbar, then click Proceed if necessary. Erasing the medium removes the entry for this disk, tape, or, CD from the backup set it previously belonged to.

Retrospect asks for a particular disk or tape, but then reports '"2-Dunsinane' is not a member of this backup set. Although it is named correctly, it has a different creation date."

This means you have more than one disk or tape with the same name. This can happen if you run a recycle backup to new media and later try to do a normal backup with older CDs, tapes, or disks. If possible, locate the proper disk, CD, or tape for the restore.

Try other disks, CDs, or tapes to see if any match the catalog you are using.

If you are sure this disk, CD, or tape has the files you want, rebuild its catalog. Go to the Tools tab, click Repair, and select the appropriate repair function to recreate the catalog (page 182).

Retrospect asks for a particular disk, CD, or tape, but you do not have it.

If you know where it is, but it is not available right now and you must back up, follow these instructions. Click Choices, then click Skip. Retrospect treats the requested member as if it were full and backs up incrementally to a new piece of media. Files previously backed up to the requested member are not backed up again. Future backups will require the new member and you will need to use both members later if you need to restore.

If you know it is lost, damaged, or erased, follow these instructions. If this is the first member of the backup set, it is easiest to start a new media backup set or run a recycle backup to this backup set. Either way, Retrospect asks for a new disk, CD, or tape, which becomes the new first backup set member. If this is not the first member and you wish to continue backing up incrementally to the members you do have, click the Choices button, then click Missing. Retrospect will start backing up to a new tape, disk, or CD. Files that were backed up to the missing member will be backed up again, if possible, during your next incremental backup.

Retrospect reports a catalog out of sync error at start of backup.

Update your catalog from the media. (See "Updating a Catalog" on page 181.)

Retrospect reports a chunk checksum error.

If the error occurs only with a particular backup set, repair its catalog and try again. (See "Updating a Catalog" on page 181.) Contact Dantz Technical Support if it occurs again.

Retrospect reports verification errors.

If Retrospect reports "different modify date/time…" for a particular file, the most likely explanation is that the file was modified during the backup. In this case, no action is required. When you next back up, Retrospect will re-copy the file.

Errors such as "File … didn't compare at data offset…" or "File … didn't compare at resource offset…" usually indicate a problem with the communications bus (for example, SCSI or ATAPI). Back up again to re-copy the file.

Note, however, that these "offset" error messages usually point to serious data corruption problems you should not ignore. If the error occurs with many or all clients or with a source connected to the backup computer itself, troubleshoot its communications bus. If the error occurs only on a particular source being backed up over the network, troubleshoot the communications bus of that computer and possibly the network connection to that computer. See "SCSI Issues" on page 193 and "Network Troubleshooting Techniques" on page 194. Consider using diagnostic software on affected volumes.

When it has finished executing an operation, Retrospect does not quit, log off, restart, or shut down according to the Unattended preference.

Retrospect quits, logs off, restarts, or shuts down when it finishes only if it is executing an operation in unattended mode and no additional operations are scheduled within the look-ahead period (page 153). Retrospect automatically enters interactive mode when you start an immediate operation and unattended mode when you start a script. While Retrospect is copying, use the Control menu to switch between modes.

A Macintosh client does not shut down after the backup.

Retrospect shuts down Macintosh client computers when all three of the following conditions are met.

• The Shutdown when done option is enabled in the client options of your script (this is the default).

• The client Macintosh is displaying the "waiting for backup" dialog.

• The client Macintosh is not scheduled for another backup within the Look Ahead Time (page 153).

Retrospect is not backing up a particular client volume.

Check that your backup script includes the volume as a source.

Make sure the client volume is not designated as private (page 98).

Make sure the client's volume is mounted for use with the client computer. (Under Mac OS, the volume icon is on the Desktop; under Windows, the drive letter is accessible.)

Use the client container as the source, rather than specific client volumes, to select all volumes connected to the client. Then go to Configure›Clients, get the properties of the client in question, click the properties window's Volumes tab, and choose Client Desktop from the combo box. For more information about using client containers see "Configuring a Client" on page 87.

The client crashes during the backup.

Failing network hardware, a virus, or a software conflict may be causing the client to crash. Use diagnostic utilities to look for viruses and hard disk problems. If it is a Mac OS client, refer to the system extensions troubleshooting techniques on page 195. Use the latest network software which matches your network hardware.

Backup Server Issues

Backup Server indicates "media," but there is a medium in the drive.

Backup Server is reporting it needs a specific media member to back up a source. To determine which backup set needs more media, click the Backup Sets tab in the Backup Server status window and look for any backup set with a status showing "media."

If you have never backed up to the backup set that needs media, Retrospect accepts any new or erased medium. Stop the Backup Server, use Configure›Devices to erase the CD, disk, or tape you want to use, then start the Backup Server again.

If you still cannot determine why Backup Server isn't accepting your medium, start a backup to that backup set using Immediate›Backup. Retrospect displays a window naming the medium being requested.

Retrospect does not quit when Backup Server completes its backups.

Backup Server is optimized to run continuously. If you have other kinds of scripts, they will start at their scheduled times even though Backup Server is still running.

If you schedule the Backup Server to run only part of the time (for example, from 7:00 A.M. until 7:00 P.M. each day), you can quit Retrospect after the Stop time without affecting the Backup Server. Retrospect will automatically launch when the next script is scheduled to start.

The Retrospect Client control panel's Backup Server Schedule was set to "As soon as possible" but the client was not immediately backed up.

The "As soon as possible" preference waits for the Backup Server to poll the client; the client does not initiate contact itself. Meanwhile, Backup Server may be busy backing up other

sources or polling other clients; it may even be inactive, according to its schedule. When Retrospect gets around to polling the client set to ASAP, it backs it up. See "Allow Early Backups" on page 77.

Restore Issues

When you start a restore, you first select the backup set from which you are restoring. You then go through the following stages: selecting a volume (specifying where the files are going), matching or selecting files, requesting media, copying, and setting privileges if necessary.

You have problems selecting a backup set.

If your backup set is not in the list, click the More button. Click Open if the catalog for your backup set is available, or click Recreate to rebuild it from the media.

If Retrospect reports a chunk checksum error after selecting a backup set, see "–641 (chunk checksum failed)" on page 210.

You have a CD, disk, or tape that you want to restore from, but you do not see its backup set in the selection window.

Use Windows Explorer to look for the backup set catalog file on your hard drive. It will have the same name as the CD, disk, or tape in Retrospect's storage devices window. For example, if a tape is named "1-Macduff" look for a catalog file named "Macduff". Double-click the catalog file to show Retrospect where it is.

If you cannot find the catalog file on your hard drive, go to the Tools tab, click Repair, and select the appropriate function to recreate it (page 182).

You cannot find the files you want to restore.

If you are using "Restore files from a backup," be sure the Snapshot you select is for the right volume. By default, the files chosen preview browser shows your files and folders in alphabetical order, organized as they were on the backed-up hard disk. Once you find the file you want, double-click it to mark it for retrieval. If you cannot find your file, choose Find from the Edit menu to search by name or other attributes. A file with a poof icon indicates the file is on a missing member of the backup set.

If you are restoring older versions of files, use "Search for files and folders." Click Searching to tell Retrospect to look for a particular file or folder name, and if necessary click More Choices to use Retrospect's Selector interface for finding files. (See "Restore" in Chapter 4 and "Using Selectors" in Chapter 9.)

While retrieving an older Snapshot from media, Retrospect says no Snapshot is available.

There are two possible causes, which follow.

You turned off the "Save source Snapshots for restore" option (page 142).

You cancelled the backup before it was completed. Retrospect does not save a Snapshot for a volume until the backup is finished.

Retrospect refuses to use the inserted tape, CD, or disk, reporting it is named correctly but has a different creation date.

This means that you have more than one CD, disk, or tape with the same name. This can happen if you run a recycle backup to new media and then try to restore with older tapes, CDs, or disks. If possible, locate the proper medium for the restore.

Try other media to see if any match the catalog you are using.

If you are sure this CD, disk, or tape has the files you want, rebuild its catalog. Go to the Tools tab, click Repair, and select the appropriate repair function to recreate the catalog. (See "Recreating a Catalog" on page 182.)

Retrospect reports the disk is full while copying during restore.

The volume you are restoring to does not have enough space for the files you are restoring. You will need to manage your disk space by moving or deleting files, or avoid the problem by marking fewer files to restore. If you are restoring a volume that was using a compression utility, you may need to restore your files in batches and use your compression utility between restores to make room for the next batch of files.

After restoring, NTFS security permissions are not set.

You must restore by Snapshot and turn on the option "Restore security information" (page 144). See "Restoring an Entire NT Server" on page 121.

After restoring, Mac OS file sharing privileges are not set.

Retrospect will only set the privileges for file sharing and AppleShare while sharing is active. (Note that sharing also had to be on during backup.) Turn on sharing and restore again. (See "Restoring Mac OS File Servers" on page 124.)

After restoring a Macintosh client, documents have generic icons in the Finder.

The Macintosh Desktop needs to be updated after a large restore. Restart the Macintosh while holding down the Command and Option keys to rebuild the Desktop.

After restoring a backup to a new Macintosh hard disk, the volume icon on the Finder Desktop is no longer custom. It is now generic.

Restart the computer.

After restoring, Subvolume definitions for a Macintosh client are wrong.

Subvolume definitions may be re-identified following an operation restoring a large number of folders. The Subvolumes may have incorrect names (because they were re-associated with incorrect folders) in Retrospect's volume selection window and browsers. The cause has to do with the invisible directory identification numbers of folders.

To prevent this rare problem from occurring, erase or format the destination volume before you use Retrospect's "restore entire disk" feature. To avoid Subvolume confusion, check the names and accuracy of all Subvolumes after any large restore operation (such as restoring an entire disk). You will have to re-define each Subvolume on a volume after a full volume restore.

You can't retrieve or restore data to a client.

Take the following steps:

1. Attempt to access the client. From the client database, select the client and click Properties from the toolbar. Click the Refresh button to check whether Retrospect can connect to the client.

2. Go to Configure›Volumes, select the volume to which you wish to restore data, and click Properties from the toolbar. Make sure the volume has enough free space to accommodate the files you want to restore, and that there is no lock symbol on the Attributes line. (If there is no Attributes line it is not locked.)

If you are sure that the volume to which you are restoring data is both unlocked and has free space but you still experience difficulty restoring, refer to Chapter 7 • Restoring for general assistance.

SCSI Issues

If the SCSI chain is not set up properly, communication errors may cause data corruption or system failures during copy operations. The following information is designed to give you guidance when you encounter SCSI problems. See also "SCSI Explained" in Chapter 3, your

SCSI card's user's guide, and the manual that came with your hardware device.

These sample errors can indicate communication errors on a SCSI bus:

• File "Home" didn't compare at resource offset 10,750

• File "Tech Note" didn't compare at data offset 3,253

• Trouble reading: "1-Office Backup 2" (0), error –102 (trouble communicating)

• Trouble writing: "1-Macbeth" (0), error –205 (lost access to storage medium)

These errors can usually be traced to a failure in the SCSI configuration, whether it is termination, a particular device, cabling, or device order. The most common cause of SCSI bus communication problems is improper termination or bad SCSI cables. Try changing terminators, trying a powered terminator, changing cables, isolating the device on the SCSI chain, and moving the device to a different computer. If it is a tape drive, clean its heads and if cleaning does not work, try different kinds of tapes.

Termination

The general rule for termination is to use only two terminators on the SCSI bus, one at the beginning and one at the end. If you have only a single device on the SCSI bus, then only one terminator is needed because your SCSI card should have built-in termination. Some SCSI peripherals come with internal termination built in, and must be placed at the end of a SCSI chain.

Consult your hardware's user guide for its specific termination requirements.

SCSI Cables

Communication problems can be caused by bad or loose-fitting SCSI cables. Check all cables to ensure they are properly seated in each connector. The entire length of your SCSI bus should not exceed 20 feet. Whenever possible, try to use short (12 to 36 inches) cables and avoid cables over six feet in length.

Device Order and Device Conflicts

To avoid problems caused by device order or device conflicts, make sure that each device has a unique SCSI address. To see the SCSI address of every device, go to the Configure tab and click Devices. Then click Device Status to view all of your devices. You may print this window for future reference or to have handy when calling Dantz Technical Support. If problems occur (for example, a device does not appear that you know is turned on and connected), try changing the order of SCSI devices or temporarily removing unneeded devices. Recheck that each device has a unique SCSI ID.

Some devices, such as scanners and removable disk drives, can cause communication failures on the SCSI bus, especially if they are turned off. If you are experiencing SCSI communication problems, make sure all of your SCSI devices are turned on when you use your computer. Even if you are not experiencing SCSI problems, we highly recommend you turn on all SCSI peripherals before starting the computer. Do not turn them off until after you shut down the computer.

Network Troubleshooting Techniques

Testing and Pinging to Verify TCP/IP Communication

Use the Test button in the live network window to see if Retrospect can connect to a computer on the network via TCP/IP and communicate with the client software. Click Test and enter an IP address, DNS name, or WINS name. If Retrospect reports error –541, it connected to the computer at that address but no client software responded. If it reports error –530, Retrospect could not even connect to the computer. Other errors may indicate network and TCP/IP con-

figuration trouble and you should "ping" the backup computer and client computer from other computers to check whether they are communicating with TCP/IP.

Windows computers configured for TCP/IP have built-in ping commands. From a TCP/IP Windows computer on your network, go to the MS-DOS command prompt and type "ping" followed by a space and the IP address.

Mac OS system software does not include a ping utility, but you can obtain a ping-capable utility from the Internet. Such utilities include AGNetTools (www.aggroup.com), IPNetMonitor (www.sustworks.com), Mac TCP Watcher (www.stairways.com), OTTool (www.neon.com), and WhatRoute (homepages.ihug.co.nz/~bryanc).

■ **NOTE:** TCP/IP must be loaded when you ping a Mac OS computer. To ensure it is loaded, open the TCP/IP control panel, un-check the option "Load only when needed" (available only in Advanced and Administrator modes) and restart.

Using an IP pinging utility on the troublesome client computer, first ping the IP address of the backup computer. A reply tells you the pinged computer's TCP/IP setup is operational. If it times out or reports it as unreachable there is a problem with the TCP/IP setup, the network interface hardware, or the network itself.

If pinging the backup computer is successful, use it or another computer to ping the IP address of the troublesome client computer.

Successful pinging does not necessarily mean a client will appear in the live network window. See page 86 and the troubleshooting items on page 186 for more information.

Selecting the Appropriate Network Driver

The backup computer and Windows client computers should be using 32-bit network drivers for best network performance and compatibility. Windows NT uses 32-bit network drivers by default. For Windows 95/98, open the Network control panel and select the computer's network interface adapter. Click the Properties button, select Enhanced mode, and click OK. You may need to get updated software from your network adapter vendor.

Verifying Open Transport Version

To work with TCP/IP, Mac OS clients must have Open Transport version 1.1 or later. Each computer's TCP/IP control panel should be set to always load, as described previously.

Troubleshooting Networks

When you have network problems with Retrospect or clients, start by identifying a pattern of failure. If the problem occurs on a single client, begin your troubleshooting by examining that particular computer. If the problem occurs on multiple client computers, find out if those computers share a common hub, router, bridge, or gateway. You may be able to identify a faulty network component that should be repaired or replaced. If you encounter failures on multiple client computers but cannot identify a pattern, troubleshoot the networking hardware on the backup computer.

Troubleshooting Mac OS Clients

When troubleshooting an individual Macintosh, the first step is to determine whether the problem lies with the Macintosh's software or its network hardware.

Start by limiting extensions and control panels on the client Macintosh to the Retrospect Client control panel, needed networking software, and minimal default Apple system software. Do this with the Extensions Manager.

If the client continues to experience the problem, there may be an incompatibility with networking software. If the client has a third party networking card, update to the latest ver-

sion of its software. If the client uses its built-in Ethernet, get the latest version of Apple's network software installer or Open Transport, available from the Apple Software Update web site.

If the client continues to experience the problem, exchange the network hardware with that of another client Macintosh. Whether it uses built-in Ethernet or an Ethernet adapter card, it is sufficient to exchange all components external to the Macintosh. If the Macintosh has an internal network card, you will need to exchange the card as well. Make sure to exchange the cables along with the other components. After exchanging the network hardware, try an operation with both clients. If the error moves to the other client, then the problem lies in the network hardware.

If the problems persist after minimizing extensions and exchanging network hardware, performing a clean installation of the System software.

COMMON QUESTIONS

Client Setup Questions

How do I find out the IP address of a client so I can access it directly?

It depends on the operating system and how the client computer is configured. If the client has a static IP address you can use it with the direct access method. However, if the client automatically obtains a dynamic IP address from a DHCP server you probably should not be using the direct access method. Dynamic IP addresses may change later and Retrospect may find a different machine at that address if you directly added a dynamic IP address. You should use multicast or subnet broadcast instead.

Here's how to determine a computer's IP address and whether it is static or dynamic.

Mac OS Open the TCP/IP control panel on the client. It shows the "IP Address" the computer is currently using. Above the IP address is the Configure pop-up menu. If it shows "Using DHCP Server" it is a dynamic address. If it shows "manually" it is a static address.

Windows 95/98 From the Run dialog or the DOS prompt, enter WinIPcfg, which shows some configuration information in a window. Click its More Info button to see the full configuration.

Windows NT and 2000 Open the DOS prompt and enter "IPconfig -All", which lists the full IP configuration.

All Windows Systems The IP configuration information shows the IP address the computer is currently using. It shows whether the computer is using a DHCP server and, if so, shows the lease dates of the automatically obtained IP address. If it does not show DHCP server and lease information, the IP address was specified manually (that is, it is static).

Client Configuration Questions

How do I change the name of a client?

The client is named when it is first accessed from the backup computer.

If a client has already been logged in and you want to change its name, go to Configure› Clients, double-click the client to be renamed, then click the Tools tab in the client properties window. Click the Rename button and enter a new name.

The name change will not affect previously backed up files—they are still stored under the old client name. New files and Snapshots will be stored under the new name.

How do I log in a client when I forgot its password?

You must uninstall the client and install new client software with a new password.

How can I get back a client volume after accidentally using Forget?

If you forget a client's volume, you can put it back into Retrospect's volume lists by configuring the client (page 87). Remember to add the volume to the appropriate scripts, if necessary.

Backup Questions

How do I back up only files that have changed?

Retrospect does this automatically. The first time you back up, Retrospect copies all selected files. On subsequent normal backups, it copies only the selected files that are new or changed.

How do I specify complete or incremental backups?

Specify the backup action (page 22): recycle, normal (incremental), or new media. Do this when executing an immediate backup, by changing the backup options (page 140). Do this when running a script by selecting an item from the manual execution dialog's combo box (page 67). Do this beforehand when scheduling a script (page 64). Finally, you can do this by configuring the backup set and using Retrospect's media control feature (page 148).

How do I back up multiple volumes to the same CD, disk, or tape?

Use the same destination backup set. To back them up at the same time, select each volume you want to back up in the volume selection window. You can make a non-contiguous selection using the Control key or select a range of volumes using the Shift key (page 162). When you execute the backup, Retrospect backs up each of the selected volumes, one after another. You can later do normal backups of other volumes to the same backup set and Retrospect will add them to the medium until it is filled.

How do I quickly start a backup?

First create a script in Retrospect. Then create and use a run document (page 68) to start that script directly from the Windows Explorer.

How do I include or exclude files with particular attributes?

You can specify which files Retrospect backs up by using selectors. These allow you to include or exclude files by their size, kind, dates, and many other attributes. See "Using Selectors" on page 170.

Network Backup Questions

How do I see what was backed up last night? How can I tell if everyone has been backed up by the Backup Server?

The Backup Report shows a summary of the backup operations for each volume. To view the report, click Report from the Retrospect Directory's Reports tab. See page 133.

The operations log shows by date and time which volumes were backed up, how much data was copied, and whether the backup completed successfully. To view the log, click Log from the Retrospect Directory's Reports tab. The log also lists any errors which occurred. See page 135.

To view files backed up during the most recent backup, choose Reports in the Retrospect Directory and click Contents. Select the appropriate backup set from the top list in the contents report window, select one or more sessions from the bottom list, and click Browse. A browser appears, listing the files in the order they were backed up. See page 137.

To see all files on a particular volume at the time of a given backup, set up an immediate restore. Select the desired backup set and volume Snapshot. From the summary window, click Files

Chosen to get a browser showing the volume. See page 47.

Can more than one backup computer run on the same network at the same time?

Yes, you can run multiple backup computers at the same time on the same network with no problems, though when they transfer data at the same time both backups will probably slow. If you run backups in different physical network segments, traffic on one segment will not affect other segments.

I want to make a computer on a different network segment the backup computer. What should I do?

Moving to a new backup computer is explained in detail in Chapter 8 • Management, which starts on page 129.

How can I use multiple network cards on the backup computer?

Retrospect Server Backup allows you to access all clients from multiple subnets without crossing your network backbone. Connect each network interface card to a separate network segment and use Retrospect Server Backup's advanced networking features (page 91) to configure a separate interface for each card/subnet combination.

What is Retrospect's network port number?

Retrospect uses a well-known port, 497, assigned by the Internet Assigned Number Authority (IANA), for both TCP and UDP.

How many client computers can I back up from a single backup computer?

There is no fixed limit to the number of clients you can access from one backup computer. It is not a question of numbers, but more a question of resources. You can back up more clients with a faster backup computer, a faster backup device with higher capacity media, and simply more time to do the backups.

If the backup computer is not completing backups in its scheduled time periods or if you want volumes to be backed up more often than they are, you may need a faster backup computer or a faster backup device, if not both. You may find helpful information under "Managing Resources," which starts on page 75.

Why do my network backups take too long?

For a discussion of backup performance, including guidelines for estimating your backup speed, see "Network Backup Guidelines", and "Choosing the Backup Computer" in Chapter 6. If you notice that your backups have suddenly become much slower, or if one particular client backs up more slowly than others with a similar configuration, you may be experiencing a problem. Potential problems may lie with the following:

• **The amount of activity on the backup and client computers during the backup.** Other applications running on either computer draw processing power away from Retrospect. Try a backup with Retrospect as the only application running on the backup computer for optimal performance.

• **The amount of data being copied.** Recycle backups tend to show higher performance figures than incremental backups. For each backup, Retrospect must spend time examining the entire volume to determine which files need to be backed up, regardless of the amount of data that needs to be backed up. The ratio of this overhead time to total backup time will be higher for a small amount of data (incremental backup), as compared to a large amount of data (for a recycle backup or when an empty backup set is first used in a normal backup). Backups of small amounts of data may therefore report slower performance times than backups of large

amounts. Table 10-1 below shows actual data from several backups. Performance figures for the recycle backup are much higher than for subsequent backups of the same client due to the lower proportion of overhead time to the amount of data actually backed up.

• **The total number of sessions for which a backup set has been used.** The greater the number of sessions created, the longer Retrospect takes to match sessions to determine what files need to be backed up. Periodically resetting your backup set with a recycle backup or adding new media to your rotation using a new media backup will limit the number of sessions in your backup set, thereby speeding up both your backup and restore operations.

• **File sharing.** File sharing slows copying on both clients and the backup computer. Turning off file sharing when it is not needed can help optimize network performance.

• **Backing up across network segments.** The backup computer and a client may reside on two physically different networks connected by a bridge or router that may slow the progress of data from one machine to the other. Backup performance may also suffer if the two networks vary greatly in terms of their relative network activity or performance. You can confirm the speed of the connection between the backup computer and the client by getting properties from Configure›Clients. If the echo time seems higher than under normal circumstances (for example, consistently above 0.3) or the KB/second performance figure seems lower than normal, a network problem may be affecting your backup speed. Get properties to view the performance figures for various client computers and compare them to determine current levels of network performance.

• **The performance of the backup and/or client computer.** Problems with either machine affect the speed of your backup. Specifically, you should check for hard drive fragmentation, problems on the SCSI bus, and network problems (page 194).

• **The speed of the backup computer.** Different computer models feature various central processing units with various clock rates (for instance, a relatively slow Pentium or a relatively fast Pentium III) that determine how quickly they perform tasks. The performance of similar CPUs also varies based on their clock cycles (as expressed in megahertz). Finally, the speed of the SCSI bus varies among the different expansion cards, influencing how fast each computer can transfer data across its SCSI bus. For optimal backup performance, assign a relatively fast computer to run Retrospect.

• **Using encryption or software compression.** If possible, avoid using encryption on the backup media or link encryption for client computers. Encryption requires additional processing power the backup computer would

Backup Action (iteration)	Number of Files	Megabytes Copied	Time (mm:ss)	MB per minute
Initial Backup	8345	719.6	24:00	30
Incremental (1)	51	5.7	00:22	15.4
Incremental (2)	360	19.7	01:26	13.8
Incremental (3)	43	5.7	00:25	13.5
Incremental (4)	53	6.1	00:30	12.6

Table 10-1: Sample values for client backups over an Ethernet network.

otherwise use to increase backup performance. Whenever possible, use hardware compression (if your tape drive includes hardware compression capabilities), since hardware compression works faster than software compression. Because backup speed influences tape capacity, hardware compression also allows more data to fit on a tape.

How do I determine a working speed threshold for the client execution option?

Get the properties of several different clients from the clients database window. For about a minute, observe the speed of each client.

Can Retrospect shut down a Windows client computer when it is done with its backup?

No. The Retrospect client software for Windows does not support software shutdown because most PCs must be turned off with a hardware switch.

Can I duplicate the system from one Windows computer to another?

No, because too much of a Windows computer's information is specific to that computer. Each card, peripheral, and software program requires specific settings which are unlikely to carry over from one PC to another, even if they were identical models and configurations.

Do I have to upgrade my clients to the latest version?

Dantz strongly recommends using the latest version of the Retrospect client software with clients used with the latest version of Retrospect.

How can I prevent the "waiting for backup" dialog from appearing on Macintosh clients on nights when no operation is scheduled?

The Retrospect Client control panel has no way of knowing when an operation is scheduled to occur, so it always waits at shutdown if this option is turned on in the Retrospect Client control panel preferences dialog. There are several ways to get around this if you do not perform operations every night.

Make a script using the No Files selector then schedule it to run on nights when no backups are scheduled. Retrospect shuts down the script's Macintosh sources.

Tell users which days they should click the Shut Down button in the "waiting for backup" dialog when they leave for the day.

Turn off the Wait at Shutdown preference in the Retrospect Client control panel on each user's Macintosh. Tell the users which nights to leave their Macintosh computers on. Remind them to turn down the monitor brightness or turn off its power to prevent screen burn-in.

I have a Macintosh client with a PPP dial-up configuration for the Internet. Will it still work over my local network with TCP/IP?

No, because Open Transport is not truly multihoming (that is, it cannot have dial-up Internet access and local Ethernet TCP/IP working at the same time). You can maintain multiple TCP/IP configurations, manually switching from dial-up for Internet work to local network for Retrospect work. If you forget to switch from the dial-up configuration to the local network, the client software will fail to work with TCP/IP.

But what about Open Transport 1.3's multihoming? Won't it let me have both Ethernet TCP/IP for backups and dial-up PPP for Internet access?

Single link multi-homing (available in Open Transport version 1.3 or later) allows you to assign more than one IP address to a single physical network adapter. Unfortunately it only applies to local network adapters, not to PPP connections, so it is not a solution.

Will Retrospect wake a sleeping PowerBook Mac OS client to back it up?

Retrospect cannot wake a PowerBook in sleep mode, but a PowerBook will not go to sleep while it is plugged in and AppleTalk is on.

Restore Questions

I thought I just restored some files. Where are they? Where did they go?

Look on the root level of your hard disk for a folder with the same name as the backup set from which you restored.

Does Retrospect restore empty folders?

Yes. Empty folders are restored when you do an immediate restore from a Snapshot using Restore an entire disk, the top option in the restore dialog, and choose any item except "Restore just files" from the combo box of destination actions.

How do I restore empty folders without restoring the entire hard disk?

Go to Immediate›Restore and in the dialog which follows, select "Restore an entire disk" (the top radio button). Then select the source backup set and SnapShot. At the destination window, select your target volume and, from the combo box, choose any restore method other than "Retrieve just files."

In the files chosen browser, double-click either the root of the source volume or an entire enclosing folder which contains empty folders. Empty folders will be highlighted but not marked. When you execute the restore, all the enclosed empty folders will be restored. No other combination of restore types or file selection will restore any empty folders.

▲ **WARNING:** Be very careful when restoring. If you choose Restore entire or Replace corresponding files in the restore method combo box, Retrospect will replace and/or delete files on the destination volume.

I backed up multiple volumes using a single backup script. How do I restore all of the volumes at once?

Create and schedule a restore script for the first Snapshot you wish to restore. Duplicate this script. Edit the copy of the first script, changing the source and destination to reflect the next Snapshot to restore. Repeat this process for each volume you wish to restore. Retrospect runs each script, one after the other, alphabetically by script name, starting at the time you specified.

Backup Set and Catalog Questions

What if I forget my catalog?

If you forget a backup set catalog from within Retrospect, its file remains on your hard disk until you drag it to the recycle bin. If you have mistakenly told Retrospect to forget a catalog, you can open the catalog file from within Retrospect or from Windows Explorer. After forgetting a catalog, you must add the backup set to your scripts again because Retrospect removes them when you forget the catalog.

What if I lose my catalog?

If you lose your backup set catalog (perhaps because it was deleted, corrupted, or lost), you can have Retrospect recreate the catalog by scanning all of the tapes or disks in the backup set. See "Recreating a Catalog" on page 182.

It may take several hours to recreate a catalog if there is a large amount of data in the backup set.

Can I delete files from a backup set?

No, you cannot delete files from a backup set because most types of storage devices do not allow it. If you want to keep only selected files from a backup set, you can copy these files to a different backup set using Retrospect's backup set transfer operation. See "Copy Operations" on page 179.

Can I rename a backup set?

Retrospect has no facility for renaming backup sets but you can rename a file backup set in the Windows Explorer. (Other types of backup sets cannot be renamed.) Open the file backup set after you rename it to make Retrospect recognize the change.

Can I put more than one backup set on a tape, disk, or CD?

You cannot have more than one backup set on a tape or CD but you can have multiple file backup sets on a disk. When you add a medium to a backup set, Retrospect reserves the entire medium for that backup set.

You can, however, back up as many volumes as you want to a single backup set (page 197).

What is the best way to manage catalog files?

Catalogs typically contain about 4 MB for each 10,000 files you back up. Keep your often-used catalogs on your hard disk. If you do not have enough room on your hard disk, here are a few alternatives:

• Store infrequently used catalogs on a file server.

• Archive old catalogs to their own backup set.

• Compress the catalogs. See "Configuring Backup Sets" on page 148.

I back up by moving a tape drive from computer to computer. What is the best way to do this?

It is not necessary to create a separate backup set for each computer unless you plan to use a different tape for each workstation. If you use a single backup set for the computers, do not do a recycle backup of each workstation; use normal backup only, and new media backup when you need to rotate media.

After each backup, copy your backup set catalog to a server or removable disk and then, once you move to the next computer, copy the catalog to its hard disk. You may want to use Retrospect's catalog compression option (page 148) to keep the catalog as small as possible.

Alternatively, keep the catalog on a server accessible from each computer. This, though, assumes all of your computers are connected by a network, in which case you will save yourself a great deal of trouble by purchasing Retrospect Clients. For less than thirty dollars per client, Retrospect client software allows Retrospect to back up Windows and Mac OS computers over a network without moving the backup device.

What are the consequences of not saving Snapshots to save time and space?

Turning off the Save source Snapshots for restore option (page 142) mainly makes it harder to view or restore a volume's folder hierarchy.

Without a Snapshot, you cannot:

• restore a volume to its exact state as of a given backup, as you would after a crash, for example;

• restore the Windows registry (necessary when restoring an entire disk);

• restore NTFS security information;

• restore empty folders;

• browse a volume backup for restoring.

Should you need to restore files, you will have to use a selector (and/or browse "flat files" without hierarchy) to choose which files to restore—a time-consuming process.

Devices and Media Questions

Why are my DAT tapes filling up sooner than I expected?

Drives using the DDS-1 format support 60 or 90 meter tapes for an uncompressed data capacity of about 1.3 GB or 1.9 GB, respectively. Drives using the DDS-2 format support 120 meter tapes for an uncompressed data capacity of about 4 GB. Drives using the DDS-3 format support 125 meter tapes for an uncompressed data capacity of about 12 GB. Drives using the

DDS-4 format support 150 meter tapes for an uncompressed data capacity of about 20 GB.

For typical everyday use, when your tape is full, it may store up to 30% less data than its ideal maximum capacity.

If you use a drive with hardware compression, you can effectively increase the capacity of your tapes. Your tape's actual capacity will depend largely upon how well the data you are copying compresses. Text compresses well, for example, but applications do not.

If you back up many small files or back up files over a network, your tape's actual capacity will also decrease.

Retrospect requests a new tape for one of three reasons:

• The tape drive reports the current tape is full.

• An error occurred while writing to the tape. Open the log to see if an error occurred.

• You selected Skip or Missing while configuring a backup set, or you are performing a new media backup.

How much space is left on my tape?

Retrospect estimates your tape's capacity to help you manage your backup. To view this estimate, click backup sets from the Retrospect Directory's Configure tab. In the backup set selection window, select your backup set and click Properties. The window that appears lists the estimated available space on that backup set's current member.

This estimate is only to help you gauge when Retrospect will request new media. Regardless of the estimated available space, Retrospect uses a member until the tape drive reports the tape is full.

Because many tape drives do not report a tape's capacity dynamically, Retrospect's estimate may be inaccurate. To change the estimate to match your tape's actual capacity (based on your own experience), see "The Options tab" under "Configuring Backup Sets," which starts on page 148.

What do I do when I know my tape or disk is going to fill up during tonight's backup?

If you think there is not enough space for the next backup on the current tape or disk of your backup set, you can tell Retrospect to ask for a new one.

To skip to a new member, see "The Options tab" under "Configuring Backup Sets," which starts on page 148. The next time Retrospect adds files to that backup set it will ask for new media, in effect skipping over the blank space at the end of the current member.

If this situation arises frequently, consider using Retrospect's Automatic skip to blank media preference. When this preference is on, Retrospect automatically uses any erased media if the current member is not available.

You might also consider purchasing a tape library, a backup device which holds a magazine of many tapes. When one tape fills, Retrospect uses an empty tape from the magazine.

When I try to erase a tape or disk Retrospect asks for the catalog file, but I no longer have it. How can I erase the tape?

When you erase a disk or tape, Retrospect tries to remove the member's contents from the catalog for that backup set. If it is missing, Retrospect asks you for it. You need to tell Retrospect to forget the catalog because it is gone, which will then allow you to erase the tape. Go to Configure›Backup Sets and Forget the backup set then go to Configure›Devices and Erase your tape.

If I have two tape drives, will Retrospect use them both when performing unattended backups?

Yes it will if the devices are similar, such as two DAT drives or two AIT drives. When it fills up a

tape, Retrospect looks in any available drive for any tape that is new or erased, or has the correct name.

How do I start over at the beginning of the tape?

Insert the tape, click the Configure tab from the Retrospect Directory, and click Devices. The devices window that appears shows you the name of the tape. Select the tape and click Erase from the toolbar.

How do I recycle tapes from old backup sets?

To re-use a tape from a backup set that you no longer need, insert the tape, click the Configure tab from the Retrospect Directory, and click Devices. The storage devices window that appears shows you the name of the tape. Select the tape and click Erase from the toolbar. The next time Retrospect requests a new member for a backup set, it will automatically use this or any other erased tape in the backup device.

You should also remove the old backup set's catalog. Click Backup Sets from the Retrospect Directory's Configure tab. In the backup set selection window that appears, select the old backup set and click Forget from the toolbar. Drag the old backup set catalog file to the recycle bin.

How do I determine the name of a certain tape?

To view the name of a tape, click Devices from the Retrospect Directory's Configure tab. Retrospect scans for available tape devices. The storage devices window appears, listing each tape drive, its type and status, and the name of the inserted tape. Insert the tape if you have not done so.

Once you know the name of a tape, use a soft-tip pen and the manufacturer's adhesive labels for the tape cartridge.

Can I use my audio DAT deck for backup?

No.

Can I use audio DAT tapes in a DAT drive?

No. While audio-grade DAT tapes can be used in some computer DAT drives, we recommend data-grade media. Data-grade tapes must pass more stringent testing than audio-grade tapes. More recent computer DAT drives recognize only Media Recognition System (MRS) data-grade tapes.

Miscellaneous Questions

In summary windows and browsers, why do the file sizes reported by Retrospect differ from the Windows Explorer?

The discrepancy in size is due to the difference between any given file's logical size and its physical size. The logical size of a file is the actual number of bytes the file contains. The physical size is the amount of space the file occupies on a hard disk or other volume. This physical size varies for a given file depending upon where you store the file (for example, on a floppy disk or a hard disk). Retrospect reports a consistent size based on the physical size of a file, regardless of where you store the file.

How do I get rid of a backup set I don't need anymore?

Click Backup Sets from the Retrospect Directory's Configure tab. In the backup set selection window, select the backup set to be removed and click Forget from the toolbar. This removes the backup set from the destination lists of all your scripts. To remove a backup set completely, you must also drag the backup set's catalog file to the recycle bin with Windows Explorer. Erase tapes with Retrospect (page 38) and erase disks with Windows Explorer.

How do I get rid of a volume that no longer exists?

Click Volumes from the Retrospect Directory's Configure tab. In the volume selection window,

select the volume to be removed and click Forget from the toolbar. This removes the volume from the source lists of all your scripts.

When I quit Retrospect, how can I prevent the message that tells me the next time Retrospect will execute?

Click Preferences from the Retrospect Directory's Special tab. Select the Notification Alerts Preferences category and turn off Check validity of next script.

Where are my scripts stored?

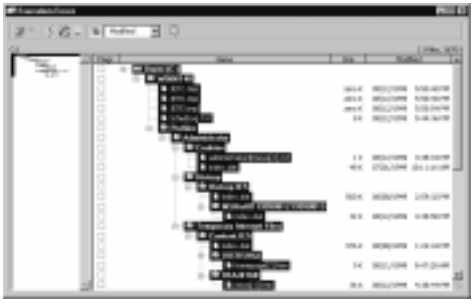
Your Retrospect scripts are stored in the Config_5.dat file in the Retrospect folder. Many other customizations you make to Retrospect are stored there as well.

ERROR MESSAGES

Retrospect Errors

Execution Errors Browser

When Retrospect detects compare errors while backing up, write errors while retrieving, or read errors while retrieving or verifying, it opens a browser displaying the files involved. The execution errors browser may be printed for reference, or copied and pasted into another browser for easy re-selection. An example errors browser follows.



The execution errors browser window.

Look in the operations log for the error message associated with each file and act appropriately.

When Retrospect is performing operations over the network, either the client or the backup computer can generate errors, which are then reported by Retrospect on the backup computer. In general, errors that are reported at the client occur when the Retrospect client software surveys the system and determines that Retrospect will not be able to use it over the network.

Catalog out of sync

Retrospect was unable to update the catalog the last time it copied data to this backup set.

This may have been due to equipment failure or power failure, or was caused by a full disk or by a lack of memory.

Repair the catalog. See "Updating a Catalog" on page 181.

If updating the catalog does not eliminate the "catalog out of sync" error Retrospect cannot add files to that tape. You have three options:

• Perform a recycle backup, which resets the catalog and erases the media, removing its existing backup files.

• Skip to a new medium with media control (page 148), forcing Retrospect to use a new piece of media for the next backup.

• Create a new backup set and do a backup to new media.

Resynchronizing (slow)

When Retrospect reports this message during a catalog update or a backup set recreation, the backup set medium in use may be damaged.

If this message appears for more than about fifteen minutes, stop the recataloging or recreation and save the partial session. You will not be able to add any more data to the medium. The next backup to this backup set will require a new or erased medium.

This error can indicate SCSI communication problems. See "SCSI Explained" in Chapter 3,

and “SCSI Issues” under “Troubleshooting,” which starts on page 186.

Bad backup set header

Retrospect encountered a missing or damaged file header, which contains information such as the file’s name and size.

This error can indicate SCSI communication problems. See “SCSI Explained” in Chapter 3, and “SCSI Issues” under “Troubleshooting,” which starts on page 186.

Content Unrecognized

Retrospect can see data on the medium, but the data is not recognized as data formatted by Retrospect. With a removable cartridge, the unrecognized content most likely is other files, which you may not want to lose.

▲ **WARNING:** When a floppy, Zip, Jaz, SuperDisk, DVD-RAM, or MO disk shows as Content Unrecognized, use caution. Any files on a disk are permanently removed when Retrospect uses the disk in an operation with a disks backup set.

For tapes this usually means that the tape was damaged, used by an incompatible backup program, or used with an incompatible drive. This often results with tapes used with hardware compression drives then used with drives which do not support the same hardware compression. Do the following to troubleshoot:

• Make sure the tape you are inserting is compatible with your tape drive. For example, DDS-4 150 meter tapes cannot be read by DDS-1, -2, or -3 drives. Refer to the “read me” file for current information on tapes that each tape drive supports.

• Clean your tape drive and continue to clean it according to your drive vendor’s recommendations. Tape drives need to be cleaned regularly with special cleaning cartridges (page 36).

• Check if other tapes also show as content unrecognized. If only one tape does then either it is damaged, it has been written to by other backup software, or it was created in a different, incompatible tape drive. If all tapes are unrecognized, then they were either all created in a different tape drive, there is a problem with your SCSI configuration, or your tape drive may be broken. See “SCSI Issues” on page 193 for detailed instructions on troubleshooting your SCSI bus. Contact Dantz Technical Support to find out if one tape drive is compatible with another.

• If possible, try your tape or tapes in a compatible tape drive. If tapes are recognized in one drive but not another of the same type, it is possible that one drive needs repair. Contact your drive vendor for advice before assuming a drive needs repair.

Media too different

Retrospect reports that your media is too different in two cases:

• You are trying to append to a tape backup set that is damaged. If you crashed or experienced a power failure while last writing to your tape and are now getting this error when trying to append, your backup set is damaged. You will not be able to append to this backup set, but you can retrieve all files from it. Create a new set, or do a recycle backup to this set if you wish to start over. The media is not damaged, but the backup set is damaged such that Retrospect cannot append to it.

• You are trying to append to a tape backup set using a different drive family. For example, you backed up to the first member with a Travan drive, then you got an AIT drive and skipped to a new member for your next backup. Use similar drives when creating mixed drive backup sets.

Verification Errors

The following messages indicate an error while comparing to verify files:

• File “Home.html”: different modify date/time

• File “Bore Dimensions”: didn’t compare at data offset 263,078

• File “Port Flow specs”: didn’t compare at resource offset 731,429

A verification error occurs during verifying (page 140) when Retrospect determines a file it copied to the destination is not identical to the file copied from the source. The file in question is not considered valid in the destination. If this happened during a backup, for example, Retrospect would try to copy the file again during the next normal backup to this backup set.

When you know the file was in use at the time the copying was done, a verification error is usually nothing to worry about. It simply means the file changed between backup and verification. Verification errors which mention data or resource offsets usually indicate problems with the communications bus. See “SCSI Issues” on page 193.

Error Numbers

–102 (trouble communicating)

The backup computer lost contact with the backup device.

Check the communications bus and device cabling, termination, and settings. See “SCSI Issues” on page 193.

–107 (out of application memory)

There is not enough memory available to Retrospect for it to continue the operation. This error occurs most often when scanning volumes and catalogs.

Retrospect may report this error when other applications are using most of the memory or your computer does not have enough RAM installed.

Try exiting your other applications, restarting, or adding more virtual memory swap space to make more memory available to Retrospect. Repeat the operation which brought about the error.

–203 (hardware failure)

The backup device is having problems because of a bad medium, a communications problem, or a mechanical error.

If the error occurs only when you use a particular medium, that medium is probably damaged. Try using a new medium. If the error occurs when you use any medium, you may have a problem with your SCSI chain or device. Try turning off the backup device and computer for two minutes and then turning them back on again. See “SCSI Issues” on page 193 or call Dantz Technical Support for more information.

–204 (device busy)

This error will likely occur if you store the catalog for a disks backup set on a disk used as a member of that backup set. Keep the catalog on your hard disk.

–205 (lost access to storage media)

Usually indicates the SCSI or ATAPI bus was reset during a backup, causing Retrospect to lose contact with the tape, disk, or CD.

This error usually indicates a communications bus problem and may be accompanied by an error –102 (trouble communicating). If error –102 accompanies error –205, see “SCSI Issues” on page 193. If error –102 does not accompany error –205 and communication problems have been ruled out, the next step is to check for media failure on the source volume. Some hard drives reset the bus when they sense they are experiencing a media failure. Try testing the hard drive with the software that was originally used to format it.

–206 (drive reported a failure, dirty heads, bad media, etc.)

There is trouble reading from or writing to the backup set medium. This error is always gener-

ated by the backup device, and is usually due to one of four causes.

• The media is physically defective and needs to be replaced. Try using a different tape, disk, or CD.

• The heads on the tape drive are dirty and need to be cleaned. Consult the manual that came with your tape drive or contact the drive manufacturer for cleaning recommendations.

• Another device is causing interference. If you have a drive immediately next to another electronic device, try moving the devices further apart. Try removing one or more devices temporarily to see if there is some other device conflict. Try using your backup device on another computer to see if interference is caused by your monitor or other nearby electronic devices. Also see "SCSI Issues" on page 193.

• Retrospect can also report error –206 when a crash or power failure interrupts the backup computer or tape drive. Helical scan tape drives, such as AIT, DAT, DTF, Exabyte 8mm, and AME 8mm, require an end of data (EOD) marker on a tape to append data. If a tape does not have an EOD marker Retrospect may report error –206 when it next tries to append to the tape. Tape drives are responsible for writing EOD markers, but a drive may not get the chance if you shut down or restart the backup computer or the power is interrupted. Lacking an EOD, the tape will later produce error –206 when you try to append (write data) to it with Retrospect.

To avoid problems, take the following precautions: do not disable the "Verification" option in scripts and immediate operations; let the tape drive fully rewind or eject the tape before you power off or restart the computer; and if the computer crashes, try to eject the tape (using the drive's eject button) before restarting or turning off the computer.

When Retrospect reports error –206 on a tape because it lacks an EOD marker, that tape is unusable for future appends until you erase it, though it is not physically damaged and you can use it to restore. The tape cannot be repaired with Retrospect's repair tool. To use the tape for additional backups or archives, you must first either reset the tape's backup set from Configure›Backup Sets or erase the tape from Configure›Devices.

When the error persists on multiple media and you have eliminated the above possibilities, the device may be failing. Contact the vendor.

–503 (backup client turned off)

The client was turned off by the user at the client computer before the operation started. The Retrospect Client control panel will automatically turn on when that client is restarted.

–505 (backup client reserved)

The client is in use by another backup computer. A client may be used by only one backup computer at a time.

This can also happen when the backup computer or client computer crash during an operation. Restart both computers.

–507 (incorrect password)

Make sure you are properly typing the password. It is case sensitive, so you must type the password's proper upper case and lower case letters. Make sure you are entering the *password* for the client, not a *license code*.

If you cannot remember the password for a client, you must reinstall the Retrospect Client control panel as instructed on page 197.

–508 (access terminated)

The client user has turned off the Retrospect Client control panel during the operation. When this occurs, the backup computer logs the error and moves on to the next client.

–515 (piton protocol violation)

Retrospect sees its data is becoming corrupt while being transferred over the network. It is usually caused by a hardware failure.

Look for a pattern to these errors. If the problem occurs only on one client, it is likely that there is a problem with the client's network connector or its connection to the network. If the problem happens on several clients with no coherent pattern, the problem may be with the backup computer's network card or connection, or with a gateway/router common to all network transactions. See page 194 for more information.

–519 (network communication failed)

The backup and client computers ceased to communicate, a situation which has many causes and solutions, as detailed below.

A user shuts down a client during the backup, or the client fails or is disconnected from the network during a backup. Determine why the client is failing or what part of the network communication link is failing (for example, a router, bridge, hub, or individual network connector). See the next item for help in determining if the problem is due to a software conflict.

A user is using too many applications on the client during the backup, or an application takes up most of the computer's processing power. Schedule backups for periods when the client is idle.

A network communication problem caused by hardware or software is making transactions unreliable. A failed network connector on a client will cause errors on that client. To determine whether a failed network connector is causing the problem, try switching connectors with a nearby computer that is not experiencing problems. See "Network Troubleshooting Techniques" on page 194.

A bad or failing hard disk is hanging the client computer. If the hard disk read light on the client is stuck "on," and not blinking, and the client must be restarted before it will work, the client has a failing hard disk or a bug in the hard disk's firmware or software. For the hard disk that is hanging, update its driver to the latest version from its vendor. Then try running a disk-checking program.

Your network software is incompatible with your network hardware. Use the latest network software which matches your network hardware because older software might have problems.

Windows Two different bugs in Windows 95 can cause the client to lose contact with Retrospect. Make sure the TCP/IP fix and Winsock 2.0 have been installed on Windows 95 clients. See "Working with Windows Clients" on page 100 for details.

Mac OS An extension or some other software on the Macintosh has broken the network connection. Make sure you are not using software applications which prevent communication, such as older versions of security or compression programs that are active during a backup. Try starting up the Macintosh with the Retrospect Client control panel turned on, but all non-Apple extensions turned off.

This error may be caused by a problem with built-in Ethernet on all non-G3 PCI-based Mac OS computers. It tends to occur during large data transfers on a busy network. One solution is to upgrade to Mac OS 8.6, which has a new extension that fixes the problem. Another solution is to install and use third-party Ethernet cards. For more information, see Dantz Technical Note #414, available on the Dantz web site.

–525 (name/login conflict)

Usually this error appears when a client has been uninstalled and re-installed or replaced by client software which is not logged in.

On the backup computer, go to Configure› Clients, select the client experiencing the problem, then Forget the client. Click Add to go to the live network window and add the client of the same name. Add the client to your scripts.

–527 (backup client was renamed)

Another backup administrator has renamed a client from another backup computer. Simply configure the client again to update the name in your own client database.

–530 (backup client not found)

Retrospect cannot find the client computer on the network. Make sure the client computer is connected to the network and turned on and that it is not powered off by energy saving software. If it is a mobile computer make sure it has not been "suspended" or put into "sleep" mode. (Restart a suspended Windows computer to let Retrospect see it.) Make sure the client has the most recent version of the Retrospect client software and that the client software loads at startup. If not, follow the suggestions provided for the error "Client service not loaded at system startup" on page 212 or "Retrospect Client not loaded at system startup" on page 212.

Test the connection between the backup computer and the client by using Properties from Configure›Volumes. If it can connect with the client, Retrospect displays its measured transfer rate in kilobytes per second. Also, try pinging it (see "Testing and Pinging to Verify TCP/IP Communication" on page 194).

If this error occurs with a Windows 95 client it may be caused by a bug in the operating system. Microsoft's Winsock 2.0 update fixes the problem. It is available free from Microsoft at: http://www.microsoft.com/windows95/downloads/contents/wuadmintools/s_wunetworkingtools/w95sockets2/default.asp

–540 (trouble creating service)

Retrospect could not properly access a Windows client. The error usually occurs with Windows 95 clients that do not have Winsock 2.0 installed. Retrospect requires Winsock 2.0 to back up Windows 95 clients.

If the client already has Winsock 2.0 installed under Windows 95, or it is running a different Windows operating system, a required DLL or system component on the client may not be installed. Reinstall the client software. If the problem persists, contact Dantz Technical Support.

–541 (backup client not installed or not running)

The backup computer can see the client computer at the IP address but no client software is operational.

Make sure the client computer is turned on and that it is not powered off by energy saving software. If it is a mobile computer make sure it has not been "suspended" or put into "sleep" mode. Restart it and try again.

Open the Retrospect Client control panel and examine its Status field for an error message about why the client software is not working. Consult the appropriate error message or troubleshooting problem in this chapter. You may need to reinstall the client software. If it is a Windows client, also see page 186.

–625 (not enough memory)

Effectively the same as error –107.

–641 (chunk checksum failed)

One of Retrospect's files, likely a catalog, is corrupt.

To check whether a catalog is corrupt, set up a restore by searching on a blank file name so Retrospect scans all files in the catalog. If the error occurs, you know this catalog is corrupt.

If the error occurs during a backup or archive, you need to rebuild the catalog (page 182) of the destination. After the catalog is reconstructed, reselect this backup set in your scripts. If the error occurs when you launch Retrospect, see "Retrospect crashes while it is being launched." on page 186.

–1020 (sharing violation)

The file cannot be accessed because it is in use.

Another application or the operating system may have the files open, preventing Retrospect from accessing them. Exit the application that owns the busy file.

It is possible this error was reported on insignificant files and you can just ignore it.

–1101 (file/directory not found)

Retrospect cannot find a file.

This usually means you or someone moved or deleted one or more files and folders while an operation was in progress.

If this error occurs because a backup set's catalog file was moved and Retrospect asks you where it is, use the file selection dialog to navigate through files and folders and point out the new location of the catalog to Retrospect.

Try backing up again. If this error continues to occur, run a disk checking utility to check for possible directory corruption.

–1110 (general failure)

A media problem occurred on a source volume.

Try verifying your source volume using a disk utility or the formatting program that came with your hard drive. Use ScanDisk on a Windows computer. On a Macintosh, use Drive Setup's Test command and Disk First Aid.

–1115 (volume full)

A volume has little or no available storage space.

There are three causes of this error:

• You are restoring or duplicating more files than will fit on the destination volume.

• Retrospect is updating a backup set catalog and the volume on which it is saved runs out of room.

• You are backing up to a file backup set and the destination volume runs out of free space.

Go to the Windows Explorer and make more space on the full hard disk by removing unnecessary files and emptying the recycle bin. Try marking fewer files to restore or duplicate, or select a larger destination volume. Use catalog compression (page 148) to make your catalogs use less space.

–1204 (user didn't respond)

Retrospect could not find a requested disk or tape before the media request timeout period elapsed.

Turn off the media request timeout preference (page 155) so Retrospect waits indefinitely for the requested media.

–2241 (damaged catalog)

Effectively the same as error –641.

–2247 (snapshot not found)

Retrospect could not find the requested Snapshot on the medium. For more information, see page 192.

Media request timeout after waiting

This is how the operations log reports error –1204 (user didn't respond).

Internal consistency check error

Retrospect experienced a major problem not due to normal errors or circumstances. When this happens, Retrospect creates an error log in the Retrospect folder named "assert_log.utx".

If you experience one of these errors restart your computer and try to do what you were doing when the error occurred. If the error occurs again contact Dantz Technical Support as detailed in the following section.

Windows Client Control Panel Errors

When everything is set up normally and no errors have occurred, the control panel's Status tab should say "Ready" or "Waiting for first access" in the Status field. Below the status is the History area with information about the most recent operation or error messages.

Client service not loaded at system startup

If the status shows this error message, examine the history field for one of the messages from Table 10-2 below, then proceed as indicated.

There are a few possible reasons (in addition to those in the table) why the client software may not load at startup.

• The client software files are not in their proper location. The client software must be in the location you specified during the installation. Put it back in place or run the Setup program to reinstall the software. Log in as the administrator or another user with full access privileges when you install.

• You have not restarted the computer after installing the client software. The client software loads when the system boots. Restart the client computer.

• The client's service was terminated. This is unusual. You may be able to run Retroclient.exe to get the service operating, but because you do not know what terminated the service in the first place, it is best to restart the client computer.

Mac OS Client Control Panel Errors

When everything is set up normally, and no errors have occurred, the Retrospect Client control panel should say "Ready" or "Waiting for first access" in the Status field. Below the status is the History area with information about the most recent operation or error messages.

Retrospect Client not loaded at system startup

If the message "Retrospect Client not loaded at system startup" is followed by one of the explanations in Table 10-3 on page 213, proceed as indicated.

If this message appears by itself in the Status area, there are several possible causes.

Message	Action/Comment
Retrospect Client startup error: Winsock initialization failed.	There is a problem with the Winsock network interface. The file WINSOCK.DLL or WSOCK32.DLL may be an incorrect version (e.g., a non-standard Winsock). Re-install the DLL from the Microsoft Windows installation media.
Retrospect Client startup error: Protocol initialization failed. Make sure protocol is working.	Make sure the computer is using a valid IP address.
Retrospect Client startup error: Initialization failed. Make sure IP protocol is installed.	Install the TCP/IP network protocol from the Microsoft Windows installation media.
Your activator code conflicts with John Doe (123.45.67.8). Please tell your backup administrator.	Forget one of the clients, uninstall its Retrospect Remote 1.0 or 1.1 client software, then install Retrospect client software version 5.0 or later. Upgrade all older clients to prevent recurring errors.

Table 10-2: Windows client control panel startup errors.

• The °Retrospect Client control panel file is not in its proper location. Place it in the Control Panels folder within the System Folder.

• You have not restarted the client after installing the Retrospect client software. Restart the client.

• You held down the Shift key when you restarted the client Macintosh, which prevented extensions from loading. Restart without holding down Shift.

• You have an extensions manager program that specifies that the Retrospect Client control panel not be loaded. Open the extensions manager and ensure the Retrospect Client control panel gets loaded at startup.

• Another control panel or system extension is conflicting with the Retrospect Client control panel. Test for a conflict by temporarily removing several system extensions and control panels from the System Folder, leaving the Retrospect Client control panel and standard Apple extensions then restarting the client Macintosh. After restarting, open the Retrospect Client control panel. If you see the message "Ready" or "Waiting for first access," you know one of the items you removed prevented the Retrospect Client

Message	Action/Comment
ROM or System Version too old	The Macintosh appears to be an antique, hopelessly incapable of running the modern networking software required for use as a client of Retrospect Backup for Windows. It is not even able to run the long-obsolete networking software required for use as a client of a ten-year-old version of Retrospect for Macintosh.
AppleTalk version too old	The Macintosh is trying to use AppleTalk, not TCP/IP. Verify that it meets the system requirements then install Open Transport and set up TCP/IP networking.
AppleTalk turned off	The Macintosh is trying to use AppleTalk, not TCP/IP. Verify that it meets the system requirements then install Open Transport and set up TCP/IP networking.
ADSP not installed	The Macintosh is trying to use AppleTalk, not TCP/IP. Verify that it meets the system requirements then install Open Transport and set up TCP/IP networking.
No Chooser Name specified	The Macintosh appears to be an antique, hopelessly incapable of running the modern networking software required to use it as a backup client with any Retrospect Backup edition for Windows. However, you can back it up with Retrospect for Macintosh.
No computer name or owner name specified in file sharing settings	For System 7.*x,* open the Sharing Setup control panel. For System 8 or later, open the File Sharing control panel. Enter computer and owner names then restart.
Network Name conflict: "Name"	Another client on the network is already installed with this Owner Name. Trash the Retrospect Client control panel and install a fresh copy.
Open Transport TCP/IP not installed	Install Open Transport and set up TCP/IP networking.
Mouse button held down	Holding down the mouse button during startup inactivates the control panel.
Doesn't run under A/UX	The Retrospect Client control panel cannot be used on a Macintosh running under A/UX.
Your activator code conflicts with John Doe (123.45.67.8). Please tell your backup administrator.	Forget one of the clients, trash its Retrospect Client control panel, then install Retrospect client software version 4.2 or later. Upgrade all older clients to prevent recurring errors.

Table 10-3: Mac OS client control panel startup errors.

control panel from loading. You may avoid the conflict by making the Retrospect Client control panel load first on startup by replacing the ° symbol in its name with a space.

TECHNICAL SUPPORT

If the common questions, troubleshooting techniques, and error messages discussed in this section have not helped you solve your problem, the Dantz Technical Support team is available to answer your questions, provide help, resolve conflicts, and troubleshoot problems. We will try to answer your questions as thoroughly as possible. If we do not have an immediate answer we will get back to you within a reasonable period of time.

Before Contacting Technical Support

Before contacting Dantz, try to recreate the problem and be able to describe the steps which cause the problems. Make a note of what has changed on your computer since the last time Retrospect worked successfully. These details could provide essential clues for Dantz Technical Support.

When you call Technical Support, please make the following preparations. It helps us answer your questions and ensures you receive efficient technical support.

Be at your computer; this makes it easier to walk through any problem. Be prepared to describe your hardware and software setup as thoroughly as possible.

Have your original package and CD-ROM close at hand. Note the current version number you are using and your application license code. Open Retrospect's license manager window to see your application license code. It is also on the inside flap of the pack that holds the Retrospect CD and on the Technical Support card that is included in Retrospect packages. Your application license code is required in order to receive technical support from Dantz.

If you are having problems with your backup device, print the device status window and have the printout when you call.

Determine whether the problem occurs only when you are using a specific type of backup media. Try backing up to a different medium. (For example, if you have been using tapes or removable cartridges, try a short backup to a file backup set.)

Determine the point in the backup or restore procedure at which the problem occurs.

Note any error messages and the point in the procedure at which they occurred. Check the operations log and Backup Report and print or write down any error messages before contacting us.

▲ **WARNING:** If your problem involves tapes, CDs, or disks being unreadable, or you suspect malfunctioning backup hardware, do not try to reproduce your problem with other, undamaged backup sets. Contact Dantz Technical Support first.

Contacting Technical Support

As technical representatives we assume two roles—we are Retrospect troubleshooters and teachers. If you are a seasoned professional, we will try to answer your questions with as much technical proficiency as we can. We do expect you to know how to use your computer, but if you are new to computers, do not be afraid to ask us questions that seem trivial. If we use a term you do not understand, please ask us for a clearer explanation. In any case, we will try to make your time spent with us a learning experience. We are here to help solve your problem, so do not be afraid to ask us for help.

Additional Technical Information

Retrospect technical notes, covering specific areas in great detail, are available from Dantz Technical Support and from our Web site (www.dantz.com). The web site also has other technical information, common questions, new product and upgrade information, and helpful tips.

Technical Support Options

Dantz offers two different technical support options: standard support at no charge and Premier Support for a fee. Full details on both support options, including international support, are included in an insert with your Retrospect package and on the Dantz web site.

The free standard support is available to all English-speaking customers by calling 925.253.3050 Monday through Thursday 9:00 a.m. to 4:00 p.m. Pacific time, or Friday from 9:00 a.m. to 2:30 p.m.

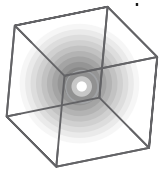
If you sign up for Premier Support you can get priority phone service by calling a toll-free number Monday through Thursday 6:00 a.m. to 5:00 p.m. Pacific time, or Friday from 6:00 a.m. to 2:30 p.m. To subscribe to Premier Support phone 888.777.8274.

Log of Your Calls to Technical Support

Use the following form to keep track of calls to Dantz Technical Support.

Registration Number:

Date	Technical Representative	Problem/Solution



APPENDICES

- A: PREPARING TCP/IP SOFTWARE
- B: GLOSSARY OF TERMS

Before you can use backup clients with Retrospect, you must make sure some network software settings are correctly configured. If you are not sure each computer is properly set up for TCP/IP networking, follow the instructions below to get the backup computer and client computers ready for TCP/IP.

Get Help if Available

It is best to have your network administrator available for assistance while installing and preparing the networking software. The network administrator knows important specifics about your network which make things go more smoothly.

Preparing Windows Computers

The backup computer and each Retrospect client computer must have TCP/IP networking software. If you do not know whether a computer has TCP/IP, follow the instructions below, depending on the operating system. It is best to have your network administrator available for assistance while installing and preparing the TCP/IP software. The network administrator knows important specifics about your network which make things go more smoothly.

Is TCP/IP Installed on Windows 95, 98 or NT 4.0?

From the Start menu's Settings submenu, choose Control Panel, then double-click the Network icon. If TCP/IP is not listed as an installed component you must click Add to install the protocol from the Windows installation media. Click OK and close the Network control panel.

Fixing Microsoft Windows 95 TCP/IP

A bug in Microsoft's network software can cause Retrospect to report a networking error. Microsoft has resolved this problem and free fixes are available for Windows 95. We strongly urge you to update your Windows 95 systems.

The hot fix for Windows 95 is installed by the Retrospect client software Setup program. After installation, use Windows Explorer to open C:\Program Files\Dantz\Retrospect Client. Open VTCPUPD, which is Microsoft's installer, and follow the instructions, then restart to complete the fix.

Windows 98, NT 4.0, and 2000 do not require an update.

Updating to Winsock 2.0 on Windows 95

Windows 95 requires the Winsock 2.0 Update from Microsoft to prevent TCP/IP networking problems. It is available free from Microsoft at: http://www.microsoft.com/windows95/downloads/contents/wuadmintools/s_wunetworkingtools/w95sockets2/default.asp

Winsock 2.0 is included with Windows 98, NT, and 2000 so they do not require an update.

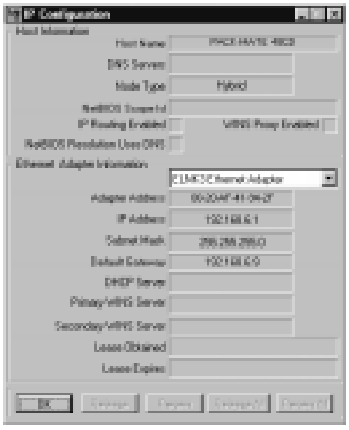
Is TCP/IP Installed on Windows 2000?

From the Start menu's Settings submenu, choose Network and Dial-up Connections, then select Local Area Connection and choose Properties from the File menu. In the properties window, if "Internet Protocol (TCP/IP)" is not listed as an installed component you must click Install to add it from the installation media. Click OK and close the properties window.

Confirm or Assign IP Address or Name

Confirm with your network administrator that the Windows computers have manually assigned IP addresses or are set up to use dynamic IP addresses from a server. If your organization does not have a network administrator or you have that responsibility, follow the steps below to confirm or assign an IP address.

Seeing Windows 95 and 98 IP Configuration Choose Run from the Start menu and enter "WinIPcfg", which opens a window with some configuration information. Click its More Info button to see the full configuration.



Windows 95 and 98 TCP/IP configuration.

Seeing Windows NT and 2000 IP Configuration Open the command prompt and enter "IPconfig -All", which lists the full IP configuration.

Windows NT and 2000 TCP/IP configuration.

Confirming Windows IP Configuration The IP Address field shows the IP address the computer is currently using. If an address is shown here then the computer is probably already set up to use TCP/IP.

If the DHCP Server field shows another IP address (of the server) then the computer is automatically obtaining an address from a server (that is, it is dynamic). Note this for later use.

If the IP Address field is blank then the computer is not set up to use TCP/IP. Consult your network administrator. If these duties are your responsibility, you may be able to get TCP/IP working on your private network by following the steps outlined next.

Assigning an IP Address on an Internal-Only Network If you have determined the computer is not set up for TCP/IP and you do not have a network administrator to get it working, follow these steps.

First determine whether your local network is directly connected or routed to other networks or the Internet. (That is, with a permanent hard-wired connection, not a temporary dial-up modem connection).

If your local network is not directly connected or routed to other networks, you can make up and use an IP address without repercussions, as it will not conflict with outside IP addresses.

On each Windows 95/98 or NT 4.0 computer, open the Control Panel and double-click its Network icon, then locate and double-click the TCP/IP protocol.

On each Windows 2000 computer, open the Local Area Connection properties and then the TCP/IP properties.

Each computer has fields for you to enter an IP address and subnet mask.

IP configuration controls for Windows.

It is far beyond the scope of this manual to explain IP addressing schemes, so we recommend you start by using the address 192.168.6.1. Make the final of the four numbers unique on each machine, so as not to conflict with another's IP address. (For example, other computers you set up with TCP/IP might use 192.168.6.2, 192.168.6.3, and so on.) Use the same subnet mask numbers, 255.255.255.0, on each machine. *You must change these to legitimate IP addresses and subnet masks if you later connect or route your network to another network. Contact your Internet service provider or network administrator to find out which IP addresses and subnet masks you must use.*

▲ **WARNING:** If your local network is directly connected or routed to other networks do not manually enter an IP address or subnet mask unless you are completely knowledgeable of the TCP/IP protocol, your network, and its addresses licensed from the Network Information Center. You could cause problems with your local network and other networks on the Internet worldwide.

Preparing Mac OS Computers

Each Mac OS computer to be used as a client must have a PowerPC CPU and Open Transport 1.1 or later, part of System 7.5.3 and later.

Confirm that each computer has the TCP/IP control panel, which is a component of Open Transport. If you are using System 7.5.5 or earlier or cannot find it, you may need to use the Network Software Selector to make the Macintosh use Open Transport networking. If you have neither the Network Software Selector nor the TCP/IP control panel you must install Open Transport.

If the Macintosh is running under System 7.5 you can custom install Open Transport from Apple's System 7.5 Update 2.0 or later installer. Be sure to read Open Transport's Read Me file to find out about possible conflicts or limitations which may affect your system.

Always Load Open Transport TCP/IP

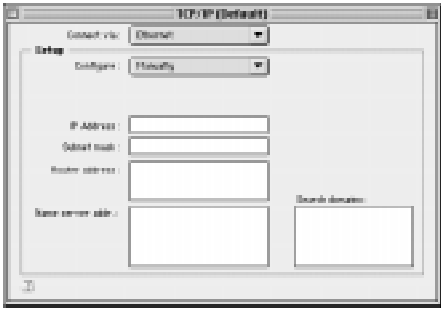
For proper network operation you should change a setting in the TCP/IP control panel to make the protocol always available.

Open the TCP/IP control panel and choose User Mode from the Edit menu. Select Advanced mode and click OK. Click the Options button, uncheck the "Load only when needed" checkbox, and click OK. Close the TCP/IP control panel and save changes, then restart.

Confirm or Assign IP Address or Name

Confirm with your network administrator that Mac OS clients have manually assigned IP addresses or are set up to use dynamic IP addresses from a server. If your organization does not have a network administrator or you have that responsibility, contact your Internet service provider for instructions on setting up TCP/IP.

Open the TCP/IP control panel.



Mac OS TCP/IP control panel.

A field for the IP address is under the Configure item. If the Configure item is set to Manually, there is also a subnet mask field under the IP address field. Examine the IP address field (and, if appropriate, the subnet mask field).

If each field already shows an IP address or mask (in the form $n_1.n_2.n_3.n_4$ where each n is a number from 0 to 255), the computer is probably al-

ready set up to use TCP/IP and you can install the client software. Close the control panel and do not save changes if asked.

If the IP address field shows "< will be supplied by server >" instead of an actual IP address, or if the IP address and subnet mask fields are blank, then consult your network administrator. If these duties are your responsibility, you may be able to get TCP/IP working on your private network by following the steps outlined below.

Assigning an IP Address on an Internal-Only Network If you have determined the computer is not set up for TCP/IP and you do not have a network administrator to get it working, follow these steps.

First determine whether your local network is directly connected or routed to other networks or the Internet. (That is, with a permanent hard-wired connection, not a temporary dial-up modem connection).

If your local network is not directly connected or routed to other networks, you can make up and use an IP address without repercussions, as it will not conflict with outside IP addresses.

On each computer, open the TCP/IP control panel and set the Configure pop-up menu to Manually. The window has fields for you to enter an IP address and subnet mask.

TCP/IP configuration controls.

It is far beyond the scope of this manual to explain IP addressing schemes, so we recommend you start by using the address 192.168.6.1. Make the final of the four numbers unique on each machine, so as not to conflict with another's IP address. (For example, other computers you set up with TCP/IP might use 192.168.6.2, 192.168.6.3, and so on.) Use the same subnet mask numbers, 255.255.255.0, on each machine. *You must change these to legitimate IP addresses and subnet masks if you later connect or route your network to another network. Contact your Internet service provider or network administrator to find out which IP addresses and subnet masks you must use.*

▲ **WARNING:** If your local network is directly connected or routed to other networks do not manually enter an IP address or subnet mask unless you are completely knowledgeable of the TCP/IP protocol, your network, and its addresses licensed from the Network Information Center. You could cause problems with your local network and other networks on the Internet worldwide.

APPENDIX B • GLOSSARY OF TERMS

access privileges – The privileges given to (or withheld from) users to see folders, see files, and make changes to shared volumes.

append – To write additional data to a backup set. In a normal backup, Retrospect appends file data to the current backup set member.

archive (verb) – To copy files from a volume to a backup set. For example, "Let's archive these QuickTime movies." Archiving may, optionally, involve removing the copied files from the source. Also see **back up**.

archive (noun) – 1. An operation in which files are archived. For example, "The archive was successful last night." 2. An entity of backup materials. For example, "Retrieve the 1997 accounts from the archive." In this respect, a backup set is an archive. Also see **backup set**.

archive attribute – This file and folder attribute in Windows file systems was meant to be used as a flag to do incremental backups. Retrospect's IncrementalPLUS method of determining which files need to be backed up is much more powerful and flexible.

back up (verb) – To copy files from a volume to a backup set (such as CD-R or CD-RW, cartridges, or floppy disks). You should back up regularly in case something happens to your hard disk or any files.

backup (noun) – 1. An operation in which files are backed up. For example, "I just did today's backup." 2. An entity of backup materials. For example, "Fortunately, we can get the backup from the safe and restore the files." In this respect, a backup set is a backup. Also see **back up** and **backup set**.

backup action – See **recycle backup, new media backup,** and **normal backup**.

Backup Clients – The Backup Clients container holds client computers which are logged in to Retrospect.

backup computer – The computer on which you are using Retrospect with a backup device. In a networked environment, it is the computer used to back up client computers.

backup date – The most recent date and time a Mac OS file, folder, or volume was copied to a backup set. Retrospect sets this date for volumes, folders, and/or files *only* when you check the appropriate boxes in the Macintosh client options. Also see **creation date** and **modification date**.

Backup Report – Displays the information in the detail log in terms of individual volumes. In the Backup Report, all known volumes are displayed with information about when they were last backed up.

Backup Server – 1. Retrospect's technology allowing flexible, resource-driven or user-initiated backups. 2. A backup computer running a Backup Server script.

backup set – A set of storage media and catalog. Retrospect stores all files in backup sets. There are different types of backup sets for different media and devices: disks backup sets for multiple ejectable volumes, file backup sets for a single volume, tapes backup sets for tape cartridges, and CD-R backup sets for recordable and rewriteable compact disc drives.

browser – Retrospect's tool that allows you to view the folder and file structure of a volume or contents of a backup set. You can also use a browser to see the files and folders in a backup set. The browser allows you to manipulate files and mark them to be worked within an operation such as a backup.

catalog – Retrospect's index of the files and folders contained in a backup set. The catalog file allows you to mark files for restore or retrieval without having to load or insert your backup set media.

CD-R discs backup set – For use with supported packet-recordable compact disc drives (CD-R or CD-RW). Also see **backup set**.

client – A network Windows or Macintosh computer with Retrospect client software whose volumes are available for backup by the backup computer. Also see **backup computer**.

compression – Reduces the size of the data being copied to the backup set media in a backup or archive. Retrospect can do it with software compression, or a capable tape drive can do it with hardware compression.

condition – In Retrospect's file selectors, a distinguishing criterion relating to file or folder characteristics. You can choose multiple conditions to make your own custom selectors. Also see **selector**.

config_5.dat file – The file containing your custom settings, including known backup sets, scripts, security codes, preferences, custom selectors, and client login names. This file is automatically created the first time you start Retrospect, and is used while Retrospect is open. If you delete this file, all of your custom information will be lost and the default configurations will be used.

configured subnet – A **subnet** that Retrospect has been configured to search for clients.

container – An item for organizing other items such as volumes or clients in certain Retrospect windows. Also see **My Computer** and **Backup Clients**.

Contents Report – A Retrospect report that shows a single backup set in terms of the sessions it contains. A list of all sessions is displayed for each backup set. Double-clicking a session creates a browser of all files in that session.

creation date – The time and date a file, folder or volume was created. A file's creation date is set when the file is first saved or made. A folder's creation date is set when you select make a new folder. A volume's creation date is set any time the volume is formatted or erased. With Windows file systems, a copied item's creation date changes to the date of the copy. Also see **backup date** and **modification date**.

creator code – The four-letter code that represents the creator of a file with the Macintosh HFS file system. For example, documents created by SimpleText have a creator code of ttxt. Retrospect lets you select files according to creator code.

day of week scheduler – A type of scheduler that lets you schedule a script to run every week on specified days of the week (for example, every Monday, Wednesday, and Friday).

destination – The storage medium to which files are being moved, copied, or otherwise transferred. When backing up or archiving, the destination is a backup set. When restoring or duplicating, the destination is a volume.

device – Any piece of peripheral equipment connected to your computer, such as a hard disk drive, removable disk drive, or CD-RW drive. In this manual, the term "backup device" refers to any device that accepts backup set media, such as a CD-R drive or tape drive.

directory – A hierarchical structure on a volume that may contain files or more directories. These are known as **folders** in the desktop metaphor used by Windows and the Mac OS.

disc – A CD-R, CD-RW, or CD-ROM medium. Compare to **disk**.

disk – A perhaps too-general term for a storage medium. It may refer to a hard disk, a floppy disk, or a Zip, Jaz, SuperDisk, DVD-RAM, MO, or other removable cartridge. This manual uses the term disk in two contexts: 1. as a Windows Explorer-accessible volume for general storage; and 2. as a medium for use in a disks backup set. Compare to **disc**.

disks backup set – For use with removable cartridges such as Zip, Jaz, SuperDisk, DVD-RAM, or MO disks. Also see **backup set**.

EasyScript – An interactive scripting assistant that creates and implements a scripted backup strategy based on your replies to a few simple questions.

encryption – A way of encoding data so that it cannot be used by others without the password.

file backup set – This type of backup set combines the catalog and the data in a single file. The backup set media must be a single volume that is accessible from Windows Explorer, such as a file server or hard disk. Also see **backup set**.

file header information – A file's name, size, dates, and other attributes. This information is part of every file, and is also indexed in a backup set's catalog.

file server – A computer running file server software, which allows users to share information over a network.

folder – 1. A **directory** on a volume. 2. A Retrospect container for organizing items such as scripts, volumes, or clients.

Forget – The Forget toolbar icon allows you to remove an item from certain windows. Use Forget to clear listings for volumes, Subvolumes, clients, or backup sets you no longer wish to use. Note that "forgetting" a backup source volume does not affect any of the backup sets it has been backed up to; its files may be restored at any time as long as the backup set media is intact.

group – A Retrospect container for organizing items such as volumes and clients.

incremental backup – A backup that intelligently copies only files that are new or have changed since the previous backup. Retrospect usually backs up incrementally with its normal backup action. See also **matching**.

interactive mode – Retrospect's mode of operation when you perform an immediate operation. Interactive mode assumes you are at the Macintosh and available to respond to prompts. See also **unattended mode**.

latest read me file – The most recent version of the Retrospect "read me" file, which includes late-breaking information, describes hardware and software conflicts, and lists all devices supported by Retrospect. The Retrospect CD-ROM includes the latest read me file as of the CD's mastering date. When the read me file is updated (for instance, with newly supported devices) it is posted on the Dantz web site, in the technical support section.

local subnet – The **subnet** in which the backup computer resides.

marking – Selecting files in the browser to be backed up or restored. Files can be marked (or unmarked) manually, or they can be marked according to various criteria using file selectors. In the browser, a check mark appears next to any marked file. Files that are highlighted in the browser are not necessarily marked.

matching – The scheme for comparing file attributes to determine whether files are identical, which then allows intelligent copying to avoid redundancy. Also see **incremental backup**.

medium – Any hard drive, CD, tape, floppy disk, DVD, MO, or cartridge to which files can

be copied. In this manual, media usually refers to the removable media of a backup set.

member – An individual **medium** (such as a floppy disk, CD, tape, or cartridge) used in a backup set.

modification date – The time and date a file was last changed. This date is automatically attached to the file by the computer's file system. A file's modification date is reset any time you make changes and save the file (see "backup date" and "creation date"). A folder's modification date is updated any time a folder or file is added, changed or removed from it.

My Computer – Retrospect's container which holds certain volumes available on the backup computer.

new media backup – Allows you to periodically introduce new media into your backups, keeping the original backup set media and catalog intact for archival purposes. A new media backup copies all selected files to a new backup set of the same name as the old, with the addition of a generation number, such as "backup set A [001]."

normal backup – Retrospect's usual backup action, performing an incremental backup to copy new or changed files.

operations log – A Retrospect report that tracks all actions by Retrospect. The operations log documents all start-ups, executions, errors, and completions, as well as information on the number of files copied, duration of backup, and backup performance.

Piton – Retrospect's own proprietary protocol for communicating with backup **clients**. In the live network window, Retrospect uses the Piton name service to establish contact with clients.

recycle backup – A recycle backup is useful to periodically reset a backup set so that it does not grow out of control. A recycle backup completely erases the backup set and catalog before copying all selected files to the backup set. All previous data in the backup set is lost.

repeating interval scheduler – A type of scheduler that lets you schedule a script to repeat automatically at a specified interval of time, such as once every three weeks.

restore – An operation which copies files from a backup set to a volume.

root – The highest level of folders in a data structure. When you select a drive icon from the Windows Explorer, you see the root folders and files.

run document – A file that automatically starts a Retrospect script when opened. A run document allows you to run predefined Retrospect scripts by double-clicking on the run document file.

scheduler – A script element that lets you schedule a script to automatically execute at dates and times of your choice. Also see **day of week scheduler**, **repeating interval scheduler**, and **single date scheduler**.

script – A saved backup procedure that you can schedule to run at some future date and time or on a repeating schedule, such as daily. You can create as many scripts as you want.

SCSI (Small Computer System Interface) – A specification of mechanical, electrical, and functional standards for connecting peripheral devices (hard drives, tape drives, printers). SCSI allows you to easily attach additional devices to your computer.

SCSI terminator – A device used on a SCSI chain to maintain the integrity of signals on the chain.

selector – A feature that lets you search for or filter files which match certain conditions. You can use Retrospect's standard selectors, or cre-

ate your own custom selectors. Also see **browser**.

session – A group of files from a single operation stored within a backup set.

single date scheduler – A type of scheduler that lets you schedule a script to automatically run at a specific date and time.

Snapshot – A Retrospect Snapshot is created during a backup operation to depict a volume's state (that is, all its files and the folder paths to them). It makes it easy to restore a hard disk to its exact state as of a given backup.

source – In a backup, duplicate, or archive operation, the volume from which files are copied. In a restore, the backup set from which files are copied.

subnet – A group of local computers physically networked together without a router or gateway, though they may use a gateway to connect to other networks. Also see **configured subnet** and **local subnet**.

Subvolume – A folder you designate as an independent volume for use within Retrospect.

tapes backup set – For use with tape drives. Also see **backup set**.

TCP/IP – An industry standard network protocol. It is the standard protocol of the Internet, web servers, and FTP servers. It is the protocol used by Retrospect clients.

unattended mode – Retrospect's mode of operation when you run a script. Unattended mode assumes no one is currently at the Macintosh, and therefore Retrospect must make assumptions about media use. See also **interactive mode**.

volume – A hard or floppy disk, partition of a hard disk, Subvolume, file server, or any data storage medium that is logically recognized by Retrospect as a file and folder storage location.

INDEX

C

D

E

F

G

H

I

J

L

M

N

O

P

Q

R

S

T

U

V

W

Z