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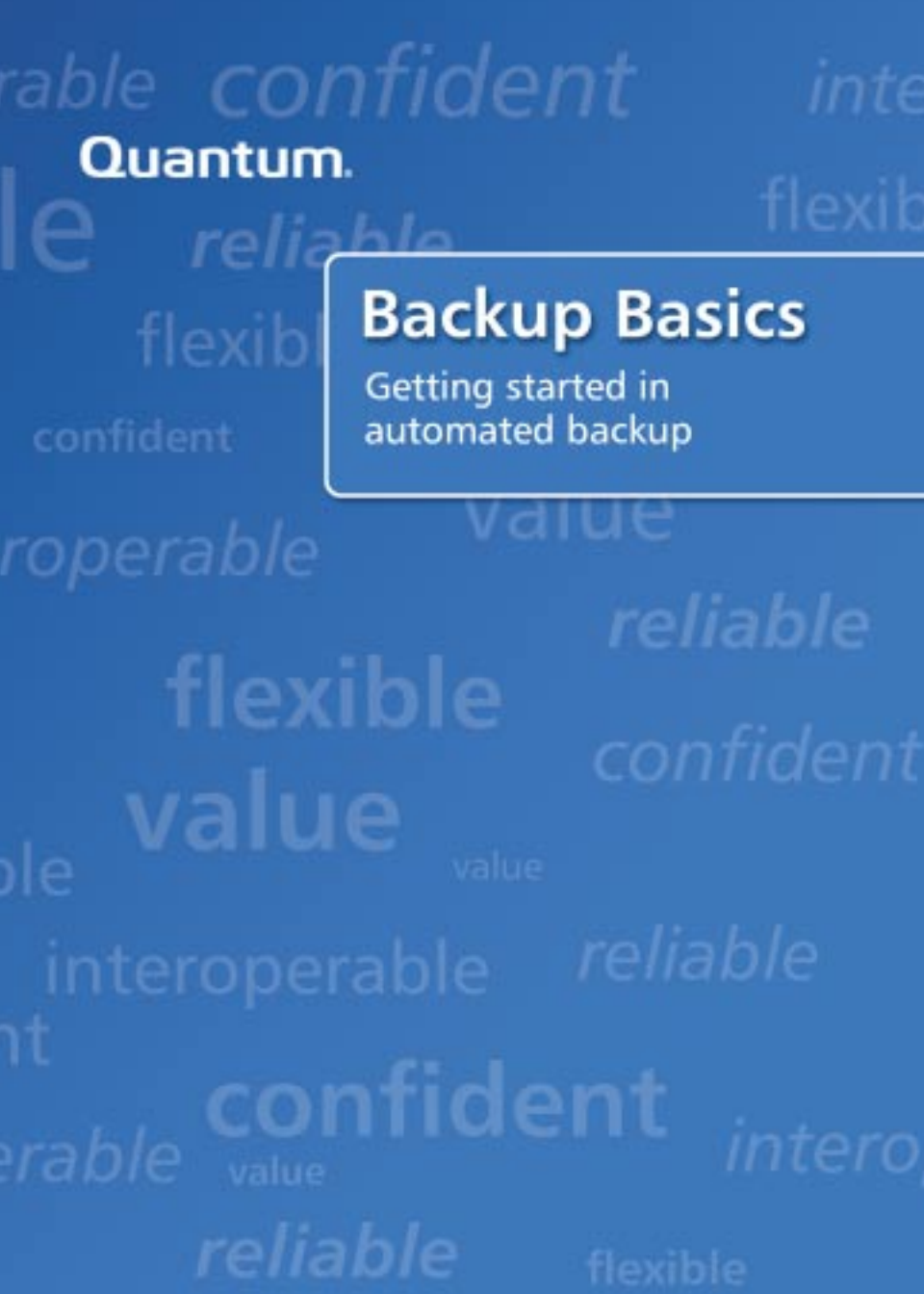
Quantum.

Backup Basics

Getting started in automated backup



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Are you responsible for making sure that the information on your company's computers is safe and secure? Then this booklet is for you!

Data is many times the most important non-human asset that a company has. It represents the thoughts and actions of the people who work for the company. If the data is lost or becomes unavailable, this can affect whether or not you stay in business.

Some companies manually copy files to external disks, floppies or CDs, which is time consuming, disruptive to day-to-day operations and error prone. This booklet explores:

- What can happen to your data
- How you can protect your data
- Concepts behind data protection – also called backup automation
- Technology hardware options
- Software options

This common-sense guide will assist you in selecting products that fit your needs. It also explains the tools that you will need to automatically and reliably make sure your data is safe.

Backup Or Perish: A Harsh Lesson

Faxes continued to pour in. The phones kept ringing. And the light switches still made the office either light or dark. Dark was just fine with Jane. The graphic design business she built from the ground up was gone.

The previous night, burglars stole the company's four PCs, six Macintosh® computers and its file server. Some of Jane's older projects were on CDs and Zip® disks. And she had hard copies of previous years' accounting and payroll data. But all her current projects, billing information, e-mail, and client and employee information were simply gone.

Sure, her insurance would replace the computers. It would even cover the expensive software that was central to her business. But insurance doesn't replace the information that was on the computers. Jane and her employees never felt they had the time to copy huge graphics files to CD or tape for safekeeping. And it never even occurred to them to back up something as common as e-mail. Though she relied on technology to drive her business, Jane felt that a formal business backup process and backup automation products were too expensive, too "techy," overkill.

Jane was wrong on all counts.
She found, as too many others before her, that the data that was on her computers was her business. Lose it and you may lose everything. Therefore the question isn't "How much does an automatic backup system cost?" It's really *"Can I afford not to protect my data?"*

Obviously, Jane could have restored the stolen data from an automated backup system to new computers from tapes stored off-site created by her backup system. Even if the burglars never struck, an automated tape backup system would have streamlined her day-to-day operations by safely and routinely backing up data without human intervention thus protecting her from losing any graphic designs and business data during her normal business day. That way, even common—but still troublesome—events, such as a hard drive failure, corruption from a virus, mistakenly deleted files, or even fire and natural disasters can be managed.

Data Storage vs. Data Backup

Data storage and backup, while related, are not the same thing. Data storage is the information that is stored on your computer. Data is the e-mail you sent to your boss, the payroll files in finance, the new graphic designs for new clients, and the bills that had been sent to clients for payment.

Backing up is the act of deliberately copying data, and storing it where it is both safe and easily retrieved.

Why Backup On Tape?

Tape is less expensive and one of the most portable media for high capacity needs. Review the chart below for media comparisons.

Media type	How much will it hold? (capacity in GB)	How much data it will copy per second? (Native Transfer Rate in MB/sec)	Cost per media type	Cost per GB
CD-RW	0.7	0.00276	$1.00	$1.43
DVD-RW	4.7	0.0162	$6.99	$1.49
DDS 4	20	3	$16.00	$0.80
ZIP	0.75	7.3	$9.70	$18.74
AIT-3	100	12	$78.00	$0.78
DLTtape IV	40	6	$50.00	$1.25
Super DLTtape I	160	32	$102.00	$0.64
LTO-1	100	15	$73.00	$0.73
LTO-2	200	30	$140.00	$0.70

HINT BOX

Tape is best for reliable backup at the lowest cost.

HINT BOX

The average tape drive holds approximately 20-40GB of data.

Essential Elements Of A Basic Data Protection System

When you start to look at automating your backup process, it is good to know that every backup system has 5 essential items:

- **Data**

Digital information, especially information organized for analysis or used to reason or make decisions, i.e., the stuff on your hard drives, CD-ROMs, Zip™ disks, floppies, etc.

- **Hardware device to backup data**

Backup is simply copying data from one device to another with the intention of protecting it against loss or damage. You can back up to hard drives, CD-Rs, CD-RWs, Zip and Jazz™ disks, floppy disks, optical disks and tape devices.

- **Software**

An essential part of a data protection system is backup software. These applications specifically aid in automating the collection, tracking, and writing of data to a backup device, as well as the restoration of data from the backup device to its place of origin.

- **Backup Process (Internal Business Process)**

Scheduling backup procedures in a way that adequately protects data while minimizing the impact of backup operations on networks is critical. Properly established, the backup process can liberate a company from the grueling chore of babysitting backups. (i.e. most backup processes can take place at night, while you sleep).

- **Off-Site Location**

Storing backup tapes in the same facility where they are created exposes them to the same risk as the original data. By rotating backup tapes to a separate location, you can easily restore lost data if disaster strikes.

A Typewriter, A Dictionary And Some Stamps:

The case for automatic backup

Your day-to-day life is filled with instances where automation replaces manual operations. You program phone numbers into your phones so you don't have to dial each time, use spell check instead of a dictionary, e-mail instead of stuff envelopes and apply stamps. You are considering backup automation because you're already familiar with the benefits: convenience, assurance that routine operations will occur reliably, and that the information involved will be available should you need it again.

Buying a stand-alone drive is like buying a rotary telephone or a dictionary or a stack of stationery and stamps. It will get the job done. But what's the real cost? Read on to find out.

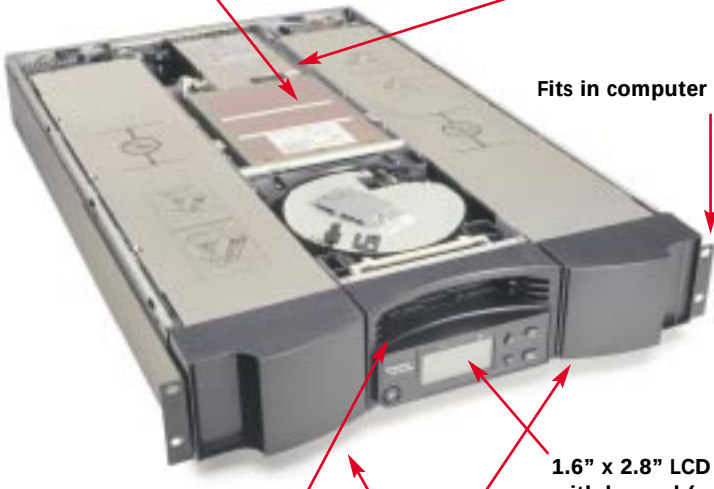
HINT BOX

A tape backup device, such as an autoloader, protects you from human mistakes and lost data.

What's An Autoloader?

The term "autoloader" refers to a backup device that contains a tape drive, tape cartridge slots and a mechanism for moving tapes between the slots and the tape drive. Autoloaders are controlled by backup software, enabling specific backup routines to run automatically while simplifying restoration of data.

Typical Autoloader Components



Why Do I Need An Autoloader?

Since all my data fits on a single tape, wouldn't a stand-alone tape drive be more cost-effective?

Good question. And, the answer is no. Here are three good reasons:

The risks of human intervention

First, let's discuss the benefits provided by an autoloader. Autoloaders specifically address several key backup challenges. First, the most common cause of failed backups is human intervention. Tape cartridges are sensitive to rough treatment—like improper insertion into or removal from a drive. Autoloaders handle the tapes for you, inserting and removing tapes from the drive delicately and within tolerances no human could ever match. Plus, it's a pain. Who will be the official Tape Swapper at your office? What happens when the Tape Swapper calls in sick, gets preoccupied and forgets to swap tapes, or, removes the tape from the drive before it disengages, thus damaging the tape?

How do you know the backup worked?

Second, how can you ensure the validity of each backup performed on a stand-alone drive? Is your Tape Swapper willing to spend the extra time to verify the backup actually occurred and that it contains the correct data? Backup software can easily be set to verify each backup on your autoloader.

Tape cartridge care and organization

Lastly, can you be certain your Tape Swapper will treat each tape cartridge with the care required to keep it operational? After all, only one tape at a time will fit inside your stand-alone drive. Tapes must be handled carefully and stored away from dust, temperature extremes and humidity. On top of that, do you have an easy-to-follow tape organization system in place, so you know exactly what day's backup is on each tape? How long will your network be down while your Tape Swapper goes through each tape looking for the correct data to perform a restore?

Autoloaders have cartridge slots. At a minimum, autoloaders can hold one tape for each day of the week, plus a cleaning cartridge or extra tape, if required. Tapes are cataloged by the autoloader and backup software, so there's no guesswork when it's time to restore data. Universal barcode readers are also an option. The software reads the codes on individual tapes to determine what data it contains. This avoids the possibility of hand-written labels becoming illegible or falling off.

Let's face it

You're already in it for the cost of the drive. The additional price paid for the robotic tape handling mechanism and cartridge slots inside an autoloader is minimal when compared to the administrative overhead and cost of downtime associated with manual backups performed on stand-alone drives.

A Primer On Tape Drive Technologies

As you saw earlier from the chart on page 3, CD and Zip technologies are not big enough or fast enough to handle your backup needs if you have over 100GB of data - roughly 2 1/2 hard drives!

Magnetic digital tape is a reliable, field-proven medium for data storage. There are several tape drive technologies that are commonly found in autoloaders today. While all will do an adequate job of getting your data from your servers to a tape cartridge, there are differences between them and advantages you should be aware of.

DLTtape™

Drive Brand	Approximate Drive Price	Native Capacity (GB)	Native Speed (GB/Hr)
DLT VS80	$1,100	40	10.8
DLT8000	$2,000	40	21.4
DLT VS160	$2,000	80	28.8
SDLT 220	$3,300	110	39.6
SDLT 320	$3,400	160	57.6

DLTtape is a very robust technology that offers reliability, capacity and performance. Over 81 million DLTtape cartridges and two million tape drives have been sold. DLTtape offers many options with different price/performance characteristics. Mean Time Between Failure (MTBF) for DLTtape drives is an incredible 250,000 hours.

LTO™

Drive Brand	Approximate Drive Price	Native Capacity (GB)	Native Speed (GB/Hr)
LTO 1	$2,600	100	54
LTO 2	$5,800	200	108

Linear Tape Open also known as LTO is very similar to DLTtape technology, with minor differences in capacity and performance. Most importantly, it also shares DLTtape's high reliability—250,000 hours MTBF.

AIT™

Drive Brand	Approximate Drive Price	Native Capacity (GB)	Native Speed (GB/Hr)
AIT-1	$1,100	35	10.8
AIT-2	$1,400	50	43.2
AIT-3	$3,100	100	43.2

Advanced Intelligent Tape also known as AIT technology is similar to the 8mm digital tape used in video cameras. Users can expect AIT drives to provide 50,000 hours MTBF. Most AIT users choose this technology due to its small size. The tapes measure 3.5" versus 5.25" for both DLTtape and LTO cartridges.

DAT™

Digital Audio Tape also known as DAT technology is another popular choice for backup systems. Based on a 4mm, dual-spindle format, DAT provides a low-cost alternative to other formats.

Drive Brand	Approximate Drive Price	Native Capacity (GB)	Native Speed (GB/Hr)
DDS-3	$700	12	4.3
DDS-4	$900	20	10
DAT-72	$1,200	36	10

Sony, a leading manufacturer of DDS-4 media and drives, notes that each cartridge maintains a useful life of 2,000 passes by the Read/Write/Erase heads within the drive. While DAT tape technology may be less expensive upon initial purchase, its lower capacity, slower performance and poorer reliability may mean it provides the least desirable total cost of ownership of tape storage types.

Backup Software: The Brains Behind The Autoloader

Choosing an autoloader is only part of an automated backup solution. You must also decide which backup software you will use to control the autoloader. There are many ways to go: from software that's bundled with your Windows® operating system to complete packages for more important data.

Backup software collects data from various sources, such as PCs and servers, and writes a copy of that data to the media in a backup device, such as an autoloader. Most companies that utilize an automatic backup process employ two types of backup: full and incremental. Full backups, which copy and store all available data, are usually performed on weekends, since much more data needs to be collected.

For an incremental backup, the software detects and collects only data that has changed since the previous incremental backup. Typically, incremental backups are performed nightly so the data transfer does not impact users on the network.

Autoloaders facilitate both types of backup by responding to commands from the backup software. Human intervention is only necessary when inserting and removing tapes outside of the autoloader, such as for off-site storage purposes. Backup routines and drive-cleaning regimens can be managed with the backup software, so data can be protected without hassles.

The simplest way to go is to use the Backup Utility that comes with Windows XP. It's already on your system if you use Windows XP Professional version, but you have to install it separately if you use Windows XP Home edition. You can find it, plus instructions, in the Value Add folder on the Windows XP Home CD.

More popular, and for good reason, are software packages from Independent Software Vendors (ISVs). These products are highly specialized and are often optimized to work with your specific make and model autoloader. ISVs and autoloader manufacturers even offer certifications that ensure the software and autoloader will work together flawlessly. Their powerful features, flexibility and simplified management tools easily justify their cost.

The main things to look for when shopping for backup software are:

- Calendar-based scheduling to customize backup strategies at the click of a mouse.
- Easy wizards to configure, backup and restore your files and applications.
- Ability to backup and restore multiple servers and operating systems from a single console.
- Rotation schemes to easily manage daily, weekly and monthly backup jobs without user intervention.
- Easy-to-install with the ability to start conducting backups out-of-the-box.

The main ISV players in the backup market are:

- Computer Associates (CA) with BrightStor ARCserve® and BrightStor Enterprise.
- VERITAS with Backup Exec™ and NetBackup products.
- Legato with Networker®

What You Need To Know Before You Go Shopping For An Autoloader

1. What is your backup window – when and how long will it take you to do your backup?

Since the backup process is touching the data while it is making a copy, it is recommended to back up your data after your employees have gone home. That way, employees are not affected by the impact to the file server or the network. So, if you are like most companies, you can start your backup at 8pm. If you want it to finish by 6am the next morning, you have a 10-hour backup window.

2. How much data do you need to backup?

You will only need to back up your data, not all of the other things on your computer. To see how much data you have, you can look in your application data folders and the 'My Documents' folders. Most computer operators know how to look at how much data is on the hard drives of your systems.

You will only need to backup the data that has changed each day. There is no need to back up data that has not changed when you already have a copy of it in your full backup.

In Jane's Example Below, 10% of her data changes each day. (.001 per day x 5 days a week x 4 weeks in a month)

Friday: full backup: 300GB
Monday: backup only what is new, in her case 10% change: 30GB
Tuesday: same growth as Monday: 30GB
Wednesday: same growth as Tuesday: 30GB
Thursday: same growth as Wednesday: 30GB
Friday: same growth as Thursday(30GB) plus full backup: 330GB + 30GB= 360GB

Total strorage space required to keep two full backups and one week of incrementals online is 750GB.

3. How fast is your data growing?

While backing up the data that has changed will determine how much total storage you need now, estimating how much your data will grow will show you what you will need a year from now. A good rule of thumb is that the amount of data in a company doubles every 18 months.

HINT BOX

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In Janes's example, her data will grow 50% in 12 months to 450GB. After 1 year, her total storage need will be

Friday: full backup: 450GB
Monday: backup only what is new, in her case 10% change: 45GB
Tuesday: same growth as Monday: 45GB
Wednesday: same growth as Tuesday: 45GB
Thursday: same growth as Wednesday: 45GB
Friday: same growth as Thursday(45GB) plus full backup: 450GB + 45GB = 495GB

Total Storage space needed in 1 year to keep 2 full backups and 1 week of incrementals online, 1.125TB

4. How often do you want to physically move tapes off-site?
Remember that you will need to use the tapes you have off-site in a worst-case scenario where all of your computer data is lost. If you move tapes off-site every week your data would be at most 1 week old.

Jane's Example Summary

Backup Window	10 hours
Amount of Data	300GB
Amount of Storage Required	750GB
Rate Data is Growing	2% a month
Total Data in 1 Year	Approximately 380GB
Move Tapes Off-site	Weekly

Which Autoloader Is Right For Me?

Selecting an autoloader is fairly straightforward. Answer the questions on the prior page to determine your needs and review the chart below to view the technologies that meet your needs and the autoloaders that support those technologies. (A worksheet has been provided at the back of this booklet for your convenience):

Tape Technologies Available Based on Capacity Needs

Total data requiring backup	Tape technologies meeting capacity requirements*
140GB or less	DLT8000, DLT VS80, SDLT, LTO-1, LTO-2, DDS-4, AIT-2, AIT-3
280GB or less	DLT8000, DLT VS80, SDLT, LTO-1, LTO-2, AIT-2, AIT-3
350GB or less	SDLT, LTO-1, LTO-2, AIT-2, AIT-3
700GB or less	SDLT, LTO-1, LTO-2, AIT-3
770GB or less	SDLT, LTO-2
1.4TB or less	SDLT, LTO-2

** Estimates are based on seven-cartridge autoloaders with uncompressed (native) data capacity.*

HINT BOX

You have many choices for hardware and your selection should be based upon your tolerated level of risk, amount of data and the backup window.

Autoloaders

AutoLoader Options	Brand	Technologies Supported	Capacity (Native)	Speed (Native)	Reliability (MSBF)	Estimated Price
Quantum	ValueLoader™	DLT VS80, DLT VS160 LTO-1	320GB - 800GB	10.8 - 57.6GB/Hr	250,000	$3,500 - $7,000
Quantum	SuperLoader™	DLT-1, SDLT 320, LTO-1, LTO-2	640GB - 3.2TB	10.8 - 108GB/Hr	1 million	$5,000 - $12,000
HP	StorageWorks 1/8 tape autoloaders	DLT VS80, SDLT 320 LTO-1 LTO-2	320GB - 1.6TB	10.8 - 108GB/Hr	250,000	$3,500 - $8,500
HP	StorageWorks 1/16 tape autoloaders	DLT-1, SDLT 320, LTO-2	640GB - 3.2TB	10.8 - 108GB/Hr	1 million	$5,000 - $12,500
HP	StorageWorks 20/40 GB DAT DDS 8 cassette Autoloader	DDS-3, DDS-4	96GB - 160GB	4.3 - 10GB/Hr	250,000	$2,500 - $3,500
HP	DAT 40x6 autoloader	DDS-4	240GB	10GB/Hr	100,000	$3,000
ADIC	Fastor 2	SDLT 320 LTO-1, LTO-2,	800GB - 1.6TB	54 - 108GB/Hr	250,000	$7,000 - $9,500
ADIC	Fastor 7	DLT1, LTO-1	280GB - 700GB	10.8 - 57.6GB/Hr	250,000	$4,000 - $8,000
Sony	StorStation	AIT-1, AIT-2, AIT-3	280GB - 800GB	10.8 - 43.2GB/Hr	1 million	$3,000 - $6,000
Overland Data	LoaderXpress	DLT1, DLT8000, SDLT 220, SDLT 320, LTO-1, LTO-2, AIT-1	400GB - 4.4TB	10.8 - 108GB/Hr	250,000	$4,000 - $10,000
Seagate	Scorpion	DDS-4	240GB	10GB/Hr	100,000	$3,000
Dell	PowerVault 122T	DLT VS80, SDLT 320, LTO-1	320GB - 1.2TB	10.8 - 57.6GB/Hr	250,000	$4,000 - $7,000

HINT BOX

If your capacity is more than the autoloader will hold, or if your backup window is too short, you may require a tape library. For information on tape libraries visit www.quantum.com

So...How Do I Install My Autoloader?

When you purchase an autoloader, you will receive full installation instructions or some type of "Getting Started" guide. Luckily, one of the central missions of autoloader manufacturers is to make their products easy to install and use. Typically, installation guides are simple one-page documents that contain graphically detailed instructions in easy 1-2-3 order.

Special skills or knowledge of computers is not absolutely necessary, but it may help. What you can expect for installation steps are as follows:

• Connecting the autoloader to a server: If your server doesn't have one, you may need to install a SCSI host bus adapter (HBA) to connect the cable from the autoloader. Contact your computer professional for assistance.

• Installing software: At a minimum, this means the driver for the autoloader. You may also install backup software from an ISV.

• Powering up: Plug it in and turn it on. There may be a simple configuration routine to perform with the user interface (screen and buttons) on the front of the unit.

HINT BOX

Many people are not comfortable installing and configuring unfamiliar hardware and software. Make sure the manufacturer or reseller you purchase from offers installation services and adequate support.

• Rack-mounting your autoloader: This one's optional. But should you choose to mount your autoloader in a rack enclosure, you'll need a rack-mounting kit. They are easily installed. A standard 19-inch rack is similar to a stereo rack and can be purchased through your reseller. This might be handy if you want to put your backup system in the same rack as your servers.

Up And Running. So Now What?

Setting proper backup procedures is critical to maximizing the value of your automated backup solution. Most backup software from ISVs will contain recommended procedures based on your needs. However there are a few simple guidelines, as mentioned earlier in this guide.

How often?

Most companies find that a daily incremental backup, with a full backup on the weekend provides the right balance between data protection and impact on network systems.

How do I know if it worked?

ISV backup software provides a "verify" function. It takes a little longer for the software to check the data on each tape, but you'll know it's there when you need it.

Disaster recovery strategies

All companies – of all sizes - need to store their backed up data off-site. That way, if there's an earthquake, flood, power outage, fire, theft or other disaster, tapes from the remote location can be returned to restore downed systems. Otherwise, anything bad that happens to your PCs and servers will most likely happen to your autoloader if housed in the same facility.

HINT BOX

Planning your backup process is the most important step in protecting your data.

Backup for your backup process

Make sure that a second person is trained in the backup process in case the primary person is out of the office.

This Is A Tape Story. So Let's Rewind.

Backup automation products like autoloaders help ensure happy endings to stories of near-tragedy. So let's visit Jane again, this time, a month before the burglary. Having read a copy of "Backup Basics", Jane calls her local reseller whom she's trusted for years. She discusses her requirements and preferences with a salesperson and orders an autoloader and backup software.

Installation was as easy as 1-2-3. She schedules daily incremental backups with a full backup running during the weekend. Each Monday, she takes the tape home that contains the full backup. This, she has decided, is adequate disaster protection for her company.

Disaster strikes. Burglars make off with all her office equipment, including her new autoloader.

Panic does not arise. Insurance claims are filed, equipment is replaced and, most notably, Jane's business does not fail. After pulling the tape cartridges from the previous weekend's backup from her cupboard or preferably a fire-proof safe, Jane starts to rebuild her systems, including applications, client projects, contact databases, graphics archives and e-mail. She and her employees settle in and pick up where they left off.

Where To Turn If You Have More Questions

While “Backup Basics” is intended to answer many of the questions faced by businesses with backup challenges, it is not a replacement for individual contact with a knowledgeable storage professional.

Personalized help can be found at Quantum Corporation. Quantum manufactures DLTtape and LTO autoloaders and libraries and is a useful resource for more detailed storage information.

Please call toll free 1-866-827-1500 or 949-856-7800.
You can also visit Quantum online at www.quantum.com/autoloaders

March 11, 2003
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Shopping For My Autoloader

Quantum Authorized On-line Partners

CDW
www.cdw.com
888-239-7313

Insight
www.insight.com
800-467-4448

PC Connection
www.pcconnection.com
888-213-1237

PC Mall
www.pcmall.com
800-555-MALL

Government Enterprise Storage Providers (ESP-Gs)

Daly
www.daly.com
800-995-3259

DLT Solutions,Inc.
www.dlt.com
800-262-4DLT (4358)

GovConnection
www.govconnection.com
800-998-0009 Federal accounts
800-800-0019 All other accounts

GTSI, Inc.
www.gtsi.com
800-999-4874

Marzik
www.marzik.com
301-306-4404

Northrop Grummman IT
www.it.northropgrumman.com
888-321-OPEN (6736)

Independent Software Vendors

Computer Associates (CA)
www.computerassociates.com
800-225-5224

VERITAS
www.veritas.com
800-327-2232

Legato
www.legato.com
650-210-7000

Autoloader Worksheet

Determining Your Backup Window:

1. What time does your office close or most employees are no longer on the network:

2. What time does your office open and employees are on the network:

Calculate the number of hours between close and open (This is your backup window):

Backup Window Example Calculation:
Office closes at 7 PM, office opens at 7 AM – You have a 12-hour backup window

Determining the Amount of Data You Need To Back Up

1. Office Computers – Determine how much data is on each computer. Look under "My Computer/My Document" and review "local drive: c". Under "Capacity", look for the "USED" category on each computer (typically in GB) and add them up for a total number:

2. Servers – Determine how much data is on each server. Same steps as above:

3. Other Equipment – Some companies utilize NAS devices (Network Attached Storage). Calculate the amount of data on your additional storage devices:

Add up the numbers in boxes 1, 2 and 3 above for your Total Amount of Data:

Determining Your Data Growth Rate

1. To determine your average rate of growth, capture the "Total Amount of Data" at one specific point in the month, and then calculate it again one month later. Utilize this monthly growth rate to estimate your company's annual growth rate:

Example: May 1 - 300GB of data
June 1 – 315GB of data
Rate of growth: 5% a month

Once you have all this calculated, review the charts on page 12 and 13 to determine the right backup solution for you.

Glossary

AIT: Advanced Intelligent Tape™, a data storage tape technology by Sony.

Autoloader: a data storage device containing one tape drive, tape cartridge slots and a mechanical device that automatically loads and removes tapes from the drive(s), usually used for backup/restore.

Automation: the techniques and equipment used to achieve automatic operation or control, i.e., replacing human activity with a mechanical solution.

Backup: the act of deliberately collecting data, creating a viable copy of it, and storing it where it is both safe and easily retrieved.

Backup process: the guidelines or schedules by which backup operations occur.

Backup software: an application that specifically aids in automating the collection and writing of data to a backup device, as well as the restoral of data from the backup device to its place of origin.

Backup window: the time during which a backup is scheduled to take place, usually during non-working or off-peak hours when impact to network users will be minimal.

Capacity: the measure of data that can be stored on a device.

Compression (compressed): encoding data to take up less storage space on magnetic tape. Compression is carried out in the host (software compression) or in the drive itself (hardware compression). Software compression speed is dependent on host processor power, whereas hardware compression gives optimum performance and is transparent to the user. Data transfer speed and total tape capacity are affected by the data compression achieved.

DAT: digital audio tape; digital recording technology originally designed for audio in 1987; subsequent generations designed for general data storage.

Data: digital information

Data protection: the act of reducing risk to data loss or corruption.

Disaster recovery: a plan by which backed-up data can be restored after a catastrophic event.

DLTtape: a linear tape technology designed specifically to store for backup/restore and archival applications.

Full backup: a backup operation that copies all available data from network-attached sources (servers, PCs, drives and drive arrays).

GB: gigabyte; a unit of computer memory or data storage capacity equal to one billion bytes.

Host Bus Adaptor (HBA): a hardware device used for the interface between a server and network or other device (such as an autoloader).

Incremental backup: a backup operation that detects and collects only data that has been created or changed since the previous backup.

Independent Software Vendor (ISV): software vendors who create products that can be used with hardware devices from various manufacturers. (i.e. CA, Legato, VERITAS)

LTO: Linear Tape Open™: a linear tape technology similar to DLTtape, designed for data storage applications such as backup/restore and archive.

Magazine: removable container for holding multiple cartridges - often holds between 5 & 10 cartridges for easy transportability or offsite storage.

Mail Slot: opening in the autoloader where tape cartridges can be removed and inserted into the autoloader without turning it off or interrupting operation.

Mean Time Between Failure (MTBF): a reliability measurement expressing the expected life of a device before service or replacement is required.

Off-site: a term used to describe the removal of backup tapes from the premises where they were created to provide a geographical safeguard against loss or damage.

Picker: robotic mechanism for capturing a tape and moving it within the autoloader.

Restore, restoration: to replace lost or damaged data with a copy found on a backup tape or tapes.

SCSI: small Computer System Interface; used for connecting peripheral devices, such as autoloaders, to computers or servers.

Stand-alone tape drive: a single tape drive that is not part of an automated solution.

Storage: a place where data resides; example: server or computer hard drive, CDROM, floppy disks, tape.

Tape drive: the device that writes and reads data to and from a tape.

Tape cartridge: the container housing tape, spindle(s), and sometimes-embedded computer chips, such as with recent AIT.

Transfer rate (data transfer rate): a measurement of tape drive performance that quantifies how quickly data can be read or written by a tape drive.

Windows XP Backup Utility: a backup software utility that is bundled with the Windows XP operating system.

Verify: an operation performed by backup software the ensures a viable copy of specified data has been recorded by the backup device (such as an autoloader).