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Need for Automated Tape Library Back-up Data Storage Grows as Computer Systems Become Larger, More Complex, More Vulnerable

During the summer of 2000, a student working on a PC out of a small apartment in the Philippines set loose the “I Love You” computer virus. It infected an estimated 45 million computers around the world. The virus forced thousands of businesses to shut down their computer systems for hours, even days. Information Technology specialists worked for weeks at thousands of companies to clear the remnants of the virus from their computer systems. Companies spent an estimated \$2.6 billion to flush the bug, correct problems and develop strategies to protect against similar threats in the future.

This event illustrates the vulnerability of even the most secure computer systems. Software experts say that similar attacks will become more frequent as the number of viruses and their destructive capabilities multiply.

Viruses are just one example of the many problems businesses and organizations face in securing their most important asset — data. Human errors, natural disasters, power failures, system and network complexity, exponential growth of digital information — all of these and more contribute to the difficulties of saving, maintaining and retrieving mission critical data. As systems and networks continue to grow bigger and more complex, organizations will face even greater challenges to assure complete data backup.

Automated tape library backup solutions provide organizations with the most reliable method of ensuring that large data stores are saved continually.

Automated tape backup:

- ❑ provides a cost-effective solution that ensures reliable and sustainable backup operations according to controlled, predictable and carefully managed schedules
- ❑ assures all computer users that their information is secure and easily recoverable
- ❑ eliminates time-consuming, expensive and unreliable manual backup chores and improves the productivity of IT staff by allowing them to focus on more critical systems and network management tasks
- ❑ offers an enterprise-wide solution, full software and hardware compatibility, web-based remote management capabilities and easy installation
- ❑ gives your organization a scalable, definable and easy-upgrade path

The Data Explosion

The production of digital data grows exponentially almost every day. Personnel files, a myriad of financial records, data bases, video and graphics files, technical drawings, photographs and even sound files are developed and stored in digital formats. As more data is produced, back-up storage demands increase daily. Industry experts predict that data storage needs are growing by 50 percent to 100 percent or more per year. The predictions vary widely because it is impossible to estimate how much new data is being created and how much needs to be stored. What they do know is that the growth of digital information will continue to accelerate.

Although data is growing, IT resources are shrinking. A shortage of IT specialists exists throughout the U.S. while organizations are struggling to keep up with the demands of managing ever-increasing data stores. At the same time, companies expect managers to handle more data and to perform more complex systems management tasks. IT specialists are building and maintaining expanded systems that link more and more devices. A variety of networks, in turn, connect legacy systems, PCs, servers, LANs, WANs and even wireless devices. All systems are in use more each day as employees come to work earlier, stay later, log-on from home or other remote locations and perform ever-increasing data-intensive tasks. Internet use is growing rapidly and adding significantly to the burdens placed on information system managers.

IT managers are under constant and growing pressure to keep systems updated and operational at all times. Not surprisingly, in this difficult environment, data back-up is often compromised.

Inherent Data Back-up Problems

IT managers face a myriad of issues related to data storage, including:

- ❑ outdated and unreliable back-up systems and procedures
- ❑ constant concerns about back-up data loss
- ❑ slow retrieval of stored or lost information
- ❑
- ❑ keeping systems operational around-the-clock
- ❑ human and financial resources allocation issues

Business is increasingly data-driven. Across the enterprise, workers need fast access to mission critical information — data bases, drawings, graphics, reports, financial records, management tools, etc. If the information is available it must be easily accessible. If data is lost, the need for fast, up-to-date retrieval is critical.

When a business loses data the results can be devastating. A loss of data will cause customer dissatisfaction, loss of revenue, and even business failure. Industry experts estimate the cost to recover lost data at \$3,000 per megabyte. Losses for companies that

lose large data stores can grow quickly into the millions of dollars. Today, a company's viability is linked intrinsically to the functionality and reliability of its data storage system.

Outdated systems

Despite the complex demands for rapid storage and retrieval of data, manual back-up procedures continue to be used widely. This technique, however, is outdated and very risky. Manual back-up is a holdover from the days when computer hardware was unreliable, IT tasks were comparatively simple and IT resources were more readily available. Moving tapes by hand provided assurance that data would be saved.

Data loss

Today, human intervention poses the most significant problem for back-up operations. Various studies show that human error causes 64 percent of all data loss. Technicians dislike manual back-up tasks — the work is monotonous and opportunities to make mistakes are plentiful. Tapes are easily mislabeled or misplaced; back-up schedules can be compromised when other system problems occur; and precise resource scheduling is necessary to maintain manual back-up cycles. Even the most diligent technicians can make mistakes when they are responsible for backing up hundreds or thousands of files every day.

Using disks for backup doesn't solve the problem of data loss either. Besides manual handling, disks are easily flawed, susceptible to viruses, network and application errors, database corruption, operator error, and malicious destruction. Like manual tapes, disks are easily mislabeled and misplaced. Also, disk backup is substantially more expensive than tape storage by at least a factor of 10 — and often far more than that.

Retrieval of data

Retrieving lost data from manual systems presents significant problems. End users must work with operators to find where the data is located. That process is difficult and time consuming, requiring operators to sift through huge volumes of data. Computer systems then must be taken off-line to restore the files.

Keeping systems operational

Systems must be taken off-line not only to restore files but also to perform manual back-up. For most companies downtime is not acceptable in today's 24/7 global operations. Manual systems also are difficult to maintain and upgrade, they are not scalable and cannot be modified easily to handle storage of continually increasing amounts of digital data.

IT resource allocation

Manual back-up also is labor-intensive, slow and expensive. Highly-paid technicians should not be used to shuttle tapes or disks from one machine to another. Using IT professionals for manual backup is, simply, a waste of money. IT specialists should be

designing data management system improvements, monitoring networks and planning for future needs.

Automated tape backup is the most efficient and cost-effective method to assure secure data storage. Utilizing automated storage assures that backup is on-going, predictable, reliable and controlled.

Automation - , Reliable, Manageable and Scalable Solutions

Automation allows completely unattended backup operations. Backup functions are continual and require essentially no down time, assuring that mission-critical data is secure and recoverable. Automation also allows the IT staff to focus on critical systems and network management.

Tape libraries provide the primary hardware for automated backup. Robust robotic mechanisms move tapes from cartridges to drives and are capable of performing up to two million swaps without interruption. For tape identification, robotics are equipped with vision and/or scanning devices. Tape-head cleaning, tape labeling and tape management are all performed automatically in the library. (not to be input, just an assertion – the labels are placed on the cartridges outside the library but the position of the specific tape is addressed/denoted by the library audit. Can we say that here instead of tape labeling which makes it sound as though the robotic picker puts on the labels!

Multiple tape drives offer redundancy and scalability. .

The most advanced systems allow simultaneous use of different types of tape drives to match the most cost-effective tape drive technology to the application being employed. Drive types include: 18 track, 36 track, DLT, Magstar, 9840, LTO Ultrium, 9940, SuperDLT, etc.

Autoloaders are used in some automated back-up systems. However, their functionality is limited. An autoloader can move tapes only in sequential order and one at a time. This works for organizations with small data stores, but it's cumbersome and slow for storing and retrieving large amounts of data.

Libraries provide more flexible and powerful functions. With random incremental storage features, libraries only back-up information that has been changed. For recovery, libraries can be directed to a specific address and move immediately to the tape where the data is stored — it does not shuffle through all tapes in the system. Both of these functions significantly reduce the amount of time necessary for back-up and retrieval.

Scalability provides a critical investment-protection feature. An upgrade path is clearly defined and larger library units with more tape drives can be added quickly to expand capacity. In many cases, storage capacity expansion as well as the addition or replacement of more tape drives can be accomplished “hot-swapped” with no system interruptions.

Automation – Enterprise-Wide Solutions with Remote Management Capability

Automated tape library back-up provides an enterprise-wide storage solution. Utilizing server technology, libraries offer full remote management capability — back-up operations can be accomplished from any location on the network.

Sharing of storage resources across the enterprise provides significant cost savings:

- ❑ technical personnel are not needed at every physical location
- ❑ equipment needs are significantly reduced
- ❑ resource scheduling is simplified

On-board web servers allow remote library management and monitoring of storage functions from anywhere using standard web browsers such as Netscape and Microsoft Explorer. Centralized management and monitoring for distributed backup applications allow IT administrators to predict overall system maintenance needs. Automatic messaging-alert informs managers via e-mail of problems in the storage system. Basic problems are corrected automatically.

Best-in-class libraries provide an open system environment and are compatible with major applications software, servers, and operating systems. Including:

- ❑ Applications Software: Computer Associates, HP OpenView, StorageTek, Tivoli and Veritas, etc.
- ❑ Operating systems: AS/400, Linux, Novell, OS/390, Unix, Windows NT, etc.
- ❑ Servers: Compaq, Dell, Gateway, HP, IBM, NCR, SGI, Siemens, etc.

Conclusions

The amount and the value of the data critical to your organization is growing. Data represents an essential resource that, if lost, could cripple your business. Automated tape backup ensures that data is properly stored and managed in a cost-effective method.

Automated Tape Back-up highlights

Cost effective	Remote management	Increases reliability	Open system solution	Improves productivity
Costs at least 10 times less than disk storage	Store data from anywhere on the network	Eliminates manual back-up tasks	Cross-platform compatibility	Better utilization of IT staff
Fewer personnel needed	Manage storage from anywhere on the network	Eliminates use of autoloaders	All applications software	Centralized management and monitoring
Resources shared across enterprise	Use standard web-browsing tools	Fast data recovery and retrieval	All major operating systems	Staff not needed at distributed locations
No down time	Automatic alerts for system problems	Continual back-up operations	All servers	Efficient resource utilization
Easy path for upgrades - protects investment		Automatic tape labeling	Simultaneous use of multiple tape-drive types	Hot-swap disk drives