Automating Network Backup to Keep Pace with Exploding Data Growth

By Simon Watkins

This article explains the concept of automated backup, examines ways in which automated backup can address cost and time constraints, and discusses how specific automated backup solutions, such as the Dell® PowerVault® 128T LTO™, increase data reliability and manageability as well as staff productivity.

Today, organizations of every size and description face a digital explosion. More data will be created in the next three years than in the past 40,000 years.[1] This data growth trend is even more pronounced in corporate environments where the use of server applications such as e-mail, data mining, intranets, and the Internet increase at an unprecedented rate. Industry experts estimate that for most medium to large enterprises, data usage increases 50 percent annually.

Much of this data is business critical, and losing it—through natural disaster, human error, or disk malfunction—can have a major financial impact. A recent study determined that some businesses stand to lose thousands or even millions of dollars per hour if their network crashes.

A suitable backup routine provides the best protection against data loss of all kinds, and tape technology remains the most efficient, reliable, and cost-effective means to protect data in medium-sized organizations as well as global 24×7 operations.

A combination of two trends complicates data backup in today's enterprise environment: the amount of critical data increases, and the available backup window shrinks as users require greater access to the system and enterprises move toward continuous operating environments. The net result is that more data must be backed up in less time. In addition, many IT and MIS managers responsible for backups have other assignments, from routine system maintenance to complete backups of multiple locations.

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Automated technology reduces the overall cost of backup procedures and increases backup reliability, data manageability, and productivity. At the same time, automated backup provides assurance that mission-critical data is safe, accurate, up-to-date, and easily restored.

This article explains the concept of automated backup, examines ways in which automated backup can address cost and time constraints, and discusses how automated backup solutions, such as the Dell® PowerVault® 128T LTO™ Tape Library together with backup management software, increase data reliability and manageability as well as staff productivity.

Automated approach ensures backup and adds flexibility

Backing up systems manually and regularly requires dedicated IT staff members to load tapes and ensure that backups occur as planned. This method is an inefficient and expensive use of

[1] Lyman, Peter and Hal R. Varian. "How Much Information." 2000. Retrieved from http://www.sims.berkeley.edu/how-much-info in December 2001.

POWERVAULT 128T LTO TAPE LIBRARY

- 1 to 2 LTO Ultrium tape drives
- 1 to 20 LTO Ultrium tape cartridges
- Up to 108 GB per hour native backup
- Up to 2 TB native capacity
- Optional embedded 1 Gbps SAN router
- Web-based management
- 5U rack-mount or deskside chassis

Drives	One drive	Two drives
Slots	20	20
Native transfer	15 MB/sec	30 MB/sec
Compressed transfer	30 MB/sec, 108 GB/hour	60 MB/sec, 216 GB/hour
Native capacity	2.0 TB	2.0 TB
Compressed capacity	4.0 TB	4.0 TB

Figure 1. PowerVault 128T LTO throughput/capacity ratings by drive count

resources. Industry analysts estimate that manually backing up a medium-sized network using a single tape drive requires about four hours each workday. After devoting all that time, many managers admit they still are not sure whether backups have been completed successfully. Problems include forgetting to change tapes, backing up data to the wrong tape, forgetting to perform backups, and logging entries incorrectly.

Automated backups are initiated, conducted, and monitored without human intervention. As a result, backups can be scheduled for any time of the day or week. This flexibility frees IT staff from the tedious manual backup task and allows them to focus on more critical projects.

An automated tape library will never forget to initiate a backup or to clean tape drives regularly. Sophisticated backup software and library robotics technology ensure that the library will always load the correct tape—preventing a failed backup to the wrong tape or preventing the erasure of existing valuable data. If one backup spans more than a single cartridge, the library swaps the tape automatically without operator monitoring or manual intervention.

Libraries with multiple drives, such as the Dell PowerVault 128T LTO Tape Library, are ideal for medium to large enterprises where uptime is critical, restores are infrequent but urgent, and backup windows are minimal. Because the libraries have multiple drives, backup and restore operations can run simultaneously on multiple drives, significantly reducing the time required to perform these operations. The devices also provide redundancy: if a drive within the library fails, the backup software can switch the backup or restore job to another available drive.

Tape library delivers increased capacity, reliability, and performance

The Dell PowerVault 128 LTO Tape Library offers high capacity, speed, and reliability in an automated tape backup solution designed to meet the increasing data protection needs of medium to large enterprises.

Save time and increase productivity

The PowerVault 128T LTO Tape Library drives are based on the Ultrium™ format implementation of Linear Tape-Open™ (LTO) tape technology, an open standard for tape storage co-developed by Hewlett-Packard, IBM, and Seagate. The LTO Ultrium tape format is a scalable and durable tape technology that improves upon existing tape storage technologies, including standard digital linear tape (DLT). This next-generation technology's future has been mapped over an extended period. Each new generation of LTO Ultrium tape products should double in capacity and performance, providing the opportunity for long-term, company-wide standardization of backup technology.

The PowerVault 128T accommodates two high-performance LTO tape drives and 20 LTO 100 GB cartridges to offer up to 4 TB (compressed) tape storage capacity—the equivalent of 6,000 compact discs. Further, the device can load a cartridge and be ready to write to it in 13 seconds (not including the access time for the library robotics to get a tape to the drive) as well as read or write data at a native transfer rate of 15 MB/sec (30 MB/sec or 108 GB/hour compressed).

The combination of this capacity and speed makes the PowerVault 128T an ideal solution for quickly backing up and restoring large amounts of data in tight backup windows. Figure 1 highlights the throughput and capacity ratings of the tape library.

> The robust mechanism and rugged cartridge/media design of the Dell PowerVault 128T LTO Tape Library improves reliability over existing tape technologies.

Minimize errors

When asked what they require most from a backup solution, most IT managers say reliability. The robust mechanism and rugged cartridge/media design (intended for 100 percent duty

cycles) of the Dell PowerVault 128T LTO Tape Library improves reliability over existing tape technologies.

With the ability to tolerate more than one million cartridge swaps, the PowerVault 128T offers increased longevity, which provides reliability and helps protect an organization's storage investment. The LTO drives in the library include powerful error correction codes to reconstruct missing or damaged data and read-while-write verification, delivering high data-integrity assurance.

Increase manageability

As internal resources face mounting pressure to maintain system uptime, any solution that eases management is invaluable. In addition to a local LCD panel on the front of the unit, the PowerVault 128T offers remote management and diagnostic capabilities through an integrated Web browser. Network administrators can monitor the status of single or dispersed units and diagnose any library or drive problems from the convenience of their workstations. Figure 2 illustrates a configuration for Web-based remote management.

The PowerVault 128T is housed in a 5U chassis that can be easily rack-mounted or used in a stand-alone configuration. This small unit allows organizations to store large amounts of data without occupying valuable rack space. In addition, the optional integrated 1 Gbps Fibre Channel router eliminates the need to house external Fibre Channel devices. These features make the PowerVault 128T an attractive option for network-attached storage (NAS) or storage area network (SAN) environments that require high-capacity backups in as little time as possible.

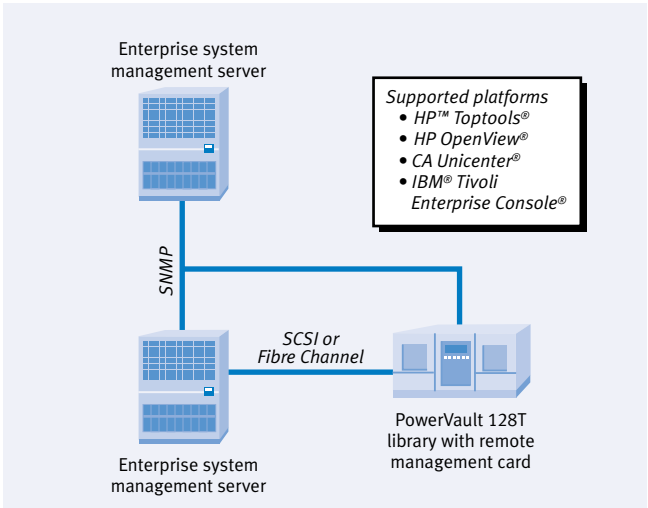

Figure 2. Web-based remote management

Libraries with multiple drives are ideal for medium to large enterprises where uptime is critical, restores are infrequent but urgent, and backup windows are minimal.

Automated tape backup maximizes IT resources

Any IT department's time is valuable and limited, and making the best use of available resources is essential. An automated tape backup solution such as the Dell PowerVault 128T LTO Tape Library allows data to be automatically backed up on a predetermined schedule without operator intervention or supervision.

This backup strategy performs many tasks automatically: initiating backups, swapping tapes, cleaning and managing tape cartridges, and skipping bad or write-protected media so backups continue without interruption. Reliable backup is further enhanced by a range of built-in intelligent diagnostic tools that warn IT departments when the library needs routine maintenance such as cleaning tape heads, replacing worn-out tapes, or replacing expired cleaning tapes. Thus, IT departments can perform pre-emptive maintenance before a failure and downtime triggers it.

The Dell PowerVault 128T LTO Tape Library and backup management software allow IT departments to increase reliability, manageability, and staff effectiveness; reduce costs; and significantly reduce error while providing a complete, high-performance backup and restore solution for all mission-critical data.

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Dell: http://www.dell.com

LTO technology: http://www.lto.org or http://www.ultrium.com

Contingency Planning Research: http://www.contingencyplanningresearch.com

Strategic Research Corporation: http://www.sresearch.com

University of California at Berkeley study: http://www.sims.berkeley.edu/how-much-info