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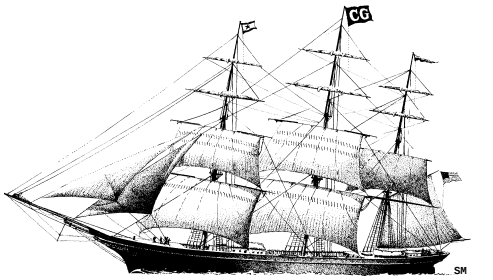

Navigating Information Technology Horizons℠

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Tape Library Solutions for the SME — When "Supersize Me" is Not the Answer

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Management Summary

Have you been shopping for a new TV recently? I'm not talking about a 13" TV for the kitchen to watch Emeril while you prepare dinner. Nor am I talking about a 20" screen for the bedroom to watch Leno before falling asleep. I am talking about a family room-sized unit to watch the big sporting event or American Idol. The options are almost too numerous to mention. You can have a tube, plasma, or rear projection. Do you pick LCD or *DLP*? You want high definition, but what about picture-in-picture to watch the reality show *and* the ballgame. You have to consider cost, of course, which then leads to the biggest question of all. Exactly how big can you go? Is 46" too big or should you go with the 65" wide-screen? Even if you can afford it, some homes do not have a family room big enough to handle 65", or even 46" for that matter. Perhaps the 36" model has all of the features that you need and is the perfect size for your environment.

A similar story plays out every day in the data center of thousands of small and mid-sized enterprises (SMEs) around the world looking to *consolidate* heterogeneous storage devices, *upgrade* an existing storage solution to provide automated backup and recovery, or to *shrink* the length of the backup window. In addition, the SME needs to provide an archiving capability and satisfy compliance data requirements to protect their businesses from data loss, lawsuits, and disaster. SMEs looking for a tape storage solution do not have the same budget or data center staffing as the Fortune 500 Company. They require a simplified solution that may contain much the same performance and functionality as the major enterprise. They do not have, however, the same capacity requirements as the major enterprise with tens or hundreds of terabytes of information. Tape library vendors such as HP, IBM, and Sun (formerly STK) have long catered to the major data centers, following the money, to provide solutions for dozens of tape drives and thousands of cartridges. Clearly, these solutions do not fit into the SME IT environment.

Some vendors are now paying closer attention to the smaller data centers, those upgrading to autoloaders for the first time, or entry-level libraries. These enterprises may only need 4 - 5 TB of capacity today, but they have identified a growth path to, perhaps, 15 - 20 TB of tape capacity. IBM, for one, recognized that need last year with the introduction of the *TS3310*, supporting 28.8 TB of data and up. Now IBM has lowered its sights another notch and introduced the *TS3100* and *TS3200*, supporting the autoloader and entry-level library environment. To see if these products will satisfy your needs, please read on.

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Tape Requirements in the 21st Century

The small and medium-sized enterprise (SME) faces many of the same storage problems as the largest enterprises – tremendous growth in on-line storage (doubling annually), a complex storage environment, an ever-shrinking backup window, and a limited budget. Unfortunately, the requirement to retain information necessary to satisfy the demands of regulatory legislation compounds the growth of data, and no end is in sight. Some of this data, while not mission-critical, is clearly business-critical. In order to protect executives from possible litigation, the enterprise retains this information for many years. However, the data center may never need to read it. Storing it on spinning media, in a disk-to-disk (D2D) architecture, is a waste of IT resources and of energy, the electricity required to keep the discs spinning and to cool the data center from the heat generated by these devices. These are all factors involved in computing the total cost of ownership (TCO) of IT infrastructure that could seriously affect departmental budgets and enterprise profitability.

Unfortunately, over the years, heterogeneous server proliferation has added significantly to the complexity of the IT architecture, with the data center installing a variety of servers to satisfy specific application requirements. Along with different servers, the data center has installed a variety of tape storage devices: DAT, DDS, DLT, LTO, and others, depending upon the standards for a particular server solution. This results in the necessity to stock not only a variety of spare devices to protect against mechanical failure, but also the necessity to stock a variety of tape cartridges to ensure that there is sufficient media on hand to satisfy the needs of any application requirement. As data centers look into consolidating their servers to improve processor utilization, they are also looking into consolidating, and simplifying, their storage. To enable unattended operation, the staff needs to select a single, standard tape format with which to implement an automated backup and/or archiving environment. They also need to select an automation solution - autoloader or library - to meet their application and budget needs.

Exhibit 1 – Automated Tape Requirements

- **Scalable capacity** – for both cartridges and drives;
- **High-performance throughput** – to reduce the length of the backup/recovery window;
- **Low-cost entry** – to meet the needs of a budget-constrained data center;
- **Reliable operation** – to enable unattended operation; and
- **Commodity solution** – to enable connection to heterogeneous servers in a consolidated tape environment.

What is the difference between an *autoloader* and a *library*? An autoloader is a data storage device usually consisting of one tape drive, a method of loading tapes into the drive via a robot, and a storage area for the tapes. A Tape Library is a larger device with multiple drives and expanded cartridge slots. An automated solution simplifies the environment and eliminates the need for manual handling of tape, eliminating the possibility of human error, but requires the addition of a barcode reader in the device to identify the cartridge containing the data. This also enables the IT staff to automate the initiation of the recovery process to reduce out-of-service time. The length of time to complete the backup or recovery procedure is dependent upon the throughput and capacity of the drive. See Exhibit 1, above, for a partial list of tape automation requirements.

In terms of capacity, current standards such as LTO-3, with a native capacity of 400GB, far exceed the capacity of formats introduced only two years ago, let alone some of the legacy drives which populate the enterprise data center. DDS-4 has a native capacity of 20GB, while DAT72 supports 36GB of uncompressed data. LTO-3 supports twice the capacity of LTO-2; in addition, LTO-3 protects the investment made in LTO-2 media. It can read and write on an LTO-2 format cartridge, as required, and can read LTO-1 format cartridges. In terms of throughput, LTO-3 again exceeds the capability of all of the legacy devices, with a native throughput

of up to 80Mb/s. DDS-4 and DAT72 have a throughput of only 3Mb/s, while LTO-2 transfers data at 35Mb/s. This has a direct bearing on the amount of data stored in the library, the length of the backup/recovery window and the number of cartridges that the IT staff currently manages, either in the library, on a shelf, or in the trunk of a car.

In order to satisfy regulatory requirements, the automated solution must have a means to eject the cartridges for storage in an offsite vault location. In addition, the autoloader or library must be reliable and have the capability of remote maintenance to enable management via the internet.

IBM Tape Solutions for the SME

In 2005, IBM made a significant effort to lower their sights and deliver a viable tape library solution for the SME. With the introduction of the *TS3310 Tape Library*[1], IBM downsized the data center solution, with a library starting at 2 LTO-3 drives and 36 cartridge slots, but capable of supporting six drives and 128 cartridge positions. However, with a list price of $14,000 for the basic library and $14,500 for each LTO-3 tape drive, the TS3310 may be a little high for the typical "S" of the "SME". In an effort to appeal to a wider audience, IBM has introduced two new models: the *System Storage TS3100 Tape Library Express* and the *System Storage TS3200 Tape Library Express.*

Built to support LVD Ultra160 SCSI and 4Gbps Fibre Channel (FC) drives through a PCI-Express interface, the TS3100 and TS3200 protect the investment made by the data center in previous iterations of these technologies and provide a throughput of up to 80Mb/s. IBM provides remote management for both models through the internet. In addition, IBM provides native device driver support for *AIX*, *OS/400*, *i5/OS*, *Windows 2000* and *2003*, Sun *Solaris, HP-UX*, and Red Hat and *United Linux*.

A 3-year customer exchange warranty is included for improved availability, worry- free operations, and reduced TCO.

System Storage TS3100 Tape Library

Designed with completely new robotics to support a single LTO-3 drive, the TS3100 is a high-performance autoloader capable of supporting up to 22 standard or WORM[2] cartridges and 8.8TB of nearline data, nearly triple the capability of the *IBM 3581 Tape Autoloader* that supported only eight cartridges. Using a 2:1 compression ratio, the TS3100 can support up to 17.6TB of compressed data. The LTO-3 drive can not only read/write LTO-3 media, it can also read LTO-1 cartridges, improving native throughput from 15Mbps to 20Mbps. Configured with a pair of removable magazines and a single, dedicated mail slot, the TS3100 can provide continuous library operation while importing or exporting library media. In addition, in case of a power failure, the removable magazines are releasable manually via a lock in the rear. A barcode reader is standard in the TS3100 to enable unattended operation of the device in sequential or random access mode.

The TS3100 hits the budget bull's eye for the first time autoloader user. With a price of $4,000 for the basic library and $5,800 for an LVD SCSI drive, the SME can be functional for under $10K in either a standalone or rack-mountable (2U) configuration. With a FC drive installed, a high-performance autoloader costs only $12,975. With the high cartridge count, the TS3100 costs a very low, very competitive $445 per slot for SCSI and only $590/slot for FC.

The TS3100 comes with an LCD display, with indicators for power, error status, and message information.

System Storage TS3200 Tape Library

Also designed with completely new robotics, the TS3200 supports up to two LTO-3 drives. Therefore, it qualifies as an entry-level, high-performance library capable of supporting up to 44 standard or WORM cartridges and 17.6TB of nearline data. Using a 2:1 compression ratio, the TS3200 can support up to 35.2TB of compressed data, almost twice the capacity of the IBM *3582*

[1] See **The Clipper Group Navigator** dated October 11, 2005, entitled *Tape Virtualization in the Enterprise – Reducing Data Center TCO*, available at http://www.clipper.com/research/TCG2005062R.pdf.

[2] Write Once, Read Many

Tape Library that held 24 LTO cartridges. The LTO-3 drives can not only read/write LTO-2 media, but they can also read LTO-1 cartridges, improving native throughput from 15Mbps to 20Mbps, 40 Mbps using a 2:1 compression. Configured with four removable magazines to support a fast bulk load of the library, a three-slot I/O station, and a dedicated cleaning cartridge slot, the TS3200 can provide continuous library operation while importing or exporting library media. In addition, in case of a power failure, the removable magazines are releasable manually via a lock in the rear. A barcode reader is standard in the TSX3200 to enable unattended operation of the device in sequential or random access mode.

The TS3200 provides a low-cost entry point for a new library user, or a data center upgrading from an autoloader. With a price of only $7,900 for the basic library and $5,800 for an LVD SCSI drive, the SME can implement a fully functional library with a single SCSI drive for $13.7K in either a standalone or rack-mountable (4U) configuration. With a pair of FC drives installed, a fully redundant, high-performance library costs just over $25K. With the very high cartridge count, the TS3200 comes in at a very low, very competitive $270 per slot for a single SCSI drive and under $590/slot for the dual FC model.

The TS3200 also comes with an optional additional power supply and control path-data path failover. An LCD display, with indicators for power, drive and activity, error status, and message information is standard.

Conclusion

With their target clearly focused upon the vast SME customer base, not to mention the departmental needs of larger enterprises, IBM has introduced a pair of tape storage solutions to handle the infrastructure simplification needs of businesses previously lacking a sound backup/recovery or archiving strategy. With the System Storage TS3100 Tape Library, IBM has delivered an autoloader containing enough scalability to support the first-time automation user for years into the future, protecting the entry-level investment and lowering the TCO for the smallest enterprises. With a purchase price under $10K and a life expectancy of at least five years, the SME is paying less to insure his data, the lifeblood of his enterprise, than he is paying to insure his entire business, annually.

With the TS3200, IBM has introduced a highly scalable, entry-level library to provide unattended operation with failover capability for the mid-sized user or enterprise department. Configurable in a 4U chassis, the TS3200 has the scalability and performance to reduce the backup/recovery window and streamline data center operations. Big enough to satisfy the demands of any SME data center application set, the TS3200 is small enough to fit inconspicuously in any enterprise environment. The TS3200 appears to be the ideal tape library solution for the smaller environment looking to secure its data while, at the same time, reducing its costs.

If your SME, or department, is concerned about the availability and accessibility to enterprise data, look at the TS3100 and TS3200. Cost is no longer an issue. You should be more concerned about the impact on your bottom line if you lose mission-critical or business-critical data. An automated tape solution will remove those concerns.

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