IBM Extends Its Tape Offerings — New Support for SMB and Enterprise

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Management Summary

Some basic technologies just will not go away. No matter how we try to improve upon them or try to get rid of them, they continue to prove their worth, and improve their capabilities over time. Take the light bulb, for example. Invented over 120 years ago, incandescent bulbs have spawned fluorescent lights, halogen bulbs, and now, new energy-efficient lighting products, each with its own value for a specific lighting purpose. However, when the bulb in the desk lamp burns out, we return to the store to obtain a new supply of 60-, 75-, or 100-watt bulbs, depending on the amount of light required. Standards established decades ago enable us to buy lamps from any manufacture and bulbs from a myriad of companies, eliminating the requirement to test each new bulb with every lamp in order to light our way. Some bright ideas just will not go away.

There is a similar technology continuing to thrive in the corporate data center: magnetic tape. It simply will not go away. Invented over 50 years ago as a primary storage medium, magnetic tape continues to survive, not only as a primary storage medium, but also for backup and archiving of mission-critical files. The need to store data securely and economically, in an energy-efficient manner, has seen a recent spurt in a variety of tape formats and capacities for different requirements: from high-performance, enterprise-level environments with native capacity of 500 GB per cartridge to the more mundane needs (and lower budgets) of small businesses and departments or remote offices of major corporations. Low-cost, commodity devices have matured over the past decade, with higher capacity and faster throughput drives evolving every year. From DAT to LTO, tape technology continues to improve, enabling the smallest enterprises with minimal IT budgets to protect the most vital resource of the enterprise – *data*. Not everyone can afford the investment in the latest enterprise-level automatic tape encryption, but with the cost of a new LTO-3 tape drive at under $5K, who can afford not to protect his or her data.

LTO-3 technology has been with us now since 2004, with native cartridge capacity up to 400 GB and a sustained throughput of up to 80 MB/second. Unfortunately, LTO-3 did not have the form factor convenience of LTO-2, available in both full-height and half-height models. That is no longer the case. IBM recently announced the availability of half-height LTO-3 drives, supporting the same media options as the full-height device, as well as higher capacity enterprise tapes. To see how these new features can streamline the cost and shape of your IT environment, please read on.

Magnetic Tape in the Data Center: Alive and Kicking

The data center has been experiencing an explosion of data recently along with an up-surge in data movement, initiated by an effort to control the costs of storage through Information Lifecycle Management (ILM)[1] and the creation of multiple tiers of storage. The causes have come from a variety of sources, not the least of which are: government regulation, security, archiving, and last but by no means least, a booming economy. (See Exhibit 1, at right.)

In order to comply with recent federal regulations, or simply to try to adhere to industry norms, enterprises across the country, and around the world, have been forced to save more data. In an effort to protect themselves from possible prosecution, CEOs and CIOs are instructing the IT staff to save everything from financial records to emails in order to be able to reproduce them for examiners. Further, to produce them without a reasonable delay. Unfortunately, the costs associated with the acquisition, maintenance, physical space, and energy requirements of additional terabytes of data is placing an undue burden on IT budgets.

Ignoring the predictions of the doomsayers, magnetic tape continues to thrive in the 21st century data center. Continual improvements in both the capacity and throughput of tape devices makes tape the logical medium for most backup and archiving environments in the enterprise, whether *Fortune 500* or SMB, where the costs associated with doubling or tripling the size of a SAN can be prohibitive when calculating all of the costs of implementing a storage network[2]. There is a place for short-term disk-to-disk backup and recovery in the mission-critical enterprise data center, but for most businesses, **tape has been, is, and will**

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[1] See **The Clipper Group Explorer** dated August 29, 2002, entitled *Tiered Storage Classes Save Money – Getting the Most Out of Your Storage Infrastructure,* at http://www.clipper.com/research/TCG2002030.pdf.

[2] See **The Clipper Group Explorer** dated June 4, 2006, entitled *Tape and Disk Costs – What It Really Costs to Power the Devices,* at http://www.clipper.com/research/TCG20062046.pdf.

Exhibit 1 – Data Explosion Factors

- *Government Regulation* – Recent laws governing SEC transactions require the preservation of all financial records;

- *Security* – In order to protect the enterprise from data loss, IT staff must backup mission critical information, often to more than one location, to ensure that it can be retrieved;

- *Archiving* – Some data becomes static after a specified period and needs to be archived in order to prevent continual backup and a waste of resources; and

- *Booming Economy* – Mergers and acquisitions, along with expanding customer lists, add to the volume of customer files that are the most valuable resource of the data center.

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continue to be the recovery/archive medium of choice.

The only question that remains is: *Which tape format?* Over the decades, the data center has seen a steady stream of both proprietary and commodity formats appear with varying capacity and throughput capability, and varying cost as well. Mainframe tape drives can cost in excess of $30,000 with cartridge costs of over $100 for 500 GB of uncompressed data, while PC solutions can cost under $100, complete. The typical data center today, however, requires a solution that can support backups of several hundred gigabytes at a time, even terabytes, and must complete them overnight, and unattended, so that enterprise operations are not impacted or financially burdened. This does not even address the problem of continued compatibility with legacy cartridges in the data center library. The CIO must be careful not to create the *Rosetta Stone* of the 21st century, a library full of cartridges and no means to read them. The CIO must protect the investment in the data center while ensuring that the enterprise has a viable path forward.

Recently, two formats are fighting it out in the commodity tape wars arena, *Linear Tape Open* (*LTO*) and *Super DLT* (*SDLT*), while IBM and Sun (nee STK) tangle in the

mainframe data center.

The Legacy Tape Environment

Before 2000, Quantum's *Digital Linear Tape* (*DLT*) and Sony's *Advanced Intelligent Tape* (*AIT*) shared the tape needs of a majority of the open systems data centers. Unfortunately, their proprietors created a pair of *proprietary technologies*, closely managing both environments. In order to develop a more open, or commodity, architecture, HP, IBM, and Seagate (now Quantum) joined forces to introduce an open standard. Using the development work done at IBM's Tucson laboratory as a basis, these three companies combined their resources to introduce LTO-1 in 2000 as an industry standard. With an initial native capacity of up to 100 GB per cartridge and a throughput of 20 MB/second, LTO-1 was vastly superior to any of the other open systems solutions available, such as DAT or DDS, had 2.5 times the capacity of DLT8000, and more than three times the performance. They introduced LTO-1 with twice the performance of SDLT 220 and comparable capacity.

LTO-2, with a native capacity of 200 GB, a throughput of up to 40 MB/second, and backward compatibility with LTO-1, began to appear in the IT infrastructure in 2002, in many cases replacing DLT. The comparable DLT architecture in 2002 was SDLT 320, with a native capacity of 160 GB and a throughput of 16 MB/second. Not including compression ratios that can vary widely depending upon the data, LTO-2 had 20% greater capacity and more than twice the throughput of SDLT 320. After the initial introduction of LTO-2 with a full-height format, a half-height drive was introduced, enabling the implementation of tape libraries with twice as many drives. With a similar pricing structure, it is no wonder that LTO made huge inroads on the DLT base.

Even though LTO-3 has been available to the data center since the fourth quarter of 2004 in an external tape drive form, many enterprises, especially smaller ones (SMBs), did not elect to make the transition to it.

With an initial price north of $6,000, many SMBs simply could not make the commitment, even though with a native capacity of 400 GB per cartridge and throughout of up to 80 MB/second LTO-3 outstripped the capability of LTO-2 and the comparable SDLT models. LTO-3 also maintains read compatibility with two previous iterations of the technology, write compatibility with LTO-2, and now has a write-once, read-many (WORM) capability. SDLT 600, also introduced in 2005, has a cartridge capacity of 300 GB, 25% less than LTO-3 and a throughput of 36 MB/second, less than half that of LTO-3.

In the mainframe arena, IBM has been leading the way with continued improvements in both capacity and throughput, first with the introduction of the *TotalStorage 3592* tape drive and then its successor, the *TS1120*[3]. With a native capacity of 500 GB and a compression ratio of 3:1, the TS1120 already supports 1.5 TB of compressed data on a single cartridge, with a native data rate of 100 MB/second, and the ability to encrypt the data before compression to protect the enterprise from the possibility of exposure due to data loss.

IBM Tape Solutions

IBM is one company that does not have to return to the tape bandwagon. They never got off. With a full line of both proprietary mainframe-class tape drives as well as the widest variety of open systems devices, IBM has proven over the years a dedication to the continued advancement of tape technology. With their latest announcements, IBM has increased the capacity of their TotalStorage 3592 and TS1120 enterprise tape drives, driven down the cost of their *TotalStorage 3580* full-height LTO-3 tape drive to under $5,000, and introduced a new half-height LTO-3 device, the *TS2230 Tape Drive Express,* at a cost of $3,395. The half-height form factor provides a device that supports

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[3] See **The Clipper Group Navigator** dated November 29, 2005, entitled *Sun Challenges IBM for Enterprise Tape Drive Supremacy – T10000's Improvements Fall Short*, available at http://www.clipper.com/research/TCG2005077.pdf.

the same capacity as the 3580 drive, but with a slightly reduced throughput.

Enterprise Tape Enhancement

One year after stretching the measure of tape from 300 GB to 500 GB with the introduction of the TS1120, IBM has increased the capacity of its enterprise tape capability by another 40%. By extending the uncompressed capability of the 3592 tape cartridge from 500 GB to 700 GB, IBM has maintained compatibility with existing enterprise drives, protecting the investment of thousands of data centers around the world, while increasing the compressed capacity from 1.5 TB to 2.1 TB on a single cartridge. **This extends the total scalability of every IBM enterprise library configured with TS-1120 tape drives by 40% without increasing floor space of energy consumption, improving library utilization, and lowering total cost of ownership for the enterprise.** Furthermore, in keeping with the existing architecture, IBM is delivering two 700 GB cartridges, one for standard data and the other for WORM. Both cartridges also support the recently announced data encryption capability. The 700 GB cartridge is expected to become available on December 8, 2006.

Commodity Tape Enhancement

The half-height IBM TS2230 supports 400 GB of uncompressed data as a desktop device or with a 2U rack-mount kit as an option. It has a native transfer rate of up to 60 MB/second, slightly slower than the 80 MB/second for the 3580 full-height LTO-3 drive. It comes with an LVD SCSI connection for simplified installation and operation. The TS2230 is ideal for the backup and recovery of environments with smaller data requirements and has read/write compatibility with LTO-2 cartridges, and read compatibility for LTO-1. While IBM has not yet made any announcements regarding compatibility with their entry-level tape automation devices, the *TS3100 Tape Library* and the *TS3200 Tape Library*, it is reasonable to assume that the TS2230 will enable the data center to double up on the drive count in these devices. In fact, by

installing two drives into the TS3100, IBM could promote this device as a well-endowed SMB library, with a potential throughput of 120 MB/second. This would also increase the throughput capability of the TS3200 to 240 MB/second, more than enough for any SMB to backup their network storage overnight. Doing this would also enable the CIO to protect the investment made in the existing enterprise LTO architecture.

Availability of the TS2230 is currently planned for December 8, 2006, with a list price of $3,395. This is in line with IBM's recent price reduction for the 3580 LTO-3 tape drive, from $5,095 to $4,665, making both devices extremely attractive to the smaller enterprises in the SMB space.

Conclusion

While some companies treat tape as a necessary evil, IBM has included magnetic tape as a staple of the IT environment for the past five decades and, it appears, will continue do so to solve enterprise storage problems for years to come. The introduction of a 700 GB cartridge for enterprise-level tape environments, at the same time as the introduction of a commodity $3K entry-level tape backup/recovery solution for the open environment, is a clear indication of IBM's focus. Both of these solutions protect the investment made in legacy hardware and work to reduce the total cost of ownership of IT investment.

As we have seen with the light bulb in the fabric of our day-to-day living, magnetic tape is a fundamental part of our IT infrastructure. It is not going to go away. IBM has recognized this fact and appears dedicated to improving its capability from one generation to the next, at all levels. No matter if your data center is managing hundreds of gigabytes or hundreds of terabytes, IBM is paying attention. If you have expanding data requirements for backup/recovery or archiving,

you should be paying attention to IBM.

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