



## Storing More Data Forever Than Ever Before? HP introduces StoreEver for Long-Term Storage

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### Management Summary

With a constantly fluctuating real estate market, many potential home buyers are postponing that decision and living in apartments instead. While there is a short-term advantage of having a reasonable and fixed expense on the monthly budget, it also brings a few disadvantages, most notably a lack of space. Depending upon the amount of space that you have available, there is a constant battle for finding room for your “things”. With all of the closets filled with items that demand immediate access, clothes for the current season, toys for the children, many apartment dwellers seem to need additional storage space for a variety of items, including off-season clothes, family heirlooms, or even Aunt Millie’s furniture that you love, but have no space for right now. In addition, there are smaller items with no place to be, such as high school yearbooks, photo albums, suitcases for your annual vacation, and the crib no longer in use. In fact, even homeowners with an addiction to hoarding often need to find additional space, both short-term and long-term. Additional low-cost storage space is available for that very purpose in the form of self-service units of varying sizes, depending upon the volume of storage space that you require and for how long.

The art of finding additional storage space is nothing new to the data center IT staff of every enterprise, large or small, who constantly are on the lookout to find additional capacity for data and files, structured and unstructured, to meet the demands of a constantly growing business. While most, if not all, mission-critical applications require the fastest access possible, often provided by a combination of Tier-0 solid-state disks and Tier-1 high-performance hard disk drives (whether SAS or Fibre Channel), other business-critical applications, such as backup, may be satisfied with slightly slower access, such as that provided by Tier-2 SATA and SAS drives that spin more slowly. Other applications, such as archiving, can meet their needs with high-capacity, low-cost alternatives, such as magnetic tape, for their Tier-3 storage requirements. At the same time, some businesses, such as SMBs or remote branch offices, often can satisfy their capacity needs with solutions that do not provide the scalability required by the largest enterprises. However, they all require similar functionality, performance, and reliability; just not with the same high-end price tag. Ease of use may be **important** to the enterprise data center, but it is **critical** to smaller data centers with limited budget and even more limited staffing. The SMB, for example, simply cannot afford the cost of a high-end archive solution, while the enterprise needs capacities that are beyond the scope of the smaller business data center. Any specific data center requires a storage solution that meets the specific needs of *that* data center in order to grow storage as the business demands.

One company that can satisfy the Tier-3 tape storage needs of any business is HP. HP has recently rebranded its tape offerings as *StoreEver* and has added *LTO-6* to their menu of options. To learn more about HP’s tape storage solutions across the capacity spectrum, please read on.

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## The Long-Term Storage Dilemma

Every data center, small, very large and everywhere in-between, has been experiencing a period of unprecedented data growth and also for the storage to house it. It doesn't matter whether your data center needs to store ten terabytes of data or ten petabytes; you need a scalable and reliable system that will enable your storage to scale to meet the growing storage needs of your business. Most data centers are doubling their storage capacity every 12 to 18 months, while some are experiencing even greater growth, compounding the management complexity and the issues involved in accessing data.

This growth is placing a tremendous burden on the IT budget, as each business attempts to control the TCO of the IT infrastructure. The IT staff not only has to acquire additional primary storage, but they also must provide for the long-term preservation of business- and mission-critical information, as well as other archival data. Many applications require a backup storage solution that may require a disk-to-disk (D2D) architecture – to expedite the availability of the data in the event that a recovery is needed. In addition, D2D can be used to better manage data center operations, as the amount of data being backed-up often stretches the bounds of the backup window and impacts workload performance when a recovery is required. The IT staff has to cope with D2D acquisition, maintenance, and licensing costs in addition to the ancillary costs, such as the power required to drive and cool the expanded architecture, the space needed to house the disks, and the additional technology needed to protect the data from unauthorized access. The IT staff needs to satisfy the demands being placed on the data center by the growth of data storage yet still remain within budgetary constraints.

**However, the TCO and data protection challenges of a D2D environment can create an unacceptable burden on the IT budget for the long-term preservation of data, whether backups or archives. Preserving this information may demand a lower cost storage target, such as tape<sup>1</sup>, which can be used with disk-to-tape (D2T) and disk-to-disk-to-tape (D2D2T) storage solutions.**

<sup>1</sup> For a discussion on lowering TCO by using tape, see the issue of *Clipper Notes* dated December 20, 2010, entitled *In Search of the Long-Term Archiving Solution – Tape Delivers Significant TCO Advantages over Disk*, and available at <http://www.clipper.com/research/TCG2010054.pdf>.

### Exhibit 1 — Long-Term Storage Requirements

- **Non-Interference** – Be able to provide sufficiently high performance to meet enterprise workload scheduling requirements ;
- **High Capacity** – Be able to meet the storage growth demands of the data center;
- **Affordability** – Be able to live within budget limitations;
- **Reliability** – Be able to ensure uninterrupted data access;
- **Scalability** – Allow the data center to protect its investment with seamless upgrades as capacity grows;
- **Security** – Be able to ensure and protect the integrity of the data and prevent unauthorized access;
- **Energy Efficiency** – Be able to lower the demand on electrical resources and extend the life of the data center, even as backed up and archived data capacity grows;
- **Portability** – Allow the transportation of media offsite to facilitate disaster recovery; and
- **Ease-of-Use** – Do this all while minimizing additional demands being placed upon the IT staff.

*Source: The Clipper Group*

Many IT organizations are looking to deploy an automated tape library with the latest technology in order to reduce the TCO and energy consumption of long-term storage as well as to enable manageable data protection strategies. In fact, with the expanded capacity and improved throughput of the newest tape architectures, some data centers are even looking to adopt, or return to, a more direct D2T solution. See Exhibit 1, above, for the requirements needed to satisfy the needs of storing data over the long term.

## The Rationale for Tape

The wise data center needs a reliable tape library architecture supporting the latest tape technology with the highest capacity and throughput and with the least complexity. Thus, it needs to deploy the newest *LTO*<sup>2</sup> technology, with the highest open systems capacity and throughput and the lowest total cost of ownership, all while protecting prior investments in *LTO* media. The data center needs *LTO-6*<sup>3</sup>, the newest *Ultrium*

<sup>2</sup> *Linear Tape Open*, also called *Ultrium*.

<sup>3</sup> See *The Clipper Group Navigator* entitled *Magnetic Tape Turns 60 – The IT Industry Receives Another*

drive, to complement or replace older, less performant LTO drives. This will facilitate data preservation within the existing IT budget by enabling the data center to protect previous investments in Ultrium LTO tape with the capability to write to *LTO-5*<sup>4</sup> cartridges and read from LTO-5 and *LTO-4* cartridges. With more than twice the compressed capacity of LTO-5 tape, LTO-6 tape enables the data center to reduce the number of cartridges required, reducing the floor space, and prolonging the investment in the tape infrastructure. In addition, with a roadmap that includes *LTO-7* and *LTO-8* technology, the IT staff can plan for even more capacity and performance in less space in the years to come.

The offsite storage of information is required for data protection, for both long-term archiving and/or disaster recovery. Tape is a great way to move and store a lot of data inexpensively. The availability of an I/O station is required to facilitate the import and export of media while maintaining continuous operation. Portability also implies additional requirements for data protection. The IT staff needs to be able to encrypt any data that will leave the data center to ensure the increased security of data in transit, keeping the enterprise out of the headlines and its executives out of court. The IT staff also needs to prove that retained data has not been altered, requiring support for WORM<sup>5</sup> media to address compliance with industry and government required standards.

Management and administration are other important elements in the information infrastructure. Due to the potential complexity inherent in an enterprise archiving architecture, the enterprise requires a web-based management capability to enable the remote management and administration of library functionality.

### HP LTO-6 Ultrium Tape Drive

With its LTO-6 Ultrium tape drive, HP has retained all of the features and functions of previous generations of the LTO Ultrium drives, and it now delivers more. HP offers multiple models of the LTO-6 *Ultrium drive*, the LTO-6 Ultrium 6250 and *Ultrium 6650*, depending upon the platform. These are available as a half-height or full-

height SAS drive for standalone tape drives and a half-height SAS or FC drive, or full-height FC-drive for library automation. Each is capable of storing 2.5TB of raw capacity and up to 6.25TB compressed, using a 2.5:1 compression ratio. These models are designed for the heavy demands of backup and recovery and archiving data for long-term storage and use. HP's new drives are accompanied by *HP TapeAssure* for manageability (discussed in next section) and *HP StoreOpen with LTFS* file system management software to extend HP LTFS<sup>6</sup> functionality from a single HP LTO drive to HP autoloaders and libraries.

- **HP StoreOpen** enables ease of use with unprecedented performance. HP LTFS simplifies the distribution and exchange of files across organizations with heterogeneous platforms to help lower costs and improve productivity. With a rated 30-year media shelf life under normal operating conditions, LTO-6 is the ideal low-cost media for long-term archiving.
- **HP Tape Assure** monitors operational performance, both drive and media utilization, and provides life/health information for both. (More on this, later.)

With LTO-6, HP has increased both the capacity and performance of the *LTO-5* tape drive to better handle the growth of Big Data<sup>7</sup> within the data center, while controlling the costs of long-term data storage. The LTO-6 Ultrium drive combines high capacity, tape reliability and performance at an open systems price. The 6250 and the 6650 provide the following commodity features and HP proprietary features to improve durability and reliability.

- **Increased native data transfer rate** to 160MB/second or 1.44TB/hour, with 2.5:1 compression.
- **Hardware encryption using AES 256-bit** to ensure easy-to-use security for protection of the most sensitive data while preventing unauthorized access to that data.

*Gift* dated July 12, 2012, and available online at <http://www.clipper.com/research/TCG2011015.pdf>.

<sup>4</sup> See **The Clipper Group Navigator** entitled *LTO Program Announces Next Gen Tape – LTO-5 Raises the Bar for Tier-3 Storage* dated January 31, 2010, and available online at <http://www.clipper.com/research/TCG2010002.pdf>.

<sup>5</sup> WORM=Write Once, Read Many.

<sup>6</sup> Linear Tape File System is an open format for storing file-based data on tape, in a way that makes them self-describing and directly accessible as files.

<sup>7</sup> Big Data is data that is coming into the data center from everywhere: from sensors used to gather climate changes, posts to social media sites, digital pictures, and videos to name a few.

- **HP's exclusive *Data Rate Matching*** to optimize performance and improve reliability by matching the host data rate. This helps to reduce the number of backhitch repositions and improves throughput performance.
- **HP's new, proprietary fabrication process** to coat its LTO-6 tape heads for additional tape media durability.
- **A new, patented larger roller diameter and dynamic tape lifter** to reduce wear and enhance performance by minimizing unnecessary drag.
- **Decreased power consumption for the drive when no cartridge is present**, defaulting into hibernation mode after a short period of inactivity.
- **Support for a WORM cartridge** that will prevent the alteration or deletion of user data,
- **An 8Gbps FC dual-ported interface or a 3Gbps or 6Gbps interface** enabling direct connection to SAS-equipped servers, depending upon the model.

In terms of cost, LTO-6 has made a significant impact on the TCO of the IT infrastructure. First, in terms of acquisition cost, with a list price starting at \$3,999 for the half-height LTO-6 Ultrium 6250, it lowers the per terabyte for cost for compressed data over an LTO-5 deployment, and even more so when compared to LTO-4 and LTO-3. LTO-6 media is available at about \$.025 per GB, offering very cost-efficient, compact, and energy-efficient storage. In comparison to LTO-5 cartridges, based upon this per GB cost, this could potentially reduce data center costs for media by a factor of two.

### HP StoreEver Storage Family

HP has introduced its LTO-6 tape drives in a variety of StoreEver Tape products, from a standalone drive to a large-scale automated tape library. This broad range includes:

- **The *HP StoreEver 1/8 G2 Tape Autoloader***, to resolve backup and archive issues in an entry-level internal, external, or rack-mount environment,
- **The *HP StoreEver MSL Tape Library*** for the SMB and mid-range environments, and
- **The *HP StoreEver ESL G3 Tape Library*** for enterprise environments.

StoreEver tape solutions enable the data center with removable media, tested to extremes in HP's media laboratory to a level of specification unique to HP. All StoreEver products carry a one-year warranty for parts and labor onsite for the MSL, EML, and ESL libraries, and a three-year warranty for the LTO-6 tape drive. The *HP EML E-series Tape Library* still is available, although LTO-6 upgrade kits will not be available until February 2013, according to HP.

With a web-based remote management capability, StoreEver platforms offer the capability for the central IT staff quickly and easily to access, configure, monitor, and troubleshoot multiple libraries remotely, eliminating the necessity of having to train a remotely-located staff that may not have any technical qualifications. With HP Tape Assure, the IT staff can effectively monitor drive and media health and utilization. The IT staff can download HP Tape Assure for free, in support of all of HP's StoreEver products. Furthermore, with native encryption, the data center can protect confidential business information from falling into the wrong hands even if a cartridge is lost or stolen or otherwise falls into the hands of the unauthorized.

HP's StoreEver products have been integrated with HP's *StoreOnce* platform for disk backup, including direct offload from the backup application. In addition, *StoreOnce Catalyst* is integrated with HP *Data Protector* and third-party backup applications to enable the management of backup and replication functions from a single interface.

### *HP StoreEver Tape Autoloaders*

The HP StoreEver 1/8 G2 Tape Loader is a compact 1U device that provides a cost-effective storage solution that is easy-to-use for even the smallest business. It enables unattended automated tape storage for archiving and data backup for entry-level data centers or remote offices. With a configuration of one LTO-6 Ultrium 6250 drive and 8 slots, this StoreEver autoloader provides the density required by many smaller offices, with up to 50TB of compressed capacity.

Each autoloader comes with one mail slot for media exchange and two removable four slot magazines for bulk loading. Each also is configured with a bar code reader to enable faster inventory times and facilitate media tracking.

### *HP StoreEver MSL Tape Library*

The HP StoreEver MSL Tape Library has been designed to meet the demanding storage

requirements of the SMB or mid-sized enterprise. It is configured with a compact form factor of up to 8U (depending on the model) that provides a cost-effective, unattended automated archiving and data backup solution for the SMB or mid-sized enterprise. The StoreEver MSL is a scalable library that can be configured with up to four LTO Ultrium drives and up to 96 cartridge slots. The IT staff quickly can increase capacity and/or performance up to these limits with tool-free upgrades and slot license capacity upgrades.

With the LTO-6 Ultrium 6250 drives deployed, the StoreEver MSL Tape Library provides the density required by the SMB or mid-sized enterprise. With three models, the data center can deploy the *StoreEver MSL 2024* (with up to 24 slots to support up to 150 TBs), the *StoreEver 4048* (with up to 48 slots for 300 TBs), or the *StoreEver 8096*, with up to 600 TBs in 96 slots. (All of these are total capacities with a compression factor of 2.5 times.)

In fact, the StoreEver MSL Tape Library can be expanded further, up to 900 TBs, by adding a second library, managed as a single library, with *HP's MSL Library Extender*. The MSL Library also can be configured with any previous LTO generation drive. With LTO-6, it has a throughput of up to 1.4 TB/hour per drive, with a maximum 4.8 TB/hour data transfer rate with a four-drive MSL8096, using Fibre Channel (FC) at up to 8Gbps or SAS at up to 6Gbps.

The IT staff easily can manage the tape media, both in and outside of the library, with a standard bar code reader, configurable mail slots, and multiple 12-slot removable magazines. The LTO-6 library-based encryption can protect important business data from unauthorized access.

### ***HP StoreEver ESL G3 Tape Library***

The HP StoreEver ESL G3 Tape Library has been designed to meet the demanding storage requirements of the largest enterprises. An entry model can be configured with as few as 100 slots or a fully-expanded model can be deployed with up to 7104 slots across 16 frames, in increments of 100 slots for capacity-on-demand. The StoreEver ESL G3 can store up to 44.4 PBs of compressed data and up to 96 LTO-6 Ultrium 6650 drives<sup>8</sup>, allowing the largest enterprise to meet their storage growth challenges directly, with HP's most scalable library. This enables the data center to keep up with unanticipated data

growth and creates an ideal environment for archiving either cold or active data with a media shelf-life of up to 30 years.

The data center also can simplify management of a complex environment with library partitioning. HP's *ESL G3 Partitioning Software* allows the IT staff to logically divide the library into up to 16 virtual tape libraries, facilitating the management of an environment with multiple SANs or backup software applications to help isolate each virtual library. Advanced partitioning support can be provided by an *Automated Media Pool* that automatically reallocates partition space as storage requirements grow, without having to reconfigure enterprise applications.

Scalability, however, is not the only feature of the StoreEver ESL G3. It also delivers high availability through redundant power supplies and optional dual robotics, along with host path connectivity failover to provide near continuous library performance. Once again, management and control of multiple libraries is enabled through an intelligent single pane of glass command GUI with HP's *Command View Tape Library Software*, while TapeAssure delivers predictive and proactive monitoring of tape drives, media, and library health.

The IT staff can easily manage the tape media with configurable import/export slots, from 24 to 528, for fast bulk load and unload. A 72-slot mailbox provides one of the largest import/export capabilities. FIPS-compliant data encryption and secure key management safeguard enterprise data from unauthorized access while it is in the library, in transit, or at rest in an offsite location. This protects the enterprise from data misuse, embarrassment, and potentially-costly litigation.

### ***HP Tape Assure***

HP Tape Assure enables faster and easier management, optimized for the reliable reading and writing of data from the enterprise library archiving environment. It provides comprehensive reports on the status, performance, utilization, and health of all tape drives and media. Tape Assure includes the following capabilities.

- **Utilization and Performance** – to pinpoint configuration changes or make recommendations for specific upgrades to enhance capabilities and/or performance.
- **Proactive Health Monitoring** – to identify issues before they become disruptive to enable the IT staff to per-

<sup>8</sup> These drives support both 4Gbps and 8Gbps FC host connections.

form preventative maintenance within planned windows.

- **Proactive Maintenance** – to identify when to clean drives, retire media, and even retire drives.
- **Consolidation of Tape Monitoring** – to deliver a single, consolidated view of tape storage solutions, regardless of device or location.
- **Justification for Expansion** – to identify when capacity limits are being reached.

HP Tape Assure works with LTO-3 drives and cartridges and above for enterprise class libraries (ESL) and LTO-4 drives and cartridges and above for MSL libraries and the Autoloader.

## Conclusion

Along with the requirement for the collection and assimilation of more and more data, comes the need to retain that information in a low-cost archive for future use. How far into the future is anyone's guess: five years, ten years, or, perhaps, forever.

*What are the critical factors that the data center needs to consider in evaluating a long-term storage solution?* As you evaluate long-term storage requirements, you must keep in mind that there is more to a durable storage solution than simply higher capacity and lower cost. The IT staff needs to ensure the reliability and availability of the library, as well as the integrity of the data and the protection provided by encryption. They need to consider the advantages of library partitioning and ease of management. Cost always will be a component of the decision equation; however, the investment protection provided by the continuation of existing tape formats, with additional upgrades on the horizon, is also critical. **Far from “dead”, tape remains a vibrant technology for the entry-level, SMB, and enterprise data center.**

The IT staff needs to deploy a long-term storage solution that not only provides the capacity required for today, but also for the scalability required to meet the expanded requirements of tomorrow. Tape is a low-cost solution that meets today's budget, yet protects the investment made today for the foreseeable future. That is exactly what the enterprise gets with HP StoreEver and related products.

With its StoreEver product set with LTO-6 drives and media, HP provides a series of scalable, easy-to-use, and economical libraries that

meet the needs of every enterprise, large or small, to preserve and protect their enterprise data, perhaps forever. StoreEver comprehensively addresses the data center's current and future requirements for information protection, retention, and optimization. No matter what your need, a standalone drive for direct server attach, a single-drive autoloader for entry into automated long-term storage or a multi-drive solution to manage tens of PBs, HP has the ideal solution for your environment. If your business or enterprise is concerned about the long-term protection and storage of their critical data, an HP StoreEver library may be the answer for you.



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