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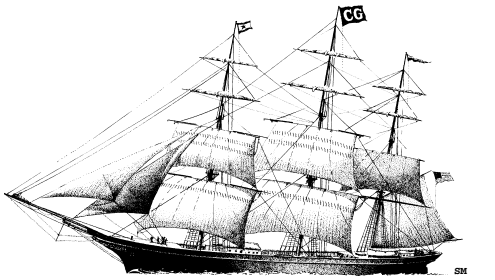

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Spectra Logic Upgrades T-Series with LTO-5 — Provides Ideal Engine for Active Archive

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Management Summary

For the average sports fan growing up before the turn of this century, following baseball was relatively simple. You could pick up the morning newspaper (which was still available) and checkout the box score for your favorite team. There, in black-and-white, you could read the important statistics: who won, the score, the **R – H – E**, (Runs, Hits, and Errors) for every game. Today, the thought of following up on all of the statistics being mined for every game is mind-boggling. Not only can you check out the runs, hits, and errors, but you can discover the number of pitches that each pitcher threw, the number of balls, the number of strikes, how each pitcher does against every batter in his career, how every batter does in every ballpark, and an infinite number of even more esoteric statistics that are available on an ever-growing Internet. How many stats are being made available? Well, to quote *Buzz Lightyear* in *Toy Story*: ***To Infinity and Beyond!***

The growth of data is certainly not unique to sports. The thirst for more competitive information is evident in the data center of every enterprise around the world. The volume of data is doubling every 12-to-18 months with no end in sight, with Tier-3 storage taking center stage as enterprises create more short- and long-term copies in an attempt to *preserve* and *secure* their business- and mission-critical applications and meet industry and governmental standards for data protection. Recent trends to create these copies in a disk-to-disk (D2D) environment, where RTO policies are critical, have begun to return to a D2D2T environment when immediate recovery is not as critical, enabling the IT staff to cope with the total cost of ownership (TCO) issues associated with their disk architecture, such as data management, floor space, and energy consumption. **Archiving is another area where more information is being preserved for future use. The ability to migrate historical information off of disks onto lower cost tape, while retaining the ability to search and retrieve libraries of vital information, is becoming essential for the long-term vitality of every enterprise.** The availability of LTO devices and media with WORM and encryption architectures, and highly-scalable tape libraries, enables a return to tape for long-term data protection. The arrival of LTO-5 with dual-partitioning to facilitate a metadata search and retrieval takes the next giant step in enabling the use of tape in active archive environments.

No company is making better use of tape for the preservation of critical enterprise data and the implementation of an active archive strategy than Spectra Logic. With the introduction last November of their highly scalable *T-Finity* library within the *T-Series*, Spectra Logic increased the capacity and efficiency of their libraries. Now, with the availability of LTO-5 drives and media for the T-Series, Spectra Logic has increased the capacity, throughput, and management of data on tape even further. To learn more about active archives and the capabilities of T-Finity for preserving your data, please read on.

IN THIS ISSUE

Data Growth in the Enterprise Data Center

The modern data center must deal with a myriad of issues revolving around the continuing growth of enterprise storage. The IT staff must cope with ever-expanding backup windows and new archive requirements that demand higher data accessibility and faster retrieval. The IT staff must also deal with the inexorable increase in TCO issues involving energy consumption, data center floor space, and the administration and management of a rapidly expanding storage architecture, all while trying to manage a static, or decreasing IT budget in support of that infrastructure.

The IT staff requires a highly scalable, economic storage deployment, in order to protect the enterprise investment, one supporting the highest density, with superior performance and the lowest energy consumption possible. They also need a solution that will enable them to search and manage that growing data storage more effectively and securely, protecting the integrity of their valuable enterprise resource.

Over the past few years, data center storage has experienced a period of unprecedented growth in volume, and all indications are that this will continue. Between mergers and acquisitions, consolidation and virtualization, industry regulations and government compliance, the enterprise is storing more data, and more kinds of data: structured, semi-structured, and unstructured, along with binary objects such as audio and video images, and more copies of data in order to mitigate risk, than ever before. Storage requirements typically are doubling every twelve to eighteen months. TCO factors are taking a significant bite out of the IT budget. Acquisition costs for storage may be fairly stable, but these overhead costs for the IT infrastructure are rising precipitously.

Primary storage continues to reside on a heterogeneous mix of spinning media: disk devices consisting of high-performance, high-availability Tier-1 Fibre Channel (F.C.), and high-capacity Tier-2 SATA, as well as the highest-performing Tier-0 solid-state disks (SSDs). Backup images for data with immediate recovery requirements will also continue to reside on high capacity disks in order to satisfy the demands for business continuity. Enterprise RPO and RTO policies, however, will dictate which backup copies can migrate to other media. **Best practices for data retention in the data center dictate that the long-term storage of email and other compliance documents, along with archiving environments, will continue to find a home on tape in order to protect the enterprise and its officers from failure to preserve this information and comply with internal policies and government regulations.**

In fact, far from being dead, tape continues to thrive in the data center, with 70% of enterprise data centers using both disk and tape to store information, with many planning to increase their use of tape. Furthermore, some data centers that may have evolved to a D2D environment, now find themselves returning to tape in order to take advantage of its high capacity, portability, low-cost WORM, and encryption technologies. These are all innovations introduced on tape - LTO *Ultrium* tape - realizing the economies available in terms of energy and other environmental factors contributing to a lower TCO, as a result of a reduction in the number of cartridges required[1].

Today's tape is *fast*, in fact with throughput faster than many networks can handle. It also has *high capacity*, with LTO-5 checking in at an impressive 3.0TB with a 2:1 compression, and a roadmap for significantly more. Most importantly in a down economy, tape is *affordable*, with a lower cost per gigabyte than disk. Furthermore, with the innovation established in LTO-5 for dual-partitioning and new software that enables a file-system front-end for tape, *tape can act like disk for search and retrieval*. This enables the data center to migrate many of their archives that contain active data to tape, creating an online, active archive that is easily searchable. In fact, Spectra Logic has joined with several others companies to form the *Active Archive Alliance*[2] to promote the use of active archives in the data center. This is a perfectly logical move for them as a vendor of both critical disk and tape storage hardware. The availability of LTO-5 devices and media make their T-Series libraries, and specifically their T-Finity library, perfectly positioned to ride the active archive wave.

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[1] See the issue of Clipper Notes dated October 21, 2008, entitled *Disk and Tape Square Off Again – Tape Remains King of the Hill with LTO-4*, and available at http://www.clipper.com/research/TCG2008056.pdf.

[2] See **The Clipper Group Navigator** entitled *Simplified, Online Access to Archived Data – Turning History into an Active Archive* dated June 11, 2010, and available at http://www.clipper.com/research/TCG2010029.pdf.

Rise of the Active Archive

As organizations collect more and more data, their archives continue to grow, and the challenge of accessing that information intensifies. In April, Spectra Logic joined with Compellent Technologies, FileTek, Inc., and QStar Technologies, to form the Active Archive Alliance to help organizations, both public and private, which are "grappling with data growth, retention compliance, and the need to leverage their knowledge and information."[3] The Alliance was formed to satisfy a data storage industry need for a multi-vendor effort to ensure inter-compatibility, define best practices, and to educate on new trends and technologies that help organizations meet the myriad of data access and retention requirements imposed upon them.

The goal of this alliance is to bring data archives online in order to promote a simplified access to an enterprise's historical data. The Alliance will provide IT organizations with "the best practices, tools, and information they need to achieve simplified access to the online storage of their archived data."[4] In this manner, organizations can turn offline archives residing on tape into persistent, visible, and accessible extensions of their online storage environments.

What is an active archive? It is an affordable, available, online archive that contains production data, no matter how old or infrequently accessed, that is searchable and can still be retrieved online. It enables a simple and persistent data access to what has been called, in the past, *active, fixed data*. The active archive is enabled by extensions to standard file systems and new software, including a file system interface, which allows applications to expand their search range. The availability of file system interfaces that span an entire pool of storage, including online disk arrays and high-density tape libraries will enable the data center to leverage all of this valuable data resource, including: structured, semi-structured, and unstructured data, along with binary objects.

In order to be deployed, the active archive library must make economic sense. It must have improved scalability, energy efficiency, high storage density and a reduced footprint in order to lower the TCO of this infrastructure. It must also be available and reliable with a requirement to ensure media and data integrity. The active archive will span many years of history and, therefore, must also have a superior media management within the library

One company that is a leader in both the Active Archive Alliance and in the development of superior tape library products is Spectra Logic. With three decades of history in delivering tape libraries to the largest enterprises, including many large broadcast organizations and HPC labs, Spectra Logic is well positioned to meet the archive needs of the enterprise data center. New innovations, such as the dual-partitioning of LTO-5, make tape the right media to deploy to enable an online active archive. Before we look at Spectra's T-Series libraries, let's take a look at what LTO-5 has to offer for the enterprise data center.

LTO-5 Advantages

For a technology that was reportedly dead a decade ago, there appears to be a very strong heartbeat in the open system LTO tape infrastructure. With higher capacity, higher throughput, and a major reduction in power, LTO-5 is breathing new life into backup and archiving applications in the enterprise data center. LTO-5 Ultrium introduces media partitioning to open systems tape architecture. It enables users to logically partition an LTO-5 cartridge into two partitions, allowing the data center to write metadata on the thin partition and data to the broad partition. This can provide new opportunities for faster access to data on tape, in support of active archiving or other applications, including security surveillance and video production.

With a native capacity of 1.5TB, 3.0TB with 2:1 compression, LTO-5 has almost twice the capacity of an LTO-4 cartridge. Furthermore, LTO has a published roadmap for compressed capacities of up to 32TB with *LTO-8*[5]. This will enable the data center to improve the density of any library solution deployed, protecting the investment for IT infrastructure as the years pass. With a native throughput of 140MB/s (280MB/s compressed) per drive, LTO-5 enables the data center to not only shrink backup window requirements, but it also enables faster data archive searches and retrieval. Quite clearly, however, there are times when a really fast tape drive can be a detriment, especially when the network or

[3] Active Archive Alliance press release dated April 27, 2010. See http://www.activearchive.com/news.

[4] Ibid.

[5] See the LTO Ultrium press release dated April 14, 2010 at http://www.ultrium.com/pdf/LTO Roadmap Extension 041410.pdf.

HBA cannot match that speed and the drive is required to stop and start repeatedly. LTO-5 combats that problem with *Digital Speed Matching (DSM)*, adjusting the transfer rate of the drive from 40MB/s up to 140MB/s, enabling the drive to match the data transfers from slower hosts. DSM utilizes a large buffer to improve overall throughput and reliability in slower environments.

In addition, LTO-5 has an improved drive technology with a simplified tape path and servo tracking systems. It has an improved reliability via read-after-write verification, error correction codes, and advances in film coating, all designed to improve the reliability of the tape environment. LTO-5 also has superior power management to help improve heat dissipation, with a 40% reduction in idle power requirement, as compared to LTO-4. There is also reduced power consumption in idle mode. As always for Ultrium, LTO-5 has two generations of backward compatibility, read compatibility with LTO-3 and read/write compatibility with LTO-4, for easy integration of historical data.

Spectra Logic T-Series

Now, Spectra Logic has integrated the technological advantages of LTO-5 into their established line of tape libraries. With 30 years of innovation on their resume, Spectra Logic has earned their position as an established vendor of data protection hardware for the enterprise data center. They provide automated tape backup solutions, disk and deduplication backup solutions, and general data backup solutions that protect enterprise data efficiently and securely. In terms of tape backup solutions, Spectra Logic offers a full range of libraries, from an entry-level *T50e* with 10 to 50 cartridge slots, all of the way up to the recently announced *T-Finity*, which starts at 100 slots and can grow to 25 frames with over 30,000 slots. This may not be *Infinity*, but it is *beyond* what all but the largest enterprise data center will ever need for effective active archiving! With 30,000 slots holding non-spinning media, T-Finity is the ultimate in scalability, performance, and power management.

In preparation for the availability of LTO-5, Spectra Logic got ahead of the game by announcing last September an LTO-5 pre-purchase program, enabling customers of their T-Series libraries to purchase LTO-4 tape drives then, with a technology refresh to LTO-5 drives when they became available, protecting their investment in T-Series libraries. Well, Spectra has now announced the availability of LTO-5 drives for their T-Series libraries, with a T-Finity tape library equipped with LTO-5 drives presenting a truly impressive enterprise solution.

Announced in November, 2009, T-Finity appears to have been designed with the media and entertainment industries and high-performance computing in mind, enterprises dealing with extremely high volumes of data. The scalability and ease of use of T-Finity make it an attractive acquisition for the high-end data center, reducing the overall capital investment required as well as lowering operational costs to lower TCO. Spectra libraries are designed with innovative features that save time and money, such as a virtualized architecture to enable component failover and replacement without requiring reconfiguration, integrated data encryption for security, media health monitoring, low power consumption, and lifecycle management. In addition, the T-Finity virtualization feature enables the data center to partition the library for both backup and archive functionality.

T-Finity satisfies all of the checkpoints for active archiving with the highest density, reliability, and built-in data integrity. T-Finity's fault-tolerant, redundant component design delivers greater than four "nines" (99.99%) availability through dual robotics, dual communications paths, redundant robotics controllers, redundant power paths and power supplies, global sparing, and Spectra Logic *BlueScale* technology. With an entry point of 100 slots, T-Finity can meet any data center budget requirements with a low cost, fast data-transfer solution that protects the enterprise investment. It can easily integrate with new active archive management applications, enabling easy and rapid access to all of the enterprise's historical data.

With up to 25 frames, a T-Finity library can scale to 30,000 slots with a maximum of 120 LTO-5 tape drives in a single system. According to Spectra Logic, enterprises with higher throughput requirements can look forward to future scalability of up to 100 frames, 122,080 slots supporting 366PB, and more than 480 LTO-5 drives with a throughput of 483.8TB/hour[6]. T-Finity currently scales to 90PB of compressed data, which compares quite favorably to an IBM TS3500 library, which scales to 192 drives in 16 frames with 20,000 LTO-5 slots and 60PB of

[6] Based upon LTO-5 with a 2:1 compression factor.

compressed data. T-Finity stores up to 72TB of data per square foot. This represents a density advantage up to 70% higher than competitive offerings which offer 40-42 TB/sq.ft. T-Finity supports non-disruptive scalability for both slots and drives.

In terms of throughput, T-Finity supports up to 24.2 TB/hour in a single frame, scalable to 121 TB/hour in a fully expanded library. With an average file access time of 65-75 seconds and dual redundant robots supporting high tape exchange rates, T-Finity enables very fast data search and retrieval times in support of today's archiving needs.

T-Finity with LTO-5 drives offers the highest power efficiency in the industry with a heat dissipation of 0.7 watts/TB. It uses 50% or less power per unit of data than competitive offerings, reducing both power and cooling costs.

For the data center with compatibility concerns, Spectra Logic has committed to support the IBM TS1130 drive in T-Finity. This enables the enterprise with an option to deploy the right cost/performance model for their data center requirements.

Today's tape libraries must have the intelligence to proactively alert the IT staff whenever a media or hardware issue is developing. Spectra Logic libraries come with a unified library management in the form of Spectra Logic's single-pane *BlueScale* interface that provides proactive notification.

Spectra Logic BlueScale 11

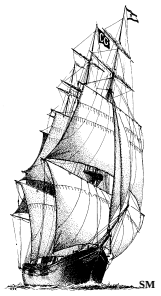
BlueScale provides the intelligence for all data reliability and data integrity validation to minimize unscheduled down time. BlueScale provides *Media Lifecycle Management* (*MLM*) to ensure tape media reliability, *Drive Lifecycle Management* (*DLM*) to proactively manage and monitor all of the tape drives in the library, and *Library Lifecycle Management* (*LLM*) to monitor the health of the hardware components. MLM inspects media before usage, identifies over-used or damaged media, and verifies data integrity immediately after being written to tape, and for years to come. By doing this, the IT staff can remove defective tapes before critical data is stored on them. Any media that approaches manufacturer's thresholds will generate an alert to the IT staff. This includes any environmental damage to media or data integrity issues on the cartridge. This functionality is critical to any active archive to ensure data availability.

DLM consists of a suite of tools and reports, including the ability to proactively track and test drive health. For example, DLM can identify any drive at risk before backup or archive functions are affected. LLM tracks the library health, alerting the IT staff whenever component thresholds are met. Furthermore, BlueScale encryption to tape with key management (Standard Edition) is included with all of Spectra Logic's LTO libraries at no extra charge. T-Finity cannot guarantee that tapes being taken off-site for disaster recovery purposes won't be lost, but with encryption, the data will be protected. In addition, the *BlueScale Energy Audit* feature displays and records real-time energy use to enable the data center to maintain an energy-efficient environment.

Conclusion

This should not come as a big surprise: tape is an indispensable media for the data center in terms of the long-term storage of valuable historic data. Not only is tape technology cost effective and affordable, but with LTO-5 technology it meets all of the requirements for any backup or archive environment.

Deployed with LTO-5 drives, a T-Finity Tape Library provides the data center with high throughput, high capacity, energy efficiency and high density. It provides the modularity the needed for seamless integration. It is reliable and scalable, providing the investment protection that any enterprise requires to take them into the future. The portability of tape along with the encryption capabilities of T-Finity, deliver the security that every enterprise requires in moving media for disaster recovery. T-Finity is an ideal engine for archiving. If your data center needs a scalable archive solution, look into T-Finity for your long-term storage requirements.



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