Tape Storage Council

Today the [Tape Storage Council](#), which includes representatives of BDT, Crossroads Systems, FUJIFILM, HP, IBM, Imation, Iron Mountain, Oracle, Overland Storage, Quantum, Spectra Logic and Tandberg Data, issued the following [memo](#) to highlight the current trends, usages and technology innovations occurring within the tape storage industry.

The Tape Storage Council will host a webinar moderated by IDC Research Director, Robert Amatruda, on Thursday, Sept. 19, 2013, at 12:00 noon ET to discuss tape's role in the data center and the cloud for 2013 and beyond. Please register [here](#).

Tape Storage Meets Long-Term Data Retention Challenges
Tape Capacity Shipments Grew 13% in 2012; Projected to Grow 26% in 2013

As Bob Dylan lamented in the 1960s, the times they are a-changing – and that is certainly true for the storage industry today. The trifecta of flat-to-shrinking IT budgets, exponential data growth and the trend toward extended retention periods are challenging IT organizations as never before. Tape storage – with its unrivaled economics and capacity advantages – is often the only viable option for tempering the skyrocketing cost of storing long-term data and for addressing many of today's toughest storage challenges.

Tape storage plays a pivotal and expanding role in today's modern data centers. Throughout 2012 tape storage continued to solidify its role as an indispensable storage medium for IT environments dealing with large, rapidly growing quantities of data, extended data retention periods, and IT budget pressures. Not only is tape storage being tapped for traditional uses in backup, disaster recovery and compliance, it is experiencing accelerating growth in active file archive, low-cost NAS storage, and as a deep archive offered by cloud providers. These trends are driving the accelerating growth of tape as LTO tape capacity shipments posted 13% year-over-year growth in 2012 and are projected to grow 26% in 2013.[i] And the worldwide enterprise tape automation market (defined as libraries with enterprise tape drives) posted nearly 30% year-over-year revenue growth in 2012.[ii]

"Tape's role in today's modern data centers is changing as IT executives and cloud service providers discover new use cases for tape technology that leverage its unique operational and cost advantages. This recognition is driving investment in new tape technologies and innovations, and it is shifting tape's usage from its historical role in data backup to one that includes archive. Tape storage is playing a requisite role for long-term retention, near-line storage, archive and active archive, especially with the use of LTFS," said Robert Amatruda, Research Director, Data-protection and Recovery, IDC.

Here are examples of tape's pivotal and expanding role in today's data centers:

- NCSA's Blue Waters supercomputer, one of the world's largest, most powerful supercomputers, deployed a 380 petabyte tape storage solution to keep all its near-line production data accessible in an active repository, perform automated data integrity verification, and deliver high performance read/write rates of up to 2.2 PBs per hour – all at a cost magnitudes lower than a disk solution.
- The National Institute of Health (NIH) chose a tape-based active archive to meet its requirements for a highly accessible and reliable technology infrastructure to archive, access, analyze, manage and link the overwhelming volume of molecular-level data currently being generated by diverse research laboratories worldwide as it transforms raw information into useable knowledge.
- Major League Baseball (MLB) oversees the game of professional baseball in North America, including 30 franchises in 28 cities across the United States and in Canada. MLB Productions and MLB Network, the

league's 24 x 7 cable television network, captures video content assets from venues and stores an additional 25 to 30TB of video data on tape each day and operates an existing library of over 13,000 LTO tapes.

- Permivault™ online data protection and archive solution enables companies across multiple industries to keep their long-term data online and readily accessible while benefiting from the significant cost savings associated with tape technology. As a cloud storage provider, Permivault finds tape ideal for both onsite and offsite active archives based on its low cost, superior reliability, long archival life, and future roadmap.
- T3 Media, a provider of cloud-based video management and licensing services, utilizes tape storage within its storage offering to enable its media owners to generate new value from their content while managing cost and complexity for them.
- The University of Southern California (USC) is offering cloud archiving and digital archive technology to scholars and archivists everywhere. Leveraging tape-based storage, the USC Digital Repository can digitize any holdings not already digital, store all holdings in the cloud and provide a patented search and indexing interface. This solution not only safeguards the holdings, but also allows researchers and institutions to provide easy access to colleagues, students and other audiences around the world.
- Optimus is a post-production company that houses a wide array of production tools and applications in a heterogeneous environment. The demand on storage is tremendous given its volume of customers, projects and the nature of video content. To manage it all, Optimus implemented a cross-platform environment that manages data across multiple tiers of storage. Tape technology is a critical component of Optimus' tiered storage environment due to its high reliability and favorable economics.
- CyArk, a small non-profit organization dedicated to protecting the history of cultural heritage sites through advanced digital scanning and 3D modeling, implemented an LTFS archive to manage and protect their data. The economics, reliability, and ease of use of their solution will help them achieve the CyArk 500, their mission to add over 500 sites and nearly 2 PB of data to their archive over the next five years.

Markets such as cloud, big data, broadcast, preservation, oil and gas exploration, seismic, scientific research, and HPC that require easy access to large quantities of stored data rapidly are adopting tape storage and leveraging its many benefits, which include its cost effectiveness, scalability, media longevity, portability, data integrity and reliability, and newer innovations that provide file system interfaces and easy data transfer. In addition, most large data centers today deploy an integrated mix of tape and disk storage[iii], which allows them to leverage each media's inherent strengths and optimize efficiency. When it comes to best practice data protection, no single disk or tape technology can provide the complete solution. Disk and tape have *different* yet *complementary* roles to play for data protection, archive, compliance, near-line storage, deep cloud storage and within industry-specific roles.

Growth in Tape
Tape storage is experiencing solid growth, as illustrated by increased capacity shipments in midrange and enterprise tape library shipments for libraries with 100 or more slots. This demand is being driven by unrelenting data growth (that shows no sign of slowing down), tape's favorable economics, and the prevalent data storage mindset of 'save everything, forever,' emanating from regulatory, compliance or governance requirements, and the desire for data to be repurposed and monetized in the future.

- Shipments of 100+ slot midrange and enterprise tape libraries grew 8% year over year in 2012.[iv]
- Tape capacity shipments reached record levels in 2012, exceeding 20,000 petabytes and achieving 13% year-over-year growth.[v]
- Tape capacity shipments are projected to grow 26% year-over-year in 2013 and to exceed 25,200 petabytes.[vi]
- LTO-6 shipped more capacity in the first three quarters after introduction than any other LTO format.[vii]
- Worldwide enterprise tape automation revenue grew nearly 30% in 2012 as the rapid growth of digital archiving is driving growth in large automated tape solutions.[viii]

Favorable Economics

Tape's unmatched and widening cost advantage vis-à-vis other storage mediums makes it by far the most cost-effective storage technology for long-term data retention. The tape industry continues to develop higher capacity media and successfully drive down storage cost per Terabyte while improving density.

- LTO-6 cartridges more than double the capacity of the preceding generation (LTO-5) and offer a 40% performance boost.[ix]
- Tape has the longest shelf life of any storage technology with a tape drive average life span of 7 to 10 years and a media life span of 30 years. The average life span of disk storage is 3 to 5 years.
- The TCO for an LTFS-based 'Tape as NAS' solution is $1.1M compared with $7.0M for a disk-based unified storage solution. Over a 10-year period, this equates to a savings of over $5.9M, which is more than 84% less than the equivalent amount for a storage system built on a 4TB hard disk drive unified storage system. Looking at this savings from a slightly different perspective, this is a TCO savings of over $2,900/TB of data.[x]

Tape's favorable economics (TCO, energy, footprint) and massive scalability have made it the preferred medium for managing vast volumes of unstructured data within archive and active archive infrastructures.

Technology Innovations: Capacity, Data Accessibility/Speed, and Reliability

Investment in tape library, tape drive, tape media and tape storage software technology innovation kept pace with expanding demand for high capacity, power efficient, high data integrity and low cost per GB long-term storage. New technology was released over the past year to continue in tape's legacy of backup and disaster recovery while also meeting the needs for emerging markets for long-term data retention in cloud, big data, medical and web environments.

- **Speed**. The streaming throughput of tape library systems has increased to support its near-line use with the largest super computers in the world. An example of this is the NCSA Blue Waters supercomputing system, which is deploying 380 petabytes of near-line tape storage.
- **Data accessibility**. Modern tape-based active archives can automatically retrieve cold, infrequently-accessed data within 60 to 75 seconds from the time a file is requested.
- **Reliability.** Tape is the storage media technology relied upon for long-term retention of important analytic, cloud, patient record, compliance and web data. With tape drive and media reliability of 2x to 4x orders of magnitude more reliable than SATA disk drives, tape is where data is more frequently stored when not actively in use. [xi]
    - NERSC study shows automated tape systems have a proven reliability for high usage environments with more than five 9's (99.999%) of availability. [xii]

Tape technology innovation is well represented by the sixth generation LTO tape drive, which incorporates the latest technology and design enhancements to deliver increased capacity, performance and reliability.
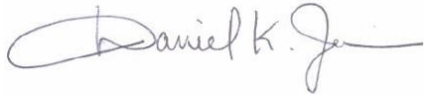
What's more, new advances in tape management software, including Linear Tape File Systems (LTFS), increases tape's simplicity and ease of use and have spurred new and expanded use cases for tape storage. For example, LTFS (an open standard supported by SNIA) enables affordable and portable archive solutions with an open tape format that stores files in application-independent, self-describing fashion, and enables the simple interchange of content across platforms and workflows. With LTFS, tape is much easier to integrate into existing products and workflows, and is being deployed at accelerated rates in "Tape as NAS" active archive solutions that combine the cost benefits of tape with the access times of NAS. LTFS solutions deliver particular value for industries such as media and entertainment, healthcare and video surveillance - where ever-increasing volumes of images, audio and video need to be protected, retained and distributed.

Tape usage continues to rise and is well positioned for a promising future as organizations store digital data at exponential rates and increasingly embrace the mindset of 'save everything, forever'.

Sincerely,

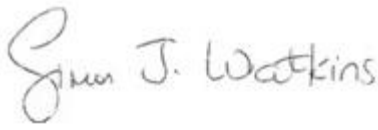Representatives of the Tape Storage Council
#tapestorage

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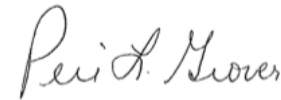Data Protection & Copy Services

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Tandberg Data, Product Manager,
Tape Products

[i] Tax, J. Santa Clara Consulting Group historical data.

[ii] IDC World Branded Tape Analysis 2012.

[iii] Csaplar, D. "Tape: The Ultimate Storage Tier," Aberdeen Group, May 2012, http://research.aberdeen.com/1/ebooks/ultimate-storage-tier/#/1/

[iv] IDC Tape Qview Calendar Year 2012 Pivot Tables

[v] Tax, J. Santa Clara Consulting Group historical data.

[vi] Tax, J. Santa Clara Consulting Group historical data.

[vii] Tax, J. Santa Clara Consulting Group historical data.

[viii] IDC World Branded Tape Analysis 2012.

[ix] Mearian, Lucas. "LTO-6 tape with up to 6.25TB capacity ships," *Computerworld*, Nov. 26, 2012.
http://www.computerworld.com/s/article/9234017/LTO_6_tape_with_up_to_6.25TB_capacity_ships

[x] Johns, B. "A New Approach to Lowering the Cost of Storing File Archive Information," Brad Johns Consulting Group, April 2013. Includes an analysis of 5 petabytes (PB) of primary archive data with 5 PB of copy data for an LTFS-based 'Tape as NAS' solution and a unified storage solution. The paper evaluates two approaches to storing these quantities of file based, non-compressible, archive data: 1) a solution that includes an LTFS-based Tape as NAS appliance configured with an enterprise tape library using the new LTO Ultrium Generation 6 tape drives and, 2) an equivalent amount of unified storage from a leading industry supplier that incorporates an estimate of the impact of 4 TB HDDs on the configuration and cost. http://www.bradjohnsconsulting.com/home/publications

[xi] INSIC (Information Storage Industry Consortium), *International Magnetic Tape Storage Roadmap, Part I: Applications & Systems*, November 2011. http://www.insic.org/news/A&S%20Roadmap.pdf

[xii] Active Archive Alliance. "NERSC Exceeds Reliability Standards With Tape-Based Active Archive," Case Study, 2012.