TAPE IT
HP OEM NEWSLETTER – April 2011

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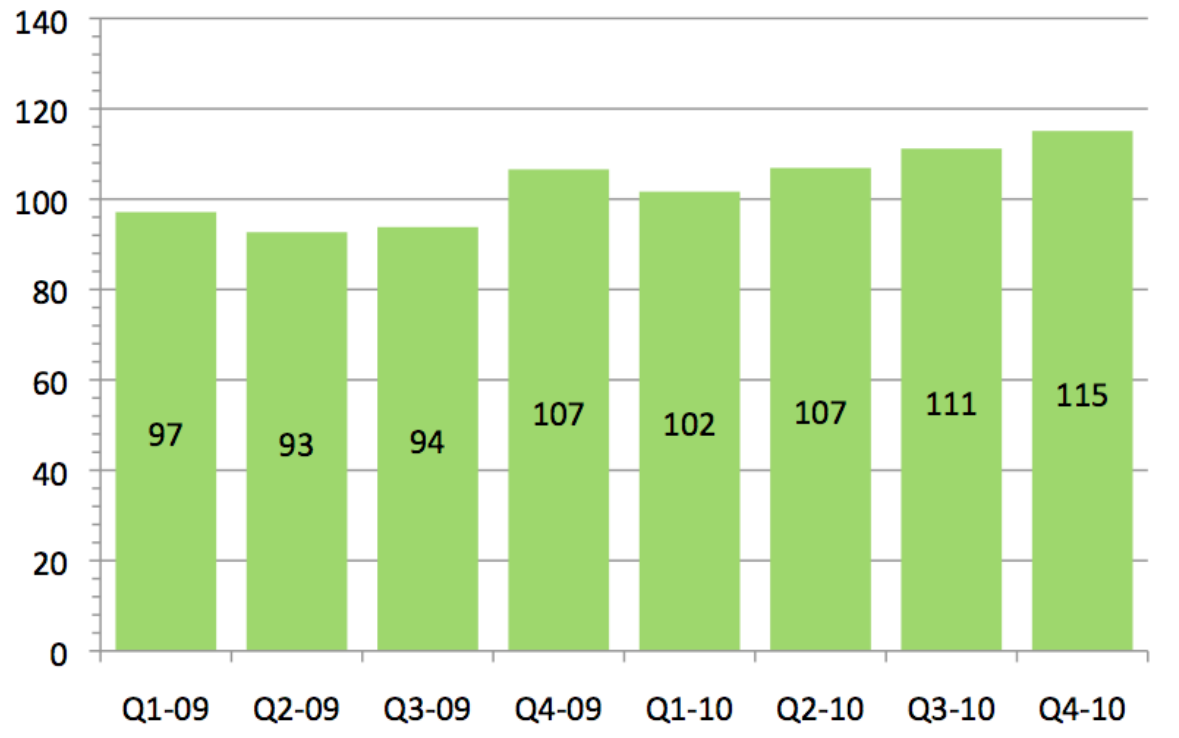
LTO tape drive market continues to grow as customer demand for tape remains strong

According to IDC, LTO tape drive shipments increased throughout 2010, driven by rapid customer adoption of LTO-5.

IDC's newly released WW Tape Drive Factory Exit Market Share[1] data paints a positive picture for the worldwide LTO tape drive market in 2010 and reflects continued widespread end user and partner recognition for the value that LTO tape provides. According to IDC, LTO tape drive shipments continued to show strong momentum in Q4 CY'10, increasing by 9% year on year – the fourth consecutive quarter of growth – and representing the highest LTO unit volume quarter for two years.

[1] IDC WW Tape Drive QView for Q4 CY2010, published March 2011

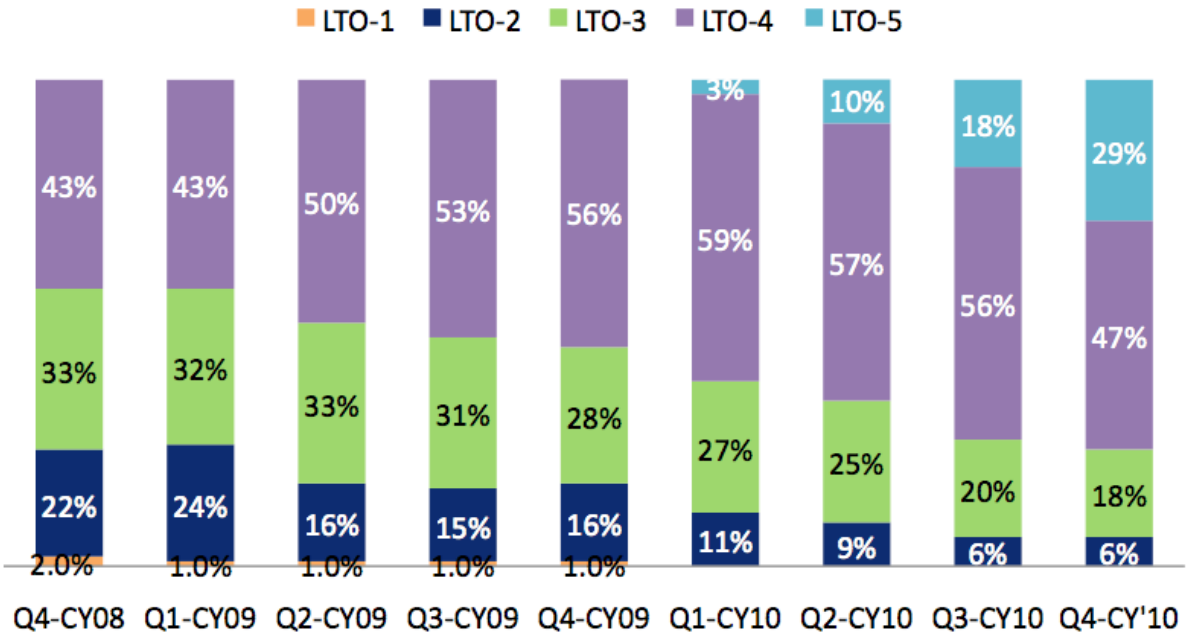
WW LTO Tape Drive Unit Shipment Volume Trend (in 000's)



According to IDC, 436,000 LTO tape drives shipped worldwide throughout 2010, a double digit unit growth of 13% year on year and the equivalent of one LTO Ultrium drive shipping every 90 seconds throughout the year!

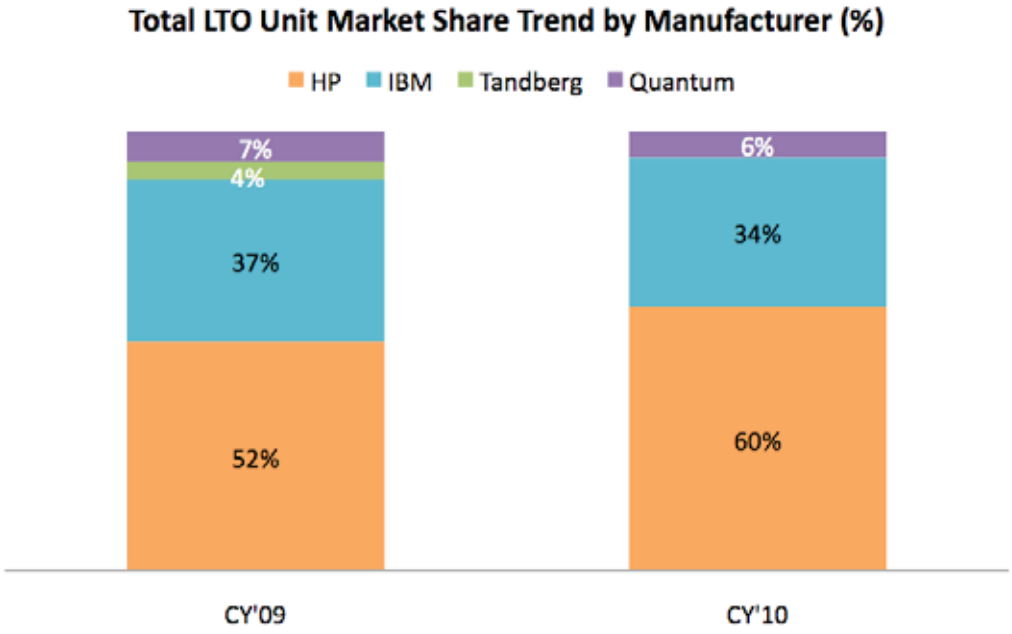
The rapid ramp of LTO-5 delivered the key driver for LTO's unit market growth. According to IDC, LTO-5 already accounts for 29% of total LTO market shipments in only its third full quarter of shipping.

WW LTO Total Unit Marketshare Trend by Generation (%)



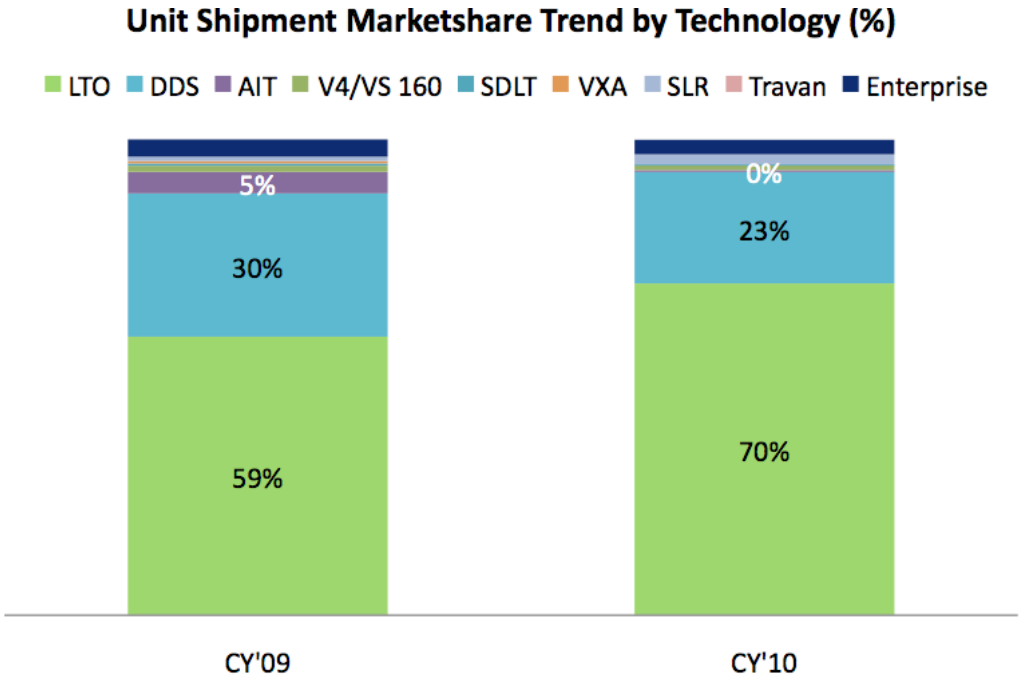
HP increases LTO drive share leadership

HP continues to win in the LTO tape drive manufacturer market, outgrowing the market in CY'10 with 29% year on year unit growth. HP increased its total LTO market unit share leadership to 60% in CY'10 and grew its unit share by 8 percentage points Y/Y, driven predominantly by LTO-4 HH and LTO-5 FH/HH share gains.

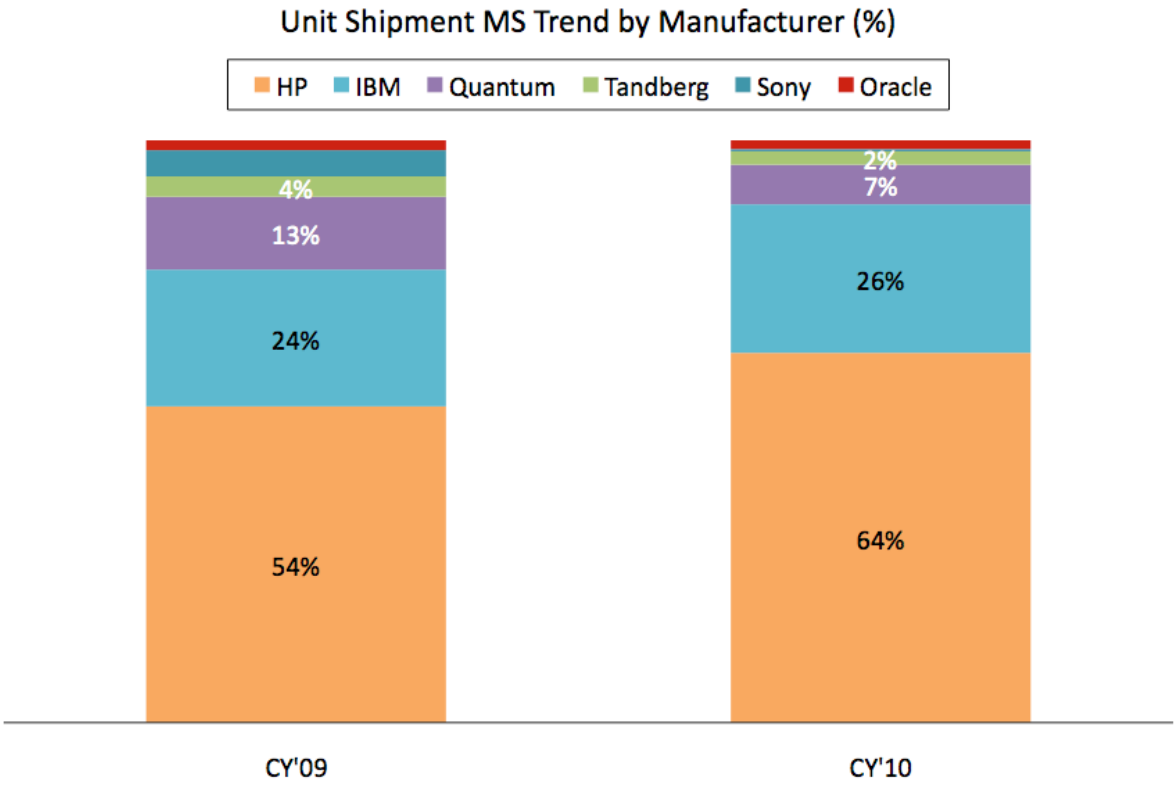


Total Tape Drive market continues to show vendor and technology consolidation

The 2010 tape drive market continues to consolidate around two tape drive manufacturers (HP and IBM, which together account for 90% of the market) and two tape technologies (LTO and DDS/DAT, which together accounted for 93% of the market.)



HP remained the world's leading tape drive manufacturer for the seventh consecutive year. HP increased its total tape drive market unit share leadership to 64% in CY'10 and grew its unit share by 10 percentage points year on year (Y/Y), driven predominantly by LTO-4 HH and LTO-5 FH/HH and DDS/DAT share gains.



In Summary

The best metric for the continuing value of a technology is market adoption - and customers continue to vote for LTO tape with their wallets. Customer demand for tape remains strong and the technology continues to play a crucial role in the storage hierarchy. With exciting technology innovations such as HP's Linear Tape File System (LTFS) opening new markets and applications, the future of tape looks bright.

HP LTO drive shipments surpass two million milestone

HP LTO tape drives continue to maintain high user acceptance rates with shipments now exceeding two million units since the introduction of HP LTO Ultrium tape drives in 2000. HP took seven years to ship the first million LTO tape drives but only three years to ship the second million LTO tape drives. This remarkable achievement is recognition that HP tape remains a cost-effective and integral part of many customers' data protection strategies.

Lights, camera, action! HP LTO-5 tape with LTFS takes a starring role at world's largest electronic media show

The 2011 NAB (National Association of Broadcasters) show, the world's largest digital media and entertainment (M&E) event, kicks off in Las Vegas on April 9th and video workflow and video asset archive solutions featuring HP LTO-5 tape and LTFS will be widely showcased

HP LTFS is creating a real buzz amongst customers, vendors and analysts in the M&E industry and it's not hard to understand why. Simply put, this exciting new and innovative tape technology is revolutionizing the value of tape for video production and digital media professionals. LTO-5 with LTFS makes video storage, sharing and archiving easier.

Making tape as easy to use as disk

LTFS formatted LTO-5 tapes are self-describing. In other words, each tape has its own file system that is viewed via a directory tree structure and used with drag and drop functionality, just like a regular USB drive. LTFS enabled tapes are thus ideal for video production workflow applications, by providing access to files at rates of up to 140 Mb/second and thus freeing up high cost, premium acquisition media for reuse.

In addition, data recovery from self describing LTFS enabled tapes is application independent, so that any required restores can stand the test of time irrespective of any application obsolescence.

Enhancing video workflows

LTFS formatted LTO-5 tapes can be used cross platform in various parts of the workflow. The open standard LTFS makes the tape contents accessible to any facility with a LTO-5 tape drive. For example, once a LTFS formatted tape is created, it can be shared with an editor using a MAC OS, and from there it may be shared with a digital effects company using Linux.

LTFS based video workflow and archive solutions

There is already significant industry momentum behind developing a wide range of video workflow and video asset archive solutions that leverage the full potential of HP LTFS. Many HP LTO-5 with LTFS (Linear Tape File System) based solutions will be on show at NAB including the following:-

Company	Company/Product overview	LTFS demonstration and booth location at NAB Show
CACHE-A ARCHIVE APPLIANCES www.cache-a.com	Cache-A is a leading supplier of network-attached archive appliances for digital film, broadcast and video professionals. Cache-A's archive appliances provide both source masters for digital acquisition and long-term storage for project archives.	Cache-A will be demonstrating a LTFS solution with LTO-5 tape drives/library showing data portability (Mac to Linux) and drag and drop capability for ease of use and archive. The LTFS solution will enable clients to more effectively safeguard data, increase data mobility and share content organization-wide. South Hall Lower SL8209
TOLIS Group www.tolisgroup.com	TOLIS Group BRU Producer's Edition™ solution archives the creative output of the broadcast, film, and music industries, and is complemented by the BRU Server™ networked system backup solution.	TOLIS Group will be demonstrating the latest release of BRU Producer's Edition (PE) which supports creation and cataloguing of LTFS volumes. BRU PE provides complete catalogue access for imported LTFS tapes allowing users to search both online and offline LTFS volumes as part of their standard BRU PE archive management. South Hall Lower SL11909
SGL SOFTWARE GENERATION LIMITED www.sglbroadcast.com	Software Generation Limited (SGL) is a technology-leading provider of content archive and storage management solutions to the broadcast industry.	SGL will be presenting the new FlashNet integration with LTFS in a working-environment demonstration. This demonstration will highlight how FlashNet is breaking new ground in archive technology, working with the LTO Program to develop a cutting-edge solution that has the potential to significantly change broadcast workflows. North Hall N2821

Is there a role for Tape in the cloud?

Tape saves the day for Google's Gmail cloud service

Google Gmail recently provided a real world example for why cloud service providers should always include tape storage in their storage infrastructure. Sunday 27th February 2011 saw Google Gmail suffer one of its worst outages in recent history when thousands of Gmail accounts were deleted due to a software bug caused by a storage software update. Google relied on tape to restore the deleted data.

"The Register" on-line news publication posted a strong endorsement for tape's role in cloud computing, summarising the lessons of Google's recent reliance on tape to restore thousands of deleted Gmail accounts as follows:-

"Tape is the final rescue for cloud disk storage screw-ups, like that of Gmail. There can realistically be no argument about this; it worked for Google when there was no alternative. The financial arguments in favour of tape versus disk for long-term storage seem strong and sustainable. Tape capacities, like disk capacities, are increasing and so tape's relative advantage should be sustainable. The use of tape reels in the cloud is already reality, and one would think that the Google Gmail incident will ensure its continued and growing take-up. The front-end backup storage tier will be disk for fast access, but the archive tier – where data is infrequently accessed – should be tape: for cost, off-site protection and energy use reasons." [2]

Enterprises considering cloud-based storage are being cautioned by leading industry commentators to be wary of entirely shedding their reliance on tape. DCIG analyst Jerome M Wendt[3] explains that cloud storage still requires tape as a complementary technology, citing the following reasons:

- The cloud can be problematic when it comes to large-scale restoration due to the need to shuttle large amounts of data over the WAN. Sending a tape can be a much easier and faster way of restoring the data.
- If cloud providers lose data suddenly, or go out of business, their customers can be left in limbo. A copy of a backup or archive held locally on tape can provide the means to continue operations or switch to another cloud service provider.
- The cloud does not absolve users of their data management responsibilities, and tape is able to provide for compliance through security, reliability and longevity.
- Replication of data in the cloud can result in the proliferation of errors or bugs that result in data corruption or loss. Tape is an off-line storage medium that retains the original data integrity separate from any online issues.

2 http://www.theregister.co.uk/2011/03/18/tape_in_the_cloud/
3 http://www.continuitycentral.com/feature0869.html

Tape for Cloud Archiving

When it comes to digital archiving, cloud service providers should be aware that LTO tape technology is expanding its role from a pure backup solution to that of a premier long term storage and archive technology. To quote one storage analyst "The 21st century data explosion is here – and tape is well positioned to become The Digital Curator of the Information Age"[4]

Tape is strengthening its position as the ideal solution for data archiving as a result of the following features and benefits:

- Lowest TCO – low power/cooling costs, high storage density, very low $/GB media
- High Capacity in small footprint – 3TB of compressed storage capacity on palm sized data cartridge
- LTFS allowing the viewing and access of tape files in a fashion like disk or other removable media with a directory tree structure
- Portable and Durable
- WORM and Data Encryption for added data security
- 30 year shelf life

It is interesting to speculate if Tape was in the Cloud before it was called a Cloud! Archival of data on Tape has heavily leveraged "Off-Premises" storage of data for 10's of years.

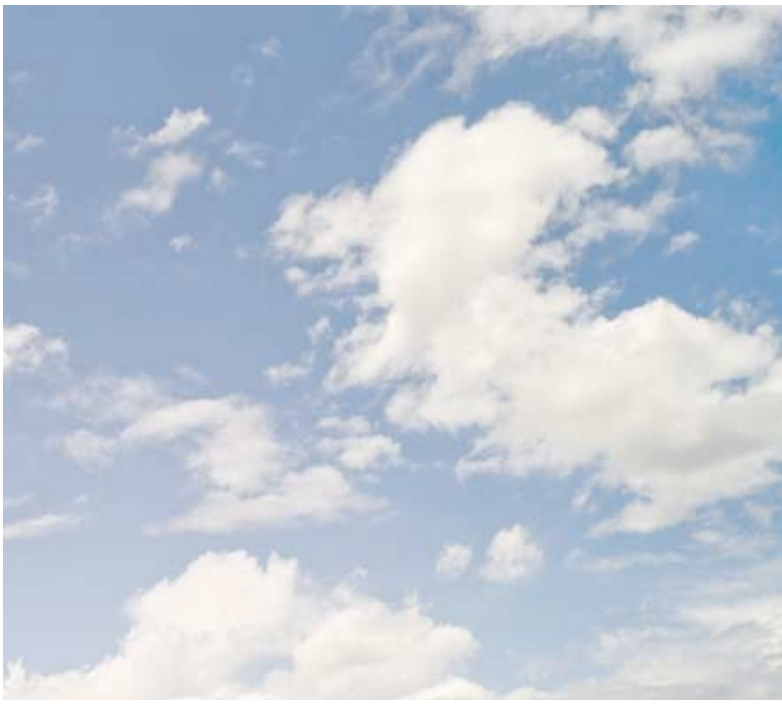
Cost-effective Cloud Storage

"Given tape's ability to store large amounts of data in a dense, energy efficient manner at a low cost per Gbyte, it is the perfect complement to disk-based cloud services." Greg Schulz[7]

In the March 2011 Tape It Newsletter, we featured the results of two new analyst studies which provide powerful independent proof points for tape's TCO advantages versus disk in backup and long term archive environments:

- In a new report, published in December 2010, The Clipper Group Inc studied the Total-Cost-Of-Ownership (TCO) of using disk or tape to archive large binary files with a 45% annual growth rate over a 12 year period. Clipper concluded that disk is more than fifteen times more expensive than tape for archival and uses 238 times more energy - costing more than the total cost of the tape solution[5]
- A report released in February 2011 by the Enterprise Strategy Group (ESG) examined the costs of ownership tape and VTL (with dedupe) architectures in four different scenarios over a five-year timeframe. In the ESG model, the TCO of VTL with deduplication ranges from 1.78 to 4.16 times higher than the various implementations of a LTO-5 tape library.

Tape acquisition and on-going operating costs remain very low. At approximately six cents per Gbyte (native)[6] for LTO-5 tape media, LTO Tape offers one of the lowest costs per Gbyte for long-term storage, particularly when factoring in energy costs. Tape storage is cool – literally - and has been shown to decrease storage power requirements by 99% when compared to disk-based storage. Tape helps meet the goal of many data centers that inactive data should not consume energy. Data archived on tape does not require the data center floor space, power or cooling that's required for data stored on disk.



4 Tape: The Digital Curator of the Information Age - Fred Moore, President Horizon, Inc.
5 http://www.clipper.com/research/TCG2010054.pdf
6 Based on prices obtained from www.cdw.com in March 2011
7 http://storageio.com/Reports/SIO_IndustryPerspective_FujiFilm_CloudAndTape_Nov28_2009.pdf

Balancing performance requirements

It could be argued that fast retrieval speeds for archived data is not such an important requirement as archived data tends to be accessed infrequently and retrieving a file from archive is rarely time-sensitive. Clearly disk is superior to tape when accessing or writing single files due to disk's random access method of read/write. However when writing/recovering large quantities of archive data, tape's streaming rates (280MB/s in the case of LTO-5) give tape a performance advantage over disk (SATA 3Gb/s can support sustained throughput rates of 250-260MB/s).

A 2008 University of Santa Cruz study[8] into archived data usage revealed that 66% of files are opened once, 95% of files are opened fewer than five times, such that 90% of data once it is stored on disk remains cold and untouched. From this perspective, there is questionable benefit of using higher cost, energy intensive disk arrays to archive data that, in reality, is almost never accessed again. While keeping all data close at hand on high speed disks might seem ideal for access purposes, in reality to do so could be prohibitively expensive in terms of both hardware purchases and the cost of power, cooling and physical space, especially when compared with tape storage.

In Summary:
Where Tape Plays Out in the Cloud

For Cloud Service providers, as for data centers, when it comes to disk and tape it is not a question of 'either-or'. The real discussion should focus on 'where' and 'how' to best use the available storage technologies as part of a comprehensive, tiered storage architecture to meet the business needs of performance, compliance, security, energy consumption, archive, data protection, and costs. The roles of disk and tape have evolved and are complementary in fulfilling best practice data protection strategies. A VTL or disk-based backup solution can provide the performance needed for the recall of files for high access applications. As data backed up to disk becomes infrequently or never accessed, it should be moved to tape for long term retention. Tape technology can provide data security, compliance, and offline protection (against viruses, hackers, system errors) and a long term, low cost archive repository.

In conclusion, Tape will be the strong, silent partner to the cloud – very much present and in use, just completely transparent to the end-user.

8 http://www.ssrc.ucsc.edu/Papers/leung-usenix08.pdf