



TAPE IT

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A slew of new customer surveys indicate that tape is still in demand.

Numerous customer surveys published in 2011 confirm that tape retains an important role in protecting business data for customers spanning multiple regions and organizational size.

Tape Usage remains steady in the enterprise

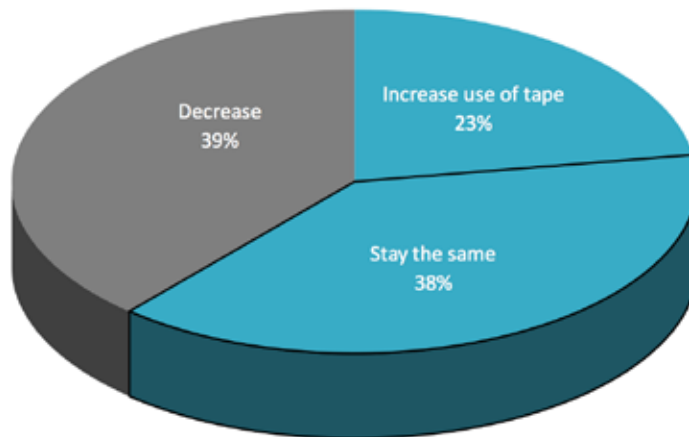
The 2011 SearchStorage.co.uk European storage Purchasing Intentions Survey, which canvassed 302 storage professionals representing businesses with average annual revenue of £896 million (equivalent of 1million Euro, and \$1.5million USD), concluded that the use of tape at the majority (61.5%) of respondents would either stay the same or increase. These findings mark no appreciable change from similar studies conducted in 2010 and 2008. **See chart on page 2**

Tape still in demand with SMBs

Storing backup copies on tape is still a preferred method in smaller firms. In a survey of 441 data protection professionals, Enterprise Strategy Group (ESG) found that a tape-only backup strategy in companies with fewer than 1,000 employees is more predominant than in firms with more than 1,000 employees (by a 3:2 margin). For example, 30% of organizations with fewer than 25 production servers employ tape-only backup, whereas only 15% of organizations with more than 500 servers rely solely on tape backup. The majority of survey respondents rely on some combination of disk and tape; 68% of respondents with 500 servers or more had adopted this combined strategy, using disk for staging their backup before longer term retention on tape.



Tape: European Purchasing Intentions Survey 2011
SearchStorage.com



Majority of users across different continents continue to use tape

According to the spring TechTarget Storage Intentions Survey published in May 2011, 77% of US companies continue to spin off all, or part of their data to tape. The survey shows that 64% of companies will either increase their spending or maintain their level of spending on tape during 2011. A more detailed look at the report reveals a two percentage point increase in the number of organizations planning to increase their tape spend, up from 22% in September 2010 to 24% in May 2011.

A survey of 1000 UK businesses conducted by Vanson Bourne in July 2011, reported that the vast majority (83%) use tape storage systems backup to protect their data. Even with the adoption of disk-based storage solutions over the past decade, tape clearly remains widely used as a key part of most organizations' data management and protection strategies.

The most popular use cases for tape storage were found to be as follows:

- The most common usage model for tape storage is off-site backup (70%)
- A large proportion (61%) of companies continue to rely on tape for on-site backup
- 43% cited archiving as the third most popular use case, and over a third (34%) have turned to tape based solutions to ensure compliance with data retention regulations
- A large segment of respondents (28%) still utilise tape for near-line storage

In summary

The best metric for the value of any technology is market adoption. The latest customer research shows that tape is alive and well and continuing to meet the data protection needs of customers of all sizes across the world.

A survey of organizations in North America and Europe published in InfoStor in June 2011, found that 57% are still using tape-based systems at the core of their backup and disaster recovery strategies. Additionally, among enterprises, some 52% are using physical tape backups for branch offices.

LTFS opens up a new world of tape usage models

LTO-5 with the Linear Tape File System (LTFS) delivers all the benefits of LTO tape plus the flexibility, portability and usability of other removable media such as USB drives

The benefits that LTFS brings to tape are opening up a raft of new tape usage models, and creating new appliances targeted at specific vertical applications.

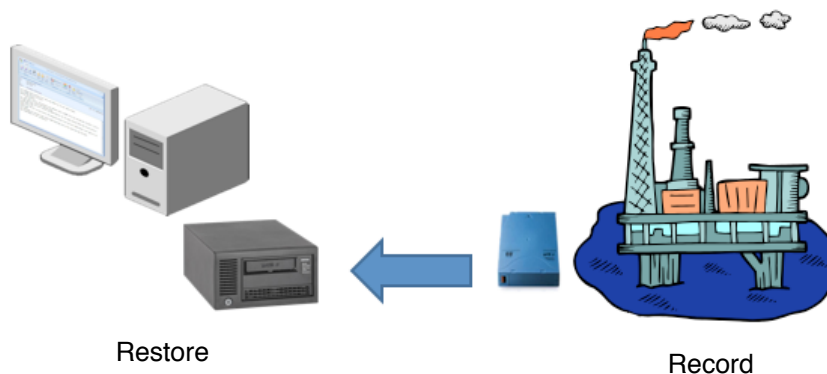
LTFS: extending tape usage models

Simplified backup and archival

LTO-5 with LTFS integrates easily into a network, providing a simple backup solution with standard operating system tools. Use LTFS as a remote file system and perform a daily copy of all, or changed data files to tape using simple tools such as xcopy or rsync. Users can also choose to remove tapes for archiving in a vault.

Remote file exchange

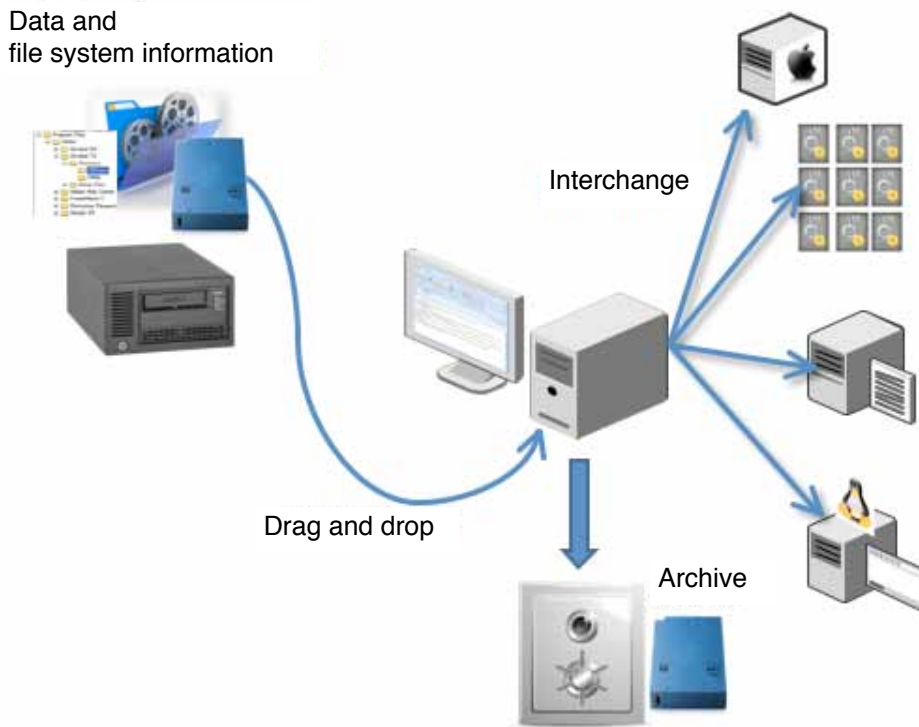
LTO-5 with LTFS can also prove useful in transporting and exchanging data to and from remote offices or locations where online access is impractical. Offshore oil rigs or remote scientific sites, for example, could return their data using LTFS tape to a central location without concerns for hardware or software compatibility.



Data interchange / digital workflows

LTO-5 with LTFS is supported cross-platform and so can be used in various parts of a workflow. For example, in the media and entertainment industry, using LTFS the media producer (video film-maker, photographer etc.) can view, access and retrieve the content directly from the tape.

Once created, the tape can then be shared with other workflow contributors that may be using a MacOS or UNIX platform. Because LTFS is open source, it allows use by multiple vendor's drives and systems to simplify interchange.



Example: Digital media acquisition and distribution – using the same media and systems, from on-set capture and backup of digital cameras to digital production workflows; file-base editing and digital imaging workflow systems as a replacement for professional VCR. Cost estimates show that LTO-5 can be 50x less expensive than professional video tape.



Enhanced Disaster recovery

Disaster recovery using HP LTO-5 Tape Drives and Libraries is even more effective with HP LTFS. Tape media with LTFS self-describing content can be accessed independently of software application, for more robust restore that is independent of any proprietary software applications. LTFS also allows swift access to content on tape for faster file restores. Implementing tape based data encryption also provides added data security for tapes on route between the data center and a disaster recovery site.

Digital archive and asset retention

HP LTO-5 Ultrium with LTFS is already been widely deployed in solutions that deliver low-cost, energy-efficient long term archival. For example, Paramount Pictures, Fox Studios and Red Pine are already using tape to archive their High Definition content.

Digital archive of large files is an increasing necessity in a wide range of industries as the following illustration shows.



In summary

HP LTO-5 with LTFS takes tape in new directions. LTFS adds to the existing benefits of LTO-5 tape with superior tape usability including drag-and-drop file management, simplified and unified file sharing and exchange, plus faster and easier access to individual files on tape.



Encryption remains a key weapon to secure data

Customers increasingly turn to data encryption solutions such as tape to ensure data security and counter the spiralling costs of data breach



The latest Global Cost of Data Breach report for 2010 published by the Ponemon Institute in May 2011 shows that the average worldwide costs of data breach continue to rise. The survey of 154 companies in the United States, the United Kingdom, Germany, France and Australia, reported that the average organizational cost of a data breach in 2010 increased to \$4 million, up 18 percent from 2009. Data breaches in 2010 cost an average of \$156 per compromised record, up \$14 (10 percent) from 2009.

Causes of data breach

While “negligence” remains the main cause of a data breach (in 41% of cases), for the first time the explanation of “malicious or criminal attacks” (in 31% of cases) came in ahead of the third leading cause, “system failure.” “Malicious or criminal attacks” are the most expensive type of data breach to discover and respond to, costing on average \$318 per customer record.

Counting the cost

It's not only the direct costs of a data breach - such as notification and legal defense costs - that impact the bottom line for companies, but also indirect costs such as lost customer business due to abnormal churn. Customer churn accounted for an average of 4% of costs in 2010.

The Ponemon Survey also discovered that 58% of the 2010 respondents have expanded their use of encryption up from 44% in 2009. This in turn is driving the demand for data encryption solutions, including the tape-based data encryption delivered by LTO-4 and LTO-5 Ultrium Tape Drives.

Rising data security requirements

In 2010, IDC estimates that 28% of the digital universe required securing beyond normal measures. By 2020, they estimate that over half of all data stored will require some form of extraordinary level of data security.

“The frightening realization is that the amount of information that needs to be secured is growing faster than our ability to secure it as employees leverage more mobile devices, consumers knowingly (and unknowingly) share more personal data, and companies find new ways to mine this data.”

IDC, Digital Universe 2011: Extracting value from chaos

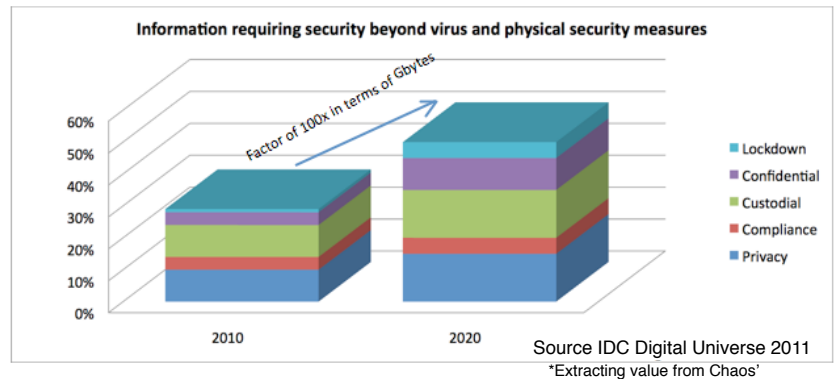
Survey of auditors: “encryption is critical”

A survey of 500 security auditors published by Ponemon in March 2011 entitled ‘What Auditors Think about Crypto Technologies’, reveals that 71% of the auditors surveyed believe that an organization’s information assets cannot be fully protected, even within the corporate boundary, without the use of cryptography. Furthermore, 81% of the auditors surveyed believe that sensitive or confidential data should be encrypted whenever practical.

HP LTO-4 and LTO-5 Ultrium tape based data encryption

Both HP LTO-4 and LTO-5 Ultrium tape drives feature hardware based data encryption. There are two primary benefits of performing data encryption within the hardware of the tape drive:

1. The tape drive, rather than the host, handles the encryption – so there is no impact on system performance.



2. Data encryption capabilities are built-in to the hardware, so there is no need for the management overhead and expense associated with dedicated encryption appliances. HP LTO-4 and LTO-5 drives employ the Advanced Encryption Standard (AES), (which features the longest and most secure encryption keys with 256 bits) and are FIPS 140-2 Level-1 accredited.

Confidence for the security conscious

Customers can derive confidence from the added security of hardware based data encryption that is delivered as a standard feature of both HP LTO-5 and HP LTO 4 tape drives, and widely supported by all major backup applications.

Why tape is more reliable than disk for long-term storage

Reliability is the cornerstone of any digital archive solution. Data retention needs to stand the test of time as it may be years or even decades before the data needs to be accessed.

According to industry experts¹ there are three reasons why tape is more reliable than disk for the long-term protection of digital assets:

1. Tape writes data more reliably than disk

A key reliability requirement is to ensure that data is written correctly to the storage media. Tape drives have included read-after-write data verification as standard for many years, verifying that the data is intact after a write procedure. If the data isn't intact, the drive will simply re-write the data at the next block and verify it again before moving on. By contrast, it is far less common to find disks offering read-after write verification, and if they offer the feature it is commonly disabled due to the impact on disk write performance.

Consequently, while tape write errors are identified and handled immediately, it may be some time before disk write-errors are discovered, usually at the point at which the data is next accessed.

2. Tape stores data more reliably than disk

Another reliability requirement relates to the dependability of the magnetic storage used to hold the data. At the core of the reliability argument between disk and tape is a proven equation for the time dependent change in magnetization of any magnetic recording. This equation exponentially related to a term known as KuV/kt – but can be summarized by the following critical factors:

Flexible recording density:

- Disk drives have been pushed for ever increasing densities, which has resulted in vendors developing disks with a much tighter “aerial density”, with little margin for error.
- Tape, on the other hand, has mainly used longer and wider tape substrate to accommodate more data in the same physical space. The result is that the tape has a larger margin to allow the storage of magnetic particles with a bigger particle volume. The bigger the particle volume, the more stable the magnetism.

Lower temperature:

- As data on tape is generally stored outside of the tape drive or library, the temperature at which that data is kept is lower than disk drives and consequently delivers an improved magnetism ratio.



“Tape is inherently a more stable magnetic medium than disk when used to store data for long periods of time. This is simply ‘recording physics 101’”

Joe Jurneke of Applied Engineering Science, Inc

¹ Excerpts featured from Joe Jurneke's whitepaper 'Protecting Digital Assets over the long-term' and a related blog post by Curtis Preston

3. Tape retains data more reliably than disk

The bit error rate or bit error ratio (BER) is the number of bit errors divided by the total number of transferred bits during a studied time interval. These errors are sometimes latent - in other words the errors are not discovered until the data is unable to be read.

Tape drives have a lower bit error rate than disk, with LTO-5 drives offering an error rate of $1:10^{17}$. Most SATA drives have an unrecoverable read error (URE) or bit error rate (BER) of 1 in 10^{14} , or about 1 block in every 12TB. This difference in bit error rate means that it is 10,000 times more likely that bad data will appear on disk than on a LTO-5 tape drive.

“Disk was never historically intended as an archive medium...it has always been intended for direct access, online storage. Tape on the other hand, has always been intended for backup and long-term archival applications.”

Joe Jurneke of Applied Engineering Science, Inc

Tape has even more to offer long-term storage

There are many additional factors in addition to reliability that contribute to tape's position as the preferred long-term storage medium. LTO Ultrium in particular offers:

Lowest total cost of ownership

A number of TCO studies have shown that tape is significantly less expensive than disk over longer periods of time. We published the results of TCO studies by ESG and The Clipper Group in the May edition of the HP Tape Newsletter.

Lowest energy consumption

“Every time I calculate power consumption for tape systems vs. disk systems, tape systems win. The reason for this is that tapes in slots take up no power at all; tape drives use very little power while they're not doing anything, and you need far fewer tape drives than you need disk drives. You buy the system once; you power it all day long every day.”

Curtis Preston

Longest shelf life

Specified at 30 years, the lifecycle of LTO tape media is significantly longer than the lifecycle of most datasets. Most customers are unlikely to trust their data to a disk that is more than five years old.

More robust design

Drop a disk on the floor and the likelihood of retrieving the data is significantly reduced. Drop a tape cartridge on the floor and there may be some edge damage, but even in the worst case, it is probable that all data will be retrieved.

Smallest footprint

Holding 3TBs of compressed data on a single cartridge the size of an envelope means that customers can physically store a great deal more data on tape than disk, and secure it in a normal fire safe without the need for power or cooling.

“In comparing the intrinsic reliability of a tape cartridge versus archiving to an entire disk drive, simplicity should win out. The tape should be more reliable from a hardware reliability perspective.”

Joe Jurneke of Applied Engineering Science, Inc