

HP TAPE IT!

TAPE STORAGE NEWSLETTER FOR OEM CUSTOMERS

February 2009

ENCRYPTION REMAINS A HOT TOPIC AS IMPATIENCE WITH DATA LOSS CULPRITS MOUNTS

New legislation recognizes the data encryption imperative

"Regulators are clearly baring their teeth to show that they are running out of patience."

Claus Egge of IDC Link Europe

"IDC's Encryption Usage Survey shows that over 70% of respondents are increasing their encryption usage."

Charles J Kilodgy of IDC Link US

MORE ON ENCRYPTION...

Visit www.ultrium.com to download the new encryption whitepaper or access the link to view the recent webinar.

Breaches of confidential data by unauthorized persons continue to mount amid suspicion that those breaches being disclosed are the tip of an iceberg.

In response to the alarming rate of data breach and loss, Governments around the world are drafting and enforcing tough new regulations and more punitive measures to protect 'Personally Identifiable Information' (or PII as its commonly known).

Clearly in this environment businesses are looking to their CIO's to provide more effective security. As a result the case for encrypting data-at-rest is now overwhelming.

INCREASED REGULATION

A raft of legislation already exists aimed at protecting personal information, the best known examples being Sarbanes-Oxley (US), Gramm-Leach-Bliley Act (US), European Union Data Protection Act and Electronic Ledger Storage Law (Japan). However, with continuing data breaches a number of other new laws have been introduced to specifically tackle the problem.

Loss of data notification laws have now been implemented in over forty US States, taking the lead from the Californian SB 1386. These laws require companies to notify citizens when their unencrypted personal data had been acquired by an unauthorized person, making negligent organisations more accountable than ever before. Similar laws are being considered by the European Union.

A new law to be enforced in Massachusetts from May 2009 goes even further, setting regulations on how all Massachusetts businesses should go about protecting confidential data including mandatory encryption of all PII in transit. IDC's comment suggests that this legislature will be watched with interest by other government bodies looking to follow suit.

Examples of tougher enforcement of data protection legislation are also to be found in Europe. In January 2009, following a very public incident when a third party lost sensitive unencrypted information concerning prisoners, the UK Information Commissioner's Office published a ruling against the Home Office setting out the requirement to more effectively monitor and enforce the compliance with UK Data Protection Act by both employees and by third parties.

MOUNTING COSTS

The most recent study on the cost of data breach, published by PGP Corporation in February 2009 reported that data breach incidents cost US companies \$202 per compromised customer record in 2008. Having examined 43 organizations across 17 different industry sectors, the study also showed an increased total average cost per incident of more than \$300,000 between 2007 and 2008 to \$6.65 million. It is interesting to note that as a result of incurring a data breach, almost half of the respondents expanded their use of data encryption.

High profile, front-page data losses have raised awareness of the role of data encryption in enhancing data security, furthermore Government mandates are moving toward making encryption a business imperative for protecting sensitive personal data.

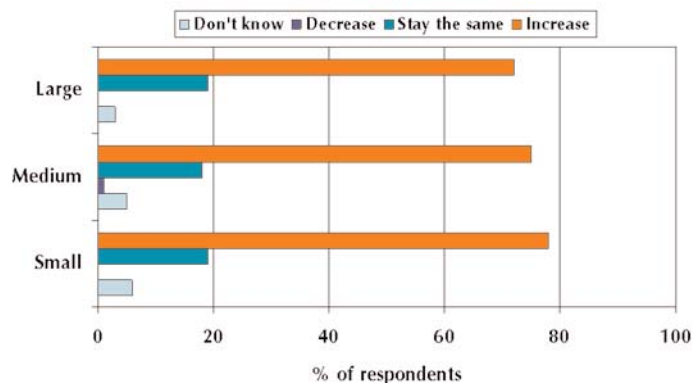
Encryption is the best method for protecting the data itself from unauthorized access and physical theft; whilst a potential thief could obtain access to the data, they would be unable to read the encrypted files. To find out more about encryption technology and key management, please visit www.ultrium.com to download the new encryption whitepaper and view the recent webinar, alternatively ask your HP Sales Representative for a copy of the HP Encryption Whitepaper.

ENCRYPTION ON THE INCREASE

A recent IDC Encryption Usage survey (published in August 2008), found that the usage of encryption has been growing steadily over the past few years. Furthermore, the survey found that over the next 18 months over 70% of all respondents across all business sizes expect the use of encryption to increase in their organisation. The primary driving factor for increasing the use of encryption was concerned with safeguarding of client or customer information and companies are trying to protect the information from being released outside the organization, either from a direct attack or from accidental exposure.

Over the next 18 months do you expect your organization's use of encryption to...

Source: IDC Encryption Usage Survey 2008



While less than half of the IDC survey respondents were employing encryption at the time of the survey, of those who were it would seem that the primary use is to protect batch file transfer or ftp [file transfer protocol file exchange], with archival and storage as a very close second application.

Interestingly, the respondents all expected that the encryption devices on offer would provide the security they sought, therefore over 80% of respondents suggested that their primary considerations when choosing an encryption technology concerned reliability, performance and ease of use/complexity.

EASING THE BURDEN - LTO-4 ENCRYPTION

Tape storage remains the most attractive form of data storage to meet the need for long-term archival, compliance and offsite disaster recovery protection. With HP LTO Ultrium products, organisations can benefit from proven reliability, a low total cost of ownership including low energy consumption levels and hardware based data encryption with LTO-4 products.

The open standard LTO-4 format specification includes the ability for data to be encrypted by the tape drive with a 256-bit symmetric key AES-GCM algorithm implemented in drive's hardware. This hardware-based data encryption means that information is encrypted by the drive when data is written to it, and decrypted when an authenticated user reads it. Known as 'end-point' encryption, this method is permanent and protects the data where it is stored.

The HP LTO-4 data encryption offers a number of benefits:

RELIABILITY

In addition to the proven reliability of the tape drive itself, users of encryption need to be sure that data is securely encrypted but can be retrieved when required.

First of all to ensure that the encryption code used is robust, the LTO-4 Tape Drive encryption implements the Advanced Encryption Standard - Galois Counter Mode (AES-GCM) algorithm in the tape drive formatter electronics. The implementation supports the IEEE P1619.1 standard for tape-based encryption and the T10 SCSI command set.

The reliability of data encryption cannot be separated from the need for robust key management. The LTO-4 technology utilises the fast and efficient Symmetric key management, using the same 256 bit symmetric key to both encrypt and

decipher the data on tape. A key management system can be either a separate appliance, or more typically software running on a server in the data center. To maintain security, the encryption key is only retained by the LTO-4 tape drive for the duration of the encryption process. When encryption is complete, a key identification tag is stored on the encrypted tape to give the key management system sufficient information to recall the required key to decipher the data when needed.

Additional security features of the HP LTO-4 tape drive with encryption include; the FIPS certified digitally signed software to prevent rogue software from contaminating encryption capabilities; prevention from reading raw data blocks; and preventing users from trying multiple incorrect keys.

PERFORMANCE

Unlike software encryption, which uses the host CPU cycles to perform host-based encryption prior to storing data, the advantages of device encryption are that there is no burden on the host server and no noticeable tape drive performance degradation either (typically less than 1% performance impact).

In addition to backup performance gains, the LTO-4 hardware-based data encryption also improves the efficient use of available storage capacity through compression. Other methods of encryption leave compression until after the encryption process has taken place, often producing random data that cannot be compressed. The LTO-4 Ultrium Tape Drive allows data to be encrypted after the compression has been done, thereby maintaining optimum storage efficiency. Furthermore, encrypted data may be added or appended to an LTO-4 encrypted tape cartridge allowing the cartridge capacity to be fully utilized.

SCALABILITY

Hardware based data encryption provides high levels of scalability by simply adding more drives in a stand-alone tape drive or tape library configuration. This avoids both the expense and the complexity associated with dedicated encryption appliances.

Some LTO-4 Tape Libraries provide the additional flexibility of partitioning, allowing the separation of encrypted from non-encrypted data depending on the sensitivity and the necessity to protect that data through encryption.



Encryption is a standard part of the Ultrium LTO-4 format which requires that all drives must be 'encryption aware', which means that all LTO-4 tape drives from any vendor will return the appropriate sense codes when presented with an encrypted LTO-4 cartridge tape. Where drives have encryption enabled, interchange of encrypted data is made possible by the standard nature of the format specification, regardless of manufacturer.

IN SUMMARY

The ability for organizations of all sizes to safeguard PII and other company data is becoming a business imperative with increased legislation and punitive measures. The use of encryption techniques is greatly recommended by all experts and legislation is also starting to require its use as a best practice. While several options exist to provide data-at-rest encryption for data held on tape, the scalability, performance and simplicity of hardware-based data encryption make the LTO-4 tape drive an obvious choice.

For more information visit www.ultrium.com

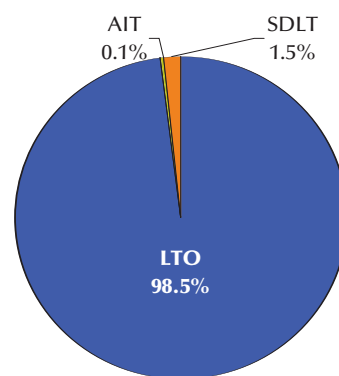
LTO-4 FULL-HEIGHT DRIVES - THE ONLY GAME IN TOWN FOR HIGH-END AUTOMATION

Shipments of LTO-4 Ultrium tape drives continue to ramp as the technology meets the needs of high-end tape automation customers for maximum capacity and performance.

The digital explosion has created a massive amount of data to be stored and backed up. According to IDC, the average SMB now backs up something around 4 TBs per week. Not long ago it would have taken 1,800 tapes to backup that 4 TBs of data, but thanks to advancing tape technologies we now backup all 4 TBs on just three cartridge tapes with LTO-4 Ultrium tape drives.

In 2007 the 4th generation of LTO Ultrium tape drive became available. By offering capacities of up to 1.6 TBs of compressed capacity per cartridge and native speeds of up to 120 MB/sec, LTO-4 set a new standard for high-capacity, high-performance tape backup that no other mid-range tape drive technology has since been able to compete with. In fact, fuelled by the LTO-4 shipment ramp (illustrated in the chart below), the IDC Q3'08 worldwide quarter view showed that LTO Ultrium technology holds more than 94% share of the mid-range tape drive market and 56% of the world-wide tape drive market in Q3'08. Furthermore, in the mid-range tape automation market, LTO held a 98.5% unit share by technology in the first three quarters of calendar year 2008 (as shown in the chart opposite).

Mid-range Tape Automation shipments by technology
Q1 to Q3 CY'08
Source: IDC Q3'08



With a market share of 52% of the overall tape drive market, HP remains the leading overall tape drive manufacturer and the leading LTO Ultrium manufacturer with a 50.1% share of LTO Ultrium tape drive shipments in Q3'08 .

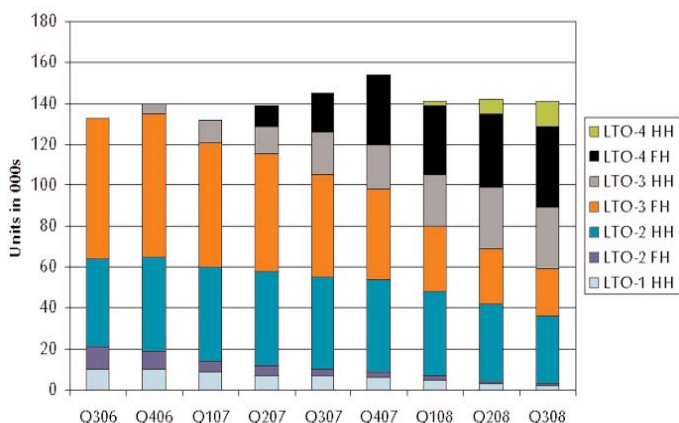
This rise of LTO-4 technology is largely the result of take-up by the mid-range and high-end tape automation market where the LTO drives are predominantly used; here the LTO-4 technology meets the blistering performance needs of enterprise class library customers.

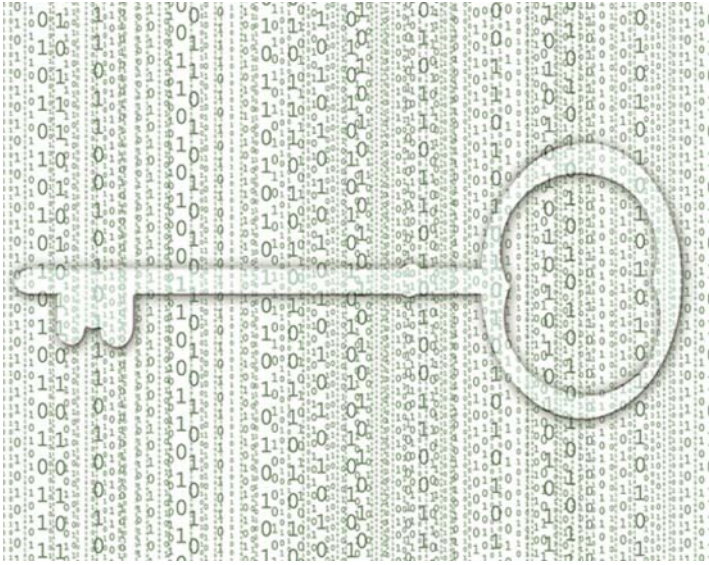
However, the success of the LTO-4 technology and in particular HP's LTO-4 Ultrium Tape Drives isn't based on performance alone; it is also due to a number of additional factors:

ASSURED RELIABILITY

The HP LTO-4 tape drive builds on the proven success of three previous generations of HP drive with state-of-the-art data integrity in a robust drive. Enterprise class reliability

LTO-4 Ultrium FH Shipment Ramp
Source: IDC Q3'08





features include; low power consumption, a dependable leader capture design, an active head cleaner, a simple tape path, a soft load/unload mechanism designed for 100,000 load/unloads and a Mean-Time-Between-Failure (MTBF) rate of 250,000 hours at 100% duty cycle. Real-time read-while-write data verification and powerful error correction codes provide further confidence in the integrity of stored data.

OPTIMUM REAL WORLD PERFORMANCE - DATA RATE MATCHING

HP's unique Dynamic Data Rate Matching ensures optimal performance regardless of the speed of the server or network, while reducing mechanical wear and tear on the drive and tape media. Unlike drives with stepped data rate matching functionality, the HP LTO-4 drive can exactly match the speed of the tape to the speed of the data as it comes in from the host.

BUILT-IN ENCRYPTION FOR GREATER SECURITY

The HP LTO Ultrium 4 tape drive's support for AES 256 bit data encryption and Write Once Read Many (WORM) media adds a strong measure of security to data stored on LTO Ultrium tape media without the performance degradation associated with host based encryption or the expense and management complexity of a dedicated appliance.

CHOICE OF LEADING INTERFACES

With compressed transfer rates of up to 864GB per hour the LTO Ultrium 4 is able to meet the demands of the tightest backup windows. The drive offers a choice of native SAS interface, a 4 Gbs native Fibre Channel interface, as well as a native Ultra320 SCSI interface which overcomes the bottlenecks that competitive drives experience with Ultra160 SCSI interface limitations.

COST-EFFECTIVE AND ENERGY EFFICIENT

LTO-4's 1.6 TB cartridge capacity combined with low cost per gigabyte can help customers reduce media consumption and thus deliver a cost effective storage consolidation solution. Requiring 50% less power than previous generations, HP LTO-4 drives can also enable customers to achieve significant energy savings per terabyte.

LTO-4 - ENABLING CUSTOMERS TO KEEP PACE

LTO-4 full-height drives bring the latest tape technology to tape libraries, allowing customers to keep up with extreme data growth through the highest capacity, fastest performance and most cost-effective tape solution for backup and archival. Furthermore, a robust LTO drive roadmap that provides a doubling of capacity every generation enables future proof investment in HP LTO-4 Ultrium tape drives. Development of HP LTO-5 technology is already well underway.



SAS INTERFACE SHIPMENTS CONTINUE TO RAMP

The trend towards SAS interface drives continues, with around one third of all LTO Ultrium tape drives shipping with a SAS interface in Q4 2008.

Historically, technology transitions in the mid-range and enterprise server markets have taken a long time to accomplish. However the transition from parallel SCSI to SAS interfaces in servers appears to have occurred over a relatively short time frame, less than one year from the first system shipments to widespread adoption by server manufacturers.

This initial SAS deployment in servers was followed by a more gradual widespread adoption of SAS in rack-optimized storage arrays attached to servers, HDDs and more recently to other peripherals including HP's range of SAS interface DDS/DAT and LTO Ultrium Tape Drives, Autoloaders and Libraries.

HDD shipments with the SAS interface provide a good indication and solid evidence of the rapid transition to SAS technology by computer and storage hardware OEMs. In Q3 2008, SAS drives accounted for about 45% (2.4 million units) of all 3.5-inch enterprise-class disk drive shipments, according to John Rydning, research director of hard disk drives at IDC. Fibre Channel drives accounted for almost



exactly the same percentage, and Ultra320 SCSI drives made up the remaining 10% of drive shipments.

In addition to the HDD evidence, HP's own data shows the increase in branded and unbranded SAS interface tape drive shipments. In the first quarter of calendar 2009, the SAS interface accounted for approximately:

- 15% of the new DAT160 tape drive shipments
- Almost 40% of standalone LTO Ultrium drives
- and roughly 15% of LTO Ultrium tape library shipments

The SAS interface was introduced in 2005 as the successor technology to the parallel SCSI interface, bridging the gap in requirements for performance, price and scalability. Keeping pace with interface trends, HP added the first native 3Gbps SAS interface to its tape drives at the end of 2006, enabling customers to directly connect to, and backup, SAS configured servers.

This 3Gbps data rate SAS interface adequately supports the majority of storage systems requirements in the market today. However a second generation of the SAS interface, dubbed SAS-2, is now under development offering a 6Gbps data rate and backward-compatibility with existing 1.5Gbps SATA and 3Gbps SAS/SATA devices and infrastructure. HP continues to monitor the latest interface developments and trends and remains committed to delivering an appropriate choice of interface options with our tape drives that meet the varying needs of our customers.

Enterprise class HDD shipments by interface (all form factors)
Source: IDC 2008

