

TAPE OR DISK STORAGE? MAYBE BOTH

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Tape or disk storage? Maybe both

The choice of enterprise storage systems may not be as clear-cut as champions of disk systems might suggest.

By Anand Parthasarathy
The Hindu
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WHEN THEY speak of 'incumbency factor' in Indian politics, it usually means the guys in power tend to be thrown out, the next time the electorate gets to decide. In the world of computer storage, though, incumbent technology has often exhibited the 'stickiness' required to last longer indeed, long after experts have written it off.

Ever since the first IBM main frame computers, fifty years ago, used those jumbo-sized tape drives, magnetic tape -- where different patterns of magnetisation are used to represent stored bits or bytes of information -- has remained the dominant media for the storage of digital information.

Earlier technology

In the early 1980s, optical technology was born, giving birth to the compact disk (CD). But rewriteable CDs were costly and complicated... the main data storage medium of the personal computer remained the hard disk. 'Mag Tape' however, was the preferred medium to back up and archive data -- and tape systems have gone through many evolutions, from the low cost DAT (Digital Audio Tape) drives to today's DLT and SuperDLT (Digital Linear Tape) drives. In the DLT drive, data is written on the tape in dozens of straight-line (linear) tracks, usually 128 or 208. A variant of DLT technology, called SuperDLT, makes

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it possible to store upwards of 300 GigaBytes (GB) on a single cartridge allowing data transfer speeds of up to 60 Giga Bits Per Second (GBPS). Competing devices include the Linear Tape Open Drive, the Advanced Intelligent Tape (AIT) drive, created by Sony with rated capacities hitting 500 GB, and the Mammoth drive.

Disk costlier than tape

Meanwhile the cost per unit storage of magnetic hard disk systems, fell dramatically — almost by a factor of 1000 within a decade. By 2001 it overtook magneto-optical drives — which combined the speed and capacity of optical technology with the flexibility and reliability of magnetic drives — as the cheaper medium. But within the magnetic spectrum, disk remains costlier than tape by a factor of five to ten. Today we talk of cost in terms of dollars per GB and speeds of data transfer in terms of GBPS.

Disk array systems with their much faster transfer speeds and their ability to swiftly and non-linearly reach the data one wanted, have captured most of the high-end of the enterprise storage business, as the best bet for both primary storage and secondary back up. And whether the storage architecture is Storage Area Networks (SAN) or Network Attached Storage (NAS), disk seems to rule as the technology of choice. Which is why, some industry watchers have begun polishing their obituaries for tape-based systems.

That would be a mistake, feel leading manufacturers of tape storage solutions who have banded themselves into the Tape Council (www.tapeCouncil.org) .

Their web resources explore the tape-versus-disk issue from many angles and conclude that tape-AND-disk would be a more realistic appraisal of the storage scenario today. Last month, I had the benefit of a detailed technical discussion with the world's largest manufacturer of the de facto standard, the half inch (12.6 mm) DLT/SuperDLT tape drive — the US-based Quantum Corporation.

'Masala-mix'

Jim Simon, Quantum's Director of Marketing for Asia Pacific explained that in today's typical enterprise, 80 per cent of all access targets just 20 percent of the data within a storage system.

System managers therefore, try for the right 'masala mix' of storage media — disk and tape — to create an economical system. With tape systems much cheaper (albeit slower), it makes sense to use costly disk arrays for the most-used current data and its 'hot swap' backup, constantly shifting the larger, more archival storage, to economical tape.

Typically today, tape costs around \$350 per terabyte versus disk's \$1500 and more. Tape, if properly maintained at around 20 degrees C can last for at least 30 years.

Indeed, an interesting new 'cross over' technology has emerged — Tape Virtualization — where a disk array is configured to emulate a tape library. This makes it easy to transfer each logical 'tape' in the disk array to a real tape, once it is no longer required for critical operations.

Quantum's India Country Manager Sunny John, added an interesting reason why tape has suddenly assumed new importance, particularly in India: Companies in data-intensive industries, particularly, those doing off shoring, are now required by law in many customer-countries led by the U.S., to follow strict data retention and archiving norms.

Multiple layers of security are required to achieve this and tape players like Quantum have reacted by creating specific solutions like DLTice — a write once, read many times (WORM) tape solution — to address this new need, while maintaining backward compatibility with existing DLT tape drives.

Future scenario

And in the future? They are already gearing for the day when both tape and disk will hit the physical limits of magnetic storage — their areal density or the maximum amount of data they can store per square cm.

Sometime between 2007 and 2010 the concept of holographic data storage may take over: Light from a laser is split into two beams, one the signal carrying data, and the other, a reference. The two overlap inside a photosensitive storage medium to produce an optical interference pattern.

– Anand Parthasarathy

More at:

<http://www.hindu.com/seta/2004/09/16/stories/2004091600201400.htm>

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Hindu life, principles, spirituality and philosophy

<http://www.hindu.org>

<http://www.hindunet.org>

The truth about Islam and Muslims

<http://www.flex.com/~jai/satyamevajayate>

The terrorist mission of Jesus stated in the Christian bible:

"Think not that I am come to send peace on earth: I came not so send peace, but a sword.

"For I am come to set a man at variance against his father, and the daughter against her mother, and the daughter in law against her mother in law.

"And a man's foes shall be they of his own household.

– Matthew 10:34–36.

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