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## **Like an old friend, tape is always there**

**By Chris Bucholtz**

At one of the world's largest developers of Linux operating system software, an imposing man in a uniform strides through the door, as he does at the same time every afternoon. He is burly, armed and carries in his hands a fireproof metal box with a lock on its hinged lid. He walks purposefully to the IT department, steps up to the IT manager's desk and asks the same question he asks every day:

"You got the backup tapes ready for me?"

Today, people have come to realize that all data is important, but very few storage media warrant armed personnel and a daily pickup schedule. Tape is the exception, because it represents the last line of defense, the final fail-safe and the ultimate tangible assurance that data is available and intact. If a server goes down with business-critical information stored on its hard drives, it can be immediately — and sometimes automatically — recovered and restored from tape backup.

The IT people know this to be the case. However, communicating the importance of this fact can be tough, especially since tape isn't seen as sexy, compared with SANs, NAS and the other fast-moving and heavily publicized technologies.

Current tape technologies have to work with the latest storage devices and so must draw from the same ideas to remain competitive. "Tape is using many of the same technologies as disk drives, such as clustered MR heads and a PRML read channel in Quantum's Super DLT tape drive," says Andy Grolnick, vice president of marketing for Quantum's DLTtape group. Efforts have been made to improve drive lifespan and to track the history of media so users can replace worn-out tapes before they can cause any data loss problems.

Another important technology for the growth of DLTtape is the Pivoting Optical Servo, which enables the drives to improve track following and allows more tracks to be written to the same width of tape.

### **The move toward efficiency**

Tape is also following the trend toward denser form factors for devices like drives, libraries and enclosures, a trend initially set in motion by disk-based systems. The proof of this comes in products like the half-height drives and "blade-style" tape arrays from companies like Benchmark Storage Innovations. In addition, tape library vendors have made a host of mechanical and robotic design changes intended to make their enclosures more space efficient.

That efficiency is also manifesting itself in drive performance. Corporate data needs are increasing dramatically each year, but the 24-hour nature of modern business has meant that the time available to perform backup each day has dwindled.

The design of current tape drive technology combines the traditional characteristics of accuracy and reliability with mechanical advances that enable tape drives to write data apace with other components of the storage ecosystem. "The performance of tape drives is keeping pace with magnetic disk performance," says Eric Ullman, technical marketing manager for Dantz Development. "With a sensible backup strategy and the use of the right management software, the shrinking backup window we hear so much about can be pushed back open, especially in networked storage environments."

That point — that tape is an integral part of storage networking and not a competing technology — is one that tape's advocates are eager to drive home. "The next generation of our drives has been designed looking at Fibre Channel," the underlying data transfer technology for building SANs today, says Grolnick. "There's an increasing demand for fiber among the players in the automation market who understand how important tape will be for their customers' overall storage strategies."

Even in smaller enterprises not looking to network their storage assets, tape is a viable option. The same media that large companies use to back up storage networks can be used by small- and medium-size businesses in a direct-attached role. Furthermore, should the enterprise grow and move toward a networked approach, the data stored on the tape can remain largely unchanged.

### **The advantages of reuse**

If users need to expand their tape systems to the next tier of products, the tapes themselves can be reused without modification, thanks to drive designs that make backward compatibility with earlier formats a priority. "The data recorded on tapes today may need to be read eventually on the drives of tomorrow," says Jo Ann Downey, vice president of channel marketing at Quantum. "The idea is to create a no-hassle DLTape environment."

Similarly, tape libraries — ranging in size from rack-mountable units holding a dozen cartridges to room-sized libraries — are designed to support a variety of different media formats. Some models from StorageTek can support as many as 13 different formats.

The proliferation of libraries points toward another of tape's enduring strengths. While most enterprises now understand the value of data, it makes little sense to keep older material on expensive disk storage. Tape provides an efficient method for archiving that data, freeing up more expensive disk space and at the same time keeping very large amounts of older data within quick access.

In the mid-'90s, there was a push toward hierarchical storage management (HSM), a system in which data was bumped from one storage system to another based on how recently the data was last accessed. Now, HSM's concepts are being revisited in a two-tier format, with tape making up the second tier. The industry is seeing an increased demand from customers for solutions that automatically migrate data when the time is appropriate.

### **Rallying the chiefs**

Archiving and backing up data are understood as important by the IT staff, but why should the people with the word "chief" in their titles — especially the CFO and CIO — be enthusiastic about this technology?

There are several major reasons, the most obvious being that tape could keep a business from complete collapse and, in the process, save a CIO's job.

"Again, if data's the most important asset your company has, tape provides an insurance policy that goes way beyond what money can give you," says Grolnick. "The first time you have a server or bank of servers crash and you have to recover and rebuild data from tape, you'll realize exactly what your return on investment is."

Even if your servers and other disk systems perform flawlessly, "the software provides plenty of feedback on operation and reliability of the backups," Grolnick says.

### **No longer an afterthought**

Until recently, backup solutions were an afterthought for many users. The data explosion brought about by falling disk prices and the Internet started to turn the tide, and September 11 changed the perceived importance of backup once and for all. According to a CMP Media study of technology resellers taken after the attacks last year, disaster recovery vaulted into second place among customer concerns, immediately behind security.

The realization that a loss of data could bring down the entire business is helping to improve tape's prestige. "It used to be that, when you made a sales call to talk about tape, you were ushered into the back, down the hall and into a little room where the IT staff was kept," says Charlene Murphy, executive vice president of sales and marketing at Benchmark Storage Innovations. "Now, we're talking to executives in their big offices with the good carpet and the nice view."

While disaster recovery plans that include tape are good for easing fears of the worst-case scenario, CFOs concerned with more predictable financial issues can be put at ease by tape's predictable growth

path. "We have a path drawn out for Super DLTape technology through 2007," says Grolnick. "But is 2007 the end of Super DLTape technology? No. It's very comparable to disk technology, which stays in use even after it's been supplanted as the state of the art."

Currently, the Super DLTape format in its SDLT 220 generation offers transfer rates of 11M bps native and can fit 110G bytes of data on a single Super DLTape cartridge. The SDLT 320 products that arrive in the summer of 2002 will accommodate 160G bytes at a 32M bps transfer rate. The second release of SDLT 320 drives, slated for the fourth quarter of 2002, will support SCSI 160 and Fibre Channel, paving the way to their integration with storage networks.

"By 2006, we'll have the first tapes that can fit one terabyte — 1.2, to be exact," says Grolnick. "A lot of the technology foundation for this has already been laid. We have three separate teams of engineers plowing forward to get us there."

Don't forget that the cartridges being used at today's speeds will still be readable when these future generations of drives reach the market. That leads directly to tape's third key attribute: longevity. Tape's longevity translates into savings beyond the simple costs of media, drives and libraries. Management costs for archived data are lower, because the backward compatibility that is now a staple of most drives allows migration only when the resources to do so are available.

#### **How not to bust your budget**

If an enterprise relies on a system of networked servers to store large volumes of archival data, the expense of hardware and the associated real estate needed to house it grow as the amount of data grows. Growth becomes a problem; enterprises must either buy hardware on a precise schedule attuned to their exact needs or purchase surplus capacity that will sit idle until it is needed. Worse yet, as the number of networked devices increases, the complexity of the storage system, management costs and the number of people required to manage the data also spiral upward. "At some point, you have to move data to a technology that is attuned to archiving, or else you'll bust your budget," says Murphy.

Is all of this adding up to a renaissance for tape? The sales numbers suggest that, quietly, tape is earning the respect it has long deserved. The installed base for DLTape drives is larger than 1.7 million, with over 70 million cartridges in use and counting, and the total market for tape drives, management software, automation products and media is growing significantly. And, according to IDC, the total volume of data stored will explode from 184,000 terabytes worldwide in 1999 to over two million terabytes in 2003. So tape's place in storage looks secure for the indefinite future.

#### **About the author**

Chris Bucholtz is a technology writer in San Jose, Calif. He has written about storage for several magazines, including *Software*, *HP World* and *Telephony*. His last staff position was senior editor/technology for *VARBusiness*.