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## Quantum Corporation Solution Guide

### The Changing Role of Tape



#### THE CHANGING ROLE OF TAPE

While disk-based systems (such as Quantum's DXi series deduplication appliances) continue to grow in popularity as the primary backup devices for many medium to large organizations, tape automation continues to serve a critical role in the majority of modern Backup, Recovery and Archive strategies. Storing data on tape remains the most cost-effective, energy efficient and resilient means to manage the life cycle of stored data while providing backwards compatibility, portability and reliability whether employed as a primary backup target, a secondary storage platform or as an archival medium.

This document illustrates how tape continues to play an important role in data storage and how to best utilize tape in your backup environment to take advantage of its cost-effectiveness, high density and portability to maximize the effectiveness and the efficiency of your Backup, Recovery and Archive methodology.

## WHY WOULD I STILL USE TAPE WHEN DISK IS MUCH FASTER?

### Cost per Gigabyte

One of the most often cited benchmarks in the storage industry is “Cost per Gigabyte,” an estimation utilized to calculate both near-term and ongoing expenses related to the acquisition and operation of the respective storage solution. Indeed, as the amount of data that companies are managing continues to grow exponentially, often in spite of constrained IT budgets, storage efficiency and ROI are of paramount importance.

There are myriad reports available from industry analysts discussing the cost per GB of disk vs. tape, a figure that is constantly fluctuating as capacities of storage media increase and prices of hardware decline. Oftentimes these figures are derived by simply dividing the cost (MSRP) of the storage medium by its capacity; however, one must consider that there are other factors that affect these prices, both initially and long-term.

Comparing one disk to one tape is not an adequate representation of true cost per GB, as 1TB of disk storage capacity may require of an array of three to five disks to incorporate the appropriate amount of redundancy for fault tolerance and performance (RAID) of a single tape. When it becomes necessary to increase the capacity of these systems, even more arrays must be installed, unlike tape, which simply requires the purchase of additional data cartridges.

## HOW CAN TAPE HELP ME GET THE MOST VALUE OUT OF ANY BACKUP-TO-DISK SOLUTION?

Datasets with strict Recovery Point Objective (RPO) and Recovery Time Objective (RTO) requirements typically utilize high speed disk systems to provide the random access and throughput required for this level of performance. These systems are expensive to acquire, operate and maintain. As data stored on these systems begins to age, it occupies valuable disk space better suited to newer and/or highly accessed data. Transitioning aging data to a lower-speed, lower-cost disk array and/or eventually to tape, depending on the RPO / RTO requirements, allows you to store your data in the most cost-effective manner while remaining accessible in the event that recovery is required.

## HOW ELSE CAN TAPE HELP ME REDUCE COSTS IN MY DATA CENTER?

### Energy and Space Efficient Storage

Data center power and cooling are some of the most formidable challenges facing IT Managers today. “Power and cooling is a pandemic in the world of the data center,” said Michael Bell, research Vice President at Gartner, Inc. “By next year, about half the world’s data centers will be functionally obsolete due to insufficient power and cooling capacity to meet the demands of high-density equipment.”

While power and cooling are important considerations for any piece of equipment in a data center, tape libraries and storage media consume significantly less power and emit significantly less heat than a comparable disk based system. Consider that disk arrays spin continuously while they read and write data, and sometimes even when idle, constantly consuming power. In addition, these high performance drives are often configured in high density arrays, which produce a substantial amount of heat, requiring additional power to cool the surrounding environment to reduce the risk of hardware failure.

On the other hand, tape is only moving when it is being written to or read from; the only power that a tape cartridge consumes “at rest” is that required to maintain appropriate environmental conditions for long term storage (up to 30 years). Moreover, a single LTO-4 data cartridge can contain up to 1.6TB of data in an incredibly small form factor, allowing efficient utilization of otherwise wasted space.

## HOW DOES TAPE ADDRESS THE THREATS OF DATA LOSS, THEFT OR MANIPULATION?

### Encryption Support

Quantum’s line of LTO-4 drives and libraries utilize hardware-based AES 256-bit data encryption to secure your data when it is written to tape, without performance degradation. In addition, Quantum’s SmartVerify™ virtually eliminates the need for a traditional verify pass during backup, reducing the backup window and increasing data integrity.

### WORM Support

Write once, read many (WORM) capability is offered on LTO Generation 3 drives and above to address regulatory and compliance needs. Data written to WORM cartridges cannot be overwritten, only appended, and WORM cartridges cannot be reused if degaussed. This gives companies a reliable, accurate, virtually tamper-proof data archive tool to meet today’s stringent regulatory requirements and legal inquiries.

Some DLT drives offer software-based WORM support through the Quantum DLTSage™ Management Suite, giving IT professionals the tools they need to protect, secure and manage their data. There is not a WORM-specific cartridge; instead the standard cartridge is formatted for WORM.

## Regulatory Compliance

In today's complex regulatory landscape, companies are forced to comply with new regulations such as HIPAA, Sarbanes-Oxley, and Gramm-Leach-Bliley concerning the security and integrity of the information they manage. Some states and local governments have also mandated requirements for companies operating within their jurisdictions. In addition, corporations often take it upon themselves to promulgate governance concerning the practices they will employ to protect their intellectual property and customer information.

All of these regulations require greater amounts of data to be retained for longer periods of time; moreover, they often include provisions requiring companies to protect their data from loss or theft, and to guarantee that the integrity of data has not been compromised since it was originally written. In the event of a lawsuit, companies can find themselves with the seemingly overwhelming task of retrieving records from multiple data sources, spanning numbers of years, and producing multiple copies for evidentiary purposes. Tape is well-suited to address the needs of these regulations in a cost-effective manner.

## HOW CAN I BE SURE THAT TAPE WILL CONTINUE TO ADDRESS MY FUTURE BACKUP, RECOVERY AND ARCHIVE NEEDS?

### Compatibility Testing

As a member of the LTO Consortium, Quantum is committed to the ongoing development and refinement of the LTO standard, continuously striving to achieve top performance and innovation in current and future LTO hardware and media products. In addition to our own comprehensive testing regimen that includes field testing our media in our own line of standalone drives and automated tape libraries, we also qualify our products for use in hardware from other industry solutions and consortium members. This ensures cross-platform compatibility, optimal performance and reliability you can count on, whether you're using a Quantum tape drive or library, or LTO hardware from another manufacturer.

### Backwards Compatibility

Investment protection and supporting your archival plan is the main intent of offering read/write compatibility between several generations of media. For example:

	LTO-4 Drive	DLT-S4 Drive
Read/Write	Ultrium 4 & 3	DLTtape S4
Read Only	Ultrium 2	Super DLTtape II & I

### Durability, Uses and Archival Life

In general, LTO and DLT offer the similar durability, uses and archival life support, as long as the appropriate environmental conditions specified on their packaging are maintained:

Durability	Average 1,000,000+ head passes in office/computer environment (or 20,000 load/unload/calibrates for DLTtape S4)
Uses	Up to 260 full tape uses
Archival Life	Up to 30 years

## HOW ELSE CAN QUANTUM HELP ME BETTER MANAGE MY MEDIA?

### Pre-Labeled Media

Bar code labels provide both human (alphanumeric characters) and machine-readable (bar code) identifiers. The human-readable portion allows cartridges to be easily identified and organized by a storage administrator. Machine readable identifiers enable the tape library system to correctly manage media cartridges. Bar code labels are critical to the effective operation of any tape automation product and provide an efficient means to quickly and accurately manage lots of media that may be shipped offsite or between central data centers and branch offices.

Pre-labeling is a value added service where Quantum affixes high quality bar code labels on media and cleaning cartridges per your requirements – saving the time and hassle of doing it yourself. Quantum also offers convenient pre-sequenced bar code label packs for do-it-yourself applications.

### Library Packaging

Library packaging (packs) is available for Quantum brand LTO Ultrium media cartridges. Each library pack ships with 20-cartridges. Four shrink wrapped “bricks” of five cartridges are “clam shelled” together in a protective tray and put in a reinforced master carton.

This bulk package option provides added protection against dust and humidity while offering easy and quick unpacking, carrying and stacking.

Library packs offers several benefits:

- Eco-friendly packaging – does not ship with individual protective polypropylene cases (p-case) and individual card stock documentation (Ucard) or master and 5-pack cartons.
- Allows for easy loading of cartridges into automation slots/trays – no need to handle or open each p-case or cartons.
- Pre-labeled media (bar coded) is also available in library packaging. Tapes are visible – easily identify contents and further reduce the time needed to load automation equipment.

While there are a number of media suppliers to choose from, Quantum continues to lead the storage industry with world class products, service and support. As the largest independent storage supplier, Quantum offers an extensive portfolio of disk and tape products providing our customers with a complete, multi-tiered “edge-to-core” Backup, Recovery and Archive solution. Using Quantum media in your drive or library ensures the high performance, reliability and support you’ve come to expect over the past thirty years.

