



WHITE PAPER

**GROUPED MEDIA:
MANAGING TOO MANY TAPES**

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Grouped Media: Managing Too Many Tapes

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Executive Summary

Too many tapes are stacked up in data centers everywhere. This problem is a direct result of tape's success: tape is increasingly essential in a backup environment because it's cost-effective, stable, extremely reliable, and removable—stored in and retrieved readily from a vault. As data quantity and value continue to dramatically increase, so does the use of tape for data storage. At the same time, this quantity of cartridges creates problems. The labor costs involved with importing, exporting, and storing hundreds of cartridges, one by one, are significant.

Question: If the costs stem from manually handling tape cartridges individually, then how does a data center reduce such costs?

Answer: By changing how cartridges are handled. Instead of manipulating cartridges one by one, data centers need a method that lets operators handle tapes in multiples—for example, in packs of ten. This solution is straightforward and logical, reducing the labor costs involved with data storage. But to implement this solution, the data center needs a library capable of using cartridge packs.



Spectra Logic's Spectra T950 library provides this solution: the TeraPack™, a secure container that holds multiple tape cartridges. The Spectra T950 library stores cartridges in TeraPacks within the library, increasing storage density by more than 200 percent. With TeraPacks, operators reduce import and export tasks by as much as 90 percent. Additionally, operators handle TeraPacks, not individual cartridges, significantly reducing human mishandling and tape misplacement, which is a leading cause of data loss.

The Problem: Too Many Tapes

Palm-sized data cartridges provide needed granularity in retrieving data, but the quantity of cartridges works against their utility. Backup operators have to deal with many, possibly thousands, of these small objects—handling, storing, importing, and exporting them.

Bar codes help; backup management software helps even more. But even with this, the operator still has too many small units to handle and manage. Every time an operator has to handle a cartridge, the probability increases that the tape will be damaged or misplaced, which means lost data.

A simple example illuminates both the problem and a logical solution: a carton of eggs. Carrying a dozen in a carton is easy; carrying a dozen without the carton invites disaster. Cartons give easy access to individual items, yet they also stack, conserve space, and provide protection.

The Solution: Media Groups

Grouped media management simultaneously solves multiple storage problems caused by the quantity of tape cartridges used and reduces the time and costs spent to solve them. These problems have, up until now, not been addressed at the source. Previously, automated libraries were not technologically sophisticated enough to handle two distinct movements: manipulating a single tape, and moving packs of cartridges.

Grouped media management, implemented in the Spectra T950 library, solves these problems:

- ♦ **Labor costs.** Reduces the number of labor-intensive tasks inherent to the backup and restore process that cannot be automated. Typically, as data backup volume increases, so does staff time. Grouped media management is a technical innovation that reduces staff workload.
- ♦ **Storage density.** Increases capacity by fitting more cartridges into less space. Packing tapes in TeraPacks requires much less space than the individual slots on the insides of traditional library walls. This means more cartridges per square meter, reducing the library footprint and the costs incurred by expensive data center real estate.
- ♦ **Data protection.** Safeguards data by reducing the amount of handling required in the backup and restore processes. Human intervention is, after all, the leading cause of damaged tape and resulting data loss.

Grouped media management starts with Certified Media purchased from Spectra Logic. Certified Media for the Spectra T950 library comes prepackaged in TeraPacks, ready to be loaded into the library. Certified Media is available for all media types supported by the Spectra T950 library.

With TeraPacks, media is handled and managed in groups throughout its life cycle, both inside and outside a library. Each pack contains multiple, individually bar-coded tape cartridges, and the TeraPack itself is identified by its own bar code. TeraPacks speed cartridge imports and exports: it can be as much as ten times faster to import and export a group of ten cartridges in each pack rather than one by one.

The TeraPack provides additional data protection by enclosing cartridges securely in a case that is used both within the library and externally, in the data center and the vault. Tapes are only moved singly when robotics load and unload tape drives, or when an operator requests a single cartridge, which is put into a TeraPack and exported using the TeraPack Access Port (TAP).

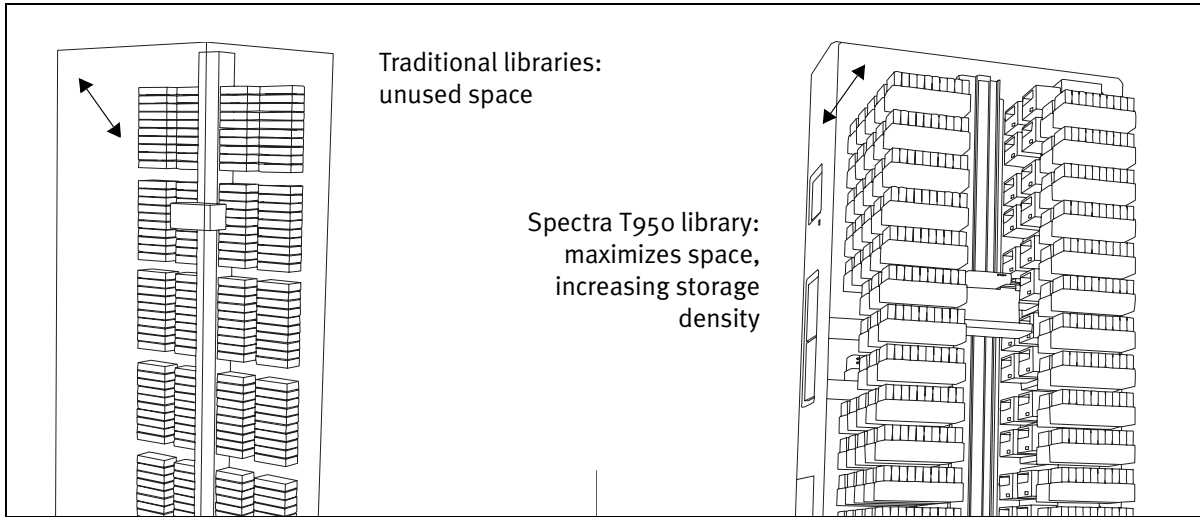
Example: Reducing Operator Workload

Comparing a backup task using a traditional library to the same task using the Spectra T950 library TeraPacks illustrates dramatic time savings. As an example, assume that a library is to eject 500 cartridges, and that it requires 20 seconds to find and eject each cartridge. After the cartridges have been ejected, operators must store each ejected cartridge in a container, then import blank or scratch media, again at 20 seconds per tape. Using these assumptions, simply importing and exporting media for this 500-cartridge library requires almost six hours of operator effort, as well as a long library latency period.

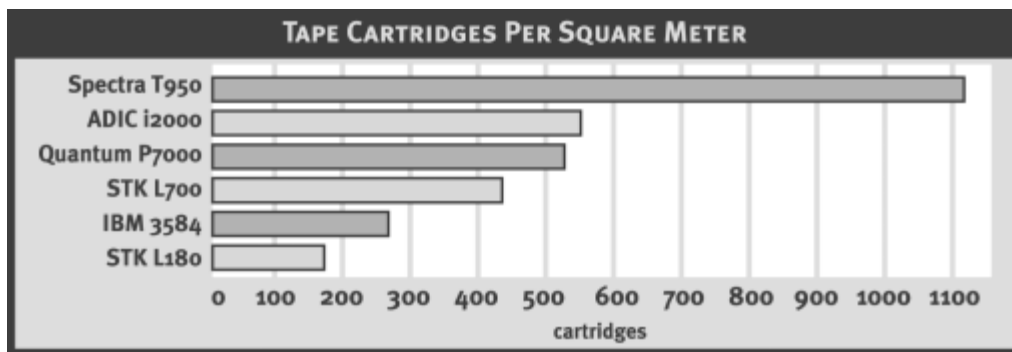
Grouped media management streamlines this process. By handling packs of media rather than individual cartridges, operators' workloads are instantly and greatly reduced. In the example above, assume 10 cartridges per pack. The operator handles 50, not 500 ejects! The time to import and eject 500 cartridges in packs of 10 is under **40 minutes**, rather than the six hours it takes for operators to import and export one tape cartridge at a time.

Comparison: Using Space Efficiently

In traditional libraries, robotics have direct access to each cartridge. This means the library allots a fixed amount of space for each tape. Grouped media greatly increases storage density by taking advantage of previously unused space within the library.



Using TeraPacks, the Spectra T950 library provides more than 200 percent greater storage density than its nearest competitor. The Spectra T950 library constantly tracks all tapes within the library, storing the inventory in non-volatile random access memory (NVRAM). With this, the library retains inventory data even after a power down and restart.



TeraPacks simplify handling multiple media types within the data center and storage vault. The outside dimensions of each pack remain constant, regardless of the dimensions of a specific media type. Storing media and transporting it is much easier and requires less space because the TeraPack's horizontal design stacks easily.

The Spectra T950 Library

The latest enterprise-class library from Spectra Logic—the Spectra T950 library—provides grouped media management through these features:

- ♦ The **TeraPack** is the secure case for tape cartridges. TeraPacks group individual cartridges of a uniform media type; the number of cartridges depends on the media type. Each TeraPack is bar-coded so that groups of cartridges can be managed more efficiently both inside and outside the library. TeraPacks are also stackable, and optional external storage systems are available.
- ♦ The **TeraPack Access Port (TAP)** is the mechanism through which TeraPacks are imported to and exported from the tape library. Each Spectra T950 library has two TAPs, which can be used simultaneously to load and unload media.
- ♦ The **Transporter** is the robotic mechanism in the library that handles TeraPacks. The Transporter moves TeraPacks and accesses individual cartridges from the packs, loading them into and removing them from the tape drives. It also handles TAP traffic, importing and exporting TeraPacks.

Conclusion

Using backup software and robotic libraries, data centers have managed to keep up with the increasing quantities of data that must be safeguarded. But the process isn't painless. Part of the difficulty with and expense of backup and recovery stems from the sheer quantity of tape cartridges used in protecting data.

Cartridges are wonderfully cost-effective and stable, and they store data efficiently; they are small and let IT managers access data quickly. However, as the amount of data to be backed up continues to increase, managing and storing the large quantity of cartridges used in a data center strains staff time and space enormously.

Grouped media management, through the use of the TeraPack, mitigates the difficulties inevitably associated with a data center's huge quantities of tape cartridges by bundling tapes into groups. This greatly lowers labor costs, minimizes data center space requirements, and reduces data loss due to human error.

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