



THE SPECTRA[®] T120 LIBRARY: SAVE TIME, LOWER COST, REDUCE RISK

SAVE TIME - SPEND 85% LESS TIME ON BACKUP

LOWER COST - SPEND 60% LESS ON BACKUP

REDUCE RISK - IMPROVE DATA SECURITY BY 93%



MARCH 2007

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Summary

Organizations of all sizes are under budget and time constraints that pressure them to get the most out of their IT infrastructure. To make the right investments, organizations need to identify immediate and long-term benefits that each infrastructure investment supplies. The Spectra T120 library provides quantifiable proven advantages in:

- ♦ Saving time
- ♦ Lowering cost
- ♦ Reducing risk

Spectra Logic analyzed¹ competing libraries, researched the current storage and IT literature, such as *Storage* magazine, *SearchStorage.com*, and *InfoWorld*, and surveyed Spectra library users and administrators familiar with a wide range of libraries, including the T120. The resulting data supports the fact that the Spectra T120 library provides tangible and measurable benefits that are unmatched by any competitive library. The savings make the T120 the best choice by an overwhelming margin for data centers handling a lot of data.

This white paper quantifies:

- ♦ Time savings, assessed in terms of media handling, increased uptime, and library management.
- ♦ Lowering cost, assessed in terms of data center energy use.
- ♦ Reducing risk, evaluated in terms of tape and data loss.

1. This analysis uses the data available to the researchers at the time of publication. This analysis will be adjusted, as appropriate, to reflect new data as it made available.

Overview

The Spectra T120 library is best in the business categories of saving time, lowering cost, and reducing risk. By offering a quantifiable benefit versus the competition in these categories, the Spectra T120 library is clearly the best choice for administrators, managers, and executives deciding on the right backup and archival investment.

The research summarized in this paper included side-by-side analysis of the Spectra T120 library—with the maximum configuration of 6 drives and 120 slots—and these libraries²:

- ◆ NEO 4100 (6 drives, 60 slots)
- ◆ Scalar 100 (6 drives, 72 slots)
- ◆ PX506 (6 drives, 100 slots)
- ◆ PX510 (10 drives, 201 slots)

These libraries are used in the analysis because they most closely match the Spectra T120 library in capacity and performance. All comparisons were made using the same LTO tape format. The results are summarized in the table below.

| Category | Sub-category | Spectra T120 Advantage |
|---|--------------------------------|---|
| Time | Library management | Reduces the time that data center staff formerly spent on library management by 50-80% (average of 65%). |
| | Limits downtime | Reduces time spent on repairs by 95% over conventional service calls, and provides twice the user-serviceable components; also, components can be stored on-site (option not available with other libraries). |
| | Media preparation | Reduces time spent preparing media for use by 95%. |
| 85% Savings: On average, save 85% of the time you would otherwise spend on data backup. | | |
| Cost | Data center power | Reduces the costs formerly spent on power by 60%. |
| 60% Savings: On average, save 60% of the cost you would otherwise spend on data backup. | | |
| Risk | Physically losing media | Reduces the risk of legal and financial exposure due to a lost backup tape by 100%. |
| | Media damage | Reduces data loss due to damage caused by human handling by 90%. |
| | Inability to find stored media | Decreases the risk of not meeting legal deadlines for e-discovery by reducing search time by 90%. |
| 92% Average Risk Reduction: On average, reduce the risk of losing valuable data by 93%. | | |

Note that the tasks discussed in this paper may fall into multiple categories. This white paper examines each task in only one category to simplify the analysis, and to ensure that each task is analyzed using the most concrete data available. For example, time savings directly correlates to lower costs. However, any dollar amount assigned to labor costs is subject to multiple variables—for example, an organization with a data center in Manhattan, NY would likely have salary costs that far exceed those in Manhattan, Kansas. To keep this clear, the reduction in staff time spent managing the library is assessed in the time category, not the cost category.

2. Comparative data about other libraries is available on request.

The Spectra T120 Library

Flexible Architecture and BlueScale® Environment

The Spectra T120 library provides unmatched flexibility and modularity, and incorporates the intelligence of the BlueScale environment so that the library is extremely easy to use. With the T120, it's easy to:

- ◆ Configure the library flexibly, so the library can be re-configured quickly as backup demands and environments change
- ◆ Handle data encryption and backup in a single step
- ◆ Reduce staff involvement in backup, for example through remote library management and use of consolidated media handling
- ◆ Select from a range of support options, including innovations such as assisted self-maintenance and auto-reporting options

The Spectra T120 library stores a lot of data in a small space, and supports a modular physical library architecture that makes the library extremely easy to scale and to service. The intelligence embedded in the library's BlueScale environment greatly simplifies management and use, both for single libraries and multiple Spectra libraries.

Library Snapshot

- ◆ Minimum configuration has as few as 30 tape slots and one tape drive
- ◆ Scales up to as many as 120 tape slots
- ◆ Scales up to as many as 6 tape drives
- ◆ Supports mixed media, within a single enclosure, of any combination of LTO (multiple generations) and SAIT tape technologies
- ◆ Lets you optionally connect using multiple simultaneous methods and protocols, including direct-connect and controller-based (QIP) connectivity, supporting Fibre Channel, SCSI, and Gigabit Ethernet with iSCSI
- ◆ Provides optional integrated AES-256 bit encryption and complete key management
- ◆ Provides user-replaceable components, including drives, controllers, power supplies, and robotics
- ◆ Offers a wide array of additional management and configuration features through the library's BlueScale software environment

Save Time: 85% Less³

The time categories assessed were those that came up most often in a survey of library users, storage analysts, and system administrators with backup responsibilities.

Backup and archival time savings are analyzed for each of the following tasks:

- ♦ Save Time Managing the Library: A 65% Savings
- ♦ Reduce Library Downtime: A 95% Savings
- ♦ Save Time Preparing Tapes for Initial Use: 95%

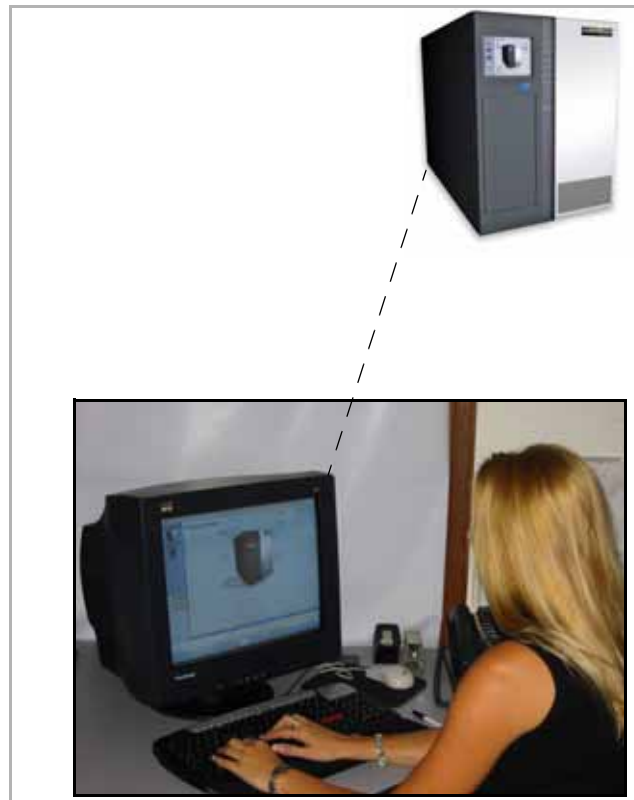
When these values are averaged, users see 85% reduction in time spent managing backups.

Save Time Managing the Library: A 65% Savings

The library's easy-to-use graphical interface reduces time spent on backups by 50-80%, annually saving hundreds of hours on backup. The BlueScale interface makes it easy to manage and use the T120 through both the library front panel and from anywhere using a standard Web browser.



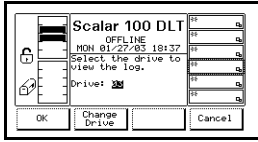

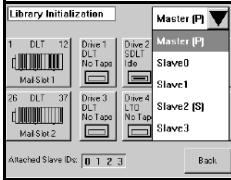
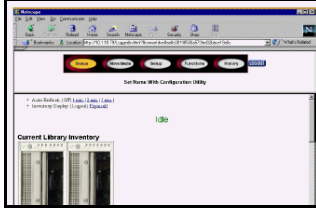

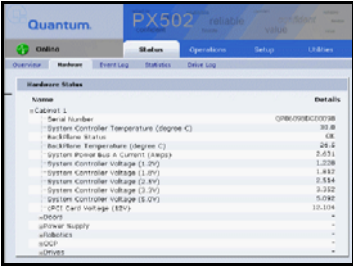
The same interface is used for all library configuration, operations, partitioning, and encryption. The interface includes a complete key management application, integrated with library administration features. To access encryption features, an encryption password is required, making BlueScale's AES-256 encryption secure, yet very easy to configure and manage.

With the Observatory application, users can manage multiple Spectra tape libraries, VTL solutions and encryption from a single interface anywhere in the world.



3. Averaged scores, rounded to the nearest percent

Based on user survey results, a key aspect of time savings stems from the ability to remotely monitor and manage libraries and to complete tasks such as power cycling the library. Because all of this can be handled from anywhere through a Web browser, users of the Spectra T120 library save 50-80% of the time that would otherwise be spent on data backup tasks.

| Library | Front Panel | Remote Interface |
|--------------|---|--|
| Spectra T120 |  |  |
| Scalar 100 |  |  |
| NEO 4100 |  |  |
| PX 506/510 |  |  |

The other libraries reviewed in this analysis present completely separate applications, one through the front panel, and a second through a Web interface. This greatly increases learning time because administrators and operators have to use multiple interfaces, and it increases complexity because of the varying methods available to complete actions. Further, with the library touch screen on the Spectra T120 library, users don't have to interpret LEDs, press small buttons to scroll through menus, and interpret the few characters that can display on the most front panels.

Reduce Library Downtime: A 95% Savings

Components Users Can Replace in Minutes

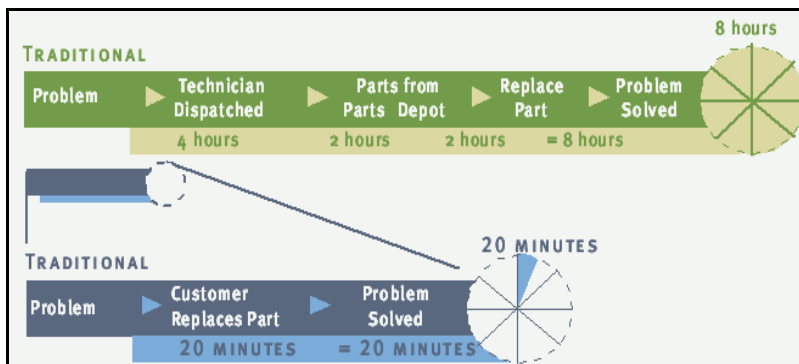
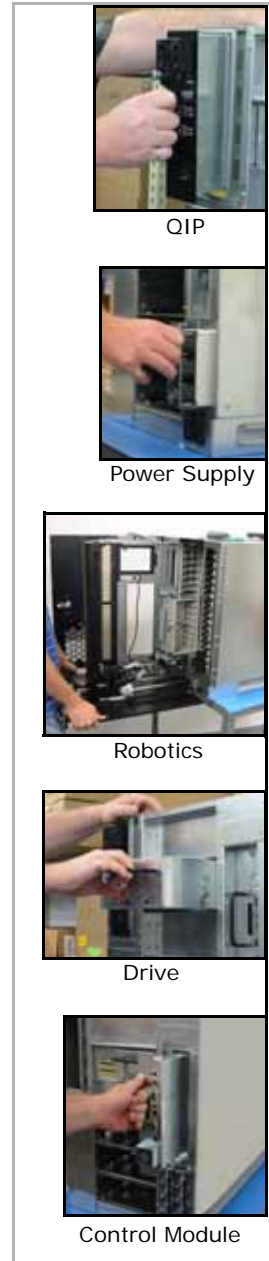
The Spectra T120 library supplies several advantages not available through any competing libraries. One such advantage is the Assisted Self-Maintenance support option, which lets a library user store a set of library components as spare parts on-site. Users can quickly replace a component themselves if a problem arises.

Competing libraries have between one and three customer-replaceable components, and no option to store those on-site, requiring either a service call or delivery of the component.⁴

Part of the reason components can be replaced and configured so quickly is that the T120 supports the abstraction of the World Wide Name (WWN) or serial number, so that replaced components can be automatically used without requiring any type of reconfiguration. This is useful because some backup software packages assume that each drive has its own specific WWN or serial number. This precludes drive sharing and can require host and application reconfiguration when a drive is replaced. With the fixed ID, the new component is automatically available, without rebooting the server, re-configuring the SAN, or making changes to backup applications.

Typically, even with rapid service, service engineers have at least a four-hour window to reach the site, and then may take up to four additional hours retrieving and installing parts from a regional parts depot. The time savings of having parts on-site and designed to be installed quickly is immediately evident, contrasting starkly with lengthy times required for other libraries. Four components in the Spectra T120 library take between 2-5 minutes to install, and the robotics requires only 15 minutes. The only tool required for any of these tasks is a screwdriver, and drives don't even require that.

Having components already on-site reduces downtime because users don't have to wait for parts to arrive. Instead of an average of eight hours, the T120 can be repaired in 20 minutes or less. Users are up and running in a fraction of the time required by competing libraries.



The savings: 80% over all competing libraries.

4. User-replaceable component data as it has been researched and verified at the time of publication.

The Spectra T120 library provides more components for you to replace than any competing library—20% to 40% more user-replaceable components, *and* the only library to provide the option to store spare components on-site.

| Spectra T120 | Scalar 100 | NEO 4100 | PX506 | PX510 |
|------------------------------|-------------------|---------------------|--------------|--------------|
| Drive | Drive | Drive | Drive | Drive |
| Power Supply | Power Supplies | Power Supply | Power Supply | Power Supply |
| QIP Connectivity Module | Fan | Connectivity Module | Fan | Fan |
| LCM (Library Control Module) | | | Controller | Controller |
| Robotics | | | | |

Increased Flexibility and Uptime with Unique T120 Features

Increased flexibility and availability certainly contribute to administrator time savings; however, these are very difficult to quantify. The Spectra T120 library offers many features and options that simply aren't available in other libraries in this range of capacity and performance range:

- ◆ Highly configurable connectivity, with more options than any other library in this analysis
- ◆ Phone-home capabilities with AutoSupport
- ◆ Drive performance monitoring

Highly Configurable Connectivity

The Spectra T120 library offers the most flexible and adaptive connectivity, easily able to work with network and connectivity protocols as they evolve and enter widespread use. The Spectra T120 library can be connected using any combination of direct-attach SCSI and Fibre Channel drives, and also attach through optional connectivity modules (Quad Interface Processors, or QIPs) that support Fibre Channel and Gigabit Ethernet/iSCSI. QIPs save you the expense of external hubs and switches, and are installed and configured in minutes. This range of options lets you connect a single library to multiple network environments, backup applications, operating systems, and protocols. Simply put, this makes the Spectra T120 library more useful for a longer period of time.

AutoSupport

AutoSupport creates and sends e-mail messages with status and diagnostic information directly to any e-mail address the end user specifies, optionally including SpectraGuard® support staff. This lets staff continually monitor the library, automatically suggesting possible preventive maintenance and enhancing response in the event of failure.



AutoSupport can be configured to send regular health updates to SpectraGuard support—updates that contain firmware revisions, error correction code (ECC) rates, notification of any abnormal events, and more. This provides library administrators (and optionally SpectraGuard support staff) with complete and detailed information about any problems, as well as access to history and configuration data on file. AutoSupport proactively ensures maximum uptime for the library.

Drive Performance Monitoring

Features that can help the user optimize system performance, such as the tool that monitors drive performance, help make the most of the Spectra T120 library.

These tools can be used to load-balance backups to take full advantage of all drives during the backup window. Additional utilities also support performance enhancement, reducing backup time.



Save Time Preparing Tapes for Initial Use: 95%

Preparing tapes for initial use requires multiple steps and typically takes longer than most users anticipate. This time can now be reclaimed by staff through the use of Spectra Logic's Certified Media. Certified Media arrives with the tapes already unwrapped, bar coded, and loaded into a TeraPack® case, which has a snap-on protective dust cover. A unique bar code sequence can be provided by Spectra Logic, or the customer can specify a sequence used in labeling tapes. These Certified Media packs arrive ready to be imported into the Spectra T120 library.



Without Certified Media, it takes a minimum of one minute per tape to unwrap each tape, apply a bar code to the tape, load the tape into the media case ... then repeat this each time for additional tapes, then apply a bar code to the media case. This sounds trivial until a new library arrives with 120 tapes to be prepared and bulk-loaded into the library. Using Certified Media for 120 tapes saves two hours of staff time. That's how Spectra Certified Media reduces time that had been spent preparing media for use by 95%.

Lower Costs: Save 60%

The major cost category assessed here is data center energy costs, for which Spectra T120 library users see a 60% reduction in the cost of running the library.

Data Center Energy Costs

Data center power use is an issue that is increasingly important as power costs continue to soar: "the price of oil... has tripled since 2002."⁵ The costs associated with data center power use are consuming an ever increasing share of IT budgets.

The price of energy varies, depending on geography, but the increase is substantial: across the U.S., energy costs have increased from 20% to more than 40%⁶ in the last year. An article in *InfoWorld* includes a checklist on how to save power, and the top item on the list is: "Invest in power-efficient hardware."⁷

The table below summarizes data comparing library energy use. The comparison shows that Spectra T120 libraries have the lowest energy costs. Power use for all libraries uses data assuming four drives per library.

- ♦ Power savings: the Spectra T120 library provides **48-73%** savings (average 60%)

| Library ^a | Rack Space | Tapes per U | Average Power Use* | Heat Dissipation | Spectra T120 Savings |
|----------------------|---------------|-------------|------------------------------|--|------------------------------|
| Spectra T120 | 14U (24.5") | 9 | 172 watts 1.5 watts/tape | 601 BTU/h 42.9 BTU/U (9 tapes) 5 BTU/tape | |
| Scalar 100 | 14U (24.5") | 5 | 205 watts 2.85 watts/tape | 701 BTU/h 50 BTU/U (5 tapes) 9.7 BTU/tape | Spectra T120: 48% savings |
| Neo 4100 | 10U (17.5") | 6 | 344 watts 5.5 watts/tape | 1176 BTU/h 117.6 BTU/U (6 tapes) 18.9 BTU/tape | Spectra T120: 73% savings |
| PX506 | 10U (17.5") | 6 | 594 watts 4.6 watts/tape | 185.9 BTU/h 185.9 BTU/U (11 tapes) 14.5 BTU/tape | Spectra T120: 65% savings |
| PX510 | 18.3U (17.5") | 11 | 620 watts 2.8 watts/tape | 2,501 BTU/h 136.7 BTU/U (11 tapes) 11.3 BTU/tape | Spectra T120: 56% savings |

a. Comparison across all libraries using four drives; figures for the T120 assume direct-attach drives.

5. Goodin, Dan. "IT Confronts the Datacenter Power Crisis," *InfoWorld*, 10/6/06.

6. Dunn, Darrel. "Power Surge," *Information Week*, 2/27/06.

7. Goodin, Dan. *Ibid.*

Reduce Risk: 93% Less

The categories of risk⁸ assessed include the following:

- ♦ Tape loss
- ♦ Data deletion
- ♦ Damage from human handling
- ♦ Legal issues
- ♦ Security

When these values are averaged, users see an overall 97% reduction in risk to data stored on their tape library when they use a T120 instead of the competition.

Exposure Due to Tape Loss: Eliminate up to 100% of the Risk

A backup tape can contain a treasure trove of information that a network hacker can only dream about: company e-mail, customer databases that include identity and financial information, support databases, detailed sales and accounting figures, and salary and payroll data—all of it well-structured, accurate, and complete. The risk of losing a tape with this data is very real—companies and organizations around the US that have lost tapes have been in the news. Losing backup tapes discredits the organization that lost the tape, and costs the organization an average of \$182 per customer⁹ for each record compromised just in notification expenses alone. In addition, the organization may also face litigation costs.

Many regulations concerning privacy and protection dictate safeguards on all data, whether on the network or stored on backup media. Many organizations now need—or will soon need—to comply with legislation that mandates the protection of customer identity data, financial data, and health care information. Two of the most well-known pieces of legislation governing data security include:

- ♦ The **Health Insurance Portability and Accountability Act (HIPAA)**, which covers health care providers, insurance companies, and company health plans. Encryption for data security is discussed in Section 164.312(2)(iv) of the act.
- ♦ The **Gramm-Leach-Bliley Act (1999)**, which covers banks, brokerages, insurance companies, and financial institutions that receive customer information. Compliance with the data security and privacy provisions of this act requires secure backups (encryption recommended) and data destruction safeguards.

Protecting data stored on tape may seem to be a difficult problem to solve—but in fact, it can be easily accomplished using Spectra BlueScale Encryption that is tightly integrated with the Spectra T120 library. The library's embedded encryption capabilities let users simultaneously encrypt data and back it up to tape.

8. Averaged scores, rounded to the nearest percent

9. *2006 Cost of a Data Breach Study*, Ponemon Institute LLC

The Spectra T120 library is the only library to integrate government-standard AES 256-bit encryption. Fast, integrated Spectra BlueScale Encryption¹⁰ can encrypt data written to any tape that the library supports—both old and new LTO media, for example. Encryption is integrated in the library hardware, so that the data is rapidly encrypted and optionally compressed as it is backed up to the tape drive.

BlueScale Encryption offers the only integrated, affordable backup encryption currently available. It adds no extra steps to a user's backup process, requires no additional equipment, and runs rapidly since the encryption is handled in hardware.

With BlueScale Encryption included as an option in the Spectra T120 library, all tapes can be encrypted while the data is being backed up. Because encrypted data is considered irretrievable, the risk of legal and external costs to the organization due to losing the tape is *zero*.

Data Deletion: Simplified Through Encryption

Encryption provides significant benefits not only in protecting data at rest, but also in the disposal of data stored on backup media. Many regulations include specifications on the disposal of data, while disclosure regulations dictate the retention period for backed up data. Increasingly, an active management of backups' life spans is key to addressing legal concerns about mandated retention and data disposal.

Without encryption, data is retained simply because it is hard to destroy. Simple data erasure isn't considered adequate (that is, data can still be recovered after multiple erasures). So, to make sure the data is destroyed, organizations feel they must physically destroy the media. This is also difficult, so many firms keep tapes longer than is needed or legally prudent. With encryption, however, data destruction is simple. Encrypted data is rendered unreadable simply by deleting the encryption key. With a rotating key sequence, a regular pattern of retention and disposal can be automatically enforced.

Reduce Risk of Data Loss Through Handling Tapes: 90%

The second leading cause of data loss behind server/system failure, is the human factor: handling individual tapes. Dropping tapes, environmental damage from dust or moisture, accidentally touching the magnetic tape, etc., accounts for 32% of data loss.¹¹

This risk of data loss is drastically reduced through the use of TeraPack magazines. With the purchase of Spectra Certified Media and its use in the Spectra T120 library, administrators only minimally handle an individual tape cartridge. With 10 LTO cartridges per pack, the handling of tapes is reduced by at least 9/10, because a single action is still required for every loaded TeraPack magazine. Additionally, the cases come with dust covers, protecting the tapes when they are outside the library. Certified Media can move directly into the library, without requiring individual tape labeling or handling.

Simply put, the use of TeraPack cases inside the library and out can reduce the risk of data loss through human error by up to 90%.

10. For more about BlueScale Encryption, refer to www.SpectraLogic.com/Encryption

11. Rich Harada, "Tape Turning: Protect Against Data Loss." Computer Technology Review, December 2004. http://findarticles.com/p/articles/mi_m0BRZ/is_12_24/ai_n13664500/print

Meet Legal Deadlines in Retrieving Stored Tapes: Find Tapes 90% Faster

Another potential source of data loss revolves around an inability to find a tape once it has been stored off-site. This is a problem that may sound like it is outside the proper domain of a tape library, because tape bar code labels are tracked by backup software. However, through the Spectra T120 library's use of bar-coded TeraPack cases, where each case can store up to 10 tapes, users have a faster way to find individual tapes. Users can search by bar code for the specific case with the tape, then easily find the tape in the case.

The Spectra T120 library tracks both TeraPack bar codes and the bar codes of tapes in the case. Users can export these values using the library's Rotation Manager, displayed through the library's BlueScale interface. The values are exported in a format that can be easily imported into off-site tape-tracking backup software and into the application that Iron Mountain uses to track tapes.

So instead of handling every tape to find one with a specific bar code, users can first search for the TeraPack bar code, then easily find the right tape. Instead of searching 100 individual tapes, users can search 10 bar coded TeraPack cases, find the right case, then rapidly identify the sought-after tape.

Tapes can be tracked up to 90% more quickly, since they can be identified in batches of up to 10 tapes, rather than one-by-one. E-discovery deadlines in legal proceedings mandate rapid data retrieval. With increasingly large data sets, some spanning multiple tapes, and compounded by chronic data growth, finding tapes efficiently becomes increasingly important.

Added Security: Restricted Access to the Spectra T120 Library

Tapes can be misused by anyone with access to the data center and library, unless the access is somehow controlled. Like many libraries, the Spectra T120 provides role-based access, so that only a user with the right privileges and password can gain full access to tapes in the library.

Encryption further limits any damage that can happen through unauthorized access to the physical library. Even if a user can access the tapes in the library, the tapes are encrypted. The only way to decrypt the tapes is to have even more passwords to access the keys that decrypt the data. If data on the tape is encrypted using a key that is no longer stored on the library, additional levels of security prevent access to the data, because one or more passwords are required to import and decrypt an encryption key that has been stored off-site. Once the data is decrypted, it still must be restored using the correct backup software application before it can be accessed.

To date, insufficient data is available to estimate the added degree of protection that role-based encryption access provides, but it certainly is significant.

Conclusion

Spectra Logic analyzed¹² competing libraries, researched current storage and IT literature (such as *Storage* magazine, SearchStorage.com, and *InfoWorld*), and surveyed Spectra library users and administrators familiar with a wide range of libraries, including the Spectra T120 library. The resulting data supports the fact that the Spectra T120 library provides measurable business benefits that are unmatched by any competitive library.

These advantages make the Spectra T120 library the best choice by an overwhelming margin for data centers handling a lot of data.

- ◆ Save Time: 85% time savings
- ◆ Lower Cost: 60% cost reduction
- ◆ Reduce Risk: 93% risk elimination

12. This analysis uses the data available to the researchers at the time of publication. This analysis will be adjusted, as appropriate, to reflect new data as it made available.



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