Quantum®

TECHNICAL BRIEF

The Value of iLayer Management: A Technical Brief

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Executive Summary

IT professionals have many tasks that they are responsible and data backup tends to be one of them. While dealing with data backup many customers have expressed that they are looking for tape libraries to proactively provide them more information regarding their units therefore requiring them to spend less time dealing hands on with unit.

With this in mind Quantum developed our Scalar libraries with integrated iLayer management software that gives our tape libraries disk-like management features to boost backup reliability, reduce service calls, speed up issue resolution, and lower users' operating expenses. The technology also allows users to analyze predictive trend data, secure their most critical data utilizing data encryption, evaluate the integrity of their removable media and tape drives, and manage their tape libraries as part of the larger storage environment using common management tools. The overall benefits from the Quantum approach to library management delivers more effective and reliable backup, reduced management overhead, and lower Total Cost of Ownership.

Traditional Library Approach

Tape libraries originated as little more than simple mechanical systems to hold tape drives and load and unload media. Management consisted primarily of the features provided by the applications software used to write data to the library's drives. Users who wanted more advanced, system–oriented management had to purchase and load separate library control software on external servers. This approach is still the norm in the industry today—most backup hardware systems provide very few of the robust monitoring and analytical capabilities that have become common in disk storage systems. The absence of management functionality in traditional libraries means that operation often requires an administrator's intervention, diagnosing and resolving problems normally requires a sophisticated and extremely technical field service organization, and even then troubleshooting is often time consuming, expensive, and uncertain. A further disadvantage to this approach is that the backup system is generally isolated from the primary storage systems—it is outside the managed storage environment.

iLayer Management Approach

The Scalar libraries with the iLayer software have a more advanced physical architecture than conventional libraries, offering internal server-class controllers, sensors, internal communication busses, and external network interfaces. This physical architecture allows the libraries to integrate Quantum's library management software tools—the iLayer.

The Quantum iLayer management approach is available in two library platforms which meet a broad range of backup needs, from workgroups to large enterprise data centers. The Scalar i500 is designed for midrange storage environments. It is a rack-mountable library that scales from 2 drives and 41 tape storage positions up to 18 drives and 407 pieces of media. The Scalar i2000 is an enterprise library that scales up to 96 drives and 3,492 tape storage slots. Both library platforms offer easy, modular growth, and they both supply users with the performance, reliability and value of a single, continuous robotics system.

Quantum's Scalar i500 and Scalar i2000 integrated iLayer management approach make backup easier to manage, reduce service calls, speed up issue resolution, and reduce costs.

The iLayer includes a series of integrated tools that provide Quantum tape libraries with robust management capabilities. They include:

- Partitioning and mixed media operation
- Proactive monitoring, alerting, and diagnostics
- I/O management
- Support for SRM tools
- Advanced trend analysis reporting
- Data security

In the Scalar libraries, all of these functions are native—they are integrated into the library and do not require use of external library control servers or software. Integration of the iLayer features means that end-users receive their benefits without incurring the maintenance costs and management overhead associated with external components and applications. The real benefit of the iLayer software is the fact that customers have opened 50% fewer service tickets and on the tickets that have been opened the time to resolution has been 30% faster when comparing the iLayer libraries to those that do not have this software. With over 28,000 iLayer libraries installed world wide customers are validating and taking advantage of these integrated management features.

Proactive Alerting and Diagnostics Increase Reliability and Reduce Service Interruptions

One of the biggest advantages that the Quantum libraries with the iLayer management software offer is the way that the iLayer handles monitoring, alerting, and diagnostics to reduce service calls, increase library reliability, and shorten issue resolution time. In many cases, the iLayer technology lets Quantum find resolution before issues become critical and even before end-users realize that an issue exists.

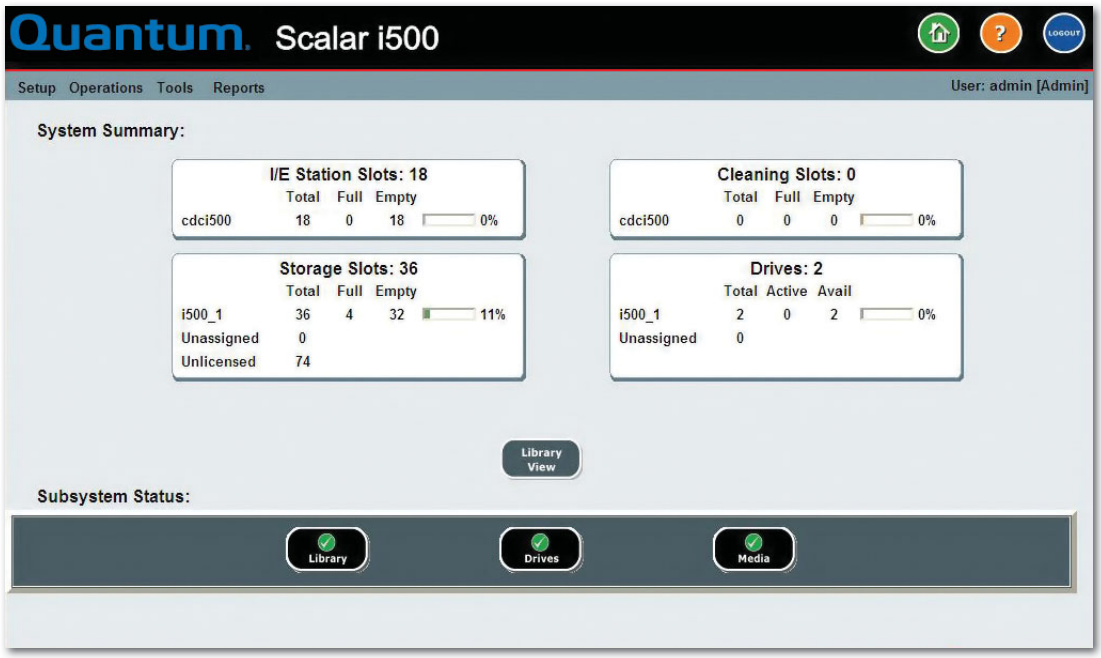
Compared to libraries without the iLayer software, the Scalar libraries can:

- Reduce the number of service tickets by more than 50%
- Shorten the time to resolve a service issue by more than 30%.

The reason that the iLayer libraries are able to have such a positive impact on users environments is due to the fact that the library's iLayer software is constantly monitoring hundreds of events in all the key library components and logs data from them. When an abnormal event is detected, the data collectors extract synchronized log data from related components and gather them into a report (called a "RAS ticket"). The iLayer technology then correlates the data to determine probable causes and next steps—if any. If the condition is not serious and corrects itself quickly, the report is kept inside the library to become part of the library's diagnostic history. If the condition is serious, the user is alerted through the library GUI, and the report—with the diagnosis, associated log files, and recommended resolution—is automatically emailed to the administrator and to the Quantum service team. This dataset, gathered and transmitted automatically without manual intervention, is used by the Quantum service team to solve issues rapidly and to call customers with resolution, often before they know there is a problem.

The iLayer selects data to gather based on the resolution history of similar events. To isolate the cause of an event involving drive-media interface, for example, the library may gather multiple datasets from the drive, the history of the particular tape in other drives, and the log from the library's media picker. Because they are armed with this history, if the Quantum service team does need to go on site, they can provide faster and more certain issue resolution.

Due to the iLayer being software, Quantum is continually collecting Quantum more event history from the global pool of libraries, the engineering team regularly updates the diagnostic logic and tunes the data selection criteria, further improving diagnosis and resolution times—in other words, the library gets smarter.



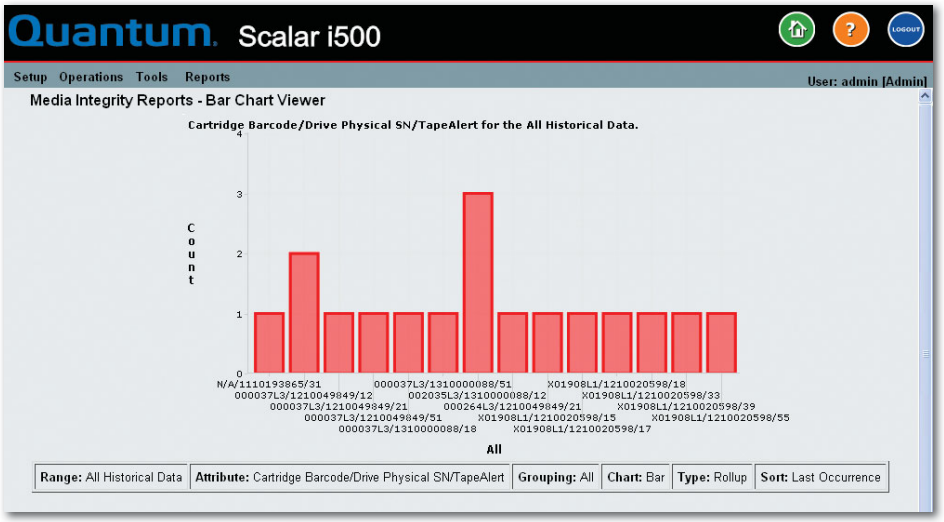
Quantum libraries offer more advanced diagnostics than conventional libraries, using their relational diagnostics to automatically select, synchronize, and analyze data from hundreds of library components and deliver them remotely. The result is 50% fewer service calls and 30% faster issue resolution.

Advanced Reporting: Data Gathering and Trend Analysis—Media Integrity and Drive Usage

In an effort to provide a more effective overall backup system, the Quantum engineering team leveraged the libraries' internal compute capability and data collection system to create new library trend analysis tools. These integrated software tools, let administrators improve resource utilization, reduce operating expenses, and increase backup reliability by proactively accessing drive and media trend data in an easy-to-read, highly intuitive format. The library architecture is flexible, powerful, and designed to allow the continued introduction of new analysis tools as part of future development efforts.

Drive Usage Reports Improve Reliability and Resource Utilization.
Long-term return on investment in enterprise backup systems is substantially improved when administrators evenly distribute loads between tape drives. The Scalar libraries, however, track the read, write, and mount activity associated with each drive to provide real-time performance metrics. The same data is used by the library's advanced drive trend reporting tools to give end-users the information needed to optimize their library resource utilization. Quantum's drive usage reports make it easy for administrators to compare drive usage trend data over variable time periods, showing use patterns (data read, data written, mounts/dismounts) for any single drive, for all the drives in a library, or for all the drives in a partition. IT managers use the drive usage reports to adjust loading to equalize wear, to find underutilized drives, and to discover libraries or partitions that need additional drives. More than just monitoring, the drive usage reports are planning and forecasting tools that help administrators plan budgets and rationalize hardware acquisition.

Media Analysis Protects Integrity.
These reports are designed to help administrators improve overall backup reliability and reduce costs by using ongoing trend data to evaluate and protect the integrity of their media pool. Evaluating the condition of removable media can be difficult, media defects accumulate slowly over time, error rates can be affected by usage patterns, manufacturer lots, and handling procedures, and it is often difficult to determine if a particular symptom is caused by a drive or a piece of media, especially if only a small number of cases are examined. Quantum's media integrity analysis reports give users the data to identify and resolve these problems. Using the database built by the library as part of its monitoring, alerting, and diagnostic procedures, the library allows administrators to generate a comprehensive set of media integrity reports. These reports summarize the alert events associated with specific pieces of media, organizing the data using variable views to show trends. Users can look at all the media known to the library, ranking them based on the number of alert events over user defined time periods.



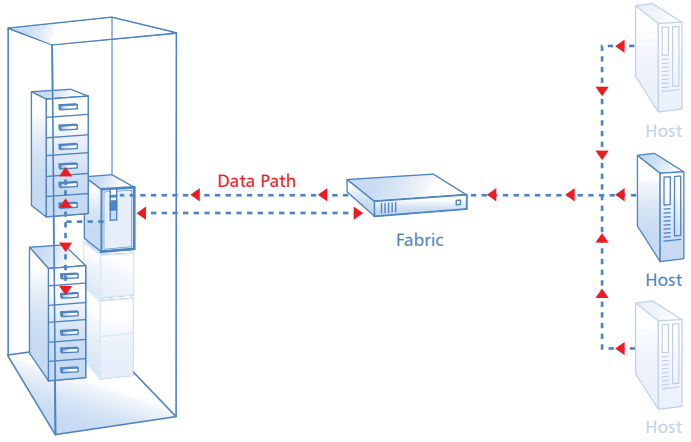
The media integrity reports provide a full view of the condition of the media pool associated with a specific library, and they are not limited to media in the library at the time the report is created. The history extends to all pieces of media that have ever been in the library, even those now in off-site storage.

I/O Management Provides Better Operation in SANs

Quantum Scalar iPlatform libraries are designed to support optional I/O blades (supplied with Quantum storage networking drives) that provide an integrated layer of management between the library's drives and the backup fabric to increase system availability, reduce port requirements, and improve security some of the benefits of the i/o blades are highlighted below:

Port Aggregation Reduces Costs. At the physical layer, iPlatform library I/O blades connect multiple drives to a single Fibre Channel port to reduce the number of switch ports that must be dedicated to the library. Port reduction reduces hardware costs and simplifies both installation and ongoing backup system management.

Path Verification and System Diagnostics Improve Reliability. The I/O blades and Quantum's Host Registration Service (HRS) supply management functions that increase overall system reliability and availability by proactively verifying datapath readiness. In complex SAN backup environments, loss of connectivity between host and library drives is usually not discovered until backup jobs are begun, creating situations that can lead to missed backups and associated business risks. Quantum libraries with storage networking drives can be configured to proactively verify the health of the data paths between hosts and the library before a backup begins by sending a heartbeat from the host to the library at user-specified intervals. When interrupted connectivity is discovered proactively, users have the opportunity to resolve the issue and still maintain their normal backup schedules.



I/O blades in iLayer libraries reduce the requirements for switch ports, add proactive path verification functionality, increase diagnostic capabilities, and provide path failover, enhanced security, and automated firmware configuration management.

Blades Enhance Diagnostics. For library and system-level diagnostics, the I/O blades are designed with on-board memory to capture command traffic between the host and the library. This data is available to the library's remote alerting system and relational diagnostic logic. The ability to examine the SCSI command traffic at the time of an abnormal event can often make resolution faster and easier by quickly showing whether the root cause is located in backup hardware, in the SAN, or in the application software.

Failover Provides Redundancy. Quantum I/O blades offer dual ports that can be configured in parallel to provide host-to-library path failover for high availability environments. Dual ported blades give economical open system drive technologies, like LTO, the redundant path protection that is otherwise only available in more expensive mainframe-class devices or through the use of specialized software that is certified with only a limited number of operating systems.

Device Level Security Protects Data. For some users, security within the backup SAN is an important benefit of Quantum I/O blade and iLayer management. An integrated I/O management tool (enhanced Virtual Private SAN-eVPS) supplied with the I/O blade allows administrators to restrict access to the library drives and robotics, including the "virtual robotics" in each library partition. With eVPS, hosts see only the resources assigned to them—to other hosts, the library resources are invisible. This access control is independent of SAN security, and it cannot be overridden by changes to switch zoning.

Self-Directed Configuration Management Reduces Administration, Improves Reliability. Since the I/O blade architecture provides a high-bandwidth, in-band connection to the drives, it allows Quantum to build services into its libraries to reduce administration time by automating configuration management. Two key features are drive identity management and automated firmware management.

Drive Identity Management. The Scalar I/O blade is configured to present to applications persistent World-Wide Node names and drive serial numbers. Both remain constant even when one physical drive is replaced with another. Persistent identity means that users do not have to change element address tables or drive target information in the host or backup applications when drives are changed.

Firmware Management. Quantum's libraries are designed to use the I/O blade's high speed, in-band path to the drive to load drive firmware from the library's internal memory, eliminating repeated use of firmware upgrade tapes. When a new drive is introduced—either a new drive or a replacement—the library compares the firmware level of the new drive to the other drives in the library and, if the user enables the feature, automatically loads the correct firmware in the new drive so that all the drives match.

Persistent identity presentation and automatic firmware leveling not only save administrators time during configuration changes, but they also prevent potential element address and firmware mis-matches, conditions which can create intermittent faults that are difficult to diagnose.

Simplified Management within a Disk Environment

In addition to providing library management tools, the Scalar libraries provides many different interfaces to allow the library to be managed centrally with users' disk.

Using these interfaces, central management tools can discover iLayer libraries remotely, see their configurations (modules, drives, ports), and view detailed information about them, including serial number ID, firmware revisions, and system configuration data. With some management tools, users can launch the remote library management interface from the console, providing a single control point for all storage resources in the environment.

With Scalar libraries, administrators can reduce the time needed to maintain their storage network environment by using a single interface to manage all the elements in their backup SAN-hosts, SAN fabric, and library.

Security of Critical Data Assets

As users are storing data for longer periods of time the need to protect the integrity of that data becomes very important. Over a recent three year period there has been over 350M records lost which have resulted in billions of dollars of fines and lost business. Quantum's Scalar libraries have a solution to help you protect your data for years to come.

The LTO-4 tape drive in Quantum libraries uses a standards based algorithm to encrypt your data. Once you encrypt your data you need a way to manage the keys to unlock the data at the appropriate time. Quantum gives you two options to manage your encryption keys. You can utilize an ISV application or Quantum's centralized key manager. Quantum's key manager is a centralized, intuitive, set & forget and redundant key manager that enables users to secure their most critical data assets.

Partitioning and Mixed Media Operation Reduce Capital and Operating Expenses

One way to reduce both capital and operating expenses is to consolidate multiple backup operations in a single library. An important function that enables consolidation is partitioning—the ability to make a single physical library look like multiple, logical libraries to outside applications. Partitioning makes it easy for a library to support multiple workgroups, different backup applications, and different drive or media technologies. Partitioning is also valuable when adding a disk tier to backup because it makes it easy to pair one part of the library with disk for performance-critical tasks while allowing other parts of the library to accept backup data directly from hosts.

Related to partitioning is mixed technology support, which includes combining different drive and media generations (LTO-2 to LTO-4), or different connectivity options (SCSI and Fibre Channel) in a single library. Mixed technology support allows end-users to retain the value of their legacy systems while taking advantage of newer technologies and backup consolidation strategies.

Native, integrated support for partitioning and mixed media are critical for end-users to derive the maximum value from consolidation. If external library control software has to be purchased, installed, and managed, both acquisition and operating costs can increase dramatically.

Conclusion

Quantum's intelligent Scalar library platforms provide industry leading levels of functionality for tape libraries, helping improve end-users' data protection process. The Scalar advanced management features make it faster and easier for administrators to install, operate, upgrade, and diagnose the library and the backup and storage ecosystem around it. They provide integrated tools to help make the backup process faster and more reliable, providing I/O management, proactive alerting and diagnostics, email notification, integrated log capture, and even giving users the industry's first comprehensive system for evaluating the integrity of their drives and media and integrates well within your current disk infrastructure.

About Quantum

Quantum Corp. (NYSE:QTM) is the leading global storage company specializing in backup, recovery and archive. Combining focused expertise, customer-driven innovation, and platform independence, Quantum provides a comprehensive range of disk, tape, media and software solutions supported by a world-class sales and service organization. This includes the DXi™-Series, the first disk backup solutions to extend the power of data deduplication and replication across the distributed enterprise. As a long-standing and trusted partner, the company works closely with a broad network of resellers, OEMs and other suppliers to meet customers' evolving data protection needs.

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