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Oracle's StorageTek SL3000 Modular Library System: Clearly Superior to Quantum—At a Lower Cost

Executive Overview

Apples-to-apples comparisons between business-critical products such as tape libraries can easily become contentious—at least for the vendors involved. For IT management, however, an emotionally charged debate is not helpful in making a meaningful product assessment or business decision. Therefore, in comparing Oracle's StorageTek SL3000 modular library system with Quantum tape storage products, this paper adheres to readily verifiable facts and publicly available sources, not opinions or self-serving distortions.

The conclusion business leaders will draw from this paper is absolutely objective. For achieving the business goals that matter most to the enterprise—reducing costs, managing growth, and increasing availability—the StorageTek SL3000 is clearly superior to Quantum's Scalar i6000 tape library.

Compared directly to the Scalar i6000, the StorageTek SL3000 provides the following key advantages:

- 24% lower acquisition cost for a 1PB archive or 10PB archive
- Up to 2.2x higher performance
- Up to 3x higher capacity
- Up to 6x savings on floor space
- "Any Cartridge Any Slot" support for enterprise and midrange (LTO) technology vs. LTO only
- More high-availability options and hot-swappable components
- Connectivity with mainframes and open systems

From a broader perspective, the StorageTek SL3000 modular library system delivers one important benefit no competitive tape library can match: peace of mind. It is a rigorously tested, proven solution that has been successfully deployed in enterprise data centers around the globe, and it has consistently delivered on its promise of cost-efficient, flexible, and reliable data storage.

Reducing Costs: Smaller Purchase Price *and* Lower TCO

Given the fast pace of data growth, it is vitally important to contain the cost of storage—but without sacrificing performance, scalability, or availability. A tape storage solution must not only expand in terms of capacity, but must also deliver more data to and from tape within the same time window, and without the risk of unplanned downtime. Enterprises thus need a tape solution that offers both a low initial purchase price and cost-effective expansion to meet future requirements.

Many factors impact the total cost of the solution, including the acquisition cost of the library, the drives, and the media to provide the needed capacity; the cost of data center floor space; and ongoing costs such as energy consumption and tape migration. All of these factors should be considered carefully. And Oracle's StorageTek tape solutions excel in each of these areas. The StorageTek SL3000 has a lower acquisition cost than the Scalar i6000—and costs less to operate, administer, and expand. When equipped with StorageTek T10000C tape drives, the StorageTek SL3000 **lowers acquisition**

costs even further because fewer cartridges, drives, and libraries are required to meet the same performance and capacity requirements as the Quantum solution.

Acquisition Cost Analysis: Advantage StorageTek SL3000

The acquisition costs of the key solution components (library, drives, and media) for 1PB and 10PB archives are compared in the tables below. In both cases, the Scalar i6000 comes out 24% higher.

TABLE 1. 1PB TAPE AUTOMATION PRICING COMPARISON

	STORAGETEK SL3000 WITH STORAGETEK T10000C DRIVES	QUANTUM SCALAR I6000 WITH LTO-5 DRIVES
NUMBER OF DRIVES	2	4
NUMBER OF CARTRIDGES	200	667
LIBRARY LIST PRICE	70,258	94,539
DRIVES LIST PRICE	60,000	90,112
MEDIA LIST PRICE	57,800	47,833
TOTAL LIST PRICE (LIBRARY, DRIVES, AND MEDIA)	$188,058	$232,484
COMPARISON TO ORACLE	N/A	**24% higher**

TABLE 2. 10 PB TAPE AUTOMATION PRICING COMPARISON

	STORAGETEK SL3000 WITH STORAGETEK T10000C DRIVES	QUANTUM SCALAR I6000 WITH LTO-5 DRIVES
NUMBER OF DRIVES	20	34
NUMBER OF CARTRIDGES	2,000	6,667
LIBRARY LIST PRICE	210,309	590,000
DRIVES LIST PRICE	600,000	765,952
MEDIA LIST PRICE	578,000	478,357
TOTAL LIST PRICE (LIBRARY, DRIVES, AND MEDIA)	$1,388,309	$1,834,309
COMPARISON TO ORACLE	N/A	**24% higher**

Two interesting observations can be made about the price comparisons in the Tables 1 and 2 above. First, the cost of the library alone is **35% - 133% higher with Quantum**, when measuring equal data storage capacities. Furthermore, to support future growth, the StorageTek SL3000 provides up to 3x the capacity of the Scalar i6000 library.

Secondly, the StorageTek SL3000 delivers additional savings—both short-term and long-term—through its use of Oracle's **StorageTek T10000C drives**. It is important to note that the purchase price is affected by both tape drive capacity and tape drive speed. A faster drive means that a tape solution can meet application throughput requirements with fewer tape drives. Similarly, because larger capacity tape drives write more data on each cartridge, they enable a library to store more data in fewer slots and occupy less data center floor space. StorageTek T10000C tape drives offer **higher capacity** than LTO-5 drives (native capacity of 5TB compared with just 1.5TB for LTO-5), as well as **higher performance** (native sustained data rate of up to 252 MB/sec compared with 140 MB/sec for LTO-5). This results in **lower acquisition costs** for the StorageTek tape solution because fewer cartridges, drives, and libraries are required to meet the same performance and capacity requirements.

Moreover, the StorageTek T10000C drives provide superior media investment protection compared to LTO-5 drives, which translates to reduced costs. StorageTek T10000C tape drives provide flexibility in reading previous-generation StorageTek T10000 tapes; and they provide StorageTek T10000 T2 media re-use, so capacity can be increased to the full new capacity of the next generation StorageTek T10000 tape drive, without additional media investment. LTO series tape drives require new media to take advantage of next generation tape drive capacity increases.

"…Do not fear the higher acquisition price of enterprise-class drives and media. In the long run, enterprise-class drives could end up costing you less. You really need to think about this! Do the math!"

— The Clipper Group[1]

Equally important, StorageTek tape libraries feature "**Any Cartridge, Any Slot**" capabilities, meaning any supported cartridge type can go into any available cartridge slot and any supported drive can go into any open drive bay. The StorageTek SL3000 supports midrange LTO tape drives from both HP and IBM along with StorageTek T9840 and StorageTek T10000 enterprise tape drives, allowing users to consolidate multiple formats in a single library, which not only saves cost, but also makes it easier to migrate from old drives and cartridges to newer technologies. By contrast, the first-generation version of Quantum's Scalar i6000 library supported midrange LTO and Super Digital Linear Tape (SDLT) technology only, and mixing media within the library required customers to purchase dedicated

[1] **The Clipper Group Captain's Log, July 12, 2011. For a copy of the full report visit:**
http://www.oracle.com/webapps/dialogue/ns/dlgwelcome.jsp?p_ext=Y&p_dlg_id=9983736&src=7011670&Act=123

magazines (SDLT vs. LTO). The second (and current) generation of the Scalar i6000 supports only LTO technology, limiting support for future tape technologies to the LTO roadmap.

Simply put, the combination of the StorageTek SL3000 library and StorageTek T10000C tape drives delivers an enterprise-class archive solution at a mid-range price point.[2]


	T10000C	LTO-5
Native Capacity	5 TB (up to 5.5 TB)	1.5 TB
Native Sustained Data Rate	Up to 252 MB/sec	140 MB/sec
End-to-End Data Protection	Yes	No
In-Drive Digital Auditing	Yes	No
Buffer Size	2 GB	256 MB
Connectivity Options	4 Gb/sec Fibre, FICON	8 Gb/sec Fibre
# Recording Heads	2	1
# Read/Write Channels	32	16
Backward Read Compatibility	T10000A, T10000B	LTO-3, LTO-4
Media Re-use	Next-generation T10000 tape drive at FULL higher capacity	None

Figure 1: Key specifications highlight the advantages of StorageTek T10000C tape drives vs. LTO-5.

Superior Density Saves Floor Tiles—and Money

The StorageTek T10000C tape drives used in the StorageTek SL3000 also provide higher storage density than LTO-5 drives, meaning fewer data center floor tiles are required to host equivalent volumes of data with the StorageTek SL3000.

In a 1PB configuration, customers using the StorageTek SL3000 with StorageTek T10000C tape drives will achieve a density of 40.4 TB/sq.ft., compared with a density of 29.4 TB/sq.ft. for the Scalar i6000 running LTO-5 drives, translating to a savings of **1.4x** in floor space. Even with equivalent LTO-5 drives, the StorageTek SL3000 achieves a higher density of 32 TB/sq.ft. In larger configurations, the space savings are even more pronounced, as depicted in Figure 2 and Figure 3.

2 All pricing data based on publicly available data as of September, 2010. For the complete price list used for comparisons in this document visit: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=2&ved=0CGAQFjAB&url=http%3A%2F%2Fwww.quantum.com%2Fpdf%2FNew_State_Pricing_September_2010.xls&ei=jcnoT-OoBsji2gWm84WnCw&usg=AFQjCNE-awz0BiMhSiIcSsFx2YEzU3or0Q&sig2=PP1jwbMg6KhxQrgZvD-Icg

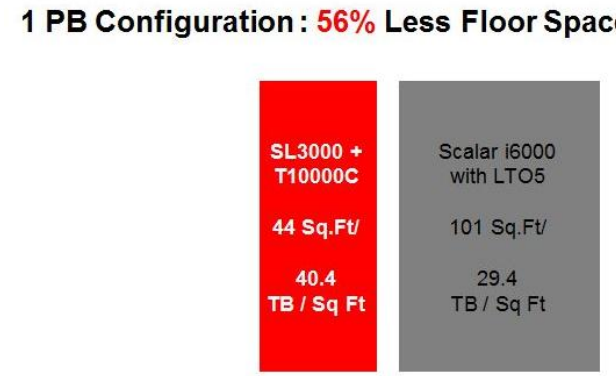

Figure 2: The StorageTek SL3000 with StorageTek T10000C tape drives saves significant floor space (graphic drawn to scale).

In a 20PB configuration, the Quantum Scalar i6000 equipped with LTO-5 drives occupies up to 6.3x the floor space needed by the StorageTek SL3000 with StorageTek T10000C tape drives, as shown in the diagram below.

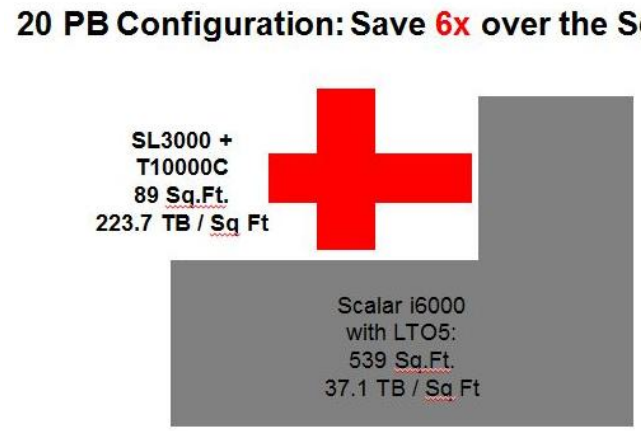

Figure 3. In a 20PB configuration the Quantum Scalar i6000 requires 6.3x the floor space of the StorageTek SL3000 equipped with StorageTek T10000C drives (graphic drawn to scale).

Managing Growth: StorageTek SL3000 is More Scalable and Reliable

Virtually every article, brochure, and white paper about data storage begins with alarming statistics about the "data explosion," which is attributed to everything from streaming content to Web apps to mobile devices. Experienced data center managers know that the sheer volume of data coursing through corporate networks has been increasing exponentially for more than a decade, that the value of that data is also increasing, and that the challenge of managing data growth is more complex than simply finding new ways to contain all of that data.

From a business perspective, managing growth requires high scalability and performance in several dimensions—and the StorageTek SL3000 modular library system address each of them more effectively than the Quantum Scalar i6000. The key categories include the ability to scale without disruption, and high performance to avoid latencies in storing and retrieving data. The discussion below focuses on each of these areas separately.

Massive Scalability for Growth without Disruption

The volatility of workloads has increased along with the raw volume of data in the enterprise data center. Unexpected spikes in demand for services, predictable but large variances in backup windows and retention periods, and other factors have created a need to scale on demand—but efficiently, in the increments needed, without disrupting current operations. The StorageTek SL3000 outshines the Scalar i6000 in this area in several respects.

- **Over 3x scalability with more flexible expansion**: With the StorageTek SL3000, customers can add slots in 25-1000 slot increments, up to 5,925 total slots and up to 32.5 petabytes (PB) of capacity. And the StorageTek SL3000's RealTime Growth allows organizations to advance-install extra physical capacity with minimal up-front cost. Future additional capacity can then be simply activated as needed, so there is no wasted investment. By contrast, the smallest capacity unit for the Scalar i6000 is 100-slots, with expansion to a maximum of 7,224 slots supporting just 10.8 PB of data.
- **"Any Cartridge, Any Slot" vs. LTO only**: StorageTek tape libraries enable organizations to grow their library any way they need to grow because any supported cartridge type can go in any available cartridge slot and any supported drive can go in any open drive bay. Supported drives include StorageTek T10000A/B/C, StorageTek T9840C/D, and LTO 3/4/5. The current generation of the Scalar i6000 supports only LTO technology.
- **38% more Import/Export Slots**: The StorageTek SL3000 supports 26-260 cartridge access port (CAP) slots and up to 468 AEM (access expansion module) CAP slots for a total of 728 CAP slots. The Scalar i6000 only supports 1-8 I/E stations and up to 528 I/E (import/export) slots.

"The StorageTek T10000C tape drive, coupled with the StorageTek SL8500 and SL3000 enterprise libraries, addresses customer requirements for high-capacity and cost-effective tape solutions enabling them greater efficiency for their backup, archive and recovery needs."

— Robert Amatruda, IDC Analyst[3]

3 Source: Press release, "Oracle Introduces StorageTek T10000C Tape Drive, January 31, 2011. To view the entire press release please visit: http://www.oracle.com/us/corporate/press/302409

Scalability Comparison

	StorageTek SL3000	Scalar i6000
Max. capacity	32.5 PB	10.8 PB
Max. density	234 TB/sq.ft.	52.8 TB/sq.ft.
Cartridge slots	200-5,925	100-7,224
Tape drives	1-56	1-96
CAPs	1-12 (26-728 slots)	1-8 (24-528 slots)
Max. bulk load/unload capacity	468 I/E slots	72 I/E slots*
Connectivity	Mainframe and open systems	Open systems only

* Quantum provides 240 "virtual" slots within the i6000 designated for import / export activities – but they can only take in or out of the library 72 at a time through a CAP.

Figure 4: The StorageTek SL3000 holds scalability advantages over the Scalar i6000 in multiple categories.

Higher Performance through Faster Drives and Robotics

As databases become larger, higher performance is required from the tape drives to execute backup and restore operations within the same time window. Faster tape drives can shorten backup and restore windows. Faster tape cartridge exchanges help improve mount performance, speeding time to first byte for backup and archival data.

The StorageTek SL3000 has a significant performance advantage over the Scalar i6000 tape library due to two key factors:

- **StorageTek T10000C drives are simply faster and more efficient**. The StorageTek T10000C tape drive delivers a maximum sustained data rate of up to 252 MB/sec, which is up to 80% faster than LTO-5.
- **Smarter "CenterLine" design translates to >4x faster robotics performance**. Above and beyond the performance advantages delivered by the active/active design of the StorageTek SL3000 robotics, the CenterLine Architecture of the StorageTek SL3000 further accelerates robotics performance compared with the Scalar i6000. With the unique CenterLine Architecture, all core infrastructure of the library is contained within the base module; all the drives are kept in the middle and the customer can add other modules to the left and right of the base module. This approach minimizes the distance the robot needs to travel to perform host commands. In fact robot moves are shortened 33-40 percent, and robot contention is reduced 50-60 percent.

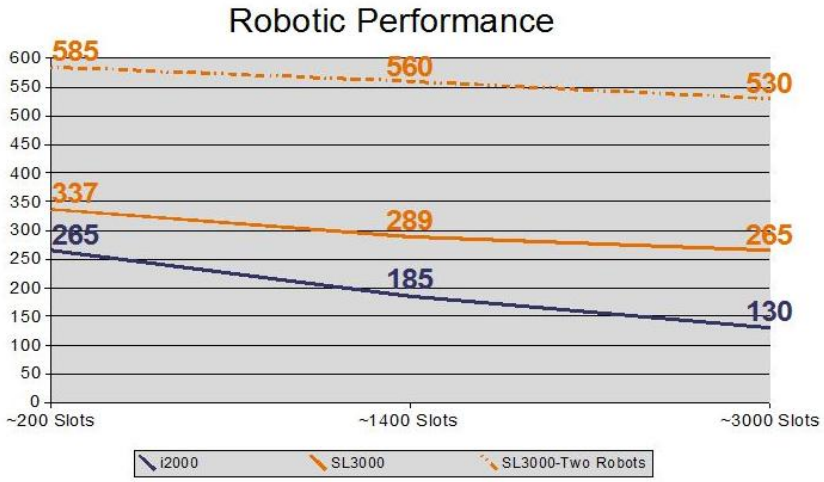

Figure 5: Oracle's CenterLine Architecture minimizes robot moves, resulting in higher performance.

More Complete and Intuitive Management

Clearly, the quality of the management software impacts the productivity and efficiency of system administrators, but it can also impact decision-making—not only at a technical level but also from a business perspective. Better information leads to better decisions, and the information provided by **StorageTek Tape Analytics** is more complete than that provided by Quantum's Vision Software and Quantum's iLayer software, combined.

StorageTek Tape Analytics: Better Information, Better Decisions

With the StorageTek Tape Analytics dashboard, the user can see the health of every library, drive and piece of media being monitored. Administrators can drill down based on device health without leaving the dashboard. It is easy to manipulate data real-time, so that operators can make quick and informed decisions to proactively improve performance. With Quantum's Vision dashboard, the user can only view Library-Level health. The Vision dashboard is not designed for drive or media monitoring—it provides only a high-level view of disk and tape health.

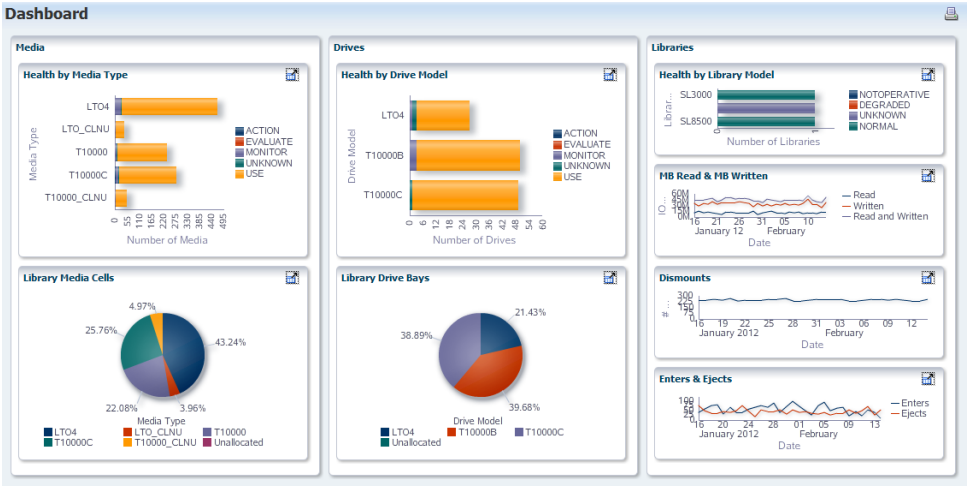

Figure 6: The StorageTek Tape Analytics dashboard is more complete and intuitive than the Quantum Vision dashboard, and is designed to monitor drive and media health as well as library health.

With the StorageTek Tape Analytics dashboard the user can see every piece of media being monitored and can see media in one of five health states; over 100 additional attributes are monitored and proactively reported on including the health of the drives the media has been mounted in, exchange errors, cleaning status, etc. With the Vision dashboard, users can view only eight media health attributes, and there is no advanced data manipulation or multi-column sorting.

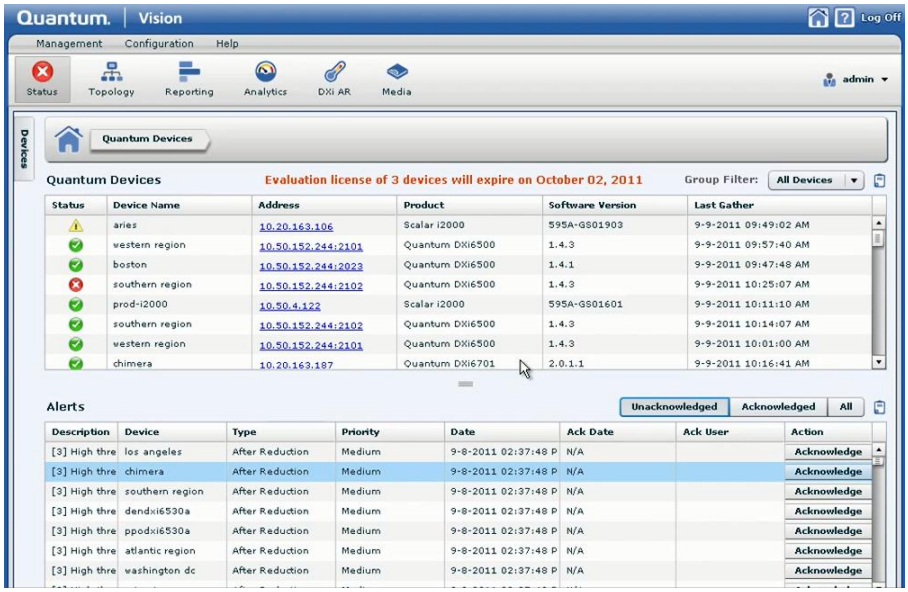

Figure 7: Quantum's Vision dashboard monitors fewer health attributes and is more difficult to interpret.

The StorageTek Tape Analytics software scales to support multiple libraries, so that tape administrators can grow their storage environment with peace of mind. Whether a new library is being added to a data center or a library is being replaced, StorageTek Tape Analytics will monitor the drives and media throughout library transitions. Because the StorageTek Tape Analytics software is not installed in the library, administrators do not lose visibility into the health of drives and media as they move from old libraries to new libraries or as drives and media are shared between library locations. With Quantum's solution, the Vision and iLayer software does not provide detailed drive and health information across libraries. When an administrator retires a library and migrates drives and media to a new library, the health information does not automatically move to the new system, instead administrators need to manually purge the health data from the Vision system.

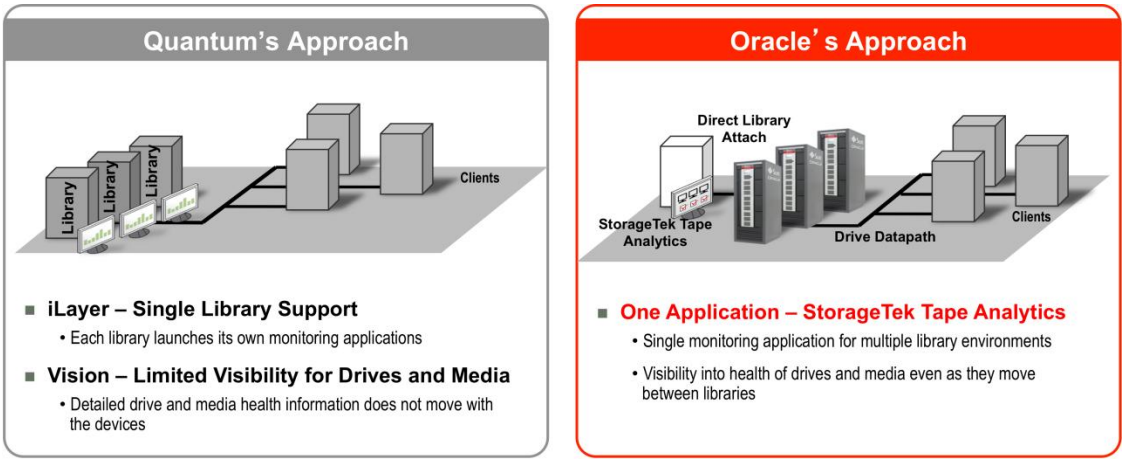

Figure 8: Quantum's library monitoring approach is inefficient and limits options. Oracle's single-application approach scales to support multiple environments.

StorageTek Automated Cartridge System Library Software (ACSLS): Centralized Control, Optimized Performance

The StorageTek SL3000 also supports Oracle's StorageTek Automated Cartridge System Library Software (ACSLS), the optional, advanced library management software that provides a central point of management and control for multiple StorageTek libraries. Whether consolidating distributed libraries into a single StorageTek SL3000 or deploying multiple Oracle libraries, StorageTek ACSLS helps IT administrators centralize library control and optimize the mount requests from multiple applications.

With StorageTek ACSLS, administrators can protect each backup or archive application's resources from unauthorized access by other applications. Easily configured access-control tables may be implemented to limit clients to their respective volumes. Client access to specific library commands can also be controlled by the administrator. To further optimize the library environment, StorageTek ACSLS offers rich logical library partitioning features. Logically assigning resources to an application simplifies shared resources planning and allows each application to grow as needed without physically carving off more resources within the library.

In addition, StorageTek ACSLS keeps the tape libraries running reliably with dynamic configuration capabilities, which allow hardware upgrades to be performed without interrupting an entire library complex. If the library should go offline unexpectedly, StorageTek ACSLS queues all client requests and initiates the mount commands as soon as the library comes back online. StorageTek ACSLS is also configured for hot-swapping drives, adding library expansion modules, and changing other hardware configurations without impact to the greater tape environment.

Quantum offers no comparable centralized library management and control software.

Increasing Availability: More HA Features and Options

In the enterprise data center, tape is the last line of defense for data—and the StorageTek SL3000 is simply more effective than the Scalar i6000 at ensuring that enterprise data is accessible and reliable at all times. The StorageTek SL3000 offers full redundancy across power, robotics, and library electronics subsystems, and its highly redundant design along with its support for non-disruptive serviceability has resulted in overall library availability of 0.99992. Details on just a few examples help illustrate the StorageTek SL3000 advantages over the Scalar i6000:

- **Active/active robots** for higher uptime and better performance: The StorageTek SL3000 has always provided dual active robots, unlike Quantum's Scalar i6000, which added redundant robotics only in its most recent iteration. And the StorageTek SL3000 robots operate in an active/active capacity, meaning both robots operate at all times, which also boosts library performance. Through the use of Access Expansion modules, the StorageTek SL3000 can continue to operate while the downed robot is being serviced. There is no queuing of host commands! The Scalar i6000 robots operate in an active/passive capacity, which means the redundant robot is only active once the primary robot fails. Servicing a downed robot also requires outages in processing host commands. Moreover, the Scalar i6000 robots use "hook and drag" cartridge handling techniques, which can increase wear on the cartridge and create library debris. The StorageTek SL3000 uses "grab and lift" cartridge handling, a safer, more reliable method proven to not increase wear on cartridges.
- **Redundant electronics**: The newest high-availability offering for the StorageTek SL3000 is redundant library electronics. Adding redundant electronics increases the availability of the library by allowing the library to stay up and running despite a control card failure. Should a library control card fail, the standby card will automatically take over and process commands while the failed card can be serviced non-disruptively. Quantum does not offer redundant library control electronics with automatic failover.
- **Hot-swappable components**: In addition to dynamic partitioning, which allows customers to add drives or slots while the library continues to operate, the StorageTek SL3000 provides hot-swappable power supplies, tape drives, fans and CAPs (cartridge access ports).
- **StorageTek T10000C high-availability features**: StorageTek Data Integrity Validation on the StorageTek T10000C provides the ability to truly verify that the data on the cartridge is what the host application wrote and is still valid, vs. Quantum's approach, which is simply to verify that data on a

cartridge is still readable. Oracle even takes pains to deliver higher availability through protection of the tape media itself. The StorageTek T10000C tape cartridges are the first to use nanoscale Barium-Ferrite (BaFe) particles to coat the tape. BaFe particles don't corrode or change chemically over time so that they extend the longevity of the product, according to Fujifilm, the manufacturer.[4]

Case Study: Oracle's Commercial IT Migrates to StorageTek SL3000

Prior to the acquisition of Sun Microsystems and its StorageTek product line in 2010, Oracle's Commercial IT (CIT) organization was using Quantum i2000 tape libraries for backup. The decision was made to launch a tech refresh program that would replace the Quantum libraries with eight StorageTek SL3000 modular library systems.

Oracle CIT quickly discovered that the political imperative to move to the StorageTek SL3000 paid dividends far beyond expectations. "There were obvious advantages just in setting up the capacity we needed," said Sam Corso, IT Systems Architect with Oracle CIT. "Quantum's libraries had a maximum of 12 drives per module, and we had to take downtime every time we needed to grow capacity," he said. "With the StorageTek SL3000 we didn't even have to do precise sizing up-front because it could be preconfigured with extra capacity, and we could just turn on and license additional capacity as we needed it."

Mr. Corso also liked the bulk-load CAPs on the StorageTek SL3000 for vaulting. "The two AEMs have 234 bulk CAP slots each plus each module can have a 26 slot CAP to scale out to 260 rotational CAPs," he said, "so we've got a total I/E capacity up to 728 slots. This allows us to speed up our vaulting process by 50%."

According to Mr. Corso, the performance of Oracle's StorageTek Automated Cartridge System Library Software (ACSLS) is "a rock star" compared to that of the previous library's management software. StorageTek ACSLS is able to parallel thread the robotics to improve mount performance. Mr. Corso found that the robotics performance was substantially higher with the StorageTek SL3000 libraries. "Our access and mount times are much faster," he said. "The StorageTek SL3000 has the dual-active robots, so it's using both all the time, as opposed to the i2000."

Another important advantage of the StorageTek SL3000 libraries is improved fault isolation, according to Mr. Corso. "Basically we had no fault isolation for the library with the i2000s," he said. "With the StorageTek SL3000 we do have fault isolation when we use our overall solution, which leverages StorageTek ACSLS, StorageTek SL3000, and a shared fabric. We can take down an entire library (planned or not) and still provide key restore/backup tasks as required. Also, the management software

4 Source: http://www.fujifilmusa.com/shared/resource_center/resources/BaFeWhitePaperFRMU.pdf

is far more complete—it monitors and reports on the health of the library, tape drives, and media—far more attributes than the management software for the i2000s."

The availability features of the StorageTek SL3000 were also an advantage, according to Mr. Corso. "The Quantum library constantly needed updating, and the updates required four-to-six-hour outage windows to upgrade the firmware and replace components," he said. Mr. Corso added that with the StorageTek SL3000 modular library systems he can get instant support. "With the i2000s, we couldn't take snapshots anymore because the library was too full—and we couldn't even get support for that without a four-hour outage. You just don't schedule for that when you buy an enterprise tape library."

Currently the migration to the StorageTek SL3000 library is 100% complete in the UK and 80% complete in North America. Overall CIT is currently doing around 8 PB/month in tape backup. The completion of the technology refresh program is expected by mid-summer 2012.

Conclusion: StorageTek SL3000 is Simply a Better Choice

The StorageTek SL3000 excels at delivering the capabilities that matter most to the enterprise: cutting costs, managing growth, and mitigating risks. Its acquisition price—including the library, drives, and media—is substantially lower than the Scalar i6000. It cuts operations costs by consuming less power, reusing media, and eliminating many planned outages required by the Scalar i6000. It also cuts costs through higher compute density, which saves valuable floor tiles. It provides far higher capacity and better performance than the Scalar i6000. It delivers far more detailed—and more intuitive—management, monitoring and reporting. It offers far more high-availability features and options. It also supports any cartridge in any drive. And it provides connectivity with mainframes as well as open systems. In short, the StorageTek SL3000 is simply a better option than the Scalar i6000.

Learn More

For additional information about the StorageTek SL3000 modular library system, visit http://www.oracle.com/us/products/servers-storage/storage/tape-storage/sl3000-modular-library-system/overview/index.html. Or call 1-800-ORACLE1 to speak to a representative. Table 3 below provides links to key resources.

TABLE 3. WEB RESOURCES FOR FURTHER INFORMATION

WEB RESOURCE DESCRIPTION	WEB RESOURCE URL
Oracle tape storage offerings	http://www.oracle.com/us/products/servers-storage/storage/tape-storage/index.html
StorageTek SL3000 modular library system	http://www.oracle.com/us/products/servers-storage/storage/tape-storage/029140.htm
StorageTek T10000C tape drive	http://www.oracle.com/us/products/servers-storage/storage/tape-storage/t10000c-tape-drive-292151.html

StorageTek Tape Analytics	http://www.oracle.com/us/products/servers-storage/storage/tape-storage/tape-analytics/overview/index.html
StorageTek Automated Cartridge System Library Software (ACSLS) software	http://www.oracle.com/us/products/servers-storage/storage/tape-storage/acsls/overview/index.html

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