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Save Time and Money with Quantum's Integrated Archiving Solution

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INTRODUCTION

In a data-hungry world, an enterprise's archiving infrastructure has become mission-critical. Data-intensive industries, such as media and entertainment, government, life sciences, oil and gas, and satellite imaging, need economical ways to archive vast amounts of data—and to easily offer secure, high-performance access to that data when it's needed. And given the increasing prevalence of very large files and data sets in all kinds of enterprises, virtually all companies need mission-critical storage archive solutions. The need becomes more acute every year because, according to IDC, unstructured data is growing at a 61% compounded annual growth rate.

Improper management of large amounts of archived data can be extremely expensive and time consuming, causing a variety of technical and business challenges. The end result is high costs, inefficiencies, and potentially lost data.

Quantum offers a comprehensive data management and archiving solution, consisting of the StorNext software and Scalar tape automation libraries, and perhaps best demonstrated by the Quantum StorNext Archive Enabled Library appliance, addressing these problems by reducing complexity and costs, and improving IT productivity.

This white paper examines the benefits that organizations can gain by using Quantum to deploy an end-to-end data management and archiving solution, as well as providing a detailed financial analysis, including return on investment and payback.

SUMMARY OF FINDINGS

Quantum collaborated with an independent research organization that specializes in return on investment (ROI) and cost-benefit analysis to perform an objective study of the financial returns generated by the use of the joint archiving solution.

This cost-benefit analysis is based on an enterprise that generates and manages a large amount of data, often with a great deal of rich file content. The company might be involved with genome sequencing research, oil and gas exploration, satellite imagery, government research, video post production, or similar work. Its file sizes are large—on average more than 5MB—and range from 16K to 10GB. It would also leverage a high-performance SAN file system infrastructure. The scenario is based on a business with 250 terabytes of data, with a compounded annually data growth rate of 61%. It compares the costs of having both transactional and archive data all on primary Fibre Channel disk, versus using an integrated Quantum StorNext Archive Enabled Library appliance with the 20% of its data that is active stored on primary Fibre Channel disk, and the remaining 80% of data archived onto Quantum Scalar tape.

A detailed examination of the benefits of using the Quantum joint archiving solution based on a five-year projected analysis period, reveals the following:

- An enterprise will gain a cumulative, projected \$4.2M in net benefits compared to an all-Fibre Channel disk storage solution.
- The project will have a return on investment (ROI) of over 400% and a payback period of less than one year.
- An enterprise can save more than \$3.7 million in media costs.
- An enterprise can save over \$1.3M in improved productivity gained by improving workflow and reducing the work required to move and maintain data.
- An enterprise can save nearly \$29,000 in energy savings.

Later in this white paper, we examine this business case in more detail. First, we explain why enterprises need to cost effectively archive data, and look at the benefits offered by using an integrated archiving strategy using the StorNext Archive Enabled Library appliance.

THE CHALLENGE: HOW TO COST EFFECTIVELY ARCHIVE DATA

Among many enterprises' most important assets is their vast amount of data, much of which is not required daily, but that needs to be accessed quickly and reliably on an ad hoc basis. Researchers and scientists, for example, may have generated terabytes or even petabytes of raw data, done their analysis, and saved the analytic results and conclusions. They no longer need the raw data to be immediately accessible, but often need to store it for subsequent research, reuse, or publication results.

As file sizes and data use skyrocket, companies need to store and archive increasing amounts of data. Storing large amounts of data on high-performance systems such as primary Fibre Channel disk can be prohibitively expensive. For example, it would cost \$287,000 to store 250 terabytes of data on Fibre Channel disk storage—and that cost increases dramatically with the substantial storage growth experienced by many enterprises. We'll examine this cost in more detail later.

To reduce costs, enterprises often divide their storage infrastructure into high-performing, high-cost, tier one primary storage, and low-performing, less costly archival storage, either on a secondary disk system or tape.

This leads to a variety of problems. The multiple storage systems—high-cost, primary storage, and low-cost, archival storage—do not integrate well. As a result, there is no simple, transparent way for administrators to archive data and for users to gain access to the archived data. IT intervention is generally needed, which requires IT staff to search for the data, recall it, then present it to the user.

Making matters even more complicated is that some enterprises have multiple, siloed systems running different operating systems, such as UNIX, Windows, Linux, even Mac. Finding, retrieving, and sharing archival data in that situation becomes geometrically more complicated.

In addition, IT staff members have to maintain disparate storage silos or storage pools. The end result: high storage costs, wasted administrative effort, high maintenance costs, and overly complex business processes and workflows. Finally, even though LTO tape has three times the life span of hard disk drives as an archive medium*, IT staff have no easy way to feel confident they will be able to restore data from a tape that has not been touched in years. All this leads to exorbitant IT costs, overburdened and bottlenecked resources, and unnecessary risk to the business.

THE SOLUTION: INTEGRATED ARCHIVING STRATEGY USING THE STORNEXT ARCHIVE ENABLED LIBRARY APPLIANCE

Quantum offers an integrated archiving solution that reduces costs and complexity and offers high-performance, transparent access to archived data. Users can search for and find archived data easily, and IT staff spend far less time managing archived data and archival systems. Enterprises save substantial amounts of money, because archived data is stored on lower-cost tape, with only the most active and current data stored on higher-performing systems—yet the archived data is as transparently accessible as is the data on tier one storage. IT administrators can eliminate much of the costs of moving to new tape archive standard formats and automatically check the integrity of tape cartridges used for long term retention with minimal human intervention. As you'll learn later in this white paper, an enterprise using the integrated archiving solution can gain a cumulative, projected \$4,186,276 in net benefits over five years compared to an all-primary disk-based Fibre Channel storage solution. These benefits are due to substantial savings in storage media, increased productivity as a result of workflow savings, and reduced electricity costs.

The integrated archiving solution is composed of StorNext data management and archiving software, and intelligent Scalar i6000 tape libraries combined in cost-effective and an easy-to-deploy StorNext Archive Enabled Library appliance. The solution combines the accessibility and transparency of storing data on tier one storage, with the cost savings and low overhead of archiving data to low-cost tape. In essence, it turns tape storage into an "active archive" in which all archived data is readily available online. The following conceptual diagram shows how the solution works.

* Carnegie Mellon 2007 study

The following diagram illustrates an example data management strategy for data life cycle. First, the business applications write data into the StorNext file system. Second, the StorNext data management engine directs data to the proper storage tier within the virtualized storage pool based on user defined policies. Shown below is a sample policy strategy where, after 30 days in the file system, the first policy migrates data to a lower tier Scalar tape library for online archiving, then another policy exports data out of the library after 180 days.

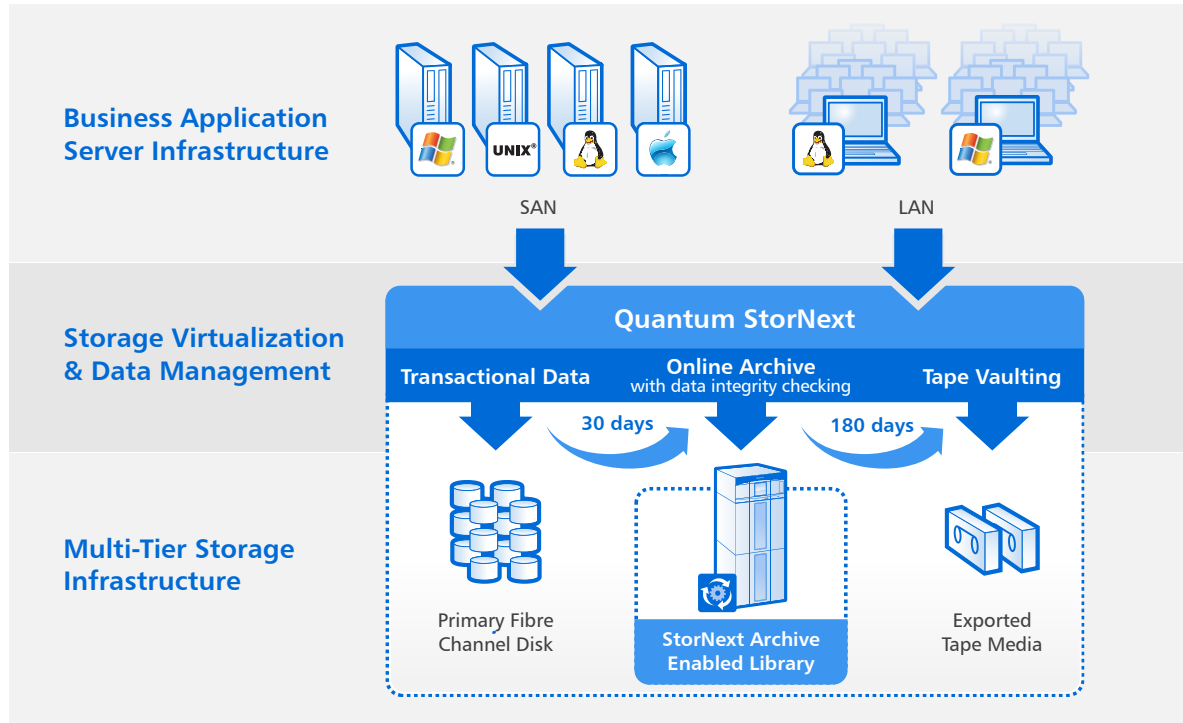


Figure 1: Quantum's integrated archiving strategy, using the StorNext Archive Enabled Library

StorNext is a SAN file system that delivers high-performance file creation, storing, and sharing for large, unstructured data. Its Distributed LAN Client (DLC) provides NAS-like clustered access scalability to thousands of servers and computer nodes over the LAN. Its shared file system enables simultaneous file access across heterogeneous operating system platforms. File system deduplication optimizes capacity usage and cost of primary storage by finding duplicate copies of data across the consolidated storage pool and saving only unique data blocks.

StorNext Storage Manager enables automated and transparent data migration based on user-defined policies to store data on the appropriate tier in an active archive scenario to better correlate the cost and performance characteristics of data with that of storage. In addition, as environments grow, StorNext Distributed Data Movers (DDM) enable easy scale and performance for tiered storage and archiving environments.

Users need not know whether data is stored on tier one storage or archived to the Scalar tape libraries. File access remains resident in the same file system namespace structure, no matter where the file is physically located.

Intelligent Scalar i6000 tape libraries are specifically designed for archive and long-term data retention needs in an enterprise-level environment. Scalar i6000 tape libraries dramatically improve the security and manageability of enterprise backup, disaster recovery, and archiving processes. The StorNext Archive Enabled Library is an appliance that combines the StorNext Storage Manager license with a Scalar i6000 library. Licensing is per tape slot, making the total price more cost effective and protecting the enterprise from future licensing investments as archive standards evolve. Moving from current LTO-5 tape technology to the future LTO-6 standard will double the capacity of the archive with no additional licensing costs for those slots already licensed. Quantum customers also experience significant management time savings due to the proactive monitoring and intelligent diagnostic features in the tape library's iLayer management software and automated tape integrity checking software, delivering up to 75% savings compared to other libraries. The utilization of the iLayer software also reduces service calls by 50% and shortens resolution time by 30%. As you'll see when we delve into the financial details of the business case later in this white paper, this has substantial financial benefits for enterprises, a total cumulative savings of \$1,325,000 over five years for a scenario in which an enterprise has 250 terabytes of storage, and a compounded annual growth rate of 61%.

Enterprises also realize significant media savings with the Scalar tape libraries with LTO-5 tape drives—up to 47%. The StorNext Archive Enabled Library appliance includes the industry's only self-monitoring and tape integrity check capability—Extended Data Life Management—that automatically scans aged tapes for defects so that StorNext can migrate data on suspect tapes to newer tapes. Extended Data Life Management even allows media scans to be triggered proactively based on StorNext media statistics that indicate a suspect tape. In addition, the Scalar i6000 secures its library against data breaches using drive-based encryption, media removal notification, and various network security features.

THE BUSINESS CASE FOR THE ARCHIVING SOLUTION

As explained earlier in this white paper, the following cost-benefit analysis is based on an enterprise such as one involved with genome sequencing research, oil and gas exploration, satellite imagery, government research, video post production, or similar industry applications. The enterprise requires large amounts of storage, manages a substantial amount of rich media, and its file sizes average more than 5MB, and range from 16K to 10GB. It uses a high-performance SAN file system infrastructure to store 250 terabytes of data in the first year. Data grows at a 61% compounded annual growth rate for the remaining four years of the analysis period. The business case compares the costs of having transactional and archive data all on Fibre Channel disk, versus using an integrated Quantum StorNext and Scalar tape solution, with the 20% of its data that is active stored on Fibre Channel disk, and the remaining 80% of data archived onto the StorNext Archive Enabled Library.

The enterprise accesses 20% of its data on a regular basis (50 terabytes of its 250 terabytes in the first year)—and does not regularly access the other 80% (200 terabytes in the first year). It may be months or longer before much of it is used, but all of it needs to be readily accessible for business process or content repurposing reasons. If the enterprise is involved in research, researchers may need to access the raw data initially to analyze it, but once they have completed their analysis, they can archive the raw data. They can't throw the raw data away, because they may need to share the data with other institutions or researchers, and the researchers at some later point may need to examine the data further.

The company realizes that it is spending unnecessarily on storage, because there is no need for the 80% of the data that it rarely accesses to be available on expensive Fibre Channel disk storage. The company is looking for an affordable way to provide high-performance storage, while reducing costs.

To do that, it chooses the Quantum integrated solution, which can migrate data from expensive tier one disk and archive data onto lower-cost tape, while still providing transparent access to maintain the integrity of business processes or workflows.

The business case compares the savings an enterprise would gain by using the integrated Quantum solution compared to an all-Fibre Channel disk storage solution. The case only includes those savings that can be clearly quantified, and does not include other benefits that are more difficult to quantify, such as increased security, data integrity, and reliability.

The business case uses a 61% compounded annual data growth rate for total data growth, as detailed in the following chart:

	Year 1	Year 2	Year 3	Year 4	Year 5
	250TB	403TB	648TB	1043TB	1680TB
Active 20%	50TB	81TB	130TB	209TB	336TB
Archival 80%	200TB	322TB	518TB	835TB	1344TB

To manage the tape archive, and generate ongoing savings by using tape instead of Fibre Channel disk storage, the enterprise will make an initial investment of \$209,900 in 10 Linux StorNext SAN clients, a StorNext HA Metadata controller, and 200 terabytes of StorNext Storage Manager archive capacity, as well as an i6000 library with LTO-5 technology supporting a 200 terabyte archive.

Configuration and Storage Media Savings

The greatest financial benefit an enterprise will see by using the integrated Quantum solution is in configuration and storage media savings—significant reductions in the amount and type of hardware required for managing data, driven by the significantly lower costs of tape storage compared to Fibre Channel disk storage. In addition, an enterprise can realize significant media savings by moving to the new LTO-5 technology used by the Scalar i6000 tape libraries. Enterprises will also see reduced maintenance costs and be able to defer library upgrades. Media savings can be as much as 47%, depending on the existing technology used by the enterprise. Drive service maintenance savings can be as much as 75%. However, the key point is that even though the data is stored on less expensive tape media, StorNext presents the data such that it is still easily accessible by users. This is the real value that a good data management software can provide.

In the scenario described in the business case, if all the enterprise's data were on Fibre Channel disk storage, the cost would be \$287,000 in the first year, and would grow substantially in each of the following four years. By moving to the integrated Quantum solution and archiving 80% of the data on Scalar tape via StorNext, while keeping only 20% on Fibre Channel disk, the total costs for the first year would be \$186,200: \$57,500 for Fibre Channel disk storage, and \$128,700 for tape. Savings for each subsequent year would grow significantly, as storage requirements and costs increase.

The following chart details the costs and savings for the archived data, which, as we've explained previously, makes up 80% of the total amount of data that needs to be stored. The costs for the active data are not included in the chart, because those costs are the same whether the data is archived to tape or remains on Fibre Channel disk.

	Year 1	Year 2	Year 3	Year 4	Year 5
Archive-Only Cost Comparison	200TB	322TB	518TB	835TB	1344TB
Fibre Channel Disk	\$230,000	\$370,300	\$596,183	\$959,855	\$1,545,366
Tape	\$128,700	\$11,250	\$29,250	\$40,500	\$58,500
Savings	\$101,300	\$359,050	\$566,933	\$919,355	\$1,486,866

Staff Savings

With Quantum's integrated archival storage solution, staff members do not need to manually move data between storage tiers, respond to user requests for data, or troubleshoot multiple storage silos. This results in a much more efficient workflow, and far greater staff productivity. By virtualizing storage, and automatically moving data between primary Fibre Channel disk and secondary tape storage, the Quantum solution reduces the time and effort required to manage data. In addition, it makes accessing the data transparent—users need not know whether the data is stored on primary disk or archived to tape. They see all the data as a single namespace within a consolidated storage repository. The Quantum solution transparently retrieves the data from the appropriate storage tier.

By moving to an integrated digital workflow with a shared storage system, many workflow steps can be eliminated. Enterprises typically see between a 50% to 75% time savings by virtualizing the storage, thereby eliminating the management overhead of multiple storage silos. Storage administrators now don't spend all of their time managing the storage infrastructure, including large library environments. The business case assumes that, on average, administrators spend 33% of their time managing the storage infrastructure.

As a result, in the scenario described in our business case, five staff members, each with a fully loaded salary of \$50,000, can be eliminated—a conservative estimate for cost savings. Additional time savings can be realized by not having to manually check the integrity of the tapes where data is stored, based on this process now being automated with the StorNext Archive Enabled Library appliance. Including a 3% annual increase in labor costs, this will lead to a total cumulative savings of \$1,325,000 over five years.

Energy Savings

The Scalar i6000 tape library saves a significant amount of electricity compared to primary Fibre Channel disk storage solutions in part because tape runs only when accessed. On average, Quantum customers access data on tape 30% of the time, consequently only consuming energy when data is either written or retrieved from tape. Conversely, Fibre Channel disk runs 24 hours a day, seven days a week. As a result, the enterprise will see 54,735 of kilowatt hours per year of savings. At a cost per kilowatt hour of \$ 0.0997, that leads to an annual savings of \$5,457. Taking into account a 3% increase in energy costs per year, an enterprise will see a cumulative projected savings of \$28,923 over five years. You can see more detail in the following chart.

Energy Savings (annually): (3% increase year over year)

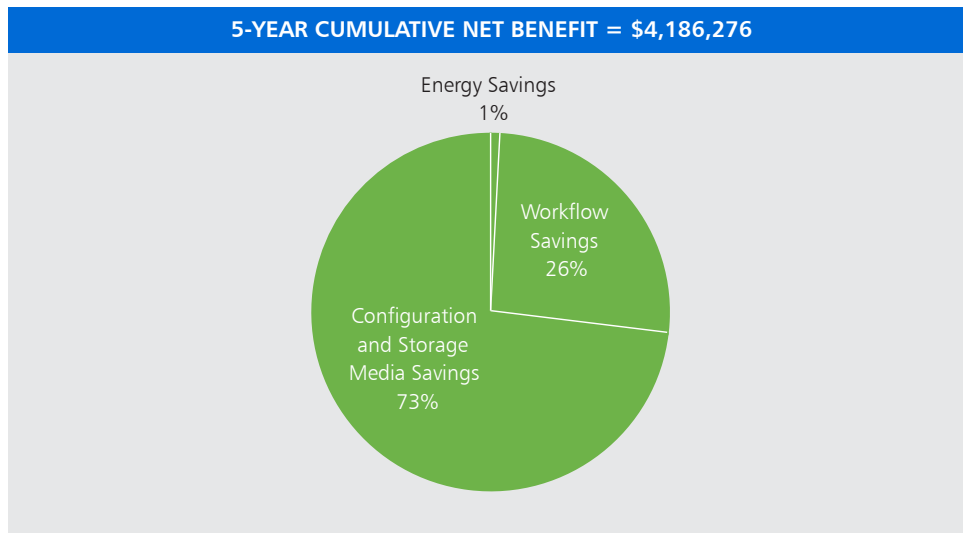
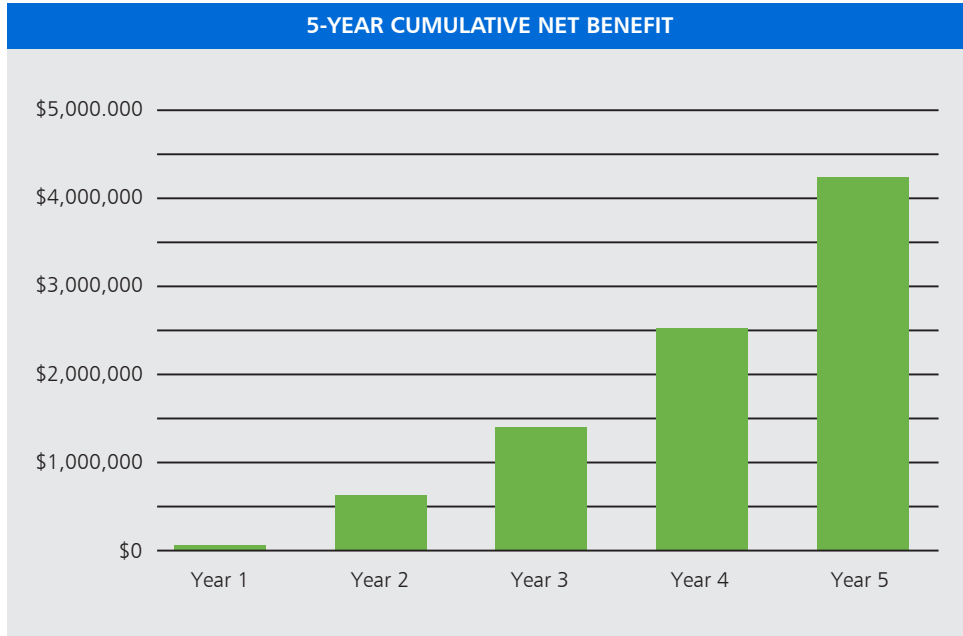
	BTU	kWh
Tape	7,151,080	2,117
Disk	219,385,440	56,852
		54,735 in kWh savings
	Cost of a kWh*	\$ 0.0997
	Annual Savings	\$5,457

*U.S Energy Information Administration (U.S. Total for Commercial on 4/10)

Total Savings

When all the financial benefits are taken into account, in our scenario an enterprise will realize \$4,186,276 in total net value, with a return on investment of 482%, and a payback period of 10 months. The following charts provide a more detailed financial analysis.

Project Summary							
ROI	482%						
Payback Period (in months)	10						
Cumulative Net Value	\$4,186,276						
Project Costs	Start Up	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Investment	\$209,000	\$128,700	\$11,250	\$29,250	\$40,500	\$58,500	\$477,200
Ongoing Costs	\$67,540	\$69,790	\$75,640	\$83,740	\$95,440	\$392,150	
TOTAL PROJECT COSTS	\$209,000	\$196,240	\$81,040	\$104,890	\$124,240	\$153,940	\$869,350
Benefits		Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Configuration & Storage Media Savings		\$230,000	\$370,300	\$596,183	\$959,855	\$1,545,366	\$3,701,704
Workflow Savings		\$250,000	\$257,500	\$265,000	\$272,500	\$280,000	\$1,325,000
Energy Savings		\$5,457	\$5,621	\$5,785	\$5,948	\$6,112	\$28,923
TOTAL BENEFITS		\$485,457	\$633,421	\$866,968	\$1,238,303	\$1,831,478	\$5,055,626
Financial Analysis	Start Up	Year 1	Year 2	Year 3	Year 4	Year 5	
Net Value	-\$209,000	\$289,217	\$552,381	\$762,078	\$1,114,063	\$1,677,538	
Cumulative Net Value	-\$209,000	\$80,217	\$632,598	\$1,394,675	\$2,508,738	\$4,186,276	
Net Present Value	\$2,885,537						
Payback Period (in months)	10						
ROI	482%						



User Views of the Integrated Archiving Solution

Quantum recently surveyed the customers of its Scalar tape libraries (both the i500 and i2000), and asked what benefits they have realized compared to their previous tape-automation solution. Below is a summary of the results.

Responses	% of Respondents
Reduced library administration time	71%
Floor space savings	38%
Energy savings (power and cooling)	16%
Savings from tape drive technology upgrade	51%
Improved archive/backup/DR process	55%
More effective growth management	40%
Improved library reliability	76%
Improved tape media/drive reliability	62%

CONCLUSION

Quantum's integrated archival solution is comprised of StorNext high-speed file sharing and cost-efficient data protection and archiving software, and intelligent Scalar i6000 tape libraries. The solution combines the accessibility and transparency of storing data on tier one storage, with the cost savings and low overhead of archiving data to low-cost tape. An enterprise using the joint archiving solution can gain a cumulative, projected \$4,186,276 in net benefits over five years compared to an all-primary Fibre Channel disk storage solution. The project will have a return on investment (ROI) of 482%, and a payback period of 10 months.

About Quantum

Quantum Corp. (NYSE:QTM) is the leading global specialist in backup, recovery, and archive. From small businesses to multinational enterprises, more than 50,000 customers trust Quantum to solve their data protection, retention and management challenges. Quantum's best-of-breed, open systems solutions provide significant storage efficiencies and cost savings while minimizing risk and protecting prior investments. They include three market-leading, highly scalable platforms: DXi[®]-Series disk-based deduplication and replication systems for fast backup and restore, Scalar[®] tape automation products for disaster recovery and long-term data retention, and StorNext[®] data management software for high-performance file sharing and archiving.

Quantum[®]

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