

WHITE PAPER

Meeting Business Objectives Through Unified and Simplified Storage

Sponsored by: Sun Microsystems

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EXECUTIVE SUMMARY

Enterprises need to store more information, and more types of information, than ever before. They also need to ensure that this information is safely retained for more rapid recovery and better corporate governance. IT executives responsible for acquiring and maintaining the storage systems that hold all this information also face continued pressures to restrain spending and boost operational efficiency.

IDC's ongoing research makes clear that IT executives' approaches toward evaluating the value of information assets and the solutions that support them are evolving. Enterprises' approaches reflect new concerns for simplicity, effective utilization, manageability, and availability. They need solutions that:

- Allow IT departments to easily deploy tiers of storage based on specific application requirements for performance, capacity, and cost-effectiveness
- Enable unified data replication so that IT managers can easily migrate or move data between different types of storage, including legacy systems
- Automate provisioning, expansion, and data protection tasks across heterogeneous storage systems to boost IT administrators' overall efficiency

Sun Microsystems, with its StorEdge family of storage hardware and software solutions, is an early leader in delivering next-generation solutions designed to address companies' plans for tiered storage and more robust business continuity. These systems provide companies with a solid foundation for deploying highly scalable, manageable, and reliable tiered storage across heterogeneous classes of storage.

To complement IDC's analysis of how the StorEdge family addresses the requirements of today's storage customers, IDC analysts interviewed two Sun customers and one Sun partner identified by Sun to determine their perspectives on the benefits offered by implementing these solutions.

KEY TRENDS DRIVING DEPLOYMENT OF STORAGE IN THE ENTERPRISE

Business Needs Drive New Requirements

Companies of all sizes are deploying a growing array of applications to meet evolving business needs. Each of these applications places different demands on the corporate IT environment, including the storage assets, in terms of cost, access performance, and levels of availability. Companies also want to simplify their infrastructures by consolidating assets, boosting utilization, and reducing administrative burdens.

Nowhere are these challenges more urgent than in the area of storage. The continued expansion in the range and amount of information that companies must store and the need to improve the protection levels for that information are placing growing strains on IT managers' staffs and budgets.

Application and Content Expansion: Changing Mix of Data Types

The storage capacity being deployed in large and medium-sized businesses is reaching levels where traditional storage solutions can no longer meet IT managers' need for flexibility, cost-effectiveness, and ease of administration. Not only is the amount of data that they need to store now measured in tens, hundreds, and thousands of terabytes, but the diversity of data types and the pace of new data creation are also reaching critical levels.

In a series of ongoing conversations with IT managers at large and medium-sized businesses, IDC found that a major challenge is the need to allocate storage in support of an increasingly diverse set of applications that includes:

- ☒ Expanded use of data-intensive applications such as email, customer relationship management (CRM), and enterprise resource planning (ERP) across a wider range of companies and departments
- ☒ Growing digitization of documents, images, and records that must now be stored electronically for extended periods to meet both general business governance and regulatory compliance requirements

This increasingly diverse array of applications with different availability, performance, capacity, and cost requirements poses a significant challenge. IT managers can no longer simply buy bigger and/or faster storage systems. Instead, companies need a range of storage systems managed with a common set of tools that allows them to optimize pools of storage for the different needs of various applications.

Business Continuity: More than Disaster Planning

Companies are more concerned than ever with ensuring both short-term and long-term access to information. Traditional storage solutions have long played a critical role in meeting business continuity requirements; however, the scale and scope of enterprises' evolving needs are pushing traditional systems to the limit in terms of performance and practical administrative capabilities. The range of information that companies need to protect is expanding rapidly, and the pressure to ensure adequate protection for all corporate data continues to rise.

Business continuity is no longer just about planning for the next system failure, network outage, or local catastrophe, however. In ongoing conversations with IT managers, IDC finds that business continuity issues include:

- ☒ Reducing planned downtime attributed to software, server, or storage upgrades
- ☒ Minimizing backup windows and improving backup reliability
- ☒ Speeding application recovery

The issue of finding time for planned downtime is a particularly critical concern for IT managers because many businesses operate continuously or nearly continuously. One healthcare company that IDC spoke with indicated that a planned storage upgrade could take up to six months of planned downtime due to the number of manual reconfiguration and data movement tasks required. In addition, the level of staff resources required to complete this process is unacceptable in a time of restricted spending.

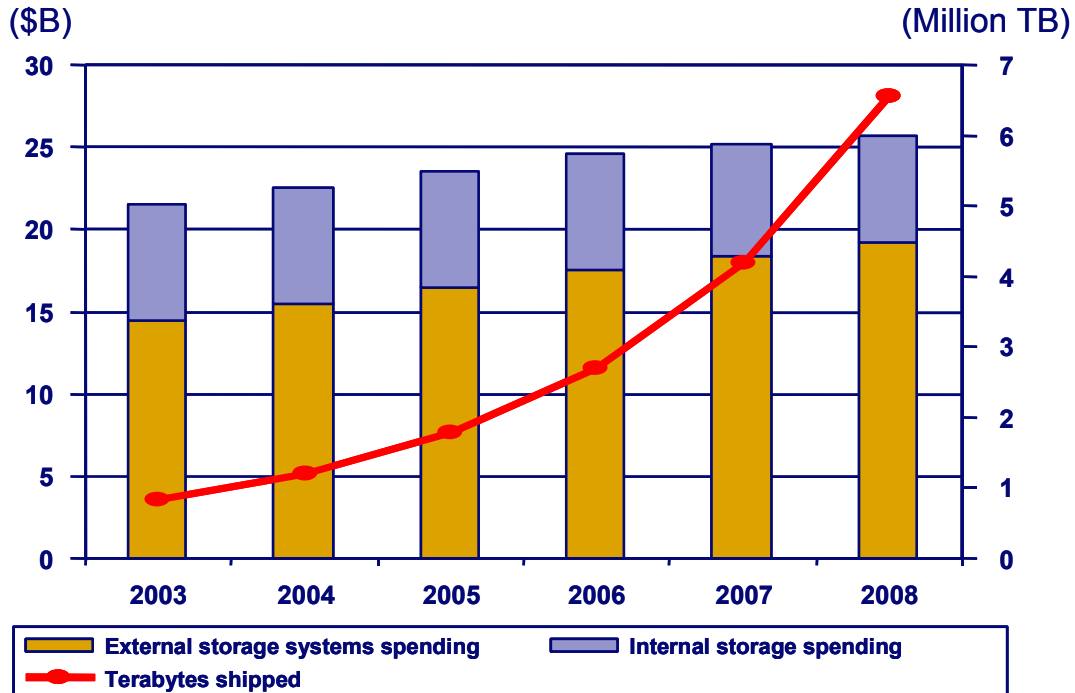
In response to all these needs, enterprises must develop business continuity plans and deploy storage solutions that allow them to protect more types of information while operating more efficiently and reacting quickly to changing business conditions.

Operational Efficiency

Accommodating a growing array of information types while boosting business continuity goals poses a significant challenge for budget-conscious IT executives. IDC's ongoing research on storage consumption by enterprises around the world clearly shows that companies' requirements for even more storage capacity will not abate in the near future (see Figure 1).

FIGURE 1

Worldwide Storage Systems Spending and Terabytes Forecast, 2003–2008



Source: IDC, 2005

Between 2005 and 2008, IDC forecasts that the total enterprise storage capacity deployed annually by companies around the world will increase 367%, from 1,786 petabytes (PB) to 6,652PB. Figure 1 also makes clear that the amount companies will spend on disk systems hardware to add all of this new capacity will grow only modestly, from \$23.6 billion to \$25.6 billion, during the same time period. IT managers also indicate that they will not significantly increase staffing levels to manage these much greater capacity levels.

Both of these findings demonstrate that enterprises' expectations about the ongoing effectiveness of their storage environments are changing drastically. Economic and business uncertainties have forced executives to closely monitor new storage systems expenditures and maximize returns on previously purchased storage assets. Boosting the effective utilization and integration of existing storage systems as well as improving the manageability of those systems are now primary goals.

The key to broadly meeting these goals is infrastructure simplification. In the storage domain, this means deploying solutions that reduce the complexity of managing existing and future assets while boosting their effective utilization.

Three Strategic Goals for IT Investments

As IT managers evaluate storage solutions that meet these goals, they are looking for new implementation options that don't cause serious degradations in existing levels of data integrity and system reliability. The status quo in terms of availability and efficiency must be maintained (there is no room for backsliding), and improvements must offer tangible competitive advantage.

Our conversations with senior IT executives show that these requirements are driving companies to focus on three major strategic initiatives: consolidation, tiered storage, and rapid recovery through layered data protection.

Consolidation: Moving Beyond Cost Savings to Better Service

From the perspective of IT executives, consolidation is consistently one of the most widely cited goals driving their overall IT strategies and investment decisions. For the past six years, IDC repeatedly asked IT managers at medium-sized and large U.S. companies whether they are undertaking any IT consolidation efforts. Today, one can easily say that IT consolidation is the norm for most companies; however, between the late 1990s and today, the underlying goals driving consolidation changed.

Most people assume that consolidation is driven solely by desires to reduce purchasing and ongoing maintenance costs for equipment and software in the face of ever-tightening IT budgets. Although operational savings remains an important goal for many IT executives, cost control is no longer the dominant issue.

When business executives request IT support, the call for services is not couched in terms of servers supported, terabytes stored, or even applications offered; rather, business executives focus their requests on numbers of concurrent users or transactions, improvements in application availability, and time to new feature deployment.

As IT executives evaluate strategies for meeting these service-level requests and time-to-market requirements, they often find that the way current storage solutions are purchased, deployed, and managed precludes success. Rather than purchasing storage on a piecemeal basis to meet individual application requirements, IT managers need to consolidate their storage assets into a commonly managed pool of storage that can be tuned to meet differing cost and business requirements.

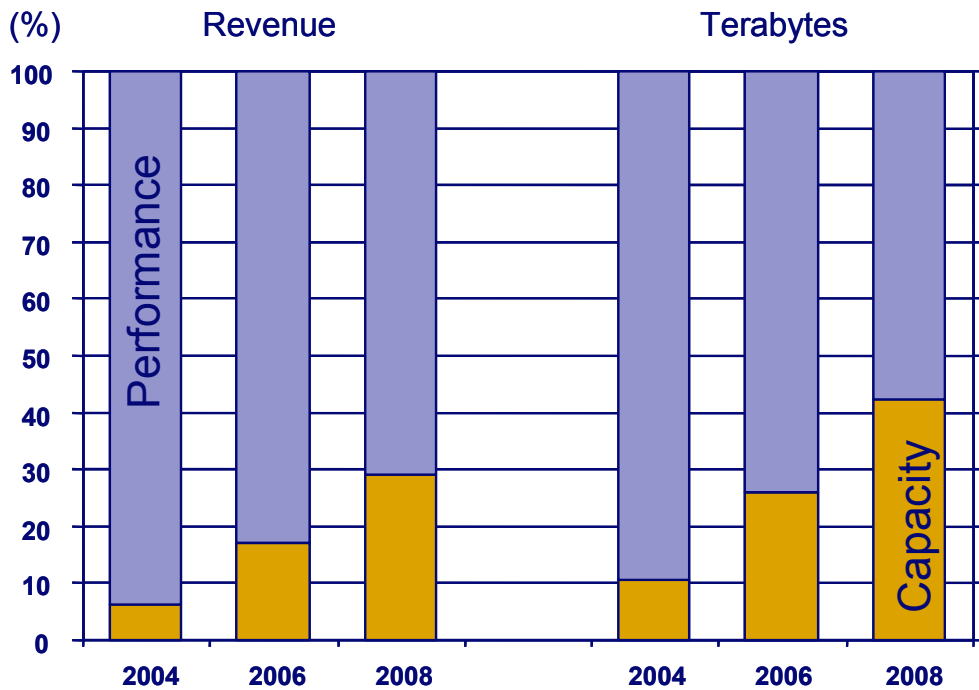
Tiered Storage: Optimizing Storage for Different Needs

The past several years have seen the emergence of a new class of storage systems that leverages lower-cost and larger-capacity disk technologies (e.g., Serial ATA) to significantly boost array capacities while reducing capacity costs.

Although not appropriate for all application workloads, these capacity-oriented technologies provide IT managers with greater control over costs when allocating storage for specific applications. Incorporating capacity-oriented storage systems into existing environments is a high priority for companies. IDC research reveals that by 2008 more than 40% of all storage capacity purchased by enterprises will be capacity-oriented (see Figure 2).

FIGURE 2

Growing Use of High-Capacity, Low-Cost Disk Storage



Source: IDC, 2005

These results make clear that companies want solutions that support the development of a tiered storage infrastructure. Such tiered storage solutions allow IT departments to use different classes of storage based on specific needs for performance, capacity, reliability, and cost-effectiveness. They also provide a set of capabilities that extends across all of these "tiers" of storage systems. These capabilities include:

- ☒ Automating storage provisioning, capacity expansion, and data protection tasks across heterogeneous systems
- ☒ Enabling cross-system data movement so that IT managers can easily and intelligently migrate or replicate data between heterogeneous storage classes
- ☒ Supporting the robust and coordinated management of information throughout its life cycle, from creation through frequent access to long-term archiving and retention for regulatory compliance

Turning the idea of tiered storage into a usable reality for IT managers is an important goal for the storage industry. It is shaping hardware and software developments as well as the design of new storage architectures.

For example, as the storage hierarchy undergoes this transformation to larger-capacity disk technologies, such as Serial ATA, IT managers will have more disk to manage. Consolidated, efficient, and easier management that can be leveraged by IT generalists, rather than just storage experts, will become a necessity.

Layered Data Protection: Balancing Costs and Availability

Companies have long been willing to invest in data protection for mission-critical data sets as the loss of valuable enterprise data can be catastrophic to an organization. With proliferating data types and the advent of tiered storage, however, IT managers face more complex choices when it comes to data protection. Not all data is equally valuable, and not all data protection methods are equally robust. An important task for today's IT managers is to understand the strengths, weaknesses, and costs of data protection solutions and to match those solutions to different classes and types of enterprise data.

Best practices in business continuity planning dictate that the degree of resiliency (i.e., recovery time) for a given application should be provided in proportion to the cost or consequences of downtime; the value of continued, timely access to information; and the value of the data itself. It is equally important, today, to implement consistent and coordinated data protection processes that can be centrally managed and audited. Companies need to prove that they've defined and implemented acceptable data protection processes for all levels of information, but not at the expense of controlling increases in administrative staffing levels.

IT organizations are looking to storage solutions that allow them to develop enterprise-wide data protection plans that protect high-value data sets with more robust data protection technologies and low-value data sets with more economical data protection technology. The key is that all these diverse data protection technologies must be managed through standard processes within a common management system.

EXPANDING ENTERPRISE STORAGE OPTIONS

IT managers can now choose from different storage systems ranging from high-end monolithic storage arrays that provide high performance and reliability in a single centrally managed system to modular storage arrays that allow IT managers to add storage capacity for applications in smaller increments. Concurrently with expanding storage array options and classes of storage, IT managers are connecting application servers and storage systems via SANs that help accelerate the consolidation of server, storage, and tape assets.

The next stage of development in storage solutions is to deliver a complete tiered storage solution with scalable hardware and support software.

Networked Controllers: Platforms for the Next Generation

The combination of multiple storage systems and scalable SANs is spurring the next step in storage systems evolution. Storage systems suppliers such as Sun are developing a new category of products that IDC calls networked controllers. Networked controllers enable companies to extend many of the capabilities of individual high-end storage systems to a pool of diverse storage systems without sacrificing performance or reliability (see Figure 3). These networked controllers:

- ☒ Scale quickly and cost-effectively with minimal disruption to ongoing operations
- ☒ Enable allocation of resources to meet variable application requirements and service level agreements
- ☒ Connect a wide range of heterogeneous storage systems from multiple suppliers and manage them as a single system

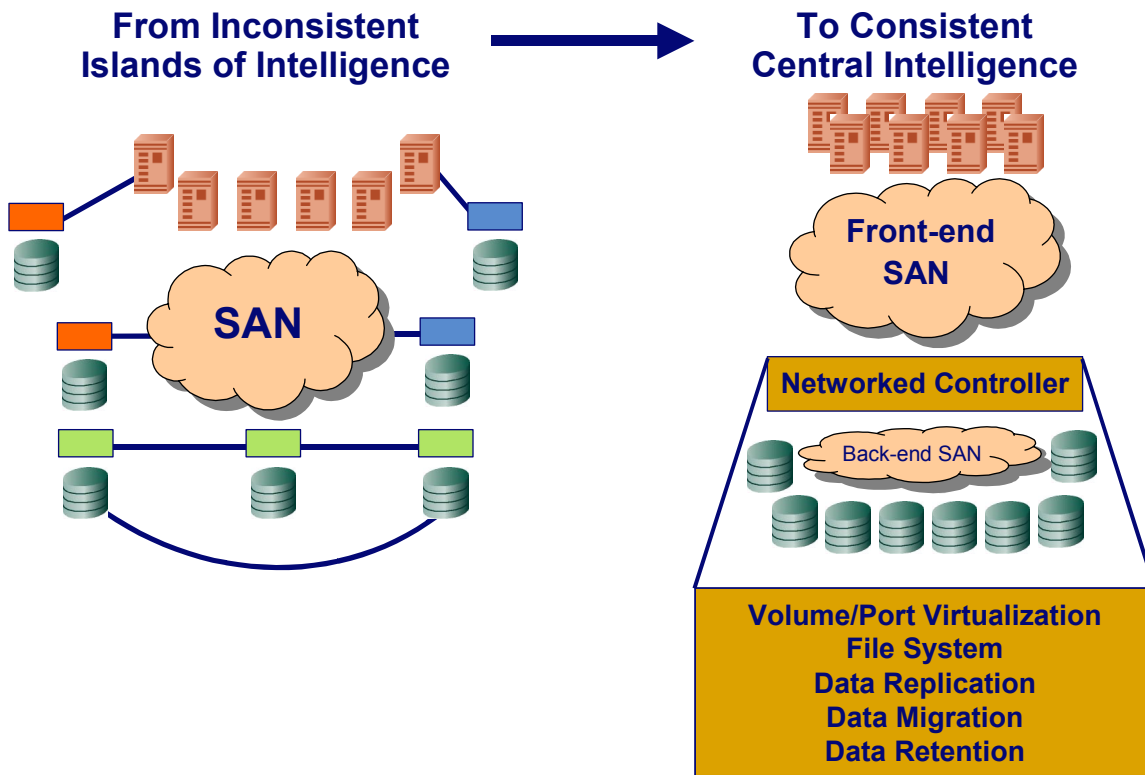
The functions supported on networked controllers include:

- ☒ Robust and well-integrated volume management that IT managers can use to deploy and manage complementary pools of storage
- ☒ Automated creation of tiered storage pools to meet specific requirements for performance, capacity, and reliability

- ☒ Common data replication capabilities that allow IT managers to match application data use and protection needs to storage attributes by easily and intelligently moving data between different classes of storage
- ☒ A portfolio of complementary storage management solutions that automates storage system provisioning/migration, capacity expansion, and data protection tasks across heterogeneous systems

FIGURE 3

Next-Generation Storage Architectures



Source: IDC, 2005

Heterogeneous Virtualization: Moving Beyond the Physical to the Logical

Today, any application modification (e.g., new servers, new storage, and new functions) requires complex manual reconfigurations on both servers and storage arrays that consume valuable IT staff resources, increase the potential for error (downtime), and contribute to increasingly long lead times in application deployment and modification.

The first challenge for IT managers, therefore, as they seek to pool diverse storage assets and applications is to shield server and application administrators from the complexities of physically provisioning, reconfiguring, and managing storage resources. Storage solutions that address these challenges must introduce layers of logical abstraction (commonly referred to as virtualization) between the physical ports on an array, the blocks of data on specific sets of disks, and the volumes or files that servers and applications need to access.

Common Data Replication: Consistent Data Movement and Recovery

Today, data replication solutions, such as point-in-time copy (snapshot) for offline backup, are often limited to a single array family. Remote copy to another storage system, though possible if the appropriate software is loaded on each system, is commonly limited to like (often very expensive) systems, forcing IT managers to create islands of underutilized storage systems. All of this diversity translates into growing administrative overhead and reduced interoperability.

The deployment of common data replication functions, in conjunction with the virtualization of volume management, leads to major improvements in data migration, movement, protection, and recovery. IT managers can more effectively take advantage of installed systems for reuse as secondary storage. They can use these secondary storage systems for local rapid recovery and long-term storage of fixed data without sacrificing system integrity.

Most important, they can also establish consistent data replication and recovery policies across all storage systems. Such consistency reduces management overhead and simultaneously delivers a significant improvement in ongoing data protection for all types of corporate information.

Enhanced Storage Capacity at CCU

Background

Ensuring high levels of performance and data integrity during a planned period of expansion was a major concern for Santiago, Chile-based Compañía de Cervecerías Unidas (CCU), a diversified beverage company operating primarily in Chile and Argentina. CCU generated \$650 million in revenue in 2003 and holds 90% of the domestic market for beer in Chile. The company both produces its own brands and serves as a distributor for a number of major international brands.

Customer Challenge

According to Carlos Guevara, the System Chief Engineer at CCU, the company realized in early 2004 that its need for more storage capacity, which was growing at a rate of 30% a year, would exhaust the capacity of its SAN. CCU's SAN comprises Sun 5200 attached storage arrays. Guevara began evaluating new storage systems with two goals:

- ☒ More flexibility in tuning performance for the needs of different applications that grow at different rates
- ☒ Enhanced data protection and application recovery options through greater use of disk-based backup and replication techniques

CCU uses Legato software to produce a full backup daily and an archive of monthly data when the month is closed. These backup files are written to tape and kept for five years. With the new system, Guevara wanted to expand the range of backed-up data and shorten recovery times.

Customer Solution

After an extensive evaluation of products, Guevara selected and then deployed Sun StorEdge 6920 systems in October 2004. CCU found that the StorEdge 6920 offered advantages in terms of density (i.e., the number of spindles per box) and the ability to finely tune cache memory for different volumes. CCU deployed 1.8TB in October 2004, and in June 2005, the company expanded the disk array to 2.5TB. CCU plans to increase the capacity of the StorEdge 6920 system to 3.2TB in the near future.

According to Guevara, "It was a very smooth process to change from the old storage system to the new. We received support from Sun and one of its resellers, an Argentinean company named Solux. It took three days to install the new disk units. Solux migrated our data to the new system over a weekend."

Future Plans

The next big step for CCU is to set up a contingency site to further improve business continuity in case of an outage at the current datacenter. As part of this expansion, Guevara wants to deploy a second StorEdge 6920 system at the contingency site and enable replication between the two storage systems. As part of this effort, he is evaluating Sun's new StorEdge Data Mirror, Data Snapshot, and Data Replicator products. A key requirement will be support for a simplified and unified management system that allows CCU to manage this new system without additional IT staff.

Guevara sees Sun and its reseller partner as key infrastructure partners and expects them to help his company anticipate any future needs.

SWT AöR Addresses Privatization with Sun Storage

Background

Privatization in the German utility industry was the major driver of a storage migration and consolidation effort at SWT AöR, a utility company in the Rhineland-Palatinate region of Germany with revenue of about \$18 million in 2004. Following privatization of the electricity industry today, and to prepare for privatization of the gas industry in the future, SWT AöR needed to update existing transmission infrastructure and reduce operating costs.

Customer Challenge

According to Ralf Haas, a Team Leader for Network Management at SWT AöR, the company realized in early 2004 that it needed to migrate a portion of its information to new systems supporting the now competitive electricity market, a process that had begun two years earlier. Since the reorganization, the company runs a number of critical applications on 90 servers (Solaris, Windows, and NetWare), which are managed by a team of 13 IT professionals. The IT organization needs to support growing applications while also reducing the staff required to manage storage systems and backup information.

Customer Solution

At the time of the initial storage upgrade in November 2004, SWT AöR deployed a StorEdge 6920 system with 8TB of capacity. Since then the system has grown to 12TB and will continue to increase in size in the coming years. SWT AöR evaluated storage solutions from a number of different vendors and selected Sun for several reasons. The IT team appreciated that Sun and its German partner Franzen & Schieben IT Solutions GbR allowed SWT AöR to test the system onsite.

In addition, and more important in the final decision, the IT team was impressed with the performance of the 6920 compared with that of other solutions and found the supporting management software easy to deploy and use. "Much of our decision related to performance, but we also believed it was important to have simpler management. We especially liked Sun's browser-based approach, and we've found that we can create a new volume in less than five minutes — much faster than on other systems that required a lot of typing," says Haas.

Future Plans

SWT AöR is embarking on the second phase of its project: boosting data protection and application availability through the establishment of a secondary datacenter at a remote location. The company plans to deploy similar storage capacity (currently 12TB) at the remote site and replicate data between the two locations. Sun's new StorEdge Data Mirror, Data Snapshot, and Data Replicator products for the 6920 are critical elements in this effort. The IT team believes that this approach will provide a unified system for managing storage systems and data management processes at multiple locations while minimizing the need to learn about disparate systems and management tools.

Common Management: Making Tiered Storage a Reality

The historic sensitivity of the connection between storage systems, SAN switches, and storage software has always translated into customer demands for extensive testing of different combinations of arrays, tape systems, servers, operating systems, and applications. In today's world of diverse server platforms, operating systems, SAN infrastructure, and storage products, the testing required to confirm all combinations is growing exponentially. IT managers face the daunting task of managing a growing array of storage-related devices, networked controllers, and storage applications.

The first step in addressing this task is rationalizing the discovery and configuration of diverse physical devices. Companies must demand products that leverage industry standards such as the Storage Management Initiative Specification (SMI-S) to collect and access common information for storage systems throughout the enterprise.

Delivering effective management for tiered storage requires more than common control of the physical devices, however. The true value of tiered storage is that it allows IT managers to provision and define storage at a logical level as well. At this logical level, the administrative concerns for IT managers shift more to areas such as process automation, capacity planning, and policy management. Effective tiered storage management solutions help IT managers:

- ☒ Automate the provision, reconfiguration, and ultimate replacement of storage systems and networked controllers through their lifetimes
- ☒ Coordinate the migration or replication of data across diverse storage systems based upon predefined data protection or changing performance conditions

These new sets of storage management software tools must go beyond managing individual devices to providing consolidated end-to-end management of all storage assets and advanced data services. For many IT managers, these storage pool managers will be the interfaces for performing all storage management tasks.

The remainder of this white paper examines Sun's storage solutions (specifically Sun's StorEdge 6920 system and the complementary Unity 3.0 release of supporting storage software), which Sun is delivering to support companies' rollouts of consolidated tiered storage and layered data protection. It also discusses how Sun's portfolio of storage management solutions plays a critical role in the company's delivery of tiered storage solutions for enterprises.

SUN MICROSYSTEMS' APPLICATION-ORIENTED STORAGE SOLUTIONS

Sun Microsystems is a leading provider of IT solutions for large and medium-sized enterprises around the world. A key component in Sun's portfolio of hardware, software, and services offerings is its suite of storage solutions, which includes a broad family of disk and tape storage systems as well as supporting SAN infrastructure and storage management products. Sun and its Storage Elite business partners also provide a number of storage support services to help companies consolidate storage assets, deploy new storage systems, and implement more business continuity practices.

Sun has two primary goals that underlie all of its storage solutions:

- ☒ Help customers better manage the cost and complexity of their growing storage infrastructures while ensuring that users have continuous access to data
- ☒ Deliver a broad portfolio of high-end and midrange storage products that provides consistent, enterprise-quality capabilities for large and medium-sized enterprises while extending the value of their existing storage assets

Sun, with its StorEdge family, is an early leader in delivering next-generation solutions designed to address companies' plans for tiered storage and more robust business continuity. These systems (the StorEdge 6920 and the StorEdge 9900) provide companies with a solid foundation for highly scalable and reliable tiered storage systems. They provide common volume virtualization and data replication services across heterogeneous classes of storage.

- ☒ The StorEdge 9900 family is targeted at large enterprises that want tiered storage solutions that include mainframe environments and/or need to support one petabyte to hundreds of petabytes of data in the next several years. The StorEdge 9990 currently scales to 330TB in a single system and a combined internal and external capacity of 32PB.
- ☒ The StorEdge 6920 is the key component in Sun's strategy to cost-effectively extend tiered storage functionality to customers that want to consolidate, protect, and manage tens of terabytes to hundreds of terabytes. The StorEdge 6920 currently scales to 65TB in a single system and a combined internal and external capacity of 256TB.

The following sections examine the StorEdge 6920 and its complement of storage software functions (Unity 3.0) in more detail.

StorEdge 6920: The Next Generation of Modular Storage

The StorEdge 6920, introduced in June 2004, represents the next generation in midrange storage system architectures. The StorEdge 6920 enables the scalable expansion of a wide array of functions, including SAN ports, underlying disk capacity, RAID processing, and cache. This flexibility allows IT managers to tune the StorEdge 6920 to meet the differing performance and capacity needs of many application types and support them concurrently within a single tiered storage environment.

Above and beyond this physical level of modularity, the StorEdge 6920 also functions as a networked controller. The Data Services Platform (DSP) allows companies to leverage the StorEdge 6920's scalable connectivity (up to 28 Fibre Channel [FC] ports), performance, capacity, and advanced data management services (see below) to extend the usefulness and performance of previously installed storage systems. Back-end storage systems supported in the current release (Unity 3.0) include EMC's CX400 and CX700, HP's EVA3000, and other Sun storage systems (i.e., StorEdge T3, 6130, 6120, 6320, 3510, 3511, 9910, 9960, and 9980).

Unity 3.0: The Foundation for Tiered Storage

Although the StorEdge 6920 provides a scalable storage hardware foundation for large and midsize enterprises, its real strength is in the portfolio of software solutions that leverage the StorEdge 6920 platform. In combination, these software products, packaged together in Unity 3.0, provide a solid foundation of capacity management and data replication services for companies that want to implement tiered storage.

StorEdge Pool Manager

Sun's StorEdge Pool Manager is the keystone to Sun's solution. It is the focal point for managing all of the storage capacity (internal and external) controlled by DSPs on the StorEdge 6920. Rather than managing individual LUNs or an expanding pool of very large disks, StorEdge Pool Manager allows general IT administrators, not just storage experts, to manage pools of storage, each with unique attributes relative to size, performance, cost, or reliability, depending on the needs of the application. For example, a company can create three pools of storage:

- ☒ Tier 1 storage for a high-end online transaction processing (OLTP) application that resides on high-performance 15Krpm FC drives internal to the StorEdge 6920
- ☒ Tier 2 storage for email on larger-capacity 10Krpm FC drives resident on both the StorEdge 6920 and an older back-end attached array
- ☒ Tier 3 storage for long-term email and file archiving on a back-end attached high-density array with Serial ATA drives

IT managers can specify configuration tuning parameters tied to each of these pools based on desired application workload characteristics. They can also automatically assign different data replication/protection rules for each pool based upon its unique requirements. To make this capability more quickly useful to companies, Sun is bundling 16 pretested profiles for widely used business applications from vendors such as Oracle or SAP as well as for specific workloads such as OLTP and high-performance computing (HPC).

Another important feature in StorEdge Pool Manager is support for virtual legacy volumes (VLVs). With this capability, IT managers can nondisruptively attach legacy arrays through the StorEdge 6920 without having to reconfigure/rename existing SAN volume names on the legacy arrays or on connected servers. At the same time, those arrays now have access to the advanced heterogeneous data replication functions on the StorEdge 6920. The combination of VLV and StorEdge 6920 data replication allows IT managers to more efficiently and nondisruptively migrate data from older arrays to new arrays.

Integration with Solaris 10 to Further Boost IT Effectiveness

For customers that leverage Sun's Solaris 10 operating system (OS) on their servers, the StorEdge 6920 provides additional levels of capabilities. Both Solaris 10 OS and the StorEdge 6920 provide for flexible allocation of system resources and the capability to dedicate resources to specific applications using Containers.

Containers are logical partitions within Solaris 10 OS that provide an isolated, virtual storage environment to a single application in a storage system that consolidates and manages storage for multiple applications. When combining StorEdge 6920 and Solaris 10 OS, customers can isolate and consolidate the entire solution from application to server to storage.

Data Replication Services

Although StorEdge Pool Manager provides the foundation for organizing and managing diverse corporate data sets, for most IT managers, the most tangible requirements for enabling tiered storage relate to data replication and data movement. The primary benefits of tiered storage are the ability to easily and nondisruptively move data between different classes of storage as well as the ability to provide consistent, layered data protection services for all data sets.

The Unity 3.0 release of software for the StorEdge 6920 includes a complete set of data replication services designed to reduce the administrative burden of data replication/movement across pools of storage. The three main components are:

- ☒ **StorEdge Data Mirror.** This software makes full-volume, independent copies called data mirrors. A data mirror consists of a primary volume component, which is always available, and up to three secondary components that can be separated and presented as unique volumes to other connected hosts for backup, data recovery, application testing and development, database extracts, or data warehousing. StorEdge Data Mirror also enables nondisruptive data migration between tiers in conjunction with StorEdge Pool Manager.
- ☒ **StorEdge Data Snapshot.** This software provides the ability to create snapshot (point-in-time) copies for use in offline operations, such as backup, reporting, and testing. StorEdge Data Snapshot can also roll back a primary volume to any active point-in-time snapshot to protect against data loss caused by software errors, user errors, and viruses, thereby limiting the need for lengthy tape restores.
- ☒ **StorEdge Data Replicator.** This software enables real-time synchronous or asynchronous volume replication between StorEdge 6920 systems or the legacy storage attached to them. The replication of virtual volumes to separate systems helps protect against data loss from a system, building, site, or even regional disaster. Sun supports the use of either FC or TCP/IP over public or private telecommunications infrastructures.

The strength of Sun's solutions is that they provide a consistent integrated set of data movement options that IT managers can apply across all storage within a pool, regardless of where it physically resides. These solutions also leverage the DSP's ability to dedicate processing resources to specific tasks. IT managers can count on

consistent and expedient data throughput that is separate from the RAID controllers and data I/O, greatly reducing the sharing of compute resources and delivering more predictable performance.

All of these capabilities allow companies to greatly increase the amount of storage that administrators can manage while significantly boosting their ability to reliably back up and restore all data and applications.

These data replication services also provide a solid foundation for implementing information life-cycle management solutions for specific classes of information. When combined with Sun StorEdge SAM-FS software (a SAN-based file system), the StorEdge 6920 and Unity 3.0 functions allow IT managers to transparently and automatically migrate data between storage classes according to business or regulatory policies.

How EOS Capitalizes on Sun Storage

Background

"Our primary value-add is that we understand our customers, and because we've been around so long, we have very long-term relationships with customers," says Michael Lance, Director of Professional Services for Eakins Open Systems (EOS), a privately owned, enterprise-focused Sun solution provider in California. As part of its emphasis on customer service, EOS takes care of the solution from manufacturer to the customer, providing delivery, inspection, testing, and OS integration before installation directly into the customer's datacenter.

Partner Challenge

For EOS, historically a server-centric value-added reseller (VAR) that derives 95% of its revenue from Sun servers and hardware, selling storage was simply an afterthought. Lance's responsibility during his three-and-a-half-year tenure at EOS has been to capitalize on the exploding storage opportunity with Sun's storage offerings. Working toward that goal, EOS has "trained our salespeople to better understand Sun storage ... and last year we hired a storage sales specialist," says Lance, who feels that he has been successful in "getting [his] people not to think about hardware but to think about information." In making that cultural shift, he counsels the sales teams to "find out what the customer's information problems are [because] where information translates to data, data has to be stored."

To maximize its profitability in storage, EOS researched the Sun Storage Elite program and made a commitment to retool its systems engineers and sales representatives to the program's standards, which Lance says are rigorous. "It's a very demanding program to get into, which means that the people who get into it are going to make the investment and commitment. And, there's a really good payback." In addition to their regular Sun certification, two engineers needed five weeks of additional training with Sun. Ongoing training is required, and Sun provides online training for sales. EOS further committed resources to its storage focus by arming its demo center with Sun storage equipment. The cost of training employees and purchasing demo equipment was significant, but EOS' revenue in storage grew 300% over three years. A return on investment [with the Storage Elite program] was realized within six months. This ROI was "purely from the Storage Elite rebate [and] does not factor in any profit [the company] made off the storage," says Lance. "For us it has been a phenomenal program."

How EOS Capitalizes on Sun Storage (Continued)

Partner Solution

EOS offers professional services that include an assessment of the customer environment, which involves storage analysis, planning, design, and implementation and post-installation support services. Storage consolidation and backup solutions are typical of what EOS provides to its customers.

EOS markets its storage solutions via cold-calling that focuses on a customer's business problem pain. It does not lead with a specific product set or brand, Lance explains. "Our cold-calling for storage opportunities is really not Sun-specific ... [We ask] questions [such as] 'Do you have compliance issues where you need to retain email or other documents?' [and] 'Do you have other legislation that is affecting your storage needs?'"

"We invite existing Sun customers into our company for a lunch and learn with Sun there. And we bring Sun storage people out to meet with our customers," Lance says. EOS highlights the interoperability and solid integration of the Sun storage line with its servers and software. Lance explains to customers that Sun's storage product line has evolved in recent years to support low-end to enterprise solutions.

"Sun is getting better with the new StorEdge 6920 system," Lance says. "The suite of switch-level services — remote replication, snapshot capability, and virtualization — is extremely helpful to my customers. Virtualization is particularly important for organizations that want to manage consolidated multitier storage systems. In addition, Sun has focused on the development of intellectual property (IP) for storage software and business logic and is better than many of its competitors in these areas."

At the end of the day, Lance feels that Sun has "in the last three years evolved into being a very good storage provider. I think they will become even stronger with the integration of StorageTek." As Sun has evolved its storage offerings, EOS has made increasing commitments to its product line.

Lessons Learned

EOS has found that professional services represent the best revenue opportunity for the company. Every proposal includes a services piece, and when a customer asks for a discount on equipment, EOS chooses to offer the customer additional value rather than commoditizing the product with a price cut. For example, it will propose to include an entire implementation at the customer site as part of the original quote. This strategy extends its reach in the customer environment and doesn't erode its hardware margins. Roughly 60% of all deals now include professional services as opposed to only 10–20% two to three years ago. To emphasize this shift in focus (from hardware to professional services), Lance states that EOS "sales reps now get three times the amount of commission on professional services that they do on hardware."

"To start from scratch and build a storage practice is a long road. It's a year of work," says Lance. "Storage is complex. It takes a while to build the knowledge base." According to Lance, an important best practice is to provide customers with a cost-free assessment because it provides entrée to the customer environment and is a necessary part of understanding customer needs. Hardware sales come as a result of the assessment.

Challenges for Sun

As an innovative supplier of tiered storage and networked controller solutions, Sun faces several challenges in achieving its goal of delivering next-generation storage solutions for its large and medium-sized business customers.

The company's efforts to deliver scalable, heterogeneous virtualization; common data replication; and storage management services across its midrange and high-end storage product lines are an important first step; however, it doesn't yet fully meet enterprises' needs for heterogeneous storage services that support older assets as well as installed storage systems from other leading suppliers.

A growing number of large enterprises are deliberately selecting storage systems from different suppliers for each storage tier in their environments. These companies want to obtain competitive pricing for storage capacity while also applying pressure to improve storage interoperability across SANs. Sun and other leading storage vendors will need to take steps to address this growing customer concern. For Sun's part, this means further expanding the range of back-end arrays supported by the StorEdge 6920.

Another challenge for both the StorEdge 9900 and the StorEdge 6920 is internal integration of capacity-oriented disk technologies. Today, both systems allow customers to connect back-end ATA-based arrays (e.g., the StorEdge 6130), but many customers want to mix drive types within single systems as part of further system consolidation efforts.

Another major challenge for Sun is to bring all its legacy storage management tools and utilities under a common management infrastructure. The steps taken in the Unity 3.0 release have laid a solid foundation for further integration, but Sun must continue to do more to ensure that its systems effectively support a tiered storage approach. Deeper integration includes:

- Employing consistent processes and workflows for completing tasks that cross devices and applications
- Employing standard tools for job scheduling, reporting, and security
- Providing integrated policy-driven automation and workflow

One specific target is the integration of more robust performance and capacity utilization functions into the StorEdge Pool Manager product.

FINAL THOUGHTS: PROCESSES AND IMPLEMENTATION ARE KEYS TO SUCCESS

The vision of an enterprise storage environment that takes advantage of tiered storage, common data replication, and coordinated management to enhance flexibility and boost application availability/reliability — all while improving the operational efficiency of the IT department — won't come to pass overnight.

The most advanced and integrated storage solution is of little use if IT departments do not implement effective storage consolidation, successfully migrate data to new systems, and change existing policies and procedures to automate repetitive administrative tasks. Effective implementation, always a major concern, is an especially critical issue when considering emerging solutions such as a networked controller-based storage system.

IT managers need help from storage suppliers such as Sun and its Storage Elite business partners as they establish rules and procedures for naming conventions, application upgrades, provisioning, and replication policies. Any company that wants to compete in this market must enhance its professional services programs to enable more effective deployment of tiered storage solutions and successful implementation of current and future products. Capabilities to look for from a business partner include:

- ☒ **Understanding of the benefits and pitfalls of server and storage consolidation.** Although network-based storage solutions can improve capacity utilization and reduce management, an implementation partner must have well-formed and well-documented server/storage consolidation and data migration practices that don't limit future options while enabling more targeted returns on IT infrastructure investments.
- ☒ **Support of heterogeneous server and storage environments.** IT managers need to maximize the use of previously installed equipment whenever possible. An implementation partner must have both knowledge and contacts to identify and resolve quickly any interoperability problems. IT managers should also make future IT infrastructure procurement decisions based on long-term investment protection to minimize interoperability issues going forward.
- ☒ **Integration of effective storage management into the deployment process.** Ongoing administration/management is the most overlooked and misunderstood issue in most IT deployment plans, regardless of company size. An implementation partner must help develop a management and provisioning process that works with existing management systems and takes advantage of the solution's new capabilities to improve management efficiency.

Choosing the right solution and the right partner to assist in implementation is, therefore, the highest priority for enterprises that seek to achieve better and more cost-effective control of their companies' information through more efficient use of storage assets.

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