

STORAGE SOLUTIONS

# strategicdirections

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## *The ROI of* STORAGE

*Strategies*  
for *Getting* the  
Most Out of Your  
Storage  
Management  
*Investment*



**CIO**

New Kinds of Networks • Backup and Recovery  
Enterprise Solutions • Real-World Payoffs



# Start with a Strategy

**H**OW MUCH DATA-STORAGE capacity does your organization need to house its information assets? How much will it need next year? The year after that?

“We’re averaging 30 to 50 percent growth annually,” says Hugh Hale, director of technical services at Blue Cross and Blue Shield of Tennessee (BCBST). It took the Chattanooga-based provider of health care insurance and services from 1945 until 1997 to build up one terabyte of information. But, Hale says, between 1997 and 2004, the company’s

stored data skyrocketed to 120 terabytes.

BCBST isn’t alone in its ever-increasing demand for storage. Industry figures indicate that, at virtually every organization of every size, overall storage capacity is doubling every 12 to 18 months, says Ken Steinhardt, director of technology analysis at Hopkinton, Mass.-based EMC Corp., which specializes in storage management solutions and services. Meanwhile, most IT budgets have stayed nearly flat, forcing CIOs to improve IT staff productivity without increasing headcount.

In addition, “companies need to be able to track their information and storage assets over time, identify which departments or applications they belong to, and understand how their utilization has changed over time,” Steinhardt says. “For many IT organizations, compiling this information is a manually intensive process involving scripts, command-line interfaces and spreadsheets to collect, correlate and summarize asset information.”



## REAL-WORLD PAYOFF: A SINGLE NETWORKED STORAGE ENVIRONMENT

By consolidating its data storage into a single networked environment and deploying a McData SAN solution, Blue Cross and Blue Shield of Tennessee has seen its investment paid back in three months and expects first-year cost savings of nearly \$600,000. The SAN has:

- Cut storage spending by 60%
- Lowered storage maintenance costs by 70%
- Boosted storage utilization by 40%
- Slashed data network-related downtime exposure by 50%

**The challenge:** To develop and execute a centralized storage strategy that encompasses connectivity, availability, reliability, backup and continuity, scalability, utilization, security and cost, while simultaneously coping with the operational tradeoffs inherent in product offerings and legacy environments.

“This really involves getting buy-in from all the different areas that implement storage and reminding them that this is an enterprisewide solution,” says Hale. “The more centralized your environment, the easier it is to manage and the fewer people you need. For instance, we manage 120 terabytes of information with two full-time employees; the industry standard is about one FTE [full-time equivalent] for every 6 to 10 terabytes.”

**One possible solution:** Mapping strategic dynamics to operational options. Start by considering several important questions:

- What data needs to be highly available so it can be easily accessed to meet your business needs?
- What kind of connectivity and reliability will this demand?
- What kind of security and backup/restore capability is necessary?
- What about meeting compliance requirements?
- How much room do your business functions need to grow?

The answers to these questions will determine your data-storage requirements and drive your quest for the best available solutions.

“By aligning the storage characteristics with the business’s specific needs, CIOs can maximize the value of their information at the lowest overall cost,” says Steinhardt.

Hale suggests starting from scratch. “Take a blank sheet of paper and design the SAN [storage area network] and the management tools you need up front and then let the solutions fit your design,” he says. “And make certain there’s a corporate strategy in place. Ours is very simple: Centralize everything. I want one tool to manage all the environments. I want the look from the console to be server- and operating system-independent. It’s simply more productive and cost-effective.”



**Ken Steinhardt**

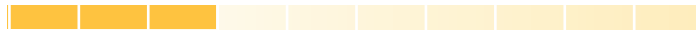
“By aligning the storage characteristics with the business’s specific needs, CIOs can maximize the value of their information at the lowest overall cost.”

**Ken Steinhardt, director of technology analysis, EMC Corp.**

## Q: What is the biggest storage-related challenge your company faces?

**Percentage of respondents who answered:**

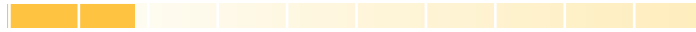
Managing growth and meeting capacity needs 30%



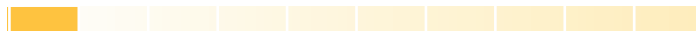
Integration and consolidation of assets 22%



Managing storage assets 18%



Choosing the right products/justifying expenditures 10%



Reliability/availability 9%



Security 4%



Other 3%



Source: *Top Ten Pain Points Survey Results Report*, prepared by the Storage Networking Industry Association End User Council, May 2004

## From the trenches: Functionality over technology

“You need to understand what you want before you go into the analysis phase,” Hale advises. “If you just go out looking for the best SAN, you might end up with great technology, but not the functionality you need. You need to begin with a list of your requirements.”

He knows the importance of that step firsthand. “We had a situation where network services wanted one SAN vendor and our UNIX folks wanted another. But our strategy says we don’t want two different SANs. So I got the all storage-support folks together and said, ‘You all have to get on the same page and you’re not leaving the room until you do.’”

Ultimately, the decision hinged on a simple question: “Which of the two solutions could handle all three of our environments—the mainframe, UNIX and Windows?” Hale says. “Only one of them could, so that immediately eliminated the other.” **SD**



# Coping With Complexity

## ENTERPRISE STORAGE MANAGEMENT

# solutions

**A**NDERS LOFGREN, vice president of product management for the BrightStor® line of solutions from Islandia, N.Y.-based Computer Associates International Inc., has a pretty simple definition for effective storage management: “It means protecting the data for all it’s worth—but not more than it’s worth.”

In a world where nearly incomprehensible amounts of data need to be stored and protected using convoluted infrastructures, it’s often hard to keep that balance in mind. It’s harder still to create an infrastructure that can deliver a seamlessly integrated environment—of which data storage is a key part—that’s simple for end users to navigate, easy to manage and grow, and hard to bring down.

Truth is, the big prize remains on the horizon. But some essential elements—such as enterprise storage management solutions—are within reach.



### REAL-WORLD PAYOFF: BOOSTING BACKUP SUCCESS RATES

To meet a companywide challenge to simplify and control costs, Unilever’s IT organization needed to streamline the global consumer-products firm’s backup and data restoration systems and measure performance against precise metrics. Using BackupReport from Bocada Inc., Unilever significantly increased backup success rates, hitting service-level performance goals of 99 percent across Europe. And thanks to BackupReport, the company consistently provides a business view of its data-protection services to internal customers throughout the enterprise.

### What’s the problem?

It’s about the data. Generally, classification processes are too manual, too redundant, too separate from asset management systems. Digital rights aren’t sufficiently monitored. Versioning is a nightmare. Storage management systems can’t, by themselves, automatically determine what’s needed to back up, replicate, and archive all the parts of shared information files.

And without an overarching, business-oriented view of enterprise data, it’s too easy for individual users to move, replicate, back up, restore, reorganize and archive data without considering the impact on the business.

“A good CIO needs to recognize that many of today’s IT processes are just plain broken and only going to get worse,” says Steve Duplessie, founder and senior analyst at the Enterprise Strategy Group, a Milford, Mass.-based research firm focusing on storage and information management. “Give the skilled people the tools, the time and the money to fix the problems before they crater the company.”

### What’s needed?

Ideally, storage management should be top-down, driven by people, processes and policies. That’s easier said than done. “The real challenge is in multiple factions in an organization not always working toward the same goals,” Duplessie says. “The storage administrator wants one set of core tools; the operations manager has different requirements.” Meanwhile, management typically doesn’t care about the details of the storage management solution—but does care about uptime and utilization.

Duplessie advises deploying solutions that improve on legacy environments, rather than just replacing them. “Pick management tools that make your previous dumb decisions suddenly look smart,” he says. “They do exist.”

Aiding this approach are standards that abstract the storage environment to create a common, vendor-independent content repository and infrastructure—in other words, a



# Implementing Electronic Vaulting Technology Makes Calpine a Winner at 2004 Technology Managers Forum



**Congratulations** to Calpine Corporation for winning the 2004 Technology Managers Forum Best Practices Award in the Business Continuity category. A leading North American power company operating more than 90 plants, Calpine's decision to implement electronic vaulting technology has helped it to achieve optimal data protection as part of a comprehensive business continuity plan.

## ELIMINATE THE RISKS

By implementing online (Internet-based) data backup and retrieval and offsite storage using electronic vaulting technology, Calpine has eliminated many of the risks associated with a traditional backup and recovery strategy. The company now has the security of automated, reliable, consistent backup and recovery processes. Storing data offline and offsite secures business-critical data out of reach of hostile threats.

Calpine's embrace of vaulting technology also means competitive advantage and increased business resilience thanks to:

- *Enhanced business continuity* through its up-to-the-minute recovery point and fast recovery time. Thousands of data points critical to plant operations are captured every 4-5 seconds and available for



quick restoration, if necessary.

- *Lower overhead costs.* Calpine determined that electronic vaulting provides a 200 percent ROI in the first year and a 500 percent ROI over three years.

- *Improved productivity and reliable, consistent backup processes.* Before electronic vaulting, each of Calpine's remote sites had non-IT staff members performing backup and tape-management activities, resulting in backup inconsistency and variable reliability. With electronic vaulting, one qualified person monitors and backs up all remote plant sites.

Calpine's outsourced solution best practices include:

- Data backed up continuously and automatically over the Internet in encrypted form to an off-site disk, monitored 24x7x365.
- Backup data stored on disk for 90 days, on tape for 7-years.
- **Quick data-recovery time and an up-to-the-minute data recovery point—over the Internet.**

Calpine's vendor for electronic vaulting services is Iron Mountain.



common file system for all enterprise storage elements. That way, products from a variety of vendors can interoperate without being dependent on a parade of individually developed application programming interfaces (APIs).

## Storage standards at last

Fortunately, the first version of the Storage Management Initiative Specification (SMI-S), embraced by most storage vendors, supports such efforts.

By providing common information models for managed storage devices and creating a common protocol for managing them, SMI-S aims to eliminate the need for vendor-specific management protocols and application protocol interfaces—and for the costly development efforts they entail. Based on the Web Based Enterprise Management (WBEM) architecture and the Common Information

Model (CIM), SMI-S's evolution is being guided by the Storage Networking Industry Association, a San Francisco-based trade association.

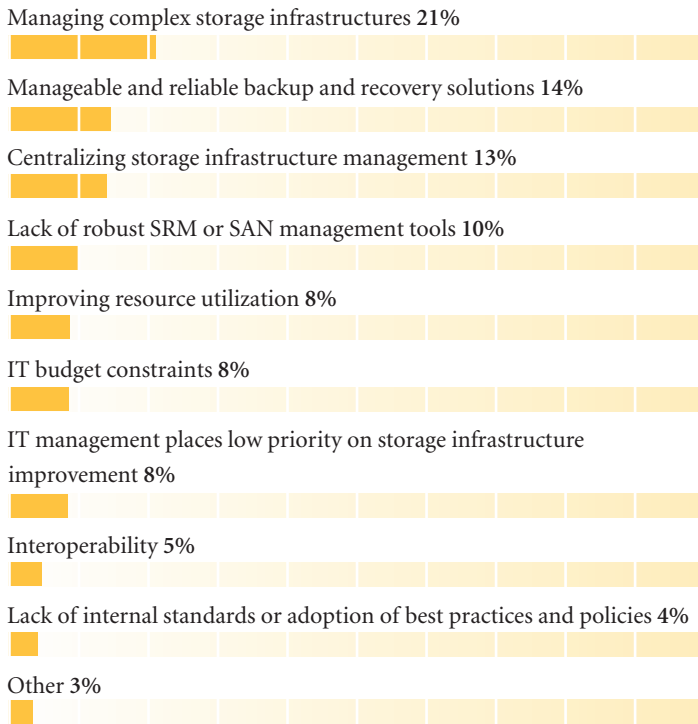
SMI-S Version 1.0, released earlier this year, defines a model for discovering and managing host bus adapters (HBAs), switches and arrays. As vendors adopt the open, extensible SMI-S standard, organizations will be able to reduce storage operations and management costs, more quickly implement changes to storage infrastructure and extend the life of their storage investments while avoiding vendor lock-in.

## Managing the data lifecycle

“Organizations seeking to lower storage costs, increase data productivity and integrity, simplify storage administration and/or create accountability for data should consider information lifecycle management [ILM],” says

## Q: What are your biggest storage-management challenges?

Percentage of respondents who answered . . .



Source: *Top Ten Pain Points Survey Results Report*, prepared by the Storage Networking Industry Association End User Council, May 2004

Gabriel Broner, senior vice president of Silicon Graphics Inc. ILM involves aligning the value of information with the cost of its storage. Effective ILM is accomplished by managing data from cradle to grave, moving it to the most cost-effective storage environment depending on how it's being used in the business at any given time. Since 90 percent of data stored on disk is rarely accessed after 90 days,

according to the Enterprise Storage Forum, a division of New York City-based JupiterMedia Corp., moving it to less costly storage media at the right time will be well worth the effort for many companies.

"The core benefits of ILM are achievable today," Broner says. "Once the largely manual process of classifying data is complete, ILM solutions can automate the management of each type of data over its useful life."

Such automation helps eliminate threats to data integrity and accountability and helps reduce the management burdens of moving data manually. Moreover, Broner says, automation provides higher productivity than alternative approaches.

"To be successful, an ILM strategy must be business-centric, tying closely to key business processes, applications and initiatives," explains Ken Steinhardt, director of technology analysis at Hopkinton, Mass.-based EMC Corp. "At the same time, it must provide an integrated view of all information assets, both—structured and unstructured."

### SRM: the Holy Grail?

The goal of storage resource management (SRM) is straightforward: to optimize the management and utilization of existing storage and backup resources to improve availability and reliability while lowering costs. To

work effectively, an SRM initiative must address capacity planning, discovery, configuration, monitoring, provisioning, performance and reporting of storage/backup devices, and the underlying infrastructure.

"SRM capabilities provide valuable insight into data and storage assets across the IT network," says Lofgren. "SRM provides a bird's-eye view of the complete storage landscape, including the

## KEY SRM FEATURES

Essential to a robust storage resource management (SRM) solution is the ability to plan, provision, monitor, report, manage devices and automate—all while working with a variety of vendors. While IT environments differ from organization to organization, most will benefit from SRM software that can:

- Identify and map the relationship between physical and logical devices, including servers, storage area networks and storage

- Graphically monitor the environment from end to end
- Manage multiple assets and processes from a centralized dashboard
- Link to management software already in-house
- Analyze events to provide intelligence useful for understanding performance issues, asset utilization, provisioning and other functions
- Report on how storage assets are utilized by application and other constructs (such as departments)

Source: *The Role of SRM in Managing the Information Lifecycle*, report by Mike Karp, senior analyst, Enterprise Management Associates Inc.

distributed and mainframe sides of the IT environment” by finding, visualizing, monitoring and reporting on both the physical and logical elements in a storage network, and by changing those elements as needed.

“The use of SRM tools, coupled with a sound information lifecycle management [ILM] strategy, can help CIOs better control overall capital and operational expenditures for the enterprise storage infrastructure,” Steinhardt says. “They help IT get command and control over storage environments via a single interface, providing timely and accurate information about the health, performance and utilization of storage assets at any given time.”

## Storage management best practices

Following are four tried-and-true practices for effective storage management, along with the likely challenges that must be overcome to effectively implement each:

- **Consolidation:** Centralize data management to reduce the need for redundancy, replication and duplication. *Challenge:* Developing TCO metrics and effective service-level agreements.
- **Standardization:** Centralize storage purchase-approval processes. *Challenge:* Figuring out how to prevent and penalize “maverick” spending.
- **Modification of data center operations:** Centralize activities such as data backups, archival procedures, and administrative automation. *Challenge:* Creating IT processes and service-level agreements that meet business requirements.
- **Use of integrated management tools:** Provide administrators with tools that help them monitor utilization and reliability, decide when to archive, and manage accessibility and security. *Challenge:* Deciding which tools are most likely to meet both current and future needs. **SD**

# Increase Data Protection Service Quality, Slash Costs and Prove Service Delivery

## CASE STUDY

BackupReport® from Bocada® collects, organizes, stores and presents a unified, enterprise-wide view of data-protection performance. Relying on patented, agentless data-collection technology, BackupReport deploys rapidly, regardless of network topology, platform or physical location of backup assets. BackupReport helps IT departments meet the business demands of their customers by presenting critical performance metrics—data protection, system utilization, chargeback and audit services—organized by business objectives.



## BULLETPROOF BACKUP OPERATIONS, MEET SLAs

Corio Inc., for example, is using BackupReport to help protect the data of its customers. Corio® delivers best-of-breed enterprise applications to some of the largest companies in the world. BackupReport provides vendor-neutral, third-party validation of backup success and allows Corio to allocate data protection costs to customers. BackupReport has helped Corio bulletproof its backup operations, establish and track SLA performance and allocate costs while improving services.

## INCREASE BACKUP SUCCESS RATES WORLDWIDE

Another BackupReport user, Virgin Atlantic Airways’ IT team, backs up roughly five terabytes of critical data every week using diverse systems and backup products spread among offices throughout the world. With BackupReport, the team boosted backup success rates from about 60% to over 85%. Server utilization has

improved, as has backup scheduling, and the team member who used to spend all his time monitoring backup activity now spends his time on strategic planning.

BackupReport is trusted by more than 135 enterprise customers worldwide, including leading brand names such as Agilent, Commerzbank, Genentech, Hershey’s, Microsoft, Honeywell, Orange, Siemens, Royal Bank of Scotland, SBC, Sprint, Unilever, Valero Energy and Xerox.

Founded in 1999, Bocada pioneered development of software that validates data protection system performance against business goals. Bocada’s flagship product, BackupReport, provides objective insight on service level delivery and performance, helping IT organizations increase data protection service quality, slash costs and prove service delivery.





# Storage as Utility

“CORRELATING STORAGE USAGE to business operations allows intelligent decisions and policies to be put place for effective storage management,” says Anders Lofgren, vice president of product management for Computer Associates’ BrightStor® solutions.

A storage utility model, Lofgren notes, enables the cost of storage to be managed in conjunction with business objectives. That capability, in turn, helps organizations control the growth of their storage environments, ensuring, as Lofgren puts it, “that the right data is on the right asset, with the right protection/security, at the right time to support the needs of the business.”

Treating storage as a utility can help simplify enterprise storage environments. Popular approaches include storage consolidation/virtualization and managed storage services.

## The fabric of storage virtualization

Storage virtualization hides infrastructure complexities behind a layer of logical abstraction so, regardless of the actual details, all physical storage appears as a single centralized repository.



### REAL-WORLD PAYOFF: VIRTUALIZING TAPE BACKUP

Since its inception in 1994, Blue Hill Data Services Inc., a provider of data-center mainframe outsourcing and direct marketing tools and services, has never lost a customer. But the company was spending too much on tape media and labor. Part of the solution was IBM’s 3590 Automated Tape Library (ATL). The rest came from Computer Associates’ BrightStor CA-Vtape Virtual Tape System, which has increased the amount of data on the IBM ATL by 147 percent. That’s resulted in a reduction in the number of tapes used—from 100,000 to 25,000—and the number of drives used—from 88 to 44. Labor costs have decreased as well.

The results:

- **Centralized management.** One tool can handle virtualization and data services with a fiber-channel fabric, eliminating the repetitive administrative tasks and the labor costs associated with them.
- **Improved disk utilization.** Consolidating stovepiped storage environments—typically an assortment of direct-attached, network-attached and storage area networks—into virtual pools enables these resources to be used more efficiently because they can be shared with any network server.
- **Tiered storage.** Administrators can mix and match storage arrays rather than being forced to use the same costly enterprise-class machines to remotely replicate critical data for high-availability and disaster recovery functionality.
- **Consolidated data services.** Migrating the data services that organizations have built into workflows and disaster-recovery plans, such as replication and snapshots, means they can perform across heterogeneous storage arrays and be more easily managed.

Approaches to storage virtualization include solutions that are software-based, switching-based, and appliance-based.

“The discussion of virtualization is too often focused on the management-tools level,” says Gabriel Broner, senior vice president and general manager of the storage and software group at Silicon Graphics Inc. in Mountain View, Calif. “Virtualization implemented in the infrastructure itself is much more effective.”

Broner sees consolidation, data lifecycle management and data protection solutions working together, virtualizing capacity, capability and heterogeneity “to grow as the business grows, with investment protection all the way down to the device and application level.”

## The virtues of electronic vaulting

Outsourcing storage-management tasks can cut labor costs by 25 to 40 percent as compared with doing the job internally, according to *Data Storage Today*, an online industry news publication. Turning to managed storage services for backup and recovery capabilities can be especially effective for small and midsize businesses, whose resources may be challenged by the need for more frequent backups of burgeoning amounts of data, with minimal time to do it.



# Delivering Sustainable Cost and Productivity Benefits for Data-Intensive Enterprises

## CASE STUDY

SGI is the world's leader in high-performance computing, visualization and storage. As the only full line of storage solutions designed specifically for data-intensive environments, SGI InfiniteStorage Solutions go beyond the TCO benefits of consolidation, contributing to your top line with productivity increases that deliver real ROI. The entire product line is designed to integrate seamlessly and to scale "infinitely" so you can change capacity, performance, connectivity or even storage architecture to meet your requirements today and tomorrow without losing your investment.

For example, Medtronic, a world leader in the design and manufacture of medical technology, has depended on SGI technology for the past 12 years for analysis, simulation and product development for many of the cardiac products.

Medtronic's problems began as the amount of its data grew and Medtronic engineers found themselves spending more and more time waiting for data to copy over already overloaded networks. The result? Engineers' productivity decreased.



## FROM A GRAVEL ROAD TO A SIX-LANE FREEWAY

To solve these problems, Medtronic implemented a Fibre Channel SAN with SGI InfiniteStorage Shared Filesystem CXFS. CXFS gives the SGI compute servers and the workstations used by Medtronic engineers instant, concurrent access to all data stored on the SAN

so engineers no longer waste valuable time copying data, and without superfluous copies, there is less data to store, manage and back up.

According to Tim Abraham, graphics resource manager for CRM therapy delivery, "With the addition of the SAN and CXFS, the return on investment for our existing equipment has gone

way up. Overall disk and server utilization has increased substantially and engineers no longer waste time copying data. For Medtronic, the transition from NFS over a LAN to CXFS over a SAN has been like going from a gravel road to a six-lane freeway."

With robust and combinable solutions for intelligent consolidation, data lifecycle management and data protection, SGI InfiniteStorage is delivering sustainable cost and productivity benefits in the unique and demanding environments of data-intensive enterprises.



In many organizations, electronic vaulting is replacing manual tape backups. Providers of electronic vaulting services automatically back up server data based on user criteria, encrypting it and sending it via the Internet or dedicated communications lines to secure offsite locations. Software from the provider enables users to recover data either onsite or remotely, effectively bundling backup and disaster recovery services.

## Online backup service checklist

Considering an online backup service? Look for solutions with these features:

- ✓ **A field-proven, scalable storage architecture** that the provider continually upgrades. Inspect the facilities to make sure the provider's infrastructure has what you need in terms of capacity, availability, management, security, vendor solutions, and other issues.
- ✓ **Fast, reliable recovery** via an easy-to-use self-service

interface that delivers granular, disk-based restores. Such capability minimizes the need for manual intervention—and the potential for human error.

- ✓ **24/7 provider monitoring**, including validation of backups, problem alerts, and technical help.
- ✓ **Vaulting that's securely offsite and offline** but that also remains online for a specified period of time so that it's available for quick restores.
- ✓ **Expertise and service offerings** tailored to your organization's applications and configurations. For example, you might look for regulation-compliant e-mail archiving and server- and PC-oriented backups.
- ✓ **Visibility** into service performance and trends via self-service interfaces or portals.
- ✓ **Predictable, measurable costs** for forecasting future needs.
- ✓ **A service level agreement** that ensures quality of service, delineates availability, capacity and recovery performance, and spells out change processes and accountability. **SD**



# New Kinds of Storage Networks

**U**NTIL FAIRLY RECENTLY, organizations wanting to move beyond direct-attached storage (DAS) had two choices:

- Network-attached storage (NAS), generally in the form of a dedicated file server that supports standard network file system protocols and uses the Internet Protocol (IP), or:
- Storage area networks (SANs), which use a dedicated network to provide access to consolidated block-level storage, connecting servers and storage arrays with fiber-channel (FC) technology.

Now these once-competitive approaches are starting to work together. With NAS, disparate servers and PCs can

simultaneously access and share files, storage can be consolidated at the file-system level, and features such as fail-over redundancy, backup integration, remote mirroring and point-in-time copying are supported. For those reasons, NAS is often used in environments where file sharing and collaboration are important.

SANs, on the other hand, offer dedicated storage provisioning and tunable performance that's fast and secure and includes such advanced capabilities as centralized backup, data replication, remote mirroring and redundant storage connectivity all without burdening operational network facilities. SAN management tools, such as those from EMC Corp. and Computer Associates, supply the physical layer of storage management by identifying, configuring, allocating and deploying storage assets in heterogeneous environments.

Such features—and their increasing speed (new fiber-channel switches and host bus adapters double their speed to 4 gigabits per second, and 10 gigabits per second is on the horizon)—make SANs very attractive to organizations with extremely large storage volumes.

## No longer NAS versus SAN

Each approach has advantages. Because NAS hangs off operational (typically Ethernet-based) local area networks (LANs), disparate servers and PCs can simultaneously access and share files. Storage can also be consolidated at the file system level, and features such as fail-over redundancy, backup integration, remote mirroring, and point-in-time copying are supported. So NAS is often used in environments where file-sharing and collaboration are important.

However, using existing Ethernet components for data storage has serious drawbacks. Among the concerns:

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### REAL-WORLD PAYOFF: REPLACING DAS WITH SAN

Blue Rhino Corp., a provider of branded propane grill cylinder exchange services, was approaching the limits of its direct-attached storage (DAS) infrastructure. Then the company implemented EMC Corp.'s CLARiiON CX400-based storage area network (supported by EMC SnapView backup software, Navisphere storage management and Access Logix data protection and shared storage access). The result: Blue Rhino has saved more than \$150,000 in annual expenses related to administration, monitoring and productivity. A \$125,000 reduction in server and tape drive costs also is expected. In addition, the company reduced its data and applications administration time by 75 percent.

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# EMC ControlCenter SRM Software Delivers Time and Cost Savings to CompUSA

## CASE STUDY

IT departments today are faced with a multi-pronged dilemma when it comes to storage. Long term, they're contending with how to manage information over the course of its lifecycle while simplifying overall administration, improving utilization and lowering management costs. And at the most basic level, they need to simply better manage the increasing size and complexity of their storage networks. Until recently, many have been taking on SAN management by whiteboarding or otherwise manually tracking storage capacity.

Storage resource management (SRM) software, such as EMC ControlCenter, is one of the key solutions that is freeing IT departments from the time-consuming task of manually tracking storage capacity, while delivering the added benefit of simplifying overall administration. ControlCenter is also a key component in information lifecycle management (ILM), enabling customers to more effectively monitor, report, plan and provision storage across tiered, multi-vendor environments.

CompUSA, one of the nation's leading retailers and resellers of technology products and services, was faced with the time-consuming, personnel-intensive task of managing SANs via command-

line scripting. Consequently, the company evaluated numerous SRM solutions and decided to implement ControlCenter to design, plan and provision the infrastructure, and configure and optimize their storage devices

## FROM DAYS TO MINUTES

"ControlCenter has had a major impact on our operations," says Sid Walton, director of IT technical services at CompUSA. "It has enabled us to increase application uptime and rapidly implement changes as our business evolves. With ControlCenter, we've dramatically reduced the hours we used to spend scripting and reporting, and we're much better equipped to troubleshoot, isolate and resolve performance issues."

ControlCenter's comprehensive monitoring and reporting capabilities also enabled CompUSA to assess growth, usage and performance, which is essential for proactively identifying performance issues and reallocating storage before the problem impacts a business-critical application. As a result, CompUSA reduced utilization reporting time from three days to minutes.



- Storage networks should not be exposed to the security risks to which corporate LANs are subject.
- LANs, which can tolerate dropped packets and collisions, are not optimized for data storage tasks, which have little tolerance for latency and cannot afford to lose data due to timeouts.

But traditional fiber channel-based SANs are complex, expensive and face distance restrictions. So now vendors are developing SANs that use the Internet rather than fiber-channel technology. The key protocol is iSCSI, which enables SANs to be constructed with proven Ethernet technology. iSCSI transports block-level storage across IP network infrastructures, allowing Internet-based data access that effectively eliminates the physical boundaries of the storage network and significantly reduces the cost of adding new servers. iSCSI can be integrated with fiber-channel

SANs using a router. By linking existing fiber-channel SAN environments, notably for disaster recovery and long-distance replication, organizations can overcome SAN distance limitations and weave intelligence into the storage fabric.

The approach also offers substantial savings compared to using proprietary protocols over fiber-channel links. For instance, the IP storage SAN installed by one Colorado county government cost 45 percent less than alternative solutions. In addition, Solucient LLC of Evanston, Ill., which provides business-intelligence solutions to the health care industry, installed an iSCSI SAN for one-third the cost of a fiber-channel SAN.

"Moving forward, iSCSI—block-storage networking over Ethernet networkshas the single greatest potential to impact storage infrastructure management," says Steve

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Duplessie, founder and senior analyst at the Enterprise Strategy Group, a Milford, Mass.-based research firm. “All the benefits you got from your fiber-channel SAN—increased availability, performance, utilization, etc.—are absolute now, so the mission is to increase the ‘touch,’ the amount of servers sharing in these benefits. With iSCSI, instead of SANs with 50 servers, we can have SANs with 5,000 servers. It’s not an either-or scenario, it’s a combination, with fiber channel at the core of your big stuff for a long, long time.”

### What about shared data?

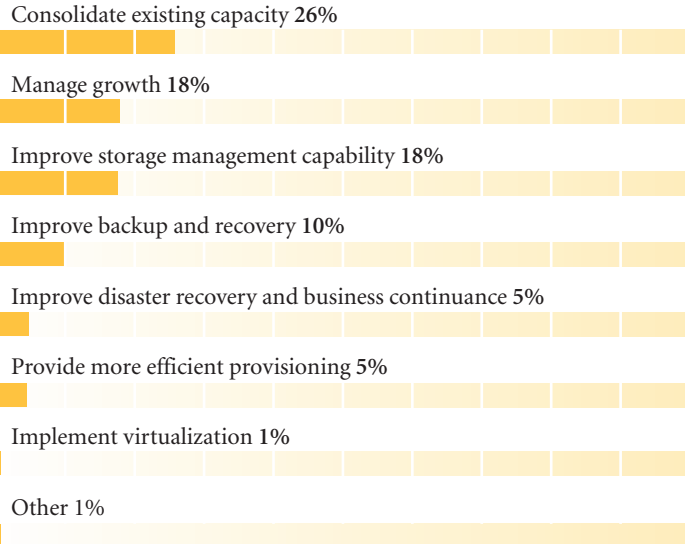
When diverse computer systems and platforms exchange data, traditional SANs can’t help, so users have been stuck with slow access methods (NFS, CIFS, FTP). This significantly degrades performance in intensive computing environments, such as those demanding advanced visualization capabilities, where user workflow depends on timely access to and sharing of large files that typically create struggles for conventional network file systems.

The solution? A SAN file system, such as CXFS from Silicon Graphics Inc., in which one system on the SAN acts as a metadata server, controlling file permissions and mediating shared access—and allowing all SAN systems simultaneous high-speed access to the same file systems and files. There’s no file server through which all data must travel, and no file server bottlenecks to slow down per-

formance. A single system can have multiple connections, enabling data rates of multiple gigabytes per second. Once the metadata server grants access, systems can read and write data directly over the SAN to and from disks. Add in fail-over redundancy and RAID storage, and the result is very high availability and a path to needed data even when some systems have failed. **SD**

## Q: What are the top reasons you have implemented or are considering a storage network?

### Percentage of respondents who answered . . .



Source: *Top Ten Pain Points Survey Results Report*, prepared by the Storage Networking Industry Association End User Council, May 2004







where the payoffs are

# RELIABLE BACKUP AND Recovery Solutions

“**I**N SPITE OF ITS MATURITY, backup is still inherently unreliable and costly. Failure rates exceed 40 percent in most large enterprises,” says Drake Pruitt, vice president of marketing at Bocada Inc., a storage software vendor in Bellevue, Wash.

Meanwhile, 60 percent of small and midsize companies participating in a study by the Enterprise Strategy Group, a Milford, Mass.-based research firm, said backups take too long, and 49 percent said recoveries take too long. “To handle the exponential growth in data, companies overspend on redundant attempts, capacity provisioning and in some cases, staffing,” Pruitt says.

## Oh, the pain

No wonder. Successful data backup matters now more than ever. Surveys by Coughlin Associates Inc., a storage-consulting firm in Atascadero, Calif., point to the rising cost of downtime. In one study, 26 percent of respondents pegged their organization’s downtime costs at \$10,000 to \$100,000 per hour. Another 15 percent estimated costs at \$100,000 to

\$1 million per hour, and nearly 10 percent said downtime costs them more than \$1 million per hour.

“The issue,” says Pruitt, “is not how to control complexity, but rather how to ensure delivery of quality services to support the business against the backdrop of growing complexity. To do this, CIOs need tools and analytic support to measure, gauge and inform their staff of areas of service shortfalls.”

Tools that automate the collection of backup performance data allow IT staff to identify, remedy and prevent chronic sources of error, he notes. They also optimize workflow, infrastructure and operations that ensure alignment with business needs.

“The net results,” Pruitt says, “are higher success rates, reduced capital consumption and compliance with internal and external policies.”

## Put out those fires

Pulling your staff out of the constant data backup/restore mode requires taking a series of steps:

- 1 Assess the state of your data backup service delivery.** Conduct an enterprise-wide audit of current backup performance. Most needed information can be gleaned from analysis of existing backup logs—up-to-date throughputs and loads, consolidated reports about current and past performance, data availability and incidents.
- 2 Find out what your business really needs.** Talk with internal customers to define their backup/restore expectations, establish benchmarks (such as restore time and compliance requirements) that define success, and translate these into service-level agreements.
- 3 Identify where you must improve.** Begin by comparing current and desired quality of service levels. Then figure out how you can reach the desired levels at the lowest possible cost.
- 4 Fix the problems.** This means troubleshooting chronic sources of backup error, clearing obvious bottlenecks, and backing up “orphaned” systems and files. It can also mean acquiring the new systems and software needed to achieve service levels, or modifying service levels that clearly cannot be achieved. Finally, formalize your reporting and communications efforts. **SD**

## REAL-WORLD PAYOFF: CONSOLIDATING BACKUP

Southeastern Freight Lines, a transportation company based in Lexington, S.C., faced significant IT costs and storage management challenges in separately backing up two critical computing environments. The company implemented EMC Corp.’s Legato NetWorker to consolidate the backup of both systems, which contained logistical, order tracking, and business information and applications. The result: Reduction of the company’s full backup window from 12 hours to three, improved productivity, decreased maintenance costs and increased utilization of existing hardware. The change also eliminated the need for duplicate backup equipment and associated licensing fees.