Mastering Storage Management Software

an internet.com Storage eBook

Sales of new licenses for storage management software are growing; with hierarchical storage management (HSM) and archiving expected to be the fastest growing segments of the market. According to Gartner, storage management software is slated to increase from a $5.6 billion market in 2004 to $9.4 billion by 2009.

So what exactly is storage management software? It has been defined as software designed to help administer functions such as backup, archival, disaster recovery, and HSM procedures within an organization. It is sometimes referred to as data storage software, infrastructure software, network storage software, or simply storage software. Although storage management software can be implemented on a standalone system, it is more frequently used in the distributed network of an enterprise.

That covers a lot of ground, so we'll start with the biggest question: why will HSM be the fastest growing segment of this market?

HSM: Driving ILM

Some analysts say the growth in HSM is being driven by the need to take advantage of lower-priced storage options as data ages. Organizations need to meet data retention requirements while better managing total cost of ownership and improving recovery, a so-called information lifecycle management (ILM) approach.

Tom Clark, director of solutions and technology at McData, says HSM is growing because the economies promised by ILM are steering users toward hierarchical storage and network infrastructures.

"By aligning the infrastructure and classes of storage containers to the business value of data, customers can maximize utilization of all storage assets and ensure that application data receives the proper class of handling as its relative value changes through time," explains Clark. "Finding more efficient means to better service upper layer business application data will be the focus of storage networking technology for years to come."

John Meyer, senior solutions architect at Dimension Data North America, says his firm is "seeing an increase in interest from our customers around HSM and archiving as a way to solve other data management challenges, such as helping reduce back-up windows by reducing the amount of storage that has to be backed up on a daily basis." Meyer said archiving for messaging applications, such as Microsoft Exchange and Lotus Notes, is also seeing an increase in demand, as customers look for ways to reduce the message stores and help with day-to-day management tasks such as backup and recovery, upgrades, and storage growth requirements. The indexing component of e-mail archiving is also of interest to companies with the potential for lawsuits requiring the discovery of e-mail records.

Brian Biles, co-founder and vice president of Data Domain, believes that archiving to disk will grow substantially, especially as capacity optimization techniques spread to minimize the economic difference between tape and disk.

Is Formal Archiving Necessary?

With all the hype surrounding formalized archiving, is it really a better approach to long-term storage of information than just using a backup of files?

Stephen Harding, director of marketing at Tek-Tools, says a real-life answer to this question depends on the needs and resources of any organization. But in broad terms, he contends the answer is "yes."

"Regularly and consistently backing up data can be a costly, time-consuming, and problematic process, particularly when a small percentage of data stored in a production environment is actually in active use," says Harding. "Without some sort of archiving policies, organizations may be repeatedly backing up data that hasn't been accessed or modified and that likely has become obsolete."

Harding believes that a logical purpose of such procedures would be insight into the types of data and its uses, since this makes for better data management and storage procedures.

"Archiving policies are an important step in this direction," he says. "The need for better, more cost-effective and efficient data management and storage is only going to become increasingly vital to business operations. Archiving little-used or unused files into manageable and searchable archives decreases the amount of data in the production environment, saves money, and improves disaster recovery service levels."

Clark says the advantage of policy-based data archiving over simple file backup is that customers will be able to retrieve data more quickly for client requests or regulatory compliance issues. Managing data by content and business value will replace bulk back-up processes for most mission-critical applications, he says.

Meyer says much depends on the business value of the information along with the likelihood and frequency that the information will need to be accessed in the future.

"Traditional backups of files create a point-in-time reference, and with tape, the portability to protect data assets," Meyer said, adding that "managing the tapes, hardware and software to access the individual files on the tapes... becomes the challenge of long-term storage."

For that subset of static data that does not change, the extra burden on the daily backups becomes unmanageable over time, he said, the reason formalized archiving has evolved to solve these challenges.

SRM Market Expected to Heat Up

Storage resource management (SRM) is another technology expected to grow fast as organizations look to better manage storage utilization and begin to automate management functions.

Many in the industry believe that the SRM space has matured in recent years from monitoring and reporting to become a set of practices involving storage, device management, backup monitoring, active management, and more.

"What we used to describe as a 'nice-to-have' is certainly becoming a 'have-to-have,' as SRM vendors have a clearer sense of end-user needs and end-users have begun to identify their need to manage capacity and growth," says Harding. "IT infrastructures continue to grow in size, complexity, and cost. At the same time, most organizations want those infrastructures to be cost-effective and efficient. Data centers are often run with shrinking staffs. Manual processes take time and are both unreliable and subject to error. Coupling automation with SRM reporting is a logical step towards a total management structure."

While standardization initiatives are gathering steam, the real world reality is that information and applications remain stovepiped. One tool runs backup, another runs SRM, another takes care of disaster recovery, and so on. In the middle sits the beleaguered storage admin, forced to engage in console hopping to get anything done.

To understand why interoperability remains little more than a good idea, it is necessary to look at the way storage management tools have developed over the years. SRM products arrived on the scene in the mid-1990s. At that time, they focused primarily on file-level analysis and reporting. These were more or less reporting tools that lacked active management of physical storage assets, but they were good enough to be gobbled up by larger vendors.

Then came a variety of tools dealing with device/element management in SANs. Every fabric switch and director and every storage system included a management tool to configure, report on, provision, and monitor the device. These were developed by hardware vendors, and thus focused on managing the vendor's storage device.

The end result is a mess of point tools for basic SRM and device management functions. None are integrated, so they require a variety of agents, databases and interfaces to operate. Even then, they don't necessarily provide a complete picture of the storage infrastructure; that's why you see administrators fiddling with Excel spreadsheets and Visio diagrams to manage and provision capacity, monitor performance and events, and map out connections between applications, host servers, HBAs, fabric switches and storage systems.

Vendor associations such as the Storage Networking Industry Association (SNIA) have successfully reined in conflicting vendor agendas under the umbrella of a Storage Management Initiative Specification (SMI-S) standard. While it is a nice start, SMI-S is far from a complete solution to user woes. Essentially, it is a common hardware interface that is aimed at integrating the management of products within a multi-vendor storage arena.

--Drew Robb, Enterprise Storage Forum

Customers can no longer afford to store massive amounts of data in first-class storage containers, says Clark. A hierarchy of containers lets customers more cost-effectively migrate data from one class of resource to another, depending on its availability, performance, security, and other requirements.

"But even with multiple classes of storage, resource management is required to ensure that the capacity of each storage class is used efficiently," says Clark. This maximizes ROI and enables customers to rationally cope with explosive data growth, he said.

Managing Storage Software

Storage customers planning large storage management software implementations are faced with a number of issues. For starters, since storage management software is designed to spot underused capacity and get it to where it's most needed, storage users need to know how a storage product will fit into their applications and processes.

Topping the list is how storage management software fits into an ILM strategy. The first step, industry experts say, is understanding the content to be stored.

McData's Clark says a hierarchical storage management infrastructure with different classes of storage containers, delivery, quality of service, and security are necessary for ILM, but customers still need to identify the business value of their data before decisions can be made about where it should be stored.

According to Gartner, storage management software is slated to increase from a $5.6 billion market in 2004 to $9.4 billion by 2009.

"This requires a much closer understanding of the business application and the data it generates," says Clark. "Manipulating file metadata, monitoring frequency of access, tagging data, etc., are really application-specific tools required to identify business value. Once that determination has been made, the data can be passed to the appropriate policy-based mechanisms within the hierarchical SAN."

Meyer says the biggest challenge storage customers face today is understanding what unstructured data exists within their environment and how to develop policies and procedures for managing it. Meyer says there are tools available that can identify characteristics of the data, such as age, format, and file size.

"The challenge occurs when IT is asked to place business value on that data and to apply business policies in managing that data," says Meyer. "A majority of customers with whom I work are waiting on the business to make decisions on what to do with this data so they can then utilize the SRM tools and products available to them."

Meyer says e-mail archiving seems to be one of the solutions that IT has enough business requirements on to begin moving forward with ILM solutions.

Still others look at ILM as more than a tool kit; it's a way of thinking about data and its management.

Harding says ILM involves managing data throughout its useful life. As its usefulness changes, so should the way it's stored and managed. At their best, ILM strategies function to move data from one storage platform to another based on how the data is used, the costs of the various types of available storage, and performance.

"Functions like file analysis and data classification are key to any ILM initiative, and data must be groomed through-

out its useful life," says Harding. "ILM strategies can certainly function without content management and still offer value to organizations. The idea of content management is a complicated one because most stored data lacks adherence to any set of conventions, making managing the content a difficult at best task, and requiring tools that can complement the data classification and file analysis features of SRM products."

Compliance Plays a Role

Regulatory compliance also has a role in storage management, particularly with storage and backup reporting.

"Compliance, at its most fundamental level, is about ensuring that data is secure, and security here means accessible to the right people and recoverable in the event of a data loss," says Harding. "It's not terribly complicated, but it does require that organizations be able to groom their data, establish policies for data protection that can then be followed."

Storage management and reporting performs these functions. Harding says there is no single way of providing compliance solutions for every organization, but a good storage and backup reporting solution performs the necessary functions for compliance and should be customizable to specific needs of an organization.

Some storage vendors are trying to ride the wave of compliance by claiming that their products are compliance solutions, says Clark. He says the onus should be on vendors to show how their solutions will help customers with compliance issues.

"Not all types of business data falls under regulatory compliance, so vendor solutions should be tailored to specific business applications that do fall under compliance," says Clark. "These more sophisticated storage solutions come at a premium, and customers will no doubt do considerable due diligence to ensure that the proposed products actually help."

Others believe that compliance may drive a segment of growth, but not the whole market. "Most storage data is not subject to regulatory oversight," says Data Domain's Biles.

Most solutions that customers implement in support of compliance objectives are comprised of multiple vendor products, says Meyer.

"Rarely is one vendor's solution implemented to cover all aspects of compliance," Meyer says. "Vendors are positioning their products as components of a broader solution that enable customers to implement compliance within their organizations."

Meyer says different vertical markets have prioritized compliance according to the regulatory requirements they face, such as access, retention and protection.

Device Resource Management Improves

Some industry experts say device resource management (DRM) offerings will continue to improve, expanding to include a wider set of vendor devices. DRM vendors are also expected to package their products with SRM tools to encourage customers to buy a wider portfolio of offerings.

Meyer agrees that product vendors want to capture both the device and storage resource markets with single solutions. "The challenge has been accomplishing this objective across a multi-vendor and multi-platform environment," he says. "Customers reducing the number of vendors in their data center will be better candidates for this type of an approach."

Harding believes that there is a trend toward offering consolidated packages of features that include both DRM and SRM capabilities, but he adds that they won't necessarily cease to be standalone products.

"Device management that allows standardized views into storage devices, including tape, disk, switches, and host bus adapters, goes hand-in-hand with storage management features that look into the server environment, databases, e-mail, file systems and other applications," Harding says.

Many SRM products already include backup management, Harding says: "Device management is a logical next step. This trend may continue to develop as the Storage Management Initiative Specification (SMI-S) is adopted more and more by device and management vendors."

Clark says device and resource management should be written to industry standards such as SMI-S so that customers have the flexibility to use whatever upper layer management framework they want to manage data transport and placement. The hope is that SMI-S will help make storage software more interoperable across hardware platforms while driving innovation, as developers spend less time on custom interfaces.

The Changing Nature of Storage Management

In the life of a new storage technology, there is a moment, if the technology is to succeed, where the relevant question changes from "is it real yet?" to "how can I best deploy it?"

That moment has arrived for a number of storage technologies, all at the same time. Add to the mix growing requirements for regulatory compliance and business continuity, driving up the visibility of IT in general and storage in particular, and it seems that storage administrators are living in interesting times, indeed.

"There are a large number of storage and storage-related technologies that will impact how system administrators do their jobs," says Tony Asaro, senior analyst at Enterprise Strategy Group.

Asaro names five of them: "iSCSI is quickly emerging as an alternative to Fibre Channel. VTL is becoming a requisite part of the backup and recovery process. Clustered network storage systems provide greater scalability, performance, reliability, and ease of management versus traditional active-active storage systems. Thin provisioning is changing the experience of storage provisioning, reducing both cost and complexity. And NAS virtualization is changing the dynamics of managing NAS storage."

One measure of the changing repertoire of storage specialists is the topic list on SNIA Foundations exam. The exam, which assesses basic storage networking skills, includes not only sections on Fibre Channel, RAID, NAS, and SAN, but also on storage virtualization, IP storage networks, and continuity management. Says Peter Manijak, SNIA director of education, "These are all things that appear on our Foundations exam as well, because we think they are so commonplace now, or should be commonplace."

iSCSI Lowers the Bar

New technology doesn't always mean new concepts to master. Implementing and managing IP storage networks, for example, may not require that storage administrators retool their FC skills.

"I think it may be the inverse of that," says Rick Bauer, SNIA technology director.

Bauer notes there are far more systems administrators with IP networking experience than those with SAN knowledge. "For the 50- to 100-server environment, I think you're going to find people feeling like it's something they've done before," says Bauer.

Administrators in these middle-sized organizations will be able to run the storage network through familiar switches and use familiar technology, making the migration path to iSCSI SANs easier. "If this is a midrange company, you're not going to have a storage administrator." Bauer notes. "You're going to have a network admin that's trying to solve a storage problem."

The Promise of Virtualization

From an administrative perspective, storage virtualization also promises to make things simpler - at least in the long run. According to Asaro, virtualization can also significantly reduce administrative costs. "ESG research found that early adopters of storage virtualization reduced SAN administration costs by 19 percent annually," he says. "One customer we spoke with actually reduced SAN administration costs by 75 percent."

These cost savings reflect the reduced management effort required for day-to-day SAN operation in a virtualized environment. Says Asaro, "Storage virtualization basically allows customers to consolidate the management of many systems to just one or fewer. Additionally, instead of being experts at two, three, or four different storage systems, they only need to be experts or maintain expertise on one system."

Yet for all the simplicity that abstraction provides, there are still those who must maintain a deeper understanding of the underlying network, if only to be able to respond when something goes wrong. As Bauer explains, "You really do need to know what's behind the curtain and to understand things. I just don't think you can rely on abstraction if you really want to understand the entire architecture."

The practice of storage virtualization is still new. "The promise of virtualization is encouraging," says Bauer. "I think there is still a fair amount of getting there."

A hierarchy of containers lets customers more cost-effectively migrate data from one class of resource to another, depending on its availability, performance, security, and other requirements.

The good news for storage practitioners is that although storage virtualization is a hot topic, it is not yet a resume requirement. "I don't think [virtualization] is going to be a specific main driver," says Matthew Sullivan of Robert Half Consulting Services.

Nor has any one approach to virtualization come to dominate. Sullivan adds, "As folks start to integrate those concepts into their environment, they'll get hands-on, immediate virtualization experience along with the rest of the talent in the talent pool. So I don't think any one solution has broken away as the virtualization solution."

A Multi-Vendor World

Virtualization highlights the multi-vendor nature of storage. EMC, IBM, and Hitachi all offer solutions that virtualize their competitor's storage systems as well as their own. Equipment from a variety of vendors has both positive and negative aspects for administrators, of course. More choice, but more dimensions in the interoperability matrix as well.

IT buyers "are starting to feel more comfortable buying heterogeneous storage products," says Bauer. Part of that comfort comes from standardization efforts such as SMI-S. According to Bauer, there are currently more than 200 SMI-S compliant products.

In 2004, a Storage Networking Industry Association (SNIA) survey revealed user frustration with storage management, including high costs, poor management tools, growing storage needs and increasing complexity.

The following year, a new survey explored these "pain points" in greater detail, examining users' inability to manage storage assets and infrastructure, the lack of integrated or interoperable solutions, and barriers to adoption.

Presented with the choice of seven challenging IT issues, 2005 respondents rated reliability (92%) and recovery/business continuity (85%) as more important than cost containment (80%) in how they approached IT within their organizations. In addition, the next three issues (security, application performance, and compliance with government regulatory issues) all ranked higher than 65% among respondents.

Managing storage assets and infrastructure was a considerable issue for 2004 survey users, and the response was no different in 2005. One in six respondents ranked as No. 1 their inability to accomplish these tasks. Their response sounds a warning, particularly in light of the fact that these same respondents expect an average of between 40% and 50% growth rates in storage over the next two years.

One in four 2005 survey respondents said they continue to struggle with a lack of integrated or interoperable solutions, and this is likely to increase, with their estimates of storage growth at over 30% through 2007. Architects, engineers and managers responded most strongly to the survey's interoperability questions, and the issue resonated most strongly with large companies. Respondents as a whole placed high importance on reliability, and moderate importance on speed of new application delivery.

Respondents saw a number of challenging storage issues at their organizations. Managing growth and meeting capacity needs, managing "I need it now" capacity demands, and justifying expenditures ranked as the top three challenges. All eight challenges cited were perceived as at least a moderate challenge by 80% of respondents. Also notable was that small businesses ranked security as their most challenging issue.

-- Marty Foltyn, Enterprise Storage Forum

But the common baseline that SMI-S provides doesn't free storage administrators from the need to learn the specifics of individual components. In managing multi-vendor storage environments, says Bauer, "the management interfaces and some of the other commonalities are going to help." But, he adds, "You're still going to see vendors competing - they are in the business to differentiate their products." Those that differentiate with additional features will always have management requirements that aren't met by a common interface.

Both integrating products from multiple vendors and deep specialization in products from a single vendor make a storage professional more valuable in the market, says Robert Half Consulting's Sullivan. "Any professional, storage-related or not, that has multiple-vendor experience is probably that much more marketable," says Sullivan. On the other hand, "Folks that specialize in a niche product are also extremely marketable," he says.

Compliance Changes Everything

The greatest force reshaping the role of the storage administrator comes not from technology, but from increasing regulation. With the threat of personal liability for corporate officers who don't ensure that records are properly maintained, among other penalties, Sarbanes-Oxley and industry-specific regulations put the spotlight squarely on storage practices.

So IT - and storage in particular - gets a higher profile within the business. Says ESG's Asaro: "Regulatory compliance has created a new dialog between business and IT. There has to be more awareness, communication and an understanding of the implications of meeting these regulations."

Compliant record management is all about defining a proper record storage policy and making sure the policy is enforced. The policy must be defined at high levels of management, often reviewed by the legal department, and with input from other parties.

"Storage decisions are being vetted by an ever-widening committee," says Bauer. "Not only is the CIO supposed to communicate and collaborate, but you've got record managers, you've got IT folks, you've got storage, you've got networking, and increasingly, you've got the corner office, the accountants, and the CFO, all having to come up with solutions."

With this larger role, storage administrators need to be able to work more closely with other departments. Business and communications skills grow in relative importance to technical proficiency. "Increasingly, storage admins have to have good relationships throughout the business unit to make sure that solutions get done and get done well," says Bauer.

Storage Pros' Prospects

Sullivan says that compliance and business continuity concerns play an important part in evaluating the skills of a storage administrator.

"We're seeing a lot of financial managers, operations managers, company CEOs that are very concerned with 'what is the storage policy,' 'how are we adhering to a policy,' and 'what measures are in place,'" says Sullivan. "So storage professionals really are being hand-picked into different spots, depending on the type of organization and the policies that they are adhering to."

Salaries are hard to quantify. In addition to regional variations, storage administrators may have a variety of titles. But on a national basis, according to Sullivan, "If they have a specific storage area network administrator title, and there's a role that's dedicated to that, I would say it's a little bit better than your five- or seven-year network admin, so it's probably in the 75 to just below 80 category."

Overall, says Sullivan, demand for skilled storage administrators is fairly strong. Those with a security background are especially valued.

"Security and storage will be hand in hand, in the same discussion," he says. "Any security skill sets, product experience, training, certifications that a storage professional can get" are strong positives.

Easier Storage Management: Are We There Yet?

SMI-S, Aperi, StorageRevolution.com, HP/AppIQ - it seems there's no shortage of efforts to simplify the world of storage. SMI-S has been in development for years and enjoys massive backing from a veritable Who's Who of the vendor community under the umbrella of the Storage Networking Industry Association (SNIA).

More recently, however, IBM appeared to break ranks with SNIA and formed its own open standards body known as Aperi along with Sun, Brocade, Cisco, Computer Associates, Engenio, Fujitsu, McData, and Network Appliance. Jon William Toigo then created a stir with StorageRevolution.com, but this area has been relatively quiet since the initial announcement. Meanwhile, HP is developing its vision for an HP-based storage management platform combining elements from its various storage software solutions to technology acquired from AppIQ.

Now What?

So when is all this going to result in a life of leisure for the storage manager or administrator? Mike Karp, an analyst with Enterprise Management Associates, said he believes that SMI-S is the only significant standardization effort currently in existence. He says SMI-S is headed down the right path. Rather than trying to solve everything in one fell swoop, it does a single task well - device discovery. But for now, the benefits are somewhat limited from the end-user perspective.

"The major value of SMI-S comes to the vendors right now as it reduces their development costs," Karp says. "But it has made things easier for storage administrators in terms of discovery."

SMI-S focuses on Host Bus Adapters (HBA), storage array, and switches. Karp, however, points out that the zone of discovery is widening as tape vendors and other OEMs obtain SMI-S certification.

"As more of them become certified, it's going to be even easier to do device discovery," says Karp.

Inside SMI-S

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n simple terms, SMI-S is the standard management interface that allows different types of storage hardware and software products supplied by multiple vendors to interoperate for the purpose of monitoring and controlling resources.

"Today, SMI-S can help users ease configuration, discovery, provisioning, trending, event management, security, and asset management tasks," says Rob Callaghan, chair of SNIA's Storage Management Forum and senior product manager at ADIC. "Additionally, it increases customer choice of solutions, reduces the number of management packages required, increases the ability of the consumer to perform asset management and provisioning of heterogeneous storage resources, reduces agent proliferation across the enterprise, as well as reduces overhead and complexity of managing ever larger amounts of storage IT or storage manager."

SMI-S will eventually replace all of the proprietary or common management activities that users do with various storage devices, Callaghan say. However, the level of innovation within the industry is causing the standards body some problems. Callaghan says that it takes time to create a standardized implementation for each new piece of functionality or technology and to add it into SMI-S. Thus SMI-S development can't go much faster than a 12-month release cycle.

Many in the industry believe that the SRM space has matured in recent years from monitoring and reporting to become a set of practices involving storage, device management, backup monitoring, active management, and more.

"Vendors are only able to deploy the technology as it lines up with their existing product lifecycles and these frequently do not always align," he says. "Also, customers are not always able to upgrade every time a new release is deployed as they must first validate the release, budget for it and many times thoroughly test it before it can be deployed in a production environment."

How does this relate to the various Aperi and the other movements and platforms mentioned above? Callaghan says SMI-S is a standard that can be used and leveraged by initiatives like Aperi and others. For example, for HP and AppIQ, SMI-S is the underlying language used to communicate with their devices.

Aperi versus SMI-S

What's the difference between Aperi and SMI-S? McData is in the interesting position of being heavily involved in both initiatives. Clark, as McData's director of SAN solutions, explains that creating open standards isn't the same as creating an open management platform.

"You can write proprietary management platforms that make standards-based API calls to solicit device information or perform configuration changes," he says. "Aperi's goal is to have an open systems management framework based on standardized (SMI-S) objects."

The idea is to put both the standards and the management framework into the public realm, as opposed to having open standards but a number of proprietary management frameworks. He admits that, at least to some extent, the formation of Aperi at a point in time when SMI-S is still in a 1.0 standard is an effort to move more quickly from the requirements definition/formulation phase into working product. That's why none of the vendors who signed up for Aperi have quit SNIA's SMI-S effort.

Aperi, Clark says, pushes for an open code management framework that would leverage SMI-S. But that doesn't mean SMI-S is a less important element. He touts the advanced storage features of the upcoming SMI-S version 1.1 such as storage virtualization.

"I don't think there are any inherent limitations on what SMI-S could help manage," Clark says. "There needs to be various forms of advanced intelligence in the storage network to actually execute higher-level function such as automation, storage policy execution, proactive traffic shaping, etc., but theoretically any of those high-level functions could be controlled by standards-based APIs."

The first 15 years of SAN technology, Clark says, have been devoted to getting the infrastructure into place and working. The next 15 years, he predicts, will focus on advanced storage services, with SMI-S becoming a common language for coordinating services such as policy-based storage administration, ILM, continuous data protection, and aligning the storage infrastructure to more fully support the needs of application data.

What about HP? Clark characterizes AppIQ's Storage Essentials (SE) as a good example of a for-profit proprietary management application that uses standards-based APIs (SMI-S): "I suspect this is what other storage vendors would also like to do, especially ones who have not joined Aperi."

HP remains firmly committed to SMI-S while rolling out its own HP Storage Essentials platform, which makes heavy use of the old AppIQ StorageAuthority Suite. It's said to deliver heterogeneous SAN management, SRM, and provisioning for NAS, SAN, and direct-attached storage on a common platform.

"From a single management console, administrators can manage their complete HP and heterogeneous server and storage environment with a feature rich, extensible and secure management tool set," says John Kelly, product manager for HP's StorageWorks division. "The unified platform offers shared server and storage core services such as auto discovery, inventory management, distributed tasks, event notification, reporting, central repository, GUI/CLUI, role-based security, and Web service API's."

Taking a different tack, StorageRevolution.com views the efforts of SNIA and SMI-S as too vendor-centric and not really catering to the needs of end users - hence the lack of traction in realizing the dream of storage manageability. Like Aperi, it's an effort to create an open systems management framework.

"StorageRevolution.com is being formed purposely outside the storage industry and vendor community, so it would have to rely exclusively on individual contributors," Clark says. "Without the expertise of those who have actually created the storage network infrastructure, a third-party effort is going to take a very long time."

Two Steps Forward, Three Steps Back?

Another way of looking at the storage management burden, though, is that we may well have made huge strides in recent years in terms of manageability. Unfortunately, that progress has been obscured by another factor - the explosive growth of storage environments and the fact that storage gear can now sprawl across corporate networks.

Think back a couple of years, and storage gear was relatively centralized. If that environment still existed, today's management tools and standards would have made major inroads in lessening the load on the storage administrator. Unfortunately, the gains made in streamlining of management have probably been outstripped by the demand to have bigger, better, and more complex storage infrastructures that span regions and even continents.

"Everyone wants bigger storage but not more complex storage," says Karp. "The problem is that it appears to be very hard to have one without the other."

Simpler SRM

New, heterogeneous storage architectures make it easier to provide a wider set of users access to a broader range of data. It also means that companies can adopt information lifecycle management policies, economically assigning files to online, nearline or offline storage. At least that is the theory.

In practice, as data stores climb into the tera- and petabyte ranges, companies can easily drown in mounting storage complexity. Just as companies needed to install network and systems management software to cope with distributed computing, so do they need SRM to manage their storage?

"Without an automation tool, managing this amount of storage would be an impossible task," says George Rodriguez, lead systems programmer for abc distributing, LLC, a catalog and online retailer headquartered in North Miami, Fla.

A Common Console

The problem of managing storage is not limited to organizations running a multi-tiered architecture. abc distributing, for example, runs a set of Unix servers as well as an IBM z/800 mainframe, but both the Unix Servers and mainframe rely on a single IBM Enterprise Storage Server 2105 Model F20 storage array with 4.3TB capacity. But although there was a single storage array, there was no common storage interface providing a clear view into both the Unix servers and the mainframe that were using that storage. As a result, the company was running out of space, which was causing delays in the batch processing.

Some storage vendors are trying to ride the wave of compliance by claiming that their products are compliance solutions

To gain visibility into the storage, Rodriguez started using Computer Associates' BrightStor CA-Vantage SRM. With it he has a common interface through which to view and manage both the Unix and mainframe storage, including monitoring the backups.

"I've been able to create a custom report of the ARCserve backup showing detailed information about the backup including the tape volser (tape volume serial number) the system used to place the data on tape," he says. "This report can then be placed in a bin with the actual tapes for disaster recovery."

It can be tough enough managing storage on a single array, but adding storage complexity adds to the complexity of management. The University of Texas Health Sciences Center, a medical research facility in Houston, splits its 8TB of primary storage between Hewlett-Packard Company EVA 5000 storage area networks and Network Appliance Network Attached Storage Devices. Network specialist George Pardue uses SyncSort's Backup Express to back up the data to a StorageTek L700E tape library.

"I run a lot of backup jobs and had no way of determining at a glance whether the backup was successful," he says. "That made it more difficult to troubleshoot when there was an issue." Like Rodriguez, he went with an SRM, but selected Profiler RX 3.86 from Tek-Tools, Inc. of Dallas, Texas. The main console login has a color-coded screen that tells how many hosts have been backed up successfully, how many are in progress and how many failed.

"Right when I walk in, I can look at it and know if I have any problems," he says.

The software also has utilization graphs. By clicking on a host, he can see its 30-day history. "It shows at a quick

glance if things have changed," he says. "Before someone could add a lot to a server and I wouldn't know about it."

Less Complex

SRM software is relatively new and, like other types of management software, early versions tended to be complex.

"A lot of the time in the past, SRM was trying to bite off too big a chunk for most to swallow," says Steve Duplessie, founder and senior analyst for The Enterprise Strategy Group in Milford, Mass. "It was too expensive and did so many things that no one could really use it."

But that has changed with recent releases. Rodriguez says that it took him less than a day to do the initial set up on his BrightStor SRM, though it did take a bit longer to create the customized views he wanted. He uses the software to manage the z/800 storage groups defined in the system using the Web publishing scripts that come with CA-Vantage. He also uses the SRM to generate reports validating backup results.

Pardue had someone from Tek-Tools set up Profiler, but once the set-up operation was complete, things kept getting simpler.

"I found the product really easy to use," he says. "They are constantly improving the product, the GUI keeps getting cleaner, and it is handy to have this information right here at hand."

This content was adapted from EarthWeb's Enterprise Storage Forum and internet.com's Enterprise IT Planet Web sites. Contributors: Drew Robb, Leslie Wood, and Steve Apiki