When Is Enough Too Much?
Taming Storage Complexity With Robust Heterogeneous Management Solutions

A White Paper
By Charles King

The Sageza Group, Inc.
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ABSTRACT

In recent years, increasingly heterogeneous computing environments and spiraling data storage growth requirements have permeated developments in enterprise data storage. The problem is exacerbated any time a new application is implemented, even if the intent is to save money by increasing the efficiency of business processes. The end results have included rising costs, increasing complexity and continuing demands on staff to implement and modify these systems. In challenging economic times, simplifying technical requirements and taming costs while maintaining data security and access are paramount to most users and vendors. Just how this evolution will proceed is a matter of intense interest, but many believe that the natural home for simplifying data management processes lies in enterprise storage management software and services.

The utopian view of enterprise storage management envisions essentially open solutions. If enterprise storage management solutions are linked solely to specific storage vendors' products, they will not solve the problems companies face in managing the heterogeneous environments they have already deployed. This same vision of openness applies to servers and networks. To be effective, management solutions must work with any type of server or network, regardless of the vendor supplying the underlying equipment.

Fully formed and centrally located enterprise storage management solutions can drive organizational efficiency, thus generating savings of cost, time and effort that are important to cost-conscious enterprises. But storage vendors' understandable focus on their own products has tended to slow the development of effective heterogeneous solutions. To truly solve customers' challenges in managing the extremely complex enterprise environments of today, vendors must step up and deliver open products that enable users to simplify their environments by standardizing on and automating storage management processes.

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Background

According to the How Much Information? data storage study compiled by the University of California, Berkeley in 2000, between 1 and 2 exabytes of digital data are stored annually, equaling roughly 250 megabytes per year for every man, woman and child alive today. Digital information is experiencing sustained annual growth rates of over 100%.

A number of converging technological and behavioral factors sparked this stunning expansion of information. First, rapid improvements in data storage functionality, scalability, performance and price as well as dramatic decreases in communication costs have placed enterprise-level storage solutions well within the reach of businesses of nearly every size. Additionally, advanced networking technologies provide businesses numerous method-ologies for communicating with and supporting company sites, employees, customers and partners. Finally, the evolution and continuing build-out of SAN environments has allowed enterprises and large service operations to consolidate data.

These changes in technology and the enormous importance of information to business and government has led to the emergence of hyper- consolidated storage environments in which enterprises commonly target, collect, analyze, leverage and permanently archive anything and everything, up to and including the metaphorical organizational kitchen sink. As every librarian knows and anyone with a cluttered closet, garage or attic understands (or at least suspects) from experience, simply owning and storing something does not necessarily make it valuable or useful. The value of a stored object hinges on it being simply and dependably accessible.

Data Storage Needs: The Evolving Marketplace

If the tendency of organizations to leverage data of every kind were not challenging enough, the rise in deployment of heterogeneous storage environments, where data storage and networking products from multiple vendors are installed and expected to work together, dramatically complicates already complex situations. Managing and supporting products from numerous vendors adds additional layers of complexity to storage management. Performing conventional storage processes such as data replication and backup across multiple platforms is both costly and time consuming, requiring IT staff to learn multiple ways of performing essentially similar tasks. A company's training and personnel costs continue to climb, especially when repairs and troubleshooting are required. Without an army of hard to find and/or employ IT analysts, mapping, monitoring and allocating storage usage, never easy tasks, are nearly impossible in heterogeneous environments. Maintaining service level agreements (SLAs), often difficult even in homogenous enterprise storage environments, can easily spiral out of administrators' control with inherently more complex heterogeneous circumstances.

What Are Some of the Current Approaches to Solving Storage Complexity?

To our way of thinking, given the current competitive and business environments, truly effective storage management solutions will likely be inspired and delivered first by vendors willing fully to embrace the potential benefits that heterogeneous environments offer. In fact, major storage vendors have generally discussed the need for such solutions and vaguely suggested their own intentions to deliver them in the future. But at this time and place, few such solutions stand out and most qualify as self-portraits of vendors' assumptions rather than accurate depictions of their customers' needs.

Vendor-developed solutions such as HP's Surestore storage management tools and Compaq's SANworks data replication manager tend to be most practical for use in those vendors' homogenous environments or for limited numbers of other OS-based storage solutions. Some companies are attempting to cover a broad area of the storage sector through technical agreements such as Hitachi Data Systems' recent alliance with Sun Microsystems. However, these efforts do not extend far enough to cover any but the most limited sorts of hetero-geneous storage environments. The same could be said for the efforts of ISVs such as Veritas, whose SANPoint control console is currently available only for Solaris, Windows NT and Windows 2000.

There have also been attempts by storage sector industry associations, such as the Storage Networking Industry Association (SNIA), to deal with complex interoperability issues and develop industry standards for even mundane management processes, but these efforts inevitably tend to lag product releases and technical breakthroughs by vendors, let alone the actual practices of storage customers. In most or all of these cases, vendors tend to ignore or lag behind the real-time needs of storage customers, who, intent on buying, deploying and operating whatever storage solutions they wish, whenever and however they want to, seemingly love to run with scissors wherever data storage in concerned.

What Is the Ideal Solution?

Given the shape of this marketplace and the behavior of enterprise storage users, what do storage customers want and need most? In a word, simplicity. Why simplicity? We believe that, given the current shaky state of the economy and general paucity of available IT staff resources, that storage customers are looking first for solutions that will save them time and money. Storage customers believe that simplified management tools can help deliver those savings first, by avoiding the squandering of employee effort. Key to that simplification are solutions that help customers better understand and use resources across their entire heterogeneous storage environments.

Successful heterogeneous storage management solutions should include the following features:

♦   Management controls for an entire storage environment should be centrally located, intuitively designed and collaborative in nature. Given the ongoing shifts in IT staff, such controls should be easy to operate with a minimum of training and provide a common platform for essential management processes.

♦   Management solutions must address not only the storage itself, but alsoCool! the entire storage environment including the storage network, switches and host storage resources. This means that intelligence needs to reside in each of these areas.

♦   Storage management tools should be automated and standardized for common, business critical processes such as data replication and backup. Data replication and backup, key processes to ensure business continuity, require IT staff to learn and execute multiple methodologies for accomplishing the same basic, essential tasks, creating numerous opportunities for process and human error.

♦   Solutions need to include tools for consolidated mapping, measurement and tracking of storage usage and availability across entire, complex hyper-consolidated environments. Effectively utilizing storage resources is virtually impossible if a company does not understand how much storage it has and how that storage is being used.

- ♦ Storage management tools must be able to provide multiple views of the storage environment, so storage administrators, system administrators and database administrators, using common tools, can all understand what storage assets are available and how they are being used.

- ♦ Effective tools for heterogeneous storage environments must provide multi-platform functionality. Interoperability is the great divide standing between enterprises that have embraced heterogeneous storage in principal and practice, but have yet to find any vendors that are willing to follow them into the promised land.
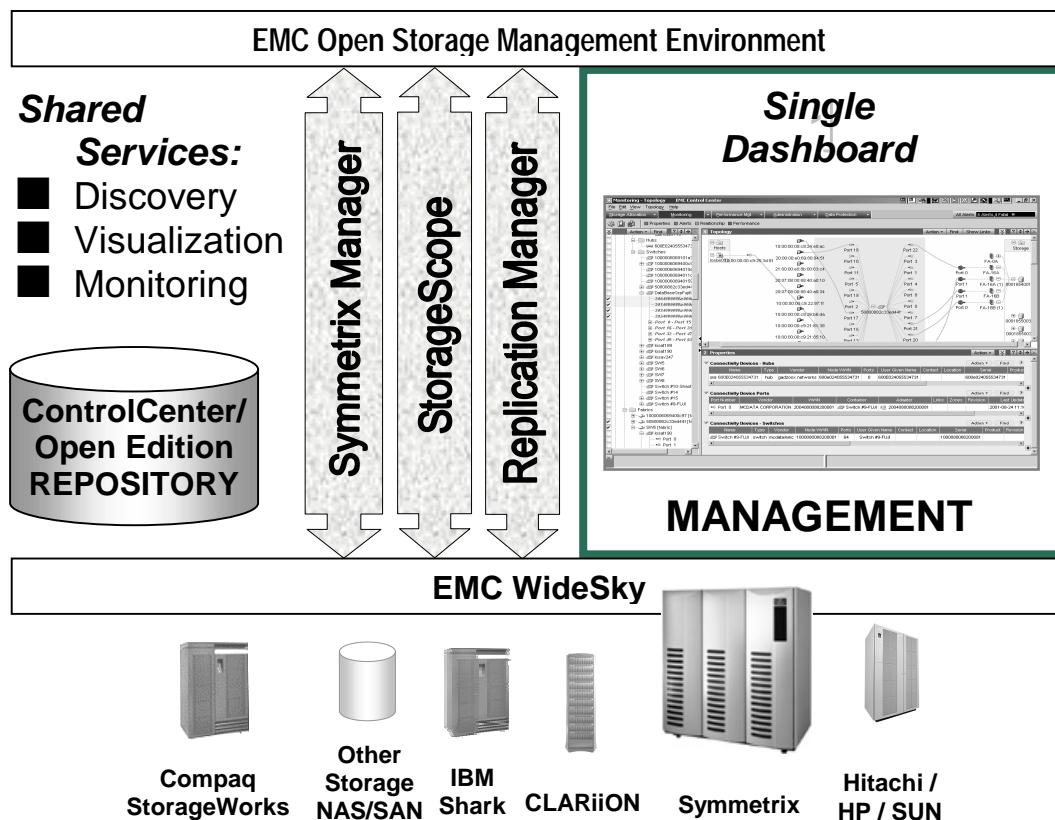
A New Approach: EMC's AutoIS

Many vendors offer products that deliver some or even many of the features listed above for homogeneous storage management, but EMC's new AutoIS management suite, which the company introduced in October 2001, appears to embody many of the elements necessary for effective management of storage resources in heterogeneous enterprise environments.

- ♦ EMC's Enterprise ControlCenter (ECC)/Open Edition offers users a centralized dashboard that can be used to consolidate storage devices and automate management processes, simplifying common tasks and allowing IT staff better to utilize their time and effort. Open Edition's Java-based toolset provides a common framework for storage discovery and visualization, and Open Edition's central data repository allows storage management applications and tools to share and leverage data to work collaboratively across the entire storage environment.

- ECC StorageScope provides automated tools for tracking storage devices and utilization across heterogeneous enterprise storage environments, and supports EMC, Compaq Storageworks and Network Appliance platforms at initial release. The application provides views of storage use by site, line of business and server, and consolidates all storage resources into a single report allowing storage managers, system administrators and line-of-business managers to share a common view of information.

- ECC Replication Manager delivers automated, policy-based processes for simplifying the management of disk technology replication processes, regardless of vendor or storage media.

- Finally, EMC WideSky, the company's storage management middleware, provides EMC's storage management software developers a common architecture for writing applications that will work across heterogeneous network and storage products.

EMC's Role in Delivering Heterogeneous Storage Management Solutions

What does this mean for enterprise storage users? First, that EMC looks ready and willing to deliver a highly integrated, automated tool set for centrally managing common and complex storage processes. Second, solutions for managing operations inherent to hyper-consolidated enterprise storage environments will be available in the same AutoIS package. Finally, if EMC is successful in supporting third party products as is suggested in its WideSky API plans, users will have access to what could eventually be a single point of entry for managing devices in heterogeneous storage environments. Overall, WideSky and ECC Open Edition should offer EMC considerable opportunities to leverage for development of future storage management solutions.

Summary

To help users to deal with increasingly complex and dispersed heterogeneous storage environments, vendors need to deliver or embrace automated, integrated, centralized storage management solutions. To be successful in today's increasingly heterogeneous storage marketplace, these solutions must work regardless of the platform or device in question.

With the AutoIS initiative and its related products, EMC is poised to meet the evolving storage needs of enterprises. ECC/Open Edition and StorageScope provide the centralized management tools needed for dealing with hyper-consolidated storage environments. ECC Replication Manager offers integrated, automated solutions for business critical data replication and back-up processes. EMC's WideSky initiative, if successful, should provide integration for the necessary applications for businesses that are deploying storage and SAN devices from multiple vendors. Overall, EMC's AutoIS appears to be an intelligently designed, realistically developed solution set that promises effectively to address the problems businesses encounter in managing heterogeneous storage environments.