Sun StorEdge™

THE BUSINESS CASE FOR STORAGE CONSOLIDATION

White Paper
December 2005

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Introduction

To survive and be successful in today's knowledge age, companies must embrace the very thing that can bring them to their knees, digital content. No one denies the value of the ever-expanding corporate knowledge base; it's the life's blood of the business. But there are looming risks every business must take into account when assessing their ability to manage and protect this vital corporate asset. Everyone from Sr. Management to IT administrators have personally experienced the demands placed on corporate infrastructures to keep pace with unrelenting growth in digital content and the need to keep track of every bit of data. The pressure is not just internal, courts and regulators also place demands on the way companies manage and protect business content.

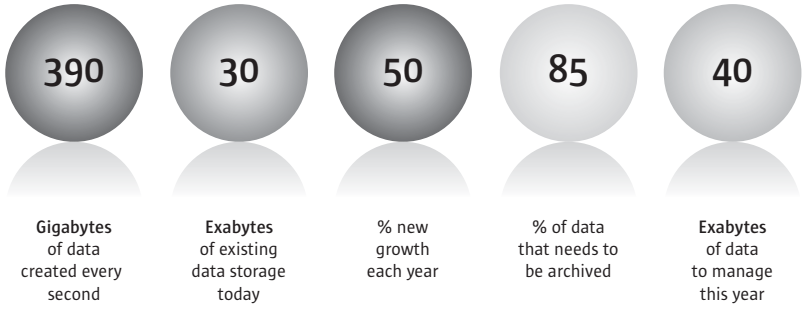

Fig. 1: Unrelenting Growth in Digital Content

Today, most corporate information is either in electronic format or quickly being converted into bits and bytes. In fact, many countries have new laws and updated statutes that encourage companies to convert paper records into electronic format. The fever pitch at which this process is preceding is driven by the need to comply with regulations and to convert information into "knowledge assets" that can be used to produce better products, improved services, lower costs and ultimately beat competition.

Short Term Fix vs. Long Term Strategy

But why are so many companies attempting to adapt to these formidable demands with aging IT paradigms. The answer is shockingly simple; they have yet to plan or execute a consolidation strategy. In an effort to quickly come into compliance, companies over the past 2 years have simply applied tactical band-aids to specific departmental deficiencies without enacting comprehensive long-term strategies. A survey of 2100 companies taken earlier this year found that two-thirds of the respondents (68%) "don't have a plan in place to preserve electronic records.... to ensure the accessibility of the information over time. These failings continue despite serious issues raised about corporate record keeping over the past two years". The results of the study went on to say, "the majority of organizations surveyed are not prepared to meet many of their current or future compliance, legal, and governance responsibilities, because of the deficiencies in the way they currently manage their electronic records. The outstanding challenges associated with the management of electronic information assets have the potential to be devastating in terms of professional careers and even corporate reputations..." [1] In the 90s, distributed IT environments grew rapidly and were the accepted norm of the day. However, this model cannot scale to meet today's capacity, security and management requirements. The simple truth is this; current distributed server and storage environments, though outdated and costly, work just fine. The barrier to exiting legacy environments is rooted in fear of unknown consequences. What will consolidation cost in terms of people, time and money and will a new IT paradigm work with coveted legacy applications? Even though there are many compelling reasons to change such as economies of scale through consolidation as well as avoiding damage to corporate reputation, court levied fines and prison terms, many companies continue to gamble that high profiled losses will happen to the other guy and not to them.

It is also difficult to give up the familiar process that continues to work even though current and future demands scream for change. The notion that, "if it ain't broke, don't fix it" tends to linger even when strong motivation to the contrary exists. This reluctance to change is compounded by the fact that consolidation strategies are neither simple to develop nor deploy. Questions such as: where to begin? how to proceed? and what options to consider? are daunting. Guidance from some vendors tends to be myopic, exaggerating risks while demonstrating a strong bias. These individuals paint a bleak future for any company that does not follow their advice and buy their software and hardware solutions. Scare tactics such as these make the user skeptical and more reticent. Who can you believe and trust? What is the best solution for your business? How do you avoid deploying the wrong solution? One thing is clear, personal reputations and jobs are on the line when the process of change is begun in earnest and the vendor of choice must be a trusted advisor.

Paraphrasing Steven Covey from his principal of personal leadership, "...begin with the image of the end of [your project] as the frame of reference by which everything else is measured. We may be busy, we may be efficient, but we will only be effective if we begin with the end in mind." For most Sr. Executives and IT professionals, the end-game is easy to envision and construct if one only considers how current technology can help with server and storage consolidation, centralized management and data protection. However, an eye to the future must also be brought into the picture. Technology that can address today's pressing issues may fall short of meeting future requirements and will ultimately place corporate digital assets at risk down the road. According to Kahn Consulting Inc, "organizations must ensure that the long-term trustworthiness and accessibility of e-records is not threatened by media, software, or hardware obsolescence". So a strategy for consolidation is not complete without providing for a periodic technical refresh when required to ensure data security and access.

Preparing a storage and server consolidation strategy requires an understanding of the limitations that need to be eliminated in the current distributed environment. This basic understanding will help when plans are designed to remove current deficiency. Moreover, new technology strategies are only part of the overall answer. When planning an effective future environment, remember that people and process combined with technology will ensure development of a comprehensive consolidation strategy. Additionally, as the vision takes legs, you may discover that the new plan will require a phased deployment. Hence, let's start at the beginning and work our way through each of these issues.

Disturbing Facts About Distributed Server and Storage Environments

Current IT infrastructures include many of the components depicted in figure 2. The diagram is a well-founded representation of many IT organizations given that 48% of all storage purchased over the past 4 years is direct attached storage-DAS [2] (meaning that storage is either within the server or directly attached to a single server or desktop).

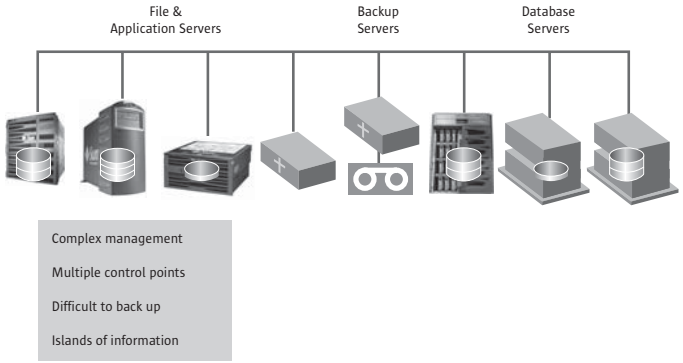

Fig. 2: Distributed Server and Storage Environment

With capacity requirements growing at a whopping 54% per year[3], the typical distributed environment is a nightmare to manage. An IT administrator must configure and monitor each storage subsystem on a server-by-server basis using disparate tools and different GUIs. Backups must be performed on each individual storage device requiring costly licenses for each server involved in the backup process. If employing a backup server, valuable LAN bandwidth must be utilized to copy data from individual storage systems to the backup server. Given that storage is doubling every 18 to 24 months, IT organizations with distributed environments are failing to achieve service level agreements (SLAs) with backup windows bleeding well into production time. It's easy to see why the typical cost to manage direct attached storage is estimated at 3 to 4 times the actual cost of the storage itself. Moreover, direct attached storage utilization is estimated at approximately 30% with some servers having more storage than necessary while others starve for more. Since it is not possible to share the unused capacity wasted behind one server, additional storage must be purchased. This distributed model includes another bonus. When an application server fills its I/O ports with direct attached storage, a new application server must be purchased to accommodate more capacity. Thus the cycle of adding more servers, more software licenses and more DAS continues to perpetuate with no end in sight. Moreover, frequent downtime and the labor intensive task of data migration are inherent characteristics of this incessant cycle. In a way, the distributed environment has the appearance and consistency of quicksand. From a distance everything appears normal, but on closer inspection, it quickly consumes budget dollars as well as major resources and eventually places your digital assets in peril.

Delaying Consolidation Plans May No Longer Be an Option

Even though corporate data repositories are growing at an exponential rate, the same cannot be said of corporate budgets. IT organizations are generally strapped for cash with budgets increases of only 6% per year on average. So a strategy for moving from the distributed model to a storage consolidation environment may need to be done in phases. Moreover, careful thought should be given to using legacy gear as part of the new paradigm through a "re-purpose" strategy. During this stage of planning, there is a tendency to get overwhelmed by the costs and risks involved in moving from the familiar, working environment to the new streamlined approach. For example, the total cost of ownership for the consolidation project includes not only the upfront investment in new hardware and software, but also the cost to migrate data and the cost of planned and unplanned downtime resulting from the move. With storage consolidation, questions regarding bandwidth, scalability and availability need to be addressed as well. Given that every server will be interacting with the same storage repository, will I/O performance be negatively impacted? Moreover, will the storage network scale to meet future capacity requirements and do so in a non-disruptive manner? Finally, with consolidation of business critical information, are their mechanisms insuring that storage consolidation provides the utmost in data protection?

Total cost numbers and risks may cause some to reconsider their decision to move forward with a consolidation project. Typically at this juncture, there needs to be a review of the compelling reasons previously discussed and consideration given to the 'total cost of failure'[4] for opting not to improve access and control of corporate information through consolidation. Reviewing the finer points that can add to the total cost of failure should provide that final motivation helping to justify the need for a centralized storage network repository. For example, the economic risks contributing to total cost of failure includes lost revenues due to poor customer service, reduced productivity and additional overtime pay. Moreover, if the company must access their distributed environment for legal discovery or a regulatory audit, expenses for failing to provide timely response include large legal fees, substantial fines and sanctions, damage to reputation, declining morale and penalties for inadvertent destruction of evidence. Obviously, we live in a new age where "organizations must be aware that if they fail to take action to [adequately] manage the valuable digital content flowing through their organizations, lawmakers, courts and regulators may be only too happy to" [5]. In today's business climate, delaying the deployments of a consolidated storage network may no longer be an option.

Solid Consolidation Strategy: People, Process and ILM Technology

Crafting plans for server and storage consolidation is an essential first step in extricating data from the quagmire of a distributed environment. With the painful knowledge of quicksand deficiencies well in hand, building a plan to eliminate these limitations can now begin in earnest. Keep in mind that defining the proper technology is only part of the total picture. People and process are also key elements in developing a comprehensive solution. With regulations numbering in the thousands and courts imposing hefty fines and time behind bars, people at high levels outside of the IT organization now have skin in the game. Corporate officers, legal and line of business management need to work in concert with IT to develop service level agreements that integrate compliance requirements. By doing so, regulatory compliance is not treated as a separate function, but rather, it is simply a part of sound corporate governance. Though policies for enhanced data protection, extended retention periods, authentication and secure access are driven by regulations; they should be viewed as part of normal operations and not handled as separate tasks. Once these enhanced procedures are integrated into daily IT activities, storage and server consolidation processes are strengthened and implementation of effective information management can be aligned with both regulations and business priorities.

Managing people and process is an ongoing endeavor, but once this effort yields ample results, it's time to review storage networking technologies capable of meeting relevant regulatory and business requirements. In reviewing different options, remember the best solution will reduce storage and management costs, mitigate corporate risks and adapt to new and unexpected events. The notion of Information Lifecycle Management (ILM) can be an essential element in the search for the right consolidation strategy. According to Mike Harwood of Enterprise Storage Forum, "All data maintained on storage networks has a defined lifecycle. The lifecycle identifies the way information travels through an organization from its inception to its eventual archiving and removal. A cornerstone concept for ILM is understanding the value of data. It's felt that ILM can...assure that information is indeed in the right place at the right time and on the right media."

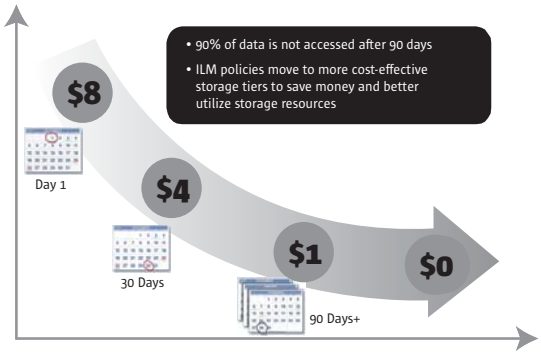

Fig. 3: Information Declines in Value Over Time

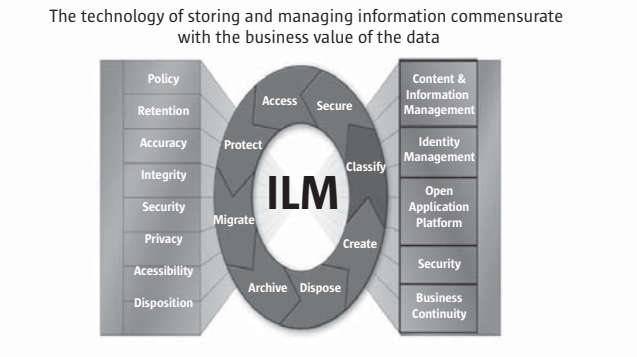

Fig. 4: Information Lifecycle Management

Simply put, in order to achieve the best return on investment when executing a storage consolidation strategy, companies must first classify the value of their data against the passage of time and then establish policies for migrating that data from high performance storage media to less expensive media based on access frequencies or other clearly defined compliance parameters. This strategy also requires a tiered storage environment where information is preserved, migrated and purged based on its business and compliance value.

The Benefits and Limitations of SAN and NAS Consolidation Strategies

Clearly, there is no shortage of valid reasons for enacting a consolidation strategy. With pressure applied from many directions, organizations need to methodically execute a cost effective plan that will produce immediate results. Achieving this goal requires careful consideration of storage networking options available on the market today. For many years, companies have carefully reviewed the advantages of deploying either a Storage Area Network (SAN) or Network Attached Storage (NAS). Given that each of these networks has unique benefits and limitations, some companies will deploy both types in a complimentary approach. In like manner, these storage networks help remove the limitations of a distributed environment by providing a storage consolidation platform with centralized management, improved availability and scalability, increased capacity utilization, and a streamlined backup process. An appreciation for the differences between these storage networks comes with a clear understanding of the historical requirements that lead to the development of NAS and SAN. The events that gave birth to the NAS initiative began with the concept of 'file servers' designed to manage large numbers of files for clients on Local Area Networks (LANs). File servers were wildly successful based on products like Netware and Windows NT server. Eventually, the full-blown operating system in a file server was trimmed down to simply provide file services. By doing so, a file server 'appliance' was created and the Network Attached Storage market ensued. Large amounts of storage could be added to the NAS appliance providing a LAN-based centralized repository for Home

directories while serving up data on a file-by-file basis. During this same period, database application servers relied on direct attached storage to provide access to vast amounts of storage capacity. File systems, which sit on top of block-based storage volumes, create unacceptable overhead for many database applications. In order to achieve optimal performance, these applications require direct access to block-based storage volumes. Since NAS is a file system based architecture, certain application servers could not take advantage of storage consolidation benefits provided by a NAS solution. Moreover, block-based storage access over Ethernet LANs was not technically possible. In time, the need for block-based storage consolidation gave birth to the concept of Storage Area Networks. These networks use a Fibre Channel Protocol (FCP) to provide block-level access to storage capacity. Consequently, many application servers can now access a single SAN-based storage repository and take advantage of the same consolidation benefits available to NAS-based clients. However, the growth of SANs over the past six years has been modest due the high cost, complexity and interoperability issues inherent in the technology.

As organizations move forward with plans to consolidate, they may decide that both storage networks provide highly desirable benefits. However, issues related to cost and time-to-deployment could force many companies to consider a phased approach whereby a low cost, simple to manage NAS appliance is initially deployed and a SAN installation is deferred until a later date. Meanwhile, emerging technologies providing block-base storage access across simple, affordable Ethernet are growing in popularity (IP-SANs) and should be considered a low cost alternative to Fibre Channel Storage Area Networks (FC-SANs).

The Value of a Trusted Advisor in Reducing Deployment Costs

Companies that have little to no experience at navigating their way through a phased consolidation strategy involving both NAS and SAN architecture would be well advised to seek guidance from those who have years of experience in storage network deployment. Such a trusted advisor can help to insure the right steps are taken and that pitfalls are avoided. Attempts to “go it alone” may result in time wasted on false starts and the loss of precious budget dollars. One company that has guided many organizations through successful storage consolidation projects is Sun MicroSystems™. With the depth of experience that comes with over 20 years as an information management vendor, Sun™ provides an extensive range of data management solutions designed to reduce cost, complexity, risks and time-to-deployment. Sun’s focus is on innovations in data management delivering solutions to manage data at work, data in motion and data at rest in a secure and trusted environment. Sun’s storage networking solutions are supported by professional services and support teams with a depth of experience that enables them to customize a storage solution for any customer environment-from small organizations to global enterprises. For companies seeking to better manage their data from creation to deletion, there is no better advisor than Sun.

The Value of a Scalable NAS Consolidation Solution Over Time

Many companies seeking to reduce cost and complexity as well as accelerate time-to-deployment turn to Sun’s Network Attached Storage solutions. Selecting a scalable NAS system capable of meeting future demands for performance and capacity can help avoid expensive upgrades required by some NAS products on the market today. Designed to meet present as well as future performance and capacity needs, the StorEdge™ NAS Systems’ ease of use, scalable processing power and multi-tiered storage capacity, can help drive consolidation projects to a quick and satisfactory conclusion. What’s more, the StorEdge 5310 NAS appliance offers both block and file level access thereby allowing a customer to deploy a unified infrastructure to meet all of their data management requirements. By deploying the StorEdge 5310 NAS

appliance as the storage consolidation vehicle, the number of storage and servers assets is reduced, hardware and software maintenance costs are dramatically lowered and storage management is centralized as well as more effective and efficient.

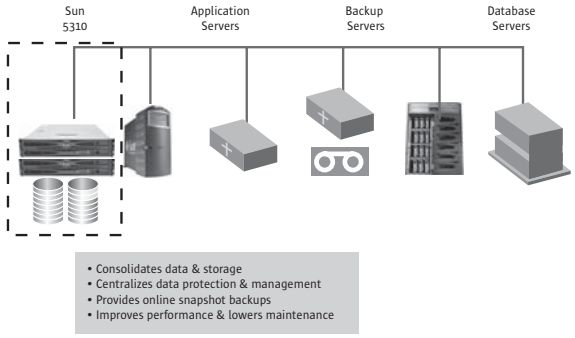

Fig. 5: Storage Consolidation Made Simple

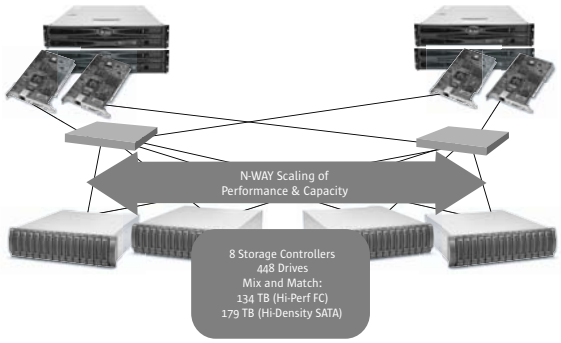

Fig. 6: Solid Scalability

Sun's Network Attached Storage systems provide an excellent platform for not only storage consolidation but also for increased collaboration, scalable performance, unsurpassed data availability, increased capacity utilization, centralized backup and unmatched, non-disruptive scalability.

Unlike other leading NAS products on the market today, Sun's offering provides the best return on investment in both the short-term and long-term. For example, the asking price for the StorEdge 5310 NAS appliance is usually 35% lower than the asking price of comparable NAS products. Many protocol features that come standard with the StorEdge 5310 NAS appliance must be purchased as separate licenses through other NAS vendors. Moreover, the Sun NAS offering can scale capacity well beyond the capabilities of other vendors and performance scales as capacity grows. In order to achieve better performance as capacity scales, other vendors require expensive component replacements. Additionally, competitors must take their product off-line any time capacity is added or performance components are replaced. The StorEdge 5310 NAS appliance scales non-disruptively, allowing you to add additional components while on-line. Finally, while other companies require you to purchase one system for compliance data (WORM protected) and another system for non-compliance data, the StorEdge 5310 NAS appliance allows you to store both compliance and non-compliance data on a single storage repository. No other company on the market today, provides the price/performance value and the rich return on investment found in the Sun NAS offering.

The StorEdge 5310 NAS appliance also has many built-in features to boost system availability including: redundant components for continuous and seamless operations, active-active failover clusters that enhance bandwidth and ensure rapid recovery of a lost NAS filer, file system journaling to protect data integrity and provide quick recovery due to system reboot, file system snapshots that provide point-in-time copies of data for on-line backup as well as recovery of deleted files, and remote data replication for easy point-and-click failover should the primary site fail for any reason.

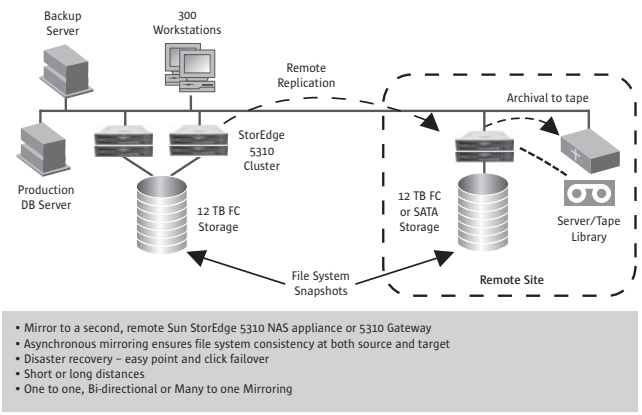

Fig. 7: Advance Data Protection Services

Keep in mind that once the StorEdge 5310 NAS appliance is deployed as a consolidated storage platform, overall business continuance is improved. For example, individual server failure in a distributed environment meant loss of access to the data held captive by that server. With Sun's NAS solution as your central data repository, data is always available regardless of individual server, application or operating system failures.

Management is easy. Once deployment of the StorEdge 5310 NAS appliance is complete (15 minutes from power up to on-line), the NAS system presents an intuitive user interface along with wizards for volume and file system creation. Snapshot policies are also simple to create and manage from the same GUI. Easy, centralized management eliminates the time consuming process of managing files and volumes on a server-by-server basis. Files can now be shared between heterogeneous servers and Sun's unified security prevents unauthorized file access across UNIX and Window systems. Moreover, islands of underutilized direct attached storage are eliminated. Ultimately, a greater amount of storage can be managed and protected with fewer administrative resources, thereby reducing IT cost. Storage management efficiency as well as effective time and resource management are primary benefits of Sun's Network storage consolidation solution. Organizations deploying the StorEdge 5310 unified infrastructure are well prepared to accommodate future demands for additional capacity.

Unified Network Storage Consolidation With Both SAN and NAS Capabilities

Some companies also require a storage network that can address database application requirements for direct access to block-level storage capacity. Fibre Channel Storage Area Networks satisfy this need, but due to high cost and complexity, companies either delay the investment or deploy a SAN with a limited number of connections. To address the need for a simple, low cost SAN, new technologies such as iSCSI now provide an affordable solution. In detailing the value of iSCSI (IP-SANs), Forrester Research made the following observation:

- Offers the advantages of a SAN without the complexity and expense of Fibre Channel
- Allows an organization to leverage its existing IP network investment including familiar network management tools. And there is an abundance of skilled, non-storage personnel that understand IP networking.
- Offers a cost-effective alternative to direct-attached storage (DAS) in areas of the IT infrastructure where Fibre Channel would be economically unfeasible.
- Significant cost savings over DAS relative to storage installation, consolidation, maintenance, and streamlined data management processes.

The iSCSI protocol is an enabling technology allowing block level storage access across Ethernet. Many organizations have already deployed simple, inexpensive IP-Storage Area Networks running on dedicated Gigabit Ethernet. Sun's StorEdge 5310 unified network storage consolidation solution can simultaneously attach to both the IP-SAN providing block level storage access and to the LAN for file level data requirements. Thus, applications requiring block level access and those that work well with file access can place their data on a single StorEdge 5310 central storage repository. This streamline approach can greatly reduce IT costs by ensuring greater use of capital resources, increased flexibility and agility for deploying and redeploying application servers and increasing the useful life of storage by allowing it to survive beyond the useful life of application servers. Moreover, on-line backup of snapshots can be moved to the dedicated IP-SAN thereby eliminating backup windows and freeing precious LAN bandwidth.

Cost Effective, Reliable Approach to Meeting Regulatory Requirements

The rapid growth of electronic content and records, along with emerging laws and regulations around retention and protection of information, are forcing organizations to rethink the way they address long-term information management. Businesses have to retain and quickly retrieve data and demonstrate it has not been altered or accessed by anyone other than an authorized user. On occasion, these records may be relevant in the event of an audit or lawsuit. As a result, the ability to demonstrate the trustworthiness of the records is imperative. The StorEdge 5310 NAS appliance coupled with Compliance Archiving Software is capable of meeting these rigorous requirements by enabling features for authenticity, integrity, ready access and security. It is a purpose-built NAS appliance providing a complete and highly available solution designed for the long haul. Employing high capacity serial ATA disks with WORM (non-erasable, non-rewritable) technology translates into cost effective, highly scalable disk capacity (179 TBytes) as well as on-demand access and dependability that mitigates legal risks while helping customers meet the demands of regulatory requirements. This system allows for write-once-read-many (WORM) properties to be assigned to files with specified retention periods that can be extended for legal-holds. The StorEdge 5310 Compliance Archiving System is a viable alternative to optical or tape providing magnetic disk speed for faster access. Robust security features such as audit logs, user authentication and access controls combine to safeguard the integrity of vital digital information. The StorEdge 5310 NAS appliance can reduce the risk of managing vast amounts of data while lowering operational overhead associated with retrieval costs for regulatory and legal discovery requirements. The system simplifies storage of sensitive documents with features to ensure authenticity, integrity, ready access and security.

Consolidation For large Data Centers and Small Work Groups

Many companies are deploying the StorEdge 5310 NAS appliance in their data center to maintain production data as well as near-line and archived digital content. However, remote offices and small workgroups that wish to implement a local storage consolidation strategy do not have the same scalability and availability requirements found in the data center. For environments such as these, Sun offers the entry-level StorEdge 5210 that runs the same value-rich NAS operating system found on the StorEdge 5310 NAS appliance. Sun's entry-level NAS offering is designed to meet the needs of smaller workgroups at a price point well within their budget. Moreover, Sun recently introduced the StorEdge 5310g, a NAS gateway product capable of accessing storage capacity in a Fibre Channel SAN and acting as a file server repository to LAN based clients. The gateway product allows a FC-SAN to provide both block-based and file-based storage access from a single storage network. Clearly, Sun's family of NAS solutions is designed to assist clients in meeting the full range of data management requirements.

The Total Package Approach to Lowering Consolidation Cost

Sun also recognizes that there has to be a concrete, quantifiable return on investment to justify any IT investment today. So we developed a proven step-by-step methodology to Assess, Implement and Maintain (AIM) a StorEdge 5310 network storage consolidation solution. Rather than simply proposing products and services, we developed a practice that includes a detailed assessment of our customer's needs prior to proposing a solution. Recommendations are then presented including metrics for expected Return On Investment (ROI), Internal Rate of Return (IRR) and Total Cost of Ownership (TCO). After acceptance and validation, we proceed with the implementation phase where we bring in experts from Sun and, as necessary, third party partners to implement a complete solution. After the StorEdge 5310 NAS appliance is deployed, we offer ongoing maintenance and enhancements to ensure the solution provides optimal performance and is continually updated with the latest technology enhancements.

For organizations seeking to better manage complex data environments, Sun's StorEdge 5310 NAS appliance is designed to respond to a customer's demanding data requirements while at the same time reducing IT costs and complexity. Customers also benefit from Sun's 20 years of information management experience. By selecting Sun to assist in your consolidation projected, you are assured of lower costs, reduced time-to-deployment and expert advice. You need a trusted advisor to ensure a successful storage consolidation deployment and there is no one on the planet better qualified to be your partner than Sun.

Endnotes

1. “American Companies Fail to Address Preservation and Retention of E-mail and Electronic Records”
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2. IDC

3. IDC

4. “Compliance in Information Management Journal”
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Notes

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