

# The financial benefits of storage consolidation:

## Consolidation, Virtualisation and Information Lifecycle Management

*The term “storage” conjures up many images, including lockers, warehouses, closets, attics, and that metal icon of the business world: the filing cabinet. But the term takes on new meaning in our digital world, with storage being one of the hottest topics in networking today.*

Demand for digital storage is wreaking havoc on businesses as IT departments scramble to deploy greater capacity while management bemoans the expense. Many companies don't have a true strategy regarding their storage networks, and the ones that do don't have a very good handle on the costs.

But storage is quickly becoming a mission-critical application for businesses large and small. Developing a long-range plan for storage—which includes cost-containment tactics—will be an essential tool for top competitors. This paper describes some of the techniques for turning storage into a valuable asset in your organisation.

### *Escalating demand for storage*

The digital nature of business today is fueling explosive growth in the demand for electronic storage. Just about everything—from the simplest email-based conversations to fully automated manufacturing and assembly—traverses a digital trail. By their very existence, these activities generate electronic “footprints” of sorts, all of which must be captured, protected, stored and retrieved—perhaps immediately or at some point down the road.

Some of this data is eventually recorded in paper format. But increasingly more of it never exists in anything but electronic form. Frost & Sullivan

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# The financial benefits of storage consolidation

estimates that as much as “85 percent or more of all business content is either created in email applications or forwarded to others as email attachments.” Consider the financial transactions that never result in the exchange of physical currency, or the Web pages that exist only in a virtual world.

The storage infrastructure is also gaining importance as a productivity tool. The shift from paper-based business processes to automated, electronic activities requires digital tools to share information and perform tasks. This is why more businesses are moving to networked storage systems, enabling employees to readily exchange data and interact with colleagues and customers around the globe.

Other factors propelling businesses toward higher storage capacity and better solutions include:

- **The paradigm shift to around-the-clock operations, driven by a highly competitive business climate and an increasingly global economy.**
- **A significant jump in the need for backup and disaster recovery tools due to the increased global threat of terrorism.**
- **New data-retention and reporting laws—Sarbanes-Oxley, Basel II Accord, Freedom of Information Act and more.**

So it's no wonder that one of the fastest growing technology sectors is the storage industry. IDC estimates that worldwide demand for storage capacity is growing by a compound annual rate of 48 percent.

## *Understanding the true cost of storage*

In any environment, extremely rapid growth can wreak havoc on budgets, systems and management. Storage is no different, with urgent demand for capacity straining the resources of IT departments and driving up costs.

According to StorageTek, annual data growth is an astounding 50-70 percent in most industries. But IT budgets aren't keeping up. One theory is that companies may be reluctant to increase storage spending because it is viewed as an incremental expense. IDC suggests that this view is short-sighted, failing “to adequately appreciate the degree to which information has become either the end-product or an essential component of providing timely and adequate customer service.”

For businesses struggling to gain control over IT and storage expenses, it's important to understand both the costs and value of the storage asset.

## The Terms of Measurement

Let's begin with some key definitions regarding “cost.” While companies may differ slightly in their accounting methods, the terms generally used to classify storage costs include:

**Capital Expenditures (CAPEX).** These are all of the procurement costs, including installation of wiring, purchase of systems and software, and the construction expenses associated with setting up a storage environment.

**Operating Expenditures (OPEX).** Everything related to management falls in this category, including training and personnel costs. Facility costs also apply, such as electricity, air conditioning, floor space and so on. OPEX also includes post-warranty maintenance costs, ongoing license fees, and generally everything that doesn't fall under CAPEX, but can be tied specifically to the ongoing operation or protection of the storage asset.

**Total Cost of Operation (TCO).** TCO is a measurement that tallies both CAPEX and OPEX over the life of a system. As a cumulative figure, TCO may also include things like write-offs and depreciation. TCO is an important measurement to consider when comparing two versions of the same solution.



# The financial benefits of storage consolidation

Another important calculation often used during purchase planning is ROI, or the expected return on investment. ROI is a measurement of both cost and value and is usually calculated using several variables: the total cost of the investment (CAPEX), the ongoing cost of operating and maintaining that investment (OPEX), the periodic financial benefit expected from the expense (e.g. monthly revenue), and the amount of time it will take before the financial benefit exceeds the initial investment. ROI is often used to evaluate the merits of replacing an existing solution with an upgraded system.

## Assigning Value to the Storage Asset

Effectively calculating the expected ROI on a new storage purchase requires making some predictions about value. Like all IT assets, storage delivers some hard-to-measure business benefits like increased productivity, customer satisfaction, faster service, better communications, streamlined production, and so forth.

When calculating ROI, these values must be included—even if only estimated. A good ROI calculation typically measures three categories to determine value:

### Operational Costs

- Staff utilisation
- Hardware utilisation
- Network costs
- Software costs

### Service Levels

- Planned downtime
- Unplanned downtime
- Performance (future)

### Business Flexibility

- Time to market
- Ease of data access
- Application development and deployment

The important point to note about this model—and others like it—is that there are measurable variables within highly subjective-sounding categories (e.g. “flexibility”). The time it takes to deliver a product to market is measurable, as is the time it takes to find and access a stored document. While every company will use a different set of metrics to assess value, the important thing is that these kinds of measurements must be included in the analysis.

It’s also important to remember that hardware procurement is usually less than 30 percent of storage TCO. The majority of costs arise from ongoing management and support. The same can be said for the benefits—with most of the value accruing from gains in productivity.

But there’s a huge temptation to ignore this ratio when faced with a critical demand for capacity. Companies without a long-term storage strategy are more likely to choose an immediate, tactical solution with a lower acquisition cost. But such “quick fixes” are often more costly over time. Consider the proliferation of direct attached storage in enterprises both large and small.

### The DAS Trap

Because they are relatively quick and easy to get up and running, IT managers often rely on servers—or direct-attached storage (DAS)—to fill an urgent need for more storage capacity. While adding a new server can be the least costly, fastest way to deliver additional storage capacity, it is likely to be the less efficient solution over the long term.



# The financial benefits of storage consolidation

That's because DAS can quickly become unwieldy. Servers must be managed and maintained independently. Unique software and hardware configurations are used to run specific applications (e.g. email, web hosting). For these and other reasons, the DAS environment is highly inefficient:

**Difficult to Manage.** DAS environments are considered high maintenance operations, requiring one person to manage every 4-5 servers. Another way to look at it is through terabytes (TB) of data managed per person. In one IDC case study, a customer with a DAS environment allocated 1.5 TB per manager. When that same customer migrated to a storage area network (SAN), this figure increased to 4.5 TB per manager—a 300 percent gain. Such a distributed, fragmented storage strategy—using systems from multiple vendors—results in higher management costs as well, because IT staff must go through multiple trainings, tap into multiple vendor support programs, and so forth.

**Data “Islands.”** Servers contain storage “islands” that cannot be reallocated to different users or different tasks. Server-based storage is contained in a disk drive that is physically attached to the server. It can't be moved, increased or decreased to match the needs of users.

**Complex Backup and Disaster Recovery.** When data is stored in servers, every one of those devices must be replicated and prepared for disaster recovery. In an environment with dozens of servers, this process is time consuming and complex, driving up the cost of data protection and consuming valuable IT resource time.

**Under-utilisation of Capacity.** The fixed nature of server-based storage means that capacity cannot be allocated among applications as needed. Some servers may be crammed with data, while others may operate well below their potential. According to storage expert HP, DAS environments are believed to utilise a mere 30 percent of their storage capacity.

**Poor Availability.** Server-based storage may render data less available to users. DAS

downtime can be high because each machine requires hands-on maintenance. Unplanned downtime can be significant as well, because most servers simply are not designed to be highly available systems. Complex server configurations can hinder the availability of data by making it difficult for users to share access. Network speed too can hamper access.

This drives up the cost of storage by requiring more IT resources for support, reducing worker productivity, and impeding the flow of information. Poor availability can be costly—both in lost revenue for a business and higher operating expenses.

**Lack of Scalability.** While it might seem simple to buy more servers to add more capacity to a DAS environment, this tactic isn't necessarily scalable. A lack of vendor interoperability and the inability to add or reallocate capacity among servers drives up the cost of a DAS environment by requiring IT departments to buy more servers than might otherwise be needed, acquire more training, and so forth.

In spite of these severe limitations, such distributed environments are not uncommon. The over-proliferation of DAS infrastructure is a common malady among businesses today.

But IDC notes that the popularity of DAS solutions is declining in favor of networked storage options. Accounting for 83 percent of all storage purchases in 1999, IDC predicts that DAS systems will only account for 36 percent of all storage revenue by 2006.<sup>6</sup>

## *Storage consolidation: the key to lowering costs and increasing value*

This trend shows how businesses are quickly grasping the benefits of centrally managed and shared storage systems—both storage area networks (SANs) and network attached storage (NAS). The question may not be whether to make the change, but when. Understanding how consolidation affects the storage and business environment may help in this regard.



# The financial benefits of storage consolidation

## The terms of consolidation

Storage consolidation allows a business to use one system for controlling all servers and storage devices located on a network. All of the data capacity in this system can be managed from a central location, reallocated among applications and users for maximum utilisation of disk space, and easily scaled to respond to growth.

Consolidation enables companies to gain control over escalating storage costs while improving the value contribution of the storage asset. These benefits are easily quantifiable. Consider the following IDC case study, which shows how one customer calculated several direct financial benefits as a result of moving from DAS to an FC SAN:6

**Fewer Physical Devices.** SAN systems are powerful devices that reduce the number of servers required on a network. By reducing the number of devices attached to the network, adopting SAN storage solutions will reduce management overhead and warranty costs. Power consumption should go down too. In the IDC case study, the customer “grew its storage capacity by 33 percent yet added only 12 servers. With its previous DAS environment, [this customer] would have had to add 24 servers” during the same period.

As a result, this customer saved \$1.2 million over four years. Lower power consumption was a big chunk of the overall financial benefit, adding up to 30 percent of the total savings of moving to a SAN.

**Device Consistency.** Networked storage calls for consistent devices to be deployed throughout the enterprise, simplifying the management and maintenance of the storage infrastructure. With fewer vendors and solutions to be managed, companies don't need to spend nearly as much time and resources on training and personnel. Backup is also much easier. When calculating all savings accrued from adopting a SAN solution, the IDC customer noted that IS efficiency and IS productivity together contributed a whopping 47.2 percent to the overall financial benefit of this change.

**Data Availability.** When it's no longer stuck inside a server, data can be more readily shared among employees and customers (as desired). Most networked storage systems offer high-performance throughput, reducing bottlenecks and enabling quick access to a company's most important data. Backup can be done more quickly, and downtime will likely be reduced. In the IDC case study, the customer reported reducing monthly backup time by 65 percent and improved mean time to repair from 150 minutes to 10 minutes, meaning the storage network experienced less downtime and increased the availability of data. At the same time, 3.8 percent of the total savings resulting from the move to the SAN were directly tied to increases in user productivity.

## Further refinements in storage design

Storage consolidation is perhaps the most important element of a long-term storage strategy. As demonstrated by the IDC case study, storage consolidation can enable businesses to achieve real long-term savings, leading to lower TCO and faster ROI. (Of course, individual results will vary.)

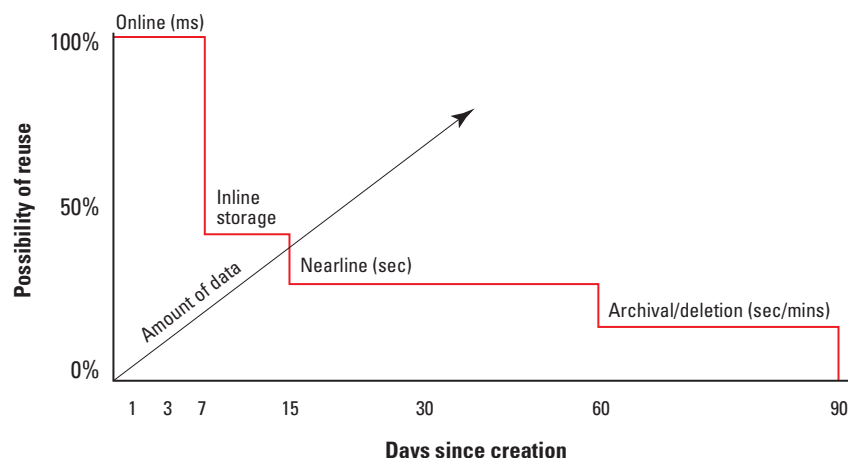
But storage consolidation is only the first technique for reducing storage costs and increasing the overall value of the storage asset. Additional refinements in storage design can improve efficiencies within an organisation, delivering even lower TCO and greater ROI. Some of the improved storage design strategies enabled by new solutions from top vendors include:

**Tiered Infrastructure.** In a well-designed SAN, businesses can define data policies that relate to value and service levels. Depending on its value to the organisation different data might be classified as either “mission-critical,” “sensitive,” or “required.” StorageTek explains that “data policies help to define the storage infrastructure, or storage tiers, required to effectively meet the business challenges for data protection and recovery and efficiency of operations. Data classification gives us the basis to align storage costs with business priorities. ... When the likelihood of using the information is at its highest, the strategy calls for online storage. As the likelihood of use declines with age or data policy, the information can be migrated to less expensive storage options.”<sup>7</sup> There are usually four



# The financial benefits of storage consolidation

levels in a tiered infrastructure—online, inline, nearline and archive—each with their own variables related to performance and cost.



HP explains how a tiered infrastructure might be deployed in a typical disk-to-disk-to-tape environment:

- 1) Data with the highest requirements is stored in the first tier, on SCSI or Fibre Channel disks.
- 2) The second tier stores near-online or infrequently accessed data (such as disk-to-disk backup copies) on Serial ATA disks.
- 3) The third tier comprises tape-based backup copies or data archived on optical media.

**Information Lifecycle Management (ILM).** Using a tiered storage infrastructure, businesses are beginning to employ strategies to manage data through its entire lifecycle, “based on its changing business relevance and usage requirements over time.” Some storage vendors are

developing software and hardware solutions that enable businesses to do this automatically. According to HP, “Imagine being able to effectively place, migrate, protect, archive, and remove data based on specific business policies or regulations with little-to-no human intervention.

The result would be a more agile business.” In other words, with ILM every measurable element of the storage asset will become more efficient—disk utilisation, data availability, scalability, management—refined to meet the particular nuances of each business.

**Virtualisation.** In an ideal world, interoperability will be the norm, where a product from any vendor will work nicely with a product from another. But the truth is that many storage systems are proprietary. While software can often run on multiple vendor platforms, entire solutions tend to be vendor-specific. The technique of virtualisation eliminates this problem by adding a layer of software that neutralises all of the components of a storage infrastructure into a single, manageable system. HP defines virtualisation “as the abstraction of servers, storage, network or other resources into pools that can be shared as needed.” The process separates the logical functions of these elements from their physical systems to allow for transparent interoperability among solutions from multiple vendors.

Virtualisation has the ability to further reduce storage costs and improve the value contribution of the storage asset by:

**Greater utilisation of the storage asset:** “Storage and server resources are consolidated and pooled, then provisioned as necessary to reduce the potential to purchase more hardware than needed. [This] maximises [use of] existing resources,” thereby reducing the number of new purchases required.

**Reduced management complexity:** After resources are aggregated, management of multiple devices is greatly simplified. For example, storage wizards allow management functions to occur across a heterogeneous storage pool, based on storage attributes.”



# The financial benefits of storage consolidation

**Reduced downtime:** “Server and storage change activities can be done on the fly, without bringing applications down. Administrators can add, remove, repurpose, or service physical storage without disrupting the business application. Virtualisation also enhances snapshot, mirroring, data migration and data replication across the heterogeneous storage devices.”

## Calculating the benefits

Every organisation will calculate the financial benefits of storage consolidation differently. But it's important to include costs (CAPEX and OPEX) and value in the equation.

Clearly the financial benefits of storage consolidation, especially when enhanced with tiered storage solutions that employ information lifecycle management and virtualisation techniques, can be significant. Consider how these benefits might help you gain control over your storage costs and increase the value contribution of storage in your organisation:

### Improve Business and Storage Flexibility

- Pool resources and data to balance the load among systems for better utilisation and greater efficiency. Instead of 30-40 percent utilisation (with DAS), utilise as much as 80-90 percent.
- Allocate storage capacity based on demand to meet the current needs.
- Grow the storage infrastructure in a modular fashion, which is more responsive to unpredictable and ever-changing business conditions.

### Ensure Scalability

- Add capacity and software to grow when needed.
- Add the right kind of storage without worrying about creating “islands” of data.

### Increase Availability of Data and the Network

- Reduce downtime through faster backup, more efficient management, and higher performance systems.
- Use SAN systems to create redundant storage to ensure continuous data availability even during downtime.
- Optimise availability using data policies that allows for high-speed access to mission-critical data, and offline storage for archives and backup data.

### Improve Manageability

- Achieve centralised control and management of the storage resource, increasing the number of terabytes that can be managed by each person.
- Reduce the amount of training required by streamlining the number of storage solutions used.
- Deliver more storage capacity with fewer resources, lowering OPEX.
- Simplify backup and compliance through centralised controls.
- Automate data policies and processes to reduce oversight.
- Speed up service resolution through centralised management.

### Increase Business Productivity

- Align data value with access policies to improve user productivity.
- Reduce downtime.
- Free IT staff to work on solutions that support business applications rather than storage management.
- Allow data to flow freely around the network, eliminating islands of storage.



# The financial benefits of storage consolidation

## Reduce Physical Costs

- Lower power consumption for reduced utility costs.
- Minimise the floor space required for systems and equipment.
- With fewer pieces of equipment, reduce the direct costs for things like warranties, licenses, annual upgrades, cables, and so forth.

## Finding a storage partner

The task of consolidating storage should be done with help from a knowledgeable advisor. Look for these traits when recruiting a storage partner:

**Multiple vendor relationships:** Storage really is a best-of-breed technology category, and it's possible to combine products from multiple vendors to achieve the optimum solution. Instead of shopping directly from a vendor, find a technology partner that has multiple relationships so that you can find the right combination of products for your organisation.

**Certification/training:** Look for an organisation with extensive training in storage technology. Top tier vendors provide “certification” for their trained resellers – make sure yours is one of them.

**In-depth knowledge of storage products and solutions:** Choose a storage partner who is well versed in a wide range of product specs and who can define a total solution. Check to see how well they understand the terms ILM and virtualisation, and how those techniques can help you refine your storage solution to maximise ROI.

**Comprehensive resources:** Seek a company with the technical expertise and tools to perform a full analysis of your storage networking needs, design your consolidated system, help with product acquisition, deployment, asset management, financing, and follow through with a post-deployment evaluation. Since storage is a long-term strategic asset, make sure your partner will be around for the long haul.

**Experience:** Look for a storage expert that has put lots of ideas to work on behalf of other customers, with success. If possible, talk to those customers to rate their level of satisfaction.

**National Coverage:** Work with a partner that can provide sales and service throughout the UK—an important consideration for multi-location enterprises.

## Store IT: Storage Resources

### What Insight Storage Services (Store IT) can do for you

Insight's storage experts take a holistic approach to storage, beginning with a fundamental assessment of the many factors involved—legacy systems, business processes, geographical considerations, budgetary requirements, plans for future growth, etc. From there, we handle every aspect of design, implementation, integration and lifecycle management, allowing you to focus on running your business.

While our approach varies based each customer's unique requirements, here is an overview of the essential services Insight can provide to address your storage needs:

#### 1. Assessment and Planning

**Business Requirements:** Insight works with the client to understand, develop, and document the business requirements for the deployment of storage hardware, software and peripherals.

**Technical Requirements:** Insight assesses and documents all technical matters that might impact the deployment, including:

- Current technology in place
- Short- and long-term plans for growth



# The financial benefits of storage consolidation

**Logistical Requirements:** Insight documents and manages all logistical matters that will impact the project, including number of users to be deployed, desired project completion date, constraints, etc.

## 2. Procurement

Through our alliances and work with leading providers, Insight exceeds expectations with commonly deployed SAN and NAS storage solutions. And our advanced knowledge of the latest technology developments allows us to provide customers with the best options to meet all technical requirements.

## 3. Management

Insight assigns a dedicated project manager to perform the following:

- Develop the project plan / schedule
- Identify appropriate reporting during the course of the project
- Specify logistical and technical resources needed to complete the project

## 4. Deployment

**Oversight:** Insight's project manager oversees the procurement, activation, configuration and shipping of devices through Insight's Advanced configuration and Distribution Centre.

**Thorough Documentation and Status:** Insight provides regular periodic project updates to the client throughout the project, making documenting all milestones and challenges.

**Change Management:** Insight provides a formal change management process to address necessary changes to the project parameters.

## 5. Lifecycle Management

Insight provides post-sales reporting, asset management, hot-swap services and system maintenance services.

### *Additional Store IT Services and Capabilities:*

As a leading national storage systems reseller, Insight can also help you with these services:

- Trade-In/Asset Disposal
- Custom Configuration
- Advanced Integration
- Implementation Services
- Customised Leasing Options
- Project Management
- Resource Management
- Software Licensing
- Training Solutions
- Warranty Upgrades
- Digital Asset Management

**For more information about storage consolidation or any of our services, please contact your Insight Account Manager today or ask for the Insight Solutions Group.**



# *The financial benefits of storage consolidation*

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