APPLICATION NOTE

Driving cost out of the data storage infrastructure

APRIL 2004

1 Executive summary

Today's data management challenges are not being met by conventional storage infrastructures and strategies. A sustainable approach is to apply the concept of information lifecycle management (ILM) to balance the cost of storing and managing information with its changing value. StorageTek® has developed an ILM-based process that helps customers reduce their storage infrastructure costs by understanding their information's value and adapting their storage systems and processes to manage it according to its value.

2 Introduction

Information lifecycle management (ILM) is a philosophy that addresses the key challenges and issues associated with managing the growth of business data. It is a strategy StorageTek has been pursuing for two years.

Our information lifecycle management approach is relatively simple. Not all data is created equal — why treat it equally? With unprecedented growth in data volumes and the requirement to keep data for longer periods of time, IT organizations, and indeed businesses themselves, are having to reconsider the costs involved with data retention, and more importantly data management, given the complexities inherent in the diverse storage solutions that exist today. Understanding data and its value to the company or business unit is a key consideration in establishing how and where data should be stored.

For example, data's value is often related to its age. Age-sensitive data is typically most active in the first hours and days of creation. Its immediate business value declines as it ages and is referenced less often.

To balance the value of the information with the cost of storing it, we must change the way the information is managed over time. How is the information replicated and protected? How well are storage resources utilized? Information lifecycle management gives us the basis for a methodology to align storage costs with business priorities.

3 A tactical response isn't sustainable in the long-term

Until now, storage decisions have been largely tactical in nature. When it comes to storing, protecting and managing data, common approaches include:

- "If I run out of storage, I buy more storage. I can just throw more disk at the problem; after all, it's getting more affordable."
- "I'll replicate all my online data to primary disk, whether or not it requires that level of protection. Better yet, I'll backup everything to tape, just for good measure."
- "I'll keep managing things the same way. If I can maintain the status quo, I can keep my head above water."

While these tactics may have worked in the past, the question is — are they sustainable for the future? We believe that the current practices are unsustainable, primarily because IT budgets remain flat despite continuing growth in data (50 percent to 70 percent in most industries) and growth in the complexity of managing it.

Current storage issues

Information management	Primary storage	Data protection	Archive
• Increasing storage infrastructure complexity • Rising management costs	• Rising capacity costs due to data growth • Low utilization of primary assets • Over-dependence on expensive disk	• Slow and unreliable backup and recovery systems • High staffing costs from manual processes	• Compliance to new data retention regulations • Growing use and repurposing of more data for longer periods

Source: IDC, Gartner, internal StorageTek analysis

4 A sustainable approach: information lifecycle management

The solution is to balance the cost of storing and managing information with its changing value — information lifecycle management. ILM provides the basis for a methodology to align storage costs with business priorities. StorageTek believes you can best implement an ILM process by:

- Matching performance needs to storage options, which requires utilizing the entire storage hierarchy
- Matching data value to protection options
- Matching data retention requirements with compliant archive and retrieval options
- Automating to reduce storage management complexity

If today's tactics are not sustainable, it's apparent that a new perspective is required. StorageTek believes it starts with the premise that data should be treated differently, according to its business value.

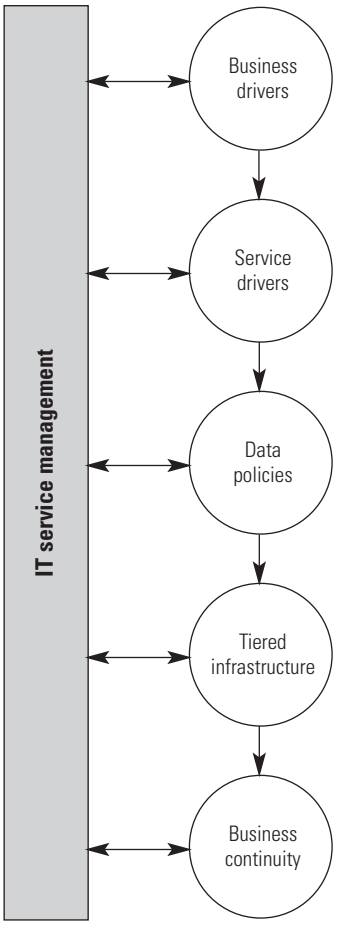
5 Determining the value of data to the business

In today's competitive business environment, information is the lifeblood of all organizations and can exist in many forms. This information is constantly under threat from many sources including internal, external, accidental and malicious loss or corruption. With the increased use of new technology to store, transmit and retrieve information, businesses are now exposed to increased numbers and types of risks and threats. The value of business information assets now dictates the need for a coherent, effective mechanism to deal with these threats and risks.

6 Managing information for life

Customers are increasingly challenged by the cost and complexity of managing their storage environment. Typically this can lead to "over provisioning" of storage resources and inefficiencies in storage management. This invariably results in higher costs, a reduction in application availability and an inability to provide effective storage and data asset management. For example, Enterprise Storage Group reports that storage now accounts for up to 50 percent of total IT infrastructure costs and that up to 60 percent of backups do not properly execute in typical network environments. Our end state vision for information lifecycle management is to be able to help customers deliver ILM across their data center(s), including:

- Valuing all data based on a set of customer-specific attributes, normally defined by the value of the data to the business e.g., application, module, user and/or time. (Note that data valuation is not just about time.)
- Segmenting the data into classes, based on value, and designing a set of storage policies for storing, protecting, managing and archiving accordingly. The policies must address data class performance, availability and cost.
- Making the cost of storage visible to end users to enable more accurate classification of data, i.e., "is that data really critical or will the vital data storage class policies be sufficient?" (Today, in most organizations, storage costs are allocated evenly across the company so end users have no sense of storage cost and hence consider all of their data critical.)
- Managing each data class based on its value.



6.1 Business drivers

In trying to establish a way forward in implementing an information lifecycle management strategy, IT organizations need to be aware of their business drivers. Each company will have its own products and services that it is taking to market. These products and services will have applications and IT services associated with them. They will be bound by the standards and policies incumbent within their organization or industry. The business drivers in turn will create business challenges for the IT organization, in terms of data protection and availability and the efficiency of operations in delivering the services to the business. Once the main business drivers are determined, the IT organization can establish a clear view of the service levels required to address the business priorities.

6.2 Service drivers

The service levels define the quality of service required to meet the business priorities in terms of cost, availability, security, reliability, manageability, connectivity, etc. StorageTek's approach to information lifecycle management allows us to establish the business and service level priorities and therefore the key data drivers.

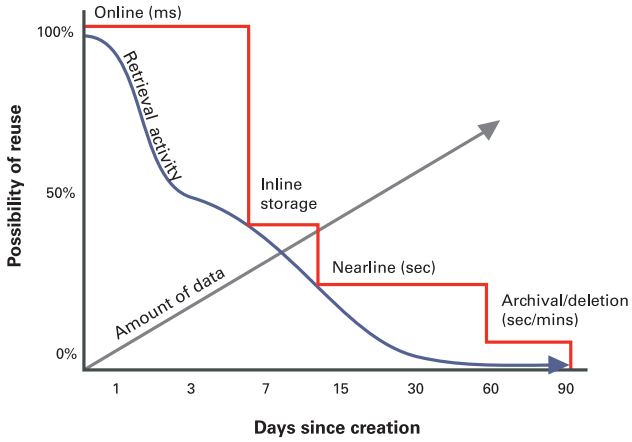
6.3 Data policies

Understanding the data drivers enables us to define data polices — critical, vital, sensitive and required, for example — that meet the necessary service levels.

The data classification framework enables alignment of risks and threats to corporate policies and standards for information protection and availability. This alignment provides a definitive capability to translate these policies and standards directly to infrastructure technology facilities. This helps IT keep keep information protected and available for access when and where it is required and in the expected format.

7 Tiered infrastructure

The 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. An organization's storage strategy must adapt to data needs, or it will waste precious storage assets over-storing information with declining use and value. Organizations can bring their storage strategy into balance by aligning the cost of storage with the value of the information.



Source: Horison Information Strategies, Storage Technology Corp.

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. The tiered infrastructure points to four levels of storage hierarchy: online, inline, nearline and archive. Each of these tiers has performance and cost attributes that need to be considered when aligning an information lifecycle management strategy to business objectives.

8 Business continuity

By developing an ILM approach, organizations can have a clearer perspective of their data priorities. This is important in establishing business continuity. By clarifying the critical data necessary for the business in a disaster or recovery situation, emphasis can be placed on that data, with secondary recovery time objectives for the other data within the hierarchy.

Similarly, by determining the data classes, appropriate charging mechanisms can be put in place to ensure that the business priorities are properly accounted for and that the business has a clearer understanding of the costs associated with their deliverable. Another benefit of data classification is that it can establish standards within the organization for new applications that come online. In most companies the propensity to throw new applications across the fence to the operations and support teams is commonplace.

Having designed the solution to the required specification, it becomes the operations team's task to manage the data and its growth within a flat or decreasing budget. Managing all data as though it were equal adds to the cost of the storage infrastructure, as the technologies available are not fully utilized to ensure service levels are maintained.

9 IT service management

Due to the rapidly increasing rate of data growth experienced by organizations, and the proliferation of complex infrastructure technology facilities, the total cost of ownership is escalating for both storage infrastructure technology and data management processes. This puts pressure on the IT organization to increase the service levels to the business while at the same time managing a flat or declining budget. IT has a practical role to play in aligning the business drivers with the cost of IT operations to make business continuity achievable.

An information lifecycle management process can help to quantify the cost of management. Typical management costs relative to infrastructure technology costs can vary from 4:1 to 8:1. This means that for every dollar spent on technology, four to eight dollars are spent on management. Most of these management costs are hidden as they are largely related to underlying processes within IT operations. With data growth rates as they are, businesses now need to take control and adopt solutions that increase efficiency and effectiveness of operations by improving return on investments, productivity and quality of service and reducing the total cost of ownership. Data classification provides a process-based mechanism to improve the utilization of technology resources and help IT to better meet service level and operational level objectives.

Discrete service offerings from StorageTek enable customers to profile their existing infrastructures and discover opportunities to make more effective use of existing assets, as well as identify where less valuable data can be migrated to a more cost effective storage tier.

10 StorageTek's position

Historically, companies store, protect and manage their information in the same way. They put it on expensive, inefficient disk — no matter how much information, what kind it is, how important it is or how often they use it.

Basically, disk is overused or used inappropriately. But all information isn't equal, and with exploding data and dwindling budgets and staffs, many companies realize that one product or one size of anything doesn't work anymore. StorageTek's approach to information lifecycle management helps customers assess and value their data, then choose the right storage solution. The right solution can be disk, tape, networking, software, services or support, all of which StorageTek offers. Our ability to apply information lifecycle management is a direct result of more than 30 years of focus on storage.

The information lifecycle management approach isn't about selling products based solely on performance and capacity. It isn't about installing StorageTek devices in place of competitive products. And it isn't about adding more hardware. We work within a customer's environment, often with best-in-class third-party providers, to define solutions that meet each customer's unique objectives. Our approach to information lifecycle management allows customers to store, manage and protect their information according to its value to their businesses, not according to the status quo. While many vendors in storage are talking about information lifecycle management, only StorageTek offers credible solutions and offerings that are available today.

11 StorageTek's focus

To execute our information lifecycle management strategy and guide our sales activities, we are focusing on satisfying four customer needs associated with data storage, protection and management:

1. Information management. We will help customers more efficiently manage their data and storage assets. We apply our assessment, deployment, monitoring and reporting skills to simplify every aspect of storage and data management. Technology and services are key deliverables today. For example, StorageTek Application Storage Manager® (ASM) and Global Storage Manager (GSM) software report on, move and manage data across tiers of storage. StorageTek Enterprise Support Services℠ program and Remote Managed Storage services provide enterprise support. In the future, we'll introduce software and tools that work across entire IT environments.

2. Primary data. We will help customers reduce expensive and unnecessary primary copies and improve utilization of existing primary storage. We offer practical, reliable, primary disk and disk backup alternatives, including virtual disk solutions.

3. Data protection. We will help customers reduce labor associated with data protection and improve the reliability and speed of backup and recovery. Using consulting/services practices, along with mirroring and data movement capabilities, plus tape virtualization, we help customers improve backup success rates. In the future, look for continuous data protection alternatives, tape library advancement, additional StorageTek BladeStore disk systems and more.

4. Archive and compliance. We will help customers retain and retrieve information to meet compliance and business needs. During the last decade, numerous laws and regulations have increased requirements for record retention. Today, StorageTek provides compliance consulting, solutions for e-mail, digital archiving, and storage solutions in both mainframe and Open Systems environments, including tape WORM (write once, read many) technologies.

12 Summary

Effective IT operation stems from the clarification and quantification of business priorities. By understanding these requirements, IT organizations can efficiently deploy their assets to improve the sustainability of business over time.

With a sole focus on data storage, StorageTek works with its customers to apply key technologies and best practices to help them regain control of their storage environment. We assess their current storage management capabilities. We then work with them to design and implement storage solutions that will result in measurable improvements in application performance and availability and result in a reduction in their storage total cost of ownership (TCO).

StorageTek applies information lifecycle management to help businesses make decisions based on the value of information assets throughout the information lifecycle. This approach facilitates consolidation of costs, improvements in quality of service, organizational productivity and the ability to take control of major risk areas such as disaster recovery and business continuity.

ABOUT STORAGETEK®

Storage Technology Corporation (NYSE: STK), a $2 billion worldwide company with headquarters in Louisville, CO, has been delivering a broad range of storage management solutions designed for IT professionals for over 30 years. StorageTek offers solutions that are easy to manage, integrate well with existing infrastructures and allow universal access to data across servers, media types and storage networks. StorageTek's practical and safe storage solutions for tape automation, disk storage systems and storage integration, coupled with a global services network, provide IT professionals with confidence and know-how to manage their entire storage management ecosystem today and in the future.

StorageTek products are available through a worldwide network. For more information, visit www.storagetek.com, or call 1.800.275.4785 or 01.303.673.2800.

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