



The road to information on demand: Infrastructure Simplification

*This is one in a series of four IBM whitepapers
designed to help your business move toward
providing information on demand.*

Contents

- 2 Executive Summary**
- 2 Introduction: the case for simplifying your storage infrastructure**
- 4 Three Proven Methods: Consolidation Virtualization Automated Management**
- 7 How IBM can help your enterprise: Consolidation Virtualization Automated Management TCO Analysis Migration Services**
- 9 Conclusion**
- 9 For more information**

Executive Summary

- Because complexity has emerged as a key inhibitor to competitiveness, a simplified infrastructure can give your business a strategic advantage.
- A simplified infrastructure can provide benefits to the IT infrastructure helping increase application availability, optimize systems and improve personnel productivity.
- Simplification can help lower costs to help your bottom line and can lay the groundwork for business continuity and information lifecycle management initiatives, paving the way towards becoming an on demand business.
- Three proven methods for simplifying the storage infrastructure are consolidation, virtualization and automated management.
- As part of its strategy for helping your enterprise enable an infrastructure for an on demand business, IBM is uniquely positioned to help you address key infrastructure simplification issues.
- IBM's TotalStorage strategy focuses on providing a resilient and easily managed storage infrastructure where information is stored on the right kind of storage to reflect its value at that point in time.

Introduction: the case for simplifying your storage infrastructure

The signs of complexity are everywhere in the modern data center—firewalls, routers, servers and multiple operating systems are just the beginning. Server environments, networks and storage are typically silos of resources dedicated per application and grow with only a loose connection to one another—and usually with no regard for overall system complexity. It's no wonder your environments can be so difficult to understand, manage, secure, update and operate.

Infrastructure simplification is a method of looking at the whole environment—end-to-end—and finding ways to eliminate the complexity that can inhibit the free flow of information necessary in today's fast-paced business world. The storage environment offers numerous opportunities for simplification that can help unlock the value of information to your business. The ability to simply and easily share and manage information is a key requirement for integrating business processes end-to-end, and is a key requirement for an on demand business.

IBM can help simplify your entire infrastructure and its management. With its broad expertise, IBM can help a company holistically address simplification issues and help you create a much more cost-effective, flexible and resilient environment.

IBM can help simplify your entire infrastructure and its management. With its broad expertise, IBM can help a company holistically address simplification issues—with servers, network, data and storage—and help you create a much more cost-effective, flexible and resilient environment.

In many cases, storage products come from different vendors and represent different generations of technology. Often, this is a natural result of short-term needs outweighing long-term planning or a result of unplanned growth such as mergers and acquisitions. Copy services, recovery and backup processes, volume and information management and other management tasks may incorporate different software from different vendors. An organization hampered by such inconsistencies can't expect to deploy its resources where they are most needed and respond to customer needs in a timely fashion.

What can your enterprise do? It can make the move towards infrastructure simplification, helping enable business growth, reducing operational risk and reducing costs by optimizing IT resources and improving productivity.

How can infrastructure simplification help your business achieve its goals? The free flow of information across and within an organization is the main currency for business innovation and creativity. When people have instant access to the information they need—in the form in which they need it—they can provide better service to customers and find new and better ways to bring value to the marketplace. Throughout a company, the IT infrastructure is where all of this information flows. When the IT infrastructure grows without regard for easing that information flow, complexity can choke that free flow just as an arterial plaque chokes blood flowing to the heart. Simplification strips away inhibitors to business acceleration—e.g., faster product development and communications with customers and partners—while allowing shared data to foster innovation. Examples include deeper and real-time analysis of data to take advantage of emerging trends and forging stronger customer ties by offering more information to them in more valuable ways. In conjunction with servers, networks and applications, simplification of the storage provides the flexibility to achieve these goals.

Most important, with a highly efficient, highly automated environment you can help reduce your enterprise's total cost of ownership (TCO). Or, as a 2003 report by the International Technology Group said, "Five-year costs for storage, hardware, software, maintenance, personnel and facilities are reduced between 2.4 and 3.9 times by transitioning from inefficient to efficient scenarios for storage utilization."¹

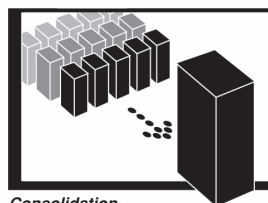
Three proven methods

The choice is clear. If your business is to compete in today's on demand world, you must find a way to simplify your infrastructure. With the help of three proven methods, you can start by reducing the complexity of your storage environment. These technologies can help organizations achieve better application availability, improved productivity and better system optimization including utilization.

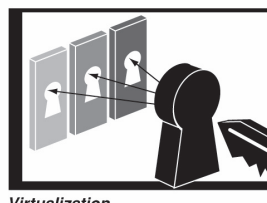
1. Consolidation. Consolidating the storage environment is a logical first step in your efforts to simplify the infrastructure. There are generally four approaches to consolidation:

- Centralization, or reducing the number of locations where data resides to only what is needed
- Physical consolidation to fewer, larger-capacity devices ("scale up")
- Data integration through such means as modular storage that easily "scales out" by adding more of the same units
- Application integration, or moving applications from clusters or multiple linked servers to a smaller number of storage devices

Infrastructure Simplification Capabilities



Consolidation



Virtualization



Automated Management

The general goal of consolidation is to reduce the number of points of management, as well as the number of physical devices. Consolidated storage environments have fewer elements, helping to reduce the chance of error or failure, avoid the creation of islands of storage and take better advantage of economies of scale for owning software, disk and tape. Consolidated environments can be more resilient and more cost-effective to manage, reducing planned downtime and TCO.

Both servers and storage can scale up or out, depending on your organization's needs. You may "scale up" via large capacity tape and disk systems while also "scaling out" via modular storage products. In addition to scaling storage technology, "scale up" server technology can assist your business in handling surges in application usage and transaction rates, while "scale out" server technology can assist in handling hundreds—even thousands—of application instances.

2. Virtualization. You will also want to consider the virtualization of IT resources. Effective virtualization is an essential part of a simplified storage environment and involves a shift in thinking from physical to logical, treating IT resources as a single, logical pool rather than as separate physical entities.

Virtualization is a natural part of the progression of IT systems. Other networks such as e-mail and the Internet have long since progressed past a need to keep track of physical resources in order to perform. The same shift is now necessary for storage networks. Just as URLs mask numeric IP addresses and email addresses mask a sequence of router hops leading to a final email server, virtualization masks complexity.

Virtualization in storage is a key component of creating a multi-tier storage environment that is managed separately from the application and server layers.

Virtualization can help your enterprise:

- Increase resource utilization by combining the storage capacity of multiple disk arrays into a single reservoir of storage
- Improve personnel productivity by enabling administrators to manage their reservoir of storage from a single user interface at a central point
- Enable a tiered storage environment in which you can match the cost of the storage to the value of the data
- Aid the consolidation of resources and simplification of management to help reduce cost and complexity, allowing your business to focus on innovation and growth
- Use Grid computing to help broaden the access to resources such as data, applications and processing capacity
- Gain the freedom to use heterogeneous hardware providers with common server management, storage management and copy services software

Virtualization in storage is a key component of creating a multi-tier storage environment that is managed separately from the application and server layers. By insulating the file and/or volume layers from applications, it helps make it easier to enact data lifecycle management, the enabling infrastructure for information lifecycle management.

3. Automated management. A third proven simplification method is automated management—that is, automating tasks such as provisioning new space for applications even if they involve a significant number of complex and time-consuming steps. This can help produce increased reliability and personnel productivity for your business. You can also use automation tools to aid in performance management—for example, figuring out why your company Web site is yielding a 15-second response time when it should be much faster. Automated management can help you understand, manage and make necessary changes to your IT environment when you have been previously authorized to do so by an IT administrator.

What can IBM do for your business as you look to reduce complexity and cost? We can help you simplify your infrastructure and its management—end to end.

There are four important applications of automated management:

- Driving resource provisioning and workload management with policies based on business goals helps better align the IT infrastructure with the business.
- Scheduled free space provisioning occurs when someone in your enterprise asks for additional storage space. With automated management, you may automate each step along the way. Tasks that previously took as long as 10 days may now take much fewer.
- Enterprise-wide reporting and monitoring can be done through the automated tracking of capacity, utilization, performance, file and device health, and integration with systems management software.
- Emergency management can be useful when your device runs out of space or an application suddenly fails in the middle of the night. With automated management and virtualized storage pools, instead of trying to cobble together the storage you need from different areas you may remotely draw from one big virtual pool of free space.

Management products should have strong integration to allow complex tasks to be automated, and to allow the flexibility to design new tasks to take advantage of automation.

How IBM can help your enterprise

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It is critically important not to think of storage as being isolated from your server and network environment or as a collection of separate, unrelated machines. Instead, simplifying your entire infrastructure can help you create a much more cost-effective, flexible and resilient environment where resources and information flow freely to where they are most needed, and can be retained or removed based on your business priorities. With an impressive portfolio that includes servers, network, storage, virtualization, and management automation software and storage, IBM – unlike narrowly focused companies – can holistically address your infrastructure simplification issues. And, thanks to the backing of IBM Business Partners, IBM Global Services and Business Consulting Services, IBM and its partners offer a depth of insight that can help our clients improve their businesses.

Consolidation. IBM can help you consolidate through the use of scale up and scale out server and storage technologies. IBM TotalStorage® *Enterprise Storage Servers* represent a strong “scale up” storage environment. IBM TotalStorage *FASiT* helps in both scaling up and modularly scaling storage out. IBM TotalStorage *SAN Volume Controller* and IBM TotalStorage *SAN File System* can help consolidate and better share and utilize data, and can dramatically reduce the number of management points for storage and servers in a scale-out strategy.

Virtualization. More than 30 years ago, IBM introduced virtualization to the marketplace. Building on the heritage of its mainframes—now called IBM eServer™ zSeries® systems—IBM continues to extend virtualization capabilities to its other product lines while raising the bar on mainframe virtualization. The new IBM *Virtualization Engine*™ can help you integrate your infrastructure with your vital business applications, enabling your business to take an enterprise-wide approach to virtualization that is consistent across heterogeneous environments. The *SAN File System* and *SAN Volume Controller*, both of which are part of the *Virtualization Engine*, can assist you in transitioning from physical file and disk management to a more flexible virtualized environment.

Automated management. Using advanced IBM automated management software, you can simplify certain tasks—e.g., provisioning new storage—to a single step. IBM TotalStorage *Productivity Center*, which is also part of the IBM *Virtualization Engine*, offers excellent management capabilities for heterogeneous storage environments. IBM *Tivoli*® *Provisioning Manager* is designed to assist in scheduled free space provisioning. IBM *Tivoli Storage Resource Manager* can help you better understand usage and improve management processes. IBM *Tivoli SAN Manager* can help you view the storage network and quickly see how it is being used. *SAN File System* and *SAN Volume Controller* are designed to add additional management capabilities such as automated file placement and failover that can improve storage management.

TCO analysis. Your IBM representative has access to TCO analysis tools based on independent data from IT experts and can help you understand the full financial impact of your IT purchase decisions over a three-, four- or five-year period. For those customers seeking a more in-depth approach to assessing simplification opportunities, IBM offers the multi-week Scorpion study, in which IBM representatives (along with your IT staff) can compare the incremental cost of computing among various platform approaches including assessment of IT spending per user and baseline cost establishment.

Migration services. IBM and selected IBM Business Partners also offer the Piper migration service to help you easily move information from unwanted disk storage onto IBM storage. By tapping IBM expertise you can help avoid the significant risk, time loss and hidden costs associated with do-it-yourself migrations.

Conclusion

The signs of complexity are everywhere in the modern data center, and in the modern storage environment, too. If your enterprise can make the move toward infrastructure simplification, it can contain expenses, enable business growth and reduce operational risk by optimizing IT resources.

As part of its strategy for helping your company enable information on demand, IBM can help you simplify your infrastructure and its management. IBM and its range of expertise, solutions and products can help address simplification issues from a broad perspective—with servers, network and storage—and help you create a much more cost-effective, flexible and resilient environment.

For more information

IBM Storage Solutions ibm.com/storage/solutions

¹ “Value Proposition for Enterprise Storage,” International Technology Group, June 2003



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