Dear Valued Business Partner:

Welcome to the IBM Business Partner Toolkit, a convenient resource to help you increase sales for your business. This toolkit is designed to bring together, in one quick-reference source, the critical information you need to get started in selling IBM System Storage offerings to your customers.

Whether you want to learn the basics of IBM storage, gain a better understanding of our individual products or get helpful tips on identifying opportunities, the IBM Business Partner Toolkit is your quick guide. It includes:

- Storage education
- Product overviews
- Opportunity identification

I hope you’ll find the IBM Business Partner Toolkit to be a valuable resource — one that will enable you to address your customers’ growing storage infrastructure challenges through delivering end-to-end offerings that create competitive advantage both for you and your customers. This toolkit is just one of the ways we’re making it easy for you to do business with IBM.

For more information about this or other IBM Business Partner resources, feel free to contact your IBM representative or your preferred distributor, or visit:

ibm.com/partnerworld

Sincerely,

Kristie Bell
Vice President, WW Marketing
IBM System Storage
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Getting started with your toolkit

Ready to get started with your IBM Business Partner Resource Toolkit? In the main sections of this toolkit, we'll take a look at some of the most-important topics in storage today—starting with an introduction to storage in *Storage at a glance*. That's where you'll find general information about our storage message and how to identify opportunities.

Next, we take a deeper dive into these main IBM System Storage™ offering categories:

- Disk systems
- Tape systems and media
- Storage networking
- Infrastructure management
- Business continuity
- Life cycle and retention

As you go to each category, you'll find sections to help you gain a better understanding of the category: education, product overviews and opportunity identification.

**Education**

So, you've heard about storage area networks, Fibre Channel and virtualization. But what do these terms really mean? Storage can be a complex subject, but a review of some storage basics can bring you up to speed. Refer to this section for an introduction to each IBM System Storage product category.

**Product overviews**

Trying to navigate through the broad portfolio of IBM System Storage offerings? How about a quick reference to guide you? Under each main category, just flip to the product overviews to find out what products we offer and how they're related to one another within a category.

**Opportunity identification**

Understanding your customers is key to meeting their needs. To facilitate your discussion, we've provided qualifying questions under the opportunity-identification section for each offering category. Asking these questions can help you find out if your customer has some of the typical needs that a product category addresses.
Storage at a glance
IBM System Storage: At a glance

Without information, people don’t have what they need to make knowledgeable decisions that lead to growth and increased profitability. Your customers’ challenge is to make sure information is always available, when and where it’s needed, to fuel the cycle of creative thinking that leads to innovation.

IBM System Storage offerings can help your customers more successfully support their business by addressing four challenging areas:

- Optimize the IT environment to simplify management and reduce costs.
- Leverage information to get the most value for your storage investment.
- Mitigate risk to meet availability, security and compliance requirements.
- Enable business flexibility to scale your IT environment as you grow.

IBM delivers the depth and breadth of intelligent storage offerings and expertise to help reliably bring information to people in a cost-effective way.
IBM System Storage: Messaging

System Storage offers strategic value across these four core themes:

**Optimize IT**
Optimize your application performance and storage-resource utilization, and reduce costs, with IBM’s virtualization, automation, and infrastructure management offerings and strong synergy across IBM servers, storage and software.

**Leverage information**
Get the most value from your information, for innovation and insight, through data mining and data sharing to speed development, foster collaboration, and simplify management and archiving of your information infrastructure.

**Mitigate risk**
Maximize business uptime and reduce risk by deploying an IT environment that makes critical information always available without disruption with IBM’s advanced availability, security and compliance offerings.

**Enable business flexibility**
Manage and adapt to growing and changing business needs with an IT environment that scales as you grow, without disruption, with multivendor interoperability and support of open industry standards.
These messages are about helping our clients optimize IT:

- Automate and simplify IT operations with revolutionary IBM System Storage offerings—so you can focus on your business and spend less time managing your infrastructure.
- Optimize your IT environment and reduce operating costs with IBM virtualization, record-breaking performance, and strong synergy between servers, storage and software.

These messages are about helping our clients leverage information:

- Deliver trusted information to people, processes and applications through data mining and data sharing to assist with collaboration, decision making and additional insights for innovation.
- Align your storage investment with the value of your information using comprehensive tiered storage, policy-based automation and intelligent information management offerings from IBM.

These messages are about helping our clients mitigate risk:

- Confidently protect your strategic information assets and efficiently comply with regulatory and security requirements with the unrivaled breadth of storage offerings from IBM.
- Keep your business running with continuous access to information through business-continuity offerings from IBM System Storage.

These messages are about helping our clients enable business flexibility:

- Rapidly adapt to evolving business needs by creating a flexible IT infrastructure that scales as you grow—without disrupting ongoing operations—using proven IBM System Storage offerings.
- Protect your investment with IBM support for open standards, superior multivendor interoperability and cost-effective offerings from IBM.
IBM System Storage: Open standards

IBM systems are built on open standards, making them interoperable with one another and with most third-party systems. IBM makes significant investments in industry-wide development communities and in delivering systems that incorporate open standards. As a result, these systems become integrated building blocks that connect together in standard ways, helping ensure greater interoperability with systems that adhere to the open-standards approach. They provide your customers with the flexibility to choose the right offering to match their business needs.

IBM Systems technology adheres to open standards for management, including the Storage Networking Industry Association’s (SNIA’s) Storage Management Initiative Specification (SMI-S). We have also joined with key partners in establishing Aperi, a project that will be managed by an independent, nonprofit, multivendor organization to form a new open-source community. Aperi builds on existing open storage standards such as SMI-S. The results are giving IT managers flexibility of choice and IT administrators one console to manage heterogeneous resources, improving productivity.
IBM System Storage: How to sell

This section provides you with some general information and valuable resources that will help you as you sell IBM products.

Identifying storage opportunities
Here are some triggers that tell you there is a sales opportunity for IBM storage:

- **Is the customer buying servers?**
  Server buyers tend to buy storage within three months of their server purchase.

- **Is there a need to share files?**
  Keeping a copy of the same file on multiple servers is wasteful and leads to confusion about which copy of the file is canonical (has the latest updates).

- **Is the number of users of the application increasing?**
  Adding employees or upgrading applications generally leads to additional storage needs.

- **Does the customer have multiple IBM System p™ or UNIX® servers? Multiple IBM System x™ or other Microsoft® Windows®, Linux® or NetWare servers? System z™? A mixture of these?**
  These typically have limited internal storage capacity, and customers can save a lot of money by using external storage.

- **Are existing storage assets coming off lease or nearing the end of the depreciation cycle?**
  The data on multiple older storage controllers can often be consolidated onto a single newer, faster system with cost savings.

- **Does the customer already have IBM external storage installed but is running out of capacity?**
  This is an opportunity to upgrade the storage.

- **Do customers need to protect their frequently updated data with a secondary tier of storage?**
  IBM offers a broad portfolio of disk and tape systems and advanced software that can be used to move data between the two tiers quickly.

- **Does the customer need to keep large amounts of infrequently accessed data at a lower cost than typically provided by storage controllers?**
  Fibre Channel Advanced Technology Attachment (FATA) and Serial ATA (SATA) drives and tape storage media can lower the overall costs of keeping this data.
• Does the customer want to leverage an existing Ethernet infrastructure to allow sharing of storage and data? The IBM System Storage N series supports Ethernet environments, enabling economical network-attached storage (NAS) and Internet Small Computer System Interface (iSCSI) deployments.

How to facilitate a storage consolidation discussion
Here is a list of probing questions you can use to explore opportunities:
• Are your data-storage needs growing?
• Do you have communities of users that need to share files?
• Can your employees and customers access data quickly enough to keep them productive and happy?
• Are you spending money on storage capacity directly attached to your servers that is not being fully utilized?
• How do you ensure that your data is protected from loss?
• Do you have multiple storage controllers coming off lease or nearing the end of their depreciation cycle?
• Who is your current storage vendor, and are you happy with the total cost of ownership (TCO) that your current storage vendor is providing you?

Typical findings
After asking the preceding questions, you’ll often find that customers have these concerns:
• Multiple islands of storage are becoming hard to manage and are driving costs up.
• Performance is not always sufficient to meet users’ needs.
• Reliability is not at desirable levels. Even a small outage is a big deal when it happens in a remote location.
• Storage capacity is not being used efficiently. Some users and servers need more storage, while capacity on other servers sits idle.
• Data backup is becoming hard to manage.
• Storage costs are getting out of control as storage needs rise.
**Qualifying questions**

Here are questions you can use to gauge a possible sales opportunity:

- Are you under pressure to control costs and IT expenditures?
- How many servers and what operating systems do you have?
- What are the key applications that drive your storage demand?
- Can your storage scale easily to meet growth and new application needs?
- Are you unable to add additional storage capacity because of budget constraints?
- Are you concerned that you can’t predict future growth? Do you need a storage system that can upgrade to higher capacity and performance without losing your initial investment?
- Do you often find that you are adding additional servers and associated storage to keep pace with your growth?
- Do you need more capacity and performance — at a lower cost?
- Does storage management cost you money for staffing, education and time?
- How much benefit would you see from having a single interface — fewer unique vendor-specific tools to learn and use — for server and storage management?
- Are your backup windows getting smaller?
- Do you need to run test applications against copies of live data?
- Do you need to set up a disaster-recovery plan?
- Are your storage needs satisfied by the internal storage in the server?
- Do you need to lower IT costs and complexity while still providing a computing infrastructure with high levels of server and storage performance typical for database and online transaction processing?
- Are you confronted with significant complexities of storage management, and are you looking to simplify the environment?
- Do you have a large number of server platforms, storage platforms or operating environments — or a combination of these?
- Do you understand the risks and costs associated with data-access delay or data unavailability? Do you have the skills to complete an analysis?
- What competitive storage or server hardware is installed, and what competitor is bidding for the business (EMC, HDS, HP, Dell, Sun)?
IBM System Storage:  
Disk and tape education

**SCSI, RAID and iSCSI**

Technologies that enable and support network storage include SCSI and Redundant Array of Independent Disks (RAID). For years, SCSI has provided a high-speed, reliable method for data storage, evolving through many standards to the point where SCSI is now the storage technology of choice. RAID is a series of standards that provide improved performance and fault tolerance for disk failures. Such protection is necessary because physical disk failures account for half of all hardware device failures in IT environments.

In addition to the SCSI and RAID mainstays, another significant storage technology is Fibre Channel, which enables interconnected storage devices to communicate at very high speeds (rapidly approaching a capability of 10 gigabits per second [Gbps]). As well as being faster than more-traditional storage technologies such as SCSI, Fibre Channel also allows for devices to be connected over a much greater distance, up to 10 kilometers (6.2 miles). Further, if one Fibre Channel switch is connected to another switch using special optic transceivers, they can communicate effectively over distances of up to 100 kilometers (62 miles). This capability enables devices in a storage area network (SAN) to be placed in the most appropriate physical location. Fibre Channel is the foundation for more than 90 percent of all SAN installations in the world.

Another development expected to make a large contribution to the growing success of network storage in general is iSCSI, a technology that enables blocks of data to be transported to and from storage devices over an Internet Protocol (IP) network. Using iSCSI, the concept of network storage can be taken anywhere that IP can go, which, as the Internet proves, is basically anywhere, representing the ultimate in flexibility in terms of where storage devices can be placed in relation to each other.
What is virtualization?
A virtualized environment can help your customers find easier ways to manage and optimize their IT systems, saving money, making their IT staff more productive and simplifying system-resource allocation.

Virtualization is a way to represent resources logically, so that they are not constrained by physical limitations. Storage virtualization allows data to be migrated from old technologies to new technologies without disrupting access from applications. IBM virtualization technologies extend the view and capabilities far beyond the realm of simple partitioning to create virtual resources, access and management of resources as one.

IBM pioneered storage-virtualization technology, and we continue to employ it across our product family tool to help our clients manage their information and systems.
Disk systems
Disk systems: 
**Education**

Disk storage is used to transfer a large amount of data to and from computer processors at a high rate of speed. Data is transferred to a group of disks for temporary or permanent storage. A disk drive is a peripheral device used to read from and write to a disk.

IBM delivered the first commercial disk system and continues to be at the forefront of new developments in disk system technology.

The first disk system for computer storage in 1956 could store five million bytes (five megabytes) of data on 50 disks, each 1 centimeter (24 inches) in diameter. In 2002, IBM scientists used innovative nanotechnology to demonstrate a data-storage density of a trillion bits per square inch—20 times higher than the most-dense magnetic storage available today. IBM achieved remarkable density, enough to store 25 million printed textbook pages on a surface the size of a postage stamp.

Disk storage is most frequently used for the following purposes:

- Fast access to data
- Random and sequential read and write of data

Disk drives are available in different forms and capacities:

- 2½ in., 3½ in. and 5¼ in. disk diameter
- Disk capacities from 36 to 500 gigabytes (GB), where a gigabyte equals 1,000,000,000 bytes
Disk systems: Storage for NAS environments

Product overviews

The success of a business often depends on its ability to manage information efficiently. Yet many businesses are finding that the rapid growth of information is outpacing their ability to collect, store and maintain it. To help facilitate effective and efficient information management, IBM introduced the following products:

- IBM System Storage SAN Volume Controller for virtualization
- IBM System Storage DS™ family for direct and SAN attached storage
- IBM System Storage N series for unified storage
Virtualization

*IBM System Storage SAN Volume Controller*

- Designed to combine storage capacity from multiple vendors into a single reservoir of capacity that can be managed from a central point
- Designed to help increase storage utilization by providing host applications with more-flexible access to capacity
- Designed to help improve productivity of storage administrators by enabling management of combined storage volumes from a single interface
- Designed to support improved application availability by insulating host applications from changes to the physical storage infrastructure
- Designed to enable a tiered storage environment in which the cost of storage can be better matched to the value of data
- Designed to support advanced copy services from higher- to lower-cost devices and across subsystems from multiple vendors

Direct- and SAN-attached storage

*Enterprise: IBM TotalStorage® DS8000™ series*

- New DS8000 Turbo models enhanced for greater performance and scalability with support for 500 GB FATA drives
- Enterprise-choice warranty allows customers to choose the warranty length that’s right for them, from one to four years
- Designed to deliver robust, flexible and cost-effective disk storage for critical workloads
- Built for outstanding performance and offers IBM’s first implementation of storage-system logical partitions (LPARs) using IBM Virtualization Engine™ technology
- Created to help provide exceptional system availability to support continuous operations
- Able to scale up to 320 terabytes (TB) of physical capacity and support storage sharing for a wide variety of servers
- Designed to facilitate asset protection with model-to-model field upgrades
- Designed to offer centralized and simplified management
Enterprise: IBM TotalStorage DS6000™ series

- New 500 GB FATA drives help increase scalability
- Designed and priced to lower the TCO for a highly available, robust storage solution for medium and large enterprises
- Delivers enterprise-class functionality, with open systems and mainframe host attachment in a modular, scalable form-factor
- Provides advanced copy services, which are equivalent to and interoperable with DS8000 series and IBM TotalStorage Enterprise Storage Server® (ESS) 800 and 750 systems
- Included with the DS6000 series is the IBM TotalStorage DS Storage Manager, offering a GUI interface and Express Configuration wizards, which provide simplified system configuration and management
- Using modular, 3U, 16-disk drive, rack-mountable enclosures, the DS6000 series can grow along with your storage needs, providing up to 64 TB of physical storage
- Standard with every DS6000 is an enterprise-class, one-year warranty with easy-to-order upgrades for additional years

Enterprise: IBM System Storage DS4800

- 4 Gbps Fibre Channel interface technology
- Up to 1600 megabytes per second (MBps) bandwidth for high-throughput applications
- Fibre channel and SATA hard disk drives supported
- Includes IBM TotalStorage DS4000™ Storage Manager to help centrally manage the DS4000 series
- Eight host channels for increased connectivity

Midrange: IBM System Storage DS4700 Express Model

- End-to-end, 4 Gbps-capable, Fibre Channel interface technology to help optimize performance
- Up to 1600 MBps bandwidth for high-throughput applications
- Support for Fibre Channel hard disk drives
- Includes IBM System Storage DS4000
- Storage Manager to help centrally manage the DS4000 Series
- Eight total host channels with dual controllers for increased connectivity
- Support for up to 112 disk drive modules with the attachment of six DS4000 EXP810 Expansion Units
**Midrange: IBM System Storage DS4700 Express**

- End-to-end, 4 Gbps-capable, Fibre Channel interface technology to help optimize performance
- Up to 1550 MBps bandwidth for high-throughput applications
- Support for Fibre Channel hard disk drives
- Includes IBM System Storage DS4000 Storage Manager to help centrally manage the DS4000 series
- Eight total host channels with dual controllers for increased connectivity
- Support for up to 112 disk drive modules with the attachment of six DS4000 EXP810 Expansion Units
- NEBS-3 compliant, designed to be powered from a -48 V dc Telco industry-standard power source

**Entry-level: IBM System Storage DS4200 Express**

- 4 Gbps Fibre Channel interface technology
- Up to 1550 MBps bandwidth for high-throughput applications
- SATA-only hard disk drives supported
- Includes IBM System Storage DS4000 Storage Manager to help centrally manage the DS4000 series
- Four total host channels with dual controllers for increased connectivity

**Entry-level: IBM System Storage DS3400**

- Affordable, 4 Gbps Fibre Channel interface technology
- Includes IBM System Storage DS3000 Storage Manager, an intuitive and easy-to-use tool to manage the DS3000 series
- Scalable to 3.6 TB of storage capacity with 300 GB hot-swappable Serial Attached SCSI (SAS) disks
- Expandable by attaching up to three EXP3000s, for a total of 14.4TB of storage capacity
- Direct-attach or SAN solution
**Entry-level: IBM System Storage DS3200**
- Affordable, 3 Gbps SAS interface technology
- Includes IBM System Storage DS3000 Storage Manager, an intuitive and easy-to-use tool to manage the DS3000 series
- Scalable to 3.6 TB of storage capacity with 300 GB hot-swappable SAS disks
- Expandable by attaching up to three EXP3000s, for a total of 14.4 TB of storage capacity
- Direct-attach solution for up to six servers

**Unified storage (supporting NAS, iSCSI and Fibre Channel simultaneously)**

**Enterprise: IBM System Storage N7600 and N7800**
- Deliver a powerful storage solution with scalability to 504 TB
- Offer extremely low maintenance requirements with one of the industry’s most-comprehensive set of advanced functions
- Facilitate NAS and iSCSI deployments that are affordable, and easy to implement and manage
- Accommodate attachment to Fibre Channel SANs
- Include many redundant features, high-availability clustering, Write Once Read Many (WORM) data protection, and on- and off-site disaster-recovery protection
- Support both high-performance Fibre Channel and cost-efficient SATA disk drives on a single system
Midrange: IBM System Storage N5200, N5300, N5500 and N5600

- **Reliable**—Designed to address the needs of business- and mission-critical applications through high data availability and system-level redundancy features
- **Versatile**—Single, integrated architecture designed to support concurrent block I/O and file serving over Ethernet and Fibre Channel SAN infrastructures
- **Fast**—Support high throughput and fast response times for database, e-mail and technical applications
- **Flexible**—Fibre Channel and SATA disk drive capabilities allow for deployment in multiple solution environments including data retention, near-line storage, disk-to-disk backup scenarios and high-performance, critical I/O-intensive operations

Entry-level: IBM System Storage N3700

- **High availability**—Leverages proven features including a high-performing and scalable operating system, data management software and redundancy features
- **Heterogeneous storage access**—Designed to provide networked storage capable of consolidating NAS and iSCSI storage requirements
- **Fibre Channel Protocol (FCP) support**—Designed for operation in Fibre Channel SAN environments
- **Scalable and upgradeable**—Supports scalability and rapid upgrades with no required data migration
IBM System Storage N series Gateways

- **Heterogeneous environment**—Designed to provide a suite of advanced functions for multiprotocol, multivendor storage environments
- **Storage consolidation**—Designed to enable organizations to consolidate UNIX, Windows and Web workloads with existing SAN storage, thereby helping to increase storage utilization
- **Use of existing SAN infrastructure**—Can integrate into existing SAN storage environments, helping to optimize investment protection and ROI

**Software**

*Data ONTAP for IBM System Storage N series*

- Employs the highly scalable and flexible Data ONTAP operating system that is designed to support the use of network filers in heterogeneous host environments
- Offers flexible management and high-availability options to support business continuance and reduce storage management complexity in your enterprise
- Designed for use in UNIX, Windows and Web (http) environments, providing the foundation to build your storage infrastructure
Disk systems: Opportunity identification

Is disk storage right for your customer? The following questions can be a starting point for determining whether IBM disk storage can address your customer’s business needs.

IBM System Storage virtualization solutions can offer clients the opportunity to decrease their TCO for block data formats. Specifically, offerings featuring IBM System Storage SAN Volume Controller are designed to offer improved application availability, improved storage-resource utilization, and enhanced personnel productivity through more-efficient, centralized storage management.

- **Are your data-storage needs growing?** Are new servers being purchased, or is the number of users on the applications increasing?
Server buyers tend to buy storage within three months of their server purchase. Adding employees or upgrading applications generally leads to additional storage needs. It is less expensive in the long run to look at long-range storage needs and consolidate storage onto a DS8000 system to save in total cost and simplify management.

- **Can your employees and customers access their data quickly enough to keep them productive and happy?**
The DS8000 series offers excellent performance to help provide faster response time and, as a result, greater productivity.

- **Are you spending money on distributed storage capacity attached to servers that are not being fully utilized?** Do you have multiple servers or multiple kinds of servers (such as UNIX, System z, System i™, Microsoft Windows, NetWare or Linux?)
Multiple islands of storage are becoming hard to manage and are driving costs up. Consolidating storage from multiple servers or controllers onto DS8000 series technology can help increase utilization and simplify management.

- **Are your existing storage assets coming off lease or nearing the end of the depreciation cycle?**
The data on multiple, older storage controllers can often be consolidated onto a single, newer, faster system with cost savings.
- **How can a SAN address your customers’ challenges?**
  The preceding table can help you match your customers’ pain points with the features of SAN offerings that are designed to address these challenges.

- **How do you ensure that your data is protected from loss?**
  Even a small outage is a big deal when it happens in a remote location or when it has an impact on the access to important data. The IBM DS8000 series is designed to support 24x7 environments and has advanced copy functions that can enable disaster-recovery and backup offerings to help protect important data.

- **Do you find that you need fast access to some data while, at the same time, you need lower-cost storage on which to place backup data for archives?**
  If so, critical data, for example, could be stored on the fastest, most-high-availability Fibre Channel disks in the DS8000 system, while less-critical or less-accessed data could be stored on lower-cost FATA drives, all within the same DS8000 system.
• Are you buying IBM servers for which you need additional disk storage?
  If so, you should consider IBM storage. IBM disk storage is thoroughly tested and supported for use with IBM servers. Additionally, IBM server and storage products are jointly developed and integrated to help ensure that they work well together. A single vendor also eliminates the finger-pointing that can occur when multiple vendors are involved in support issues.

• Do you need to share files?
  Keeping a copy of the same file on multiple servers can be redundant and lead to confusion about which copy of the file has the latest updates.

• Do you have multiple IBM System p or UNIX servers?
  Multiple IBM System x or other Windows, Linux or NetWare servers? IBM System z? A mixture of these? These typically have limited internal storage capacity, and you stand to save money by sharing files among these devices on external storage.

• Do you already have IBM external storage installed? If so, are you running out of capacity?
  This might be the right time for you to upgrade your storage.

• If you have an open-systems infrastructure, do you need to protect your frequently updated data with a secondary tier of storage, allowing rapid restore or movement to a backup device?
  The DS4000 can intermix Fibre Channel and SATA drives behind the same controller, and either the IBM FlashCopy® utility or VolumeCopy can be used to move data between the two tiers quickly.
  Similarly, the DS8000 and DS6000 can intermix Fibre Channel and FATA drives behind the same controller, and either FlashCopy or VolumeCopy can be used to move data between the two tiers quickly.
  For Ethernet-attached or mixed (Ethernet and Fibre Channel) deployments, all N series platforms offer an intermix of Fibre Channel and SATA drives behind the same controller.
• Does the open-systems customer need to keep large amounts of (infrequently accessed) data at a lower cost than typically provided by storage controllers?
SATA drives behind a DS4000 controller, as well as FATA drives behind a DS6000 or DS8000 controller, can lower the overall costs of keeping this data, yet at sequential retrieval rates comparable to Fibre Channel storage.

• Does the customer want to leverage an Ethernet infrastructure to allow sharing of storage and data?
All N series controllers (N3700, N5200, N5300, N5500, N5600, N7600 and N7800) support Ethernet environments, enabling economical NAS and iSCSI deployments.

**IBM System Storage SAN Volume Controller**
The following questions can help you determine if a customer might benefit from IBM SAN Volume Controller:

• Are you currently using storage virtualization products in your business? Are you getting the value you expected? Is there something more you’d like to see?
• If you are currently using storage virtualization products in your business, what products are you using?
• How much storage capacity do you currently have, and how many people are managing it at your main data center location? What vendors’ products are installed there?
• Are you concerned about the efficiency of storage and the costs associated with managing it?
• Are you concerned about impacts to application availability caused by storage management activities, such as moving data from one disk system to another?
• Do you plan to consolidate your storage infrastructure? Would you like to learn more about how virtualization products can help you better implement your existing storage plans?
SAN Volume Controller can help in many of these areas:

- In an open-systems environment, all customers can benefit from SAN Volume Controller.
- Using different disk systems can mean having to learn different ways of managing them. SAN Volume Controller consolidates management of storage into a centralized location with only one set of skills to learn.
- SAN Volume Controller can help to improve the utilization you get from your existing disk systems, which might reduce your need to buy additional storage.
- By centralizing management, SAN Volume Controller can help to reduce the amount of effort involved in managing storage. This can help reduce the need for storage-administration staff, freeing them for more productive activities.
- SAN Volume Controller can move data from one disk system to another without disruption to applications using that data. This enables you to migrate data from an older disk system to a newer one quickly and easily. Or you can balance load across different disk systems.
- SAN Volume Controller frees you from being tied to any specific storage vendor. This enables you to choose the most cost-effective storage system whenever you are buying storage, without having to be concerned about compatibility with existing storage.

**IBM unified storage environments**

To determine if a NAS offering might address your customers’ needs, you might first consider the typical characteristics of small and medium business (SMB) customers. These are customers who:

- Are responsible for IT operations (frequently these will be functional managers in accounting or finance who wear multiple hats that include IT responsibilities).
- Have mission-critical storage needs.
- Need IP-attached storage.
- Want pooled or shared storage attached to a network but can’t afford, or don’t have the skills or time, to implement a Fibre Channel SAN.
- Need a single storage platform that supports file server and database applications over an IP network, as well as Fibre Channel connectivity.
- Want to centralize their storage operations.
N series products are an excellent choice for SMB customers who want:

- To lower hardware costs by improving the overall disk utilization in their environments.
- To decrease the risk of lost data in their enterprises.
- Heterogeneous access to a single storage platform.
- To simplify server environments and storage management, and reduce costs as a result.
- To compensate for a lack of IT skills to effectively manage distributed environments.
- The convenience of purchasing and getting support from a single-source vendor.

The following questions can assist you during a discussion with your customers to determine if NAS is right for them. Ask them:

- How many servers do you currently have installed?
- Are you using direct-attached storage?
- What are the growth rates of the servers and storage currently in use by your company?
- Are storage management and data backup causing you problems?
- Would you like to eliminate the need for many Microsoft Windows Client Access Licenses?
- Would you consider the advantages that IP-attached storage can offer, if the solution was simple and cost effective, and didn’t require that your staff develop new network management skills?
- In addition to IP connectivity, are you interested in a storage device that also connects to Fibre Channel SAN?
For more information about System Storage N series:

- Go to the IBM PartnerWorld® Business Partner N series sales kit at:
  
  ibm.com/partnerworld/sales/systems/myportal/_s.155/307?navID=f220&geoID=All&prodID=NAS&x=8&y=16#SalesKit

- Visit IBM Network Attached Storage at:
  
  ibm.com/servers/storage/nas/
Tape systems and media
Tape systems and media: Education

Tape storage is based on a principal similar to the way that cassette tapes operate for video or music. In its simplest form, it’s a magnetic coating on plastic film.

IBM delivered the first tape system for computer storage in 1952, when the company announced the first tape drive. This marked the transition from punched-card calculators to electronic computers. Since then, IBM has initiated nearly every innovation in linear tape storage and has led the industry in setting standards for tape interchange.

Clients quickly find out that the tape automation system that they purchased not so long ago lacks sufficient capacity to meet all of their storage requirements today. They are then faced with installing more automation or migrating to higher-capacity tape devices to maximize the capacity of each automated slot.

To address this issue, IBM introduced the IBM TotalStorage Enterprise Tape Drive 3592 in 2003, with a native cartridge capacity of 300 GB. The drive is designed to work with IBM’s 3494 tape library, offering users investment protection, an open environment and ease of implementation.

Our newest drive, the IBM System Storage TS1120 Tape Drive, can store up to 2.1 TB with 3:1 compression on a tape cartridge and can transfer data at 104 MBps. The Linear Tape Open (LTO) Ultrium 4 tape drive stores 800 GB native per cartridge and transfers data at up to 120 MBps.

Tape is most frequently used for the following purposes:

- Low-cost archive of data
- Backup and disaster recovery
- Interchange of data between systems

Tape is available in different forms and with different characteristics:

- 4 mm
- 8 mm
- One-half inch cartridge
Tape systems and media: 
**Product overviews**

IBM offers a complete portfolio of highly scalable tape systems and devices, from easy-to-acquire, entry-level options to high-performance systems for large enterprises.

Devices include:
- Tape storage virtualization
- Tape libraries and automation
- Tape drives and media

IBM's entry-level tape products provide data backup and protection of client data at a cost that will appeal to companies with the tightest of budgets. For small to medium-sized clients who are expanding operations or experiencing rapid growth, IBM entry-level tape products cost-effectively handle data backup, archiving and management. On the other hand, IBM enterprise tape products offer exceptionally high performance, availability, reliability and capacity to help meet the needs of clients seeking robust offerings for data archiving, backup and disaster recovery.
**Tape storage virtualization**

**IBM Virtualization Engine TS7520**
- Virtual tape-backup functionality with disk-based access speeds and rapid access to the most frequently used data
- Designed to allow multiple backup or restore jobs, or both, to run simultaneously on a single TS7520 for high performance and infrastructure simplification
- Designed to allow for electronic vaulting with high-security features using encryption
- Provides up to 884 TB native capacity
- Part of a complete information life-cycle management (ILM) solution to help efficiently manage critical data
- Designed for IBM System i, System p, System x, System z (Linux) and other Linux, Windows and UNIX distributed systems environments

**IBM Virtualization Engine TS7700**
- Can help accelerate backups and recalls by leveraging a tiered hierarchy of disk and tape to more efficiently use tape drives
- Can help automate and simplify IT operations using advanced policy management
- Can help reduce costs such as power, maintenance, operations and support staff
- Supports business continuity by supporting GRID connectivity and automated replication
- Provides up to 6 TB native tape volume cache
- Supports up to 16 tape drives
- Designed for IBM System z environments
**Tape libraries and automation**

**IBM Storage System TS3500**
- Designed for IBM System z, IBM Virtual Tape Server and open-systems environments
- Utilizes the IBM TotalStorage 3592 Tape Drive Model J1A and IBM System Storage TS1120 Tape Drive for System z, Virtual Tape Server and open-systems environments
- Utilizes the IBM System Storage TS1030 Tape Drive, using LTO Ultrium 3 technology for increased capacity, throughput, fast access performance and WORM data cartridges in open-systems environments
- Optional dual-library accessor, with the IBM System Storage TS3500 Model HA1, designed to increase library performance, availability and reliability
- Supports TS1120 tape-drive encryption for data protection
- Provides native capacity of up to 2.75 PB with LTO cartridges, up to 4.3 PB with TS1120 cartridges

**IBM TotalStorage 3494 Tape Library**
- Designed to provide reliable, scalable tape automation
- Supports multiple IBM tape-drive models
- Supports 3592 rewritable and WORM cartridges
- Designed to support data-retention and business-continuity requirements
- Supports IBM Virtual Tape

**IBM System Storage TS3310**
- Modular, scalable tape library designed to grow as your needs grow
- Available in desktop, deskside and rack-mounted configurations
- Designed for optimal data-storage efficiency with high cartridge density using standard or WORM LTO data cartridges
- Hot-swap tape drives and power supplies
- Redundant power and host-path connectivity failover options
- Remote Web-based management and SMI-S interface capable
- Provides up to 316 TB native capacity
**IBM System Storage TS3200 Tape Library**

*Express Model*

- Available with one or two Ultrium 3 Tape Drives with either Low Voltage Differential (LVD) SCSI or the new 4 GB Fibre Channel attachment
- Configured to hold four removable magazines, providing 44 data cartridges, a three-slot I/O station, and one dedicated cleaning cartridge slot
- Offers up to 17.6 TB native capacity
- Standard bar code reader and remote management unit to give the user greater flexibility in deployment and operation
- Removable cartridge magazines support quick bulk load of the tape library as well as ease of storage for media
- Ultrium 3 cartridges with WORM capability are supported with the IBM Ultrium 3 Tape Drives
- Stand-alone or rack-mountable

**IBM System Storage TS3100 Tape Library**

*Express Model*

- Designed to support the new IBM LTO Ultrium 3 Tape Drive, to help increase capacity and performance, including 4 Gbps Fibre Channel attachment and LVD SCSI attachment
- Designed to support cost-effective backup, save and restore, and archival storage in sequential or random access mode with a standard bar code reader
- Designed to offer outstanding capacity, performance and reliability for midrange and network tape-storage environments in a 2U form factor with the 22 data-cartridge slots and a dedicated mail slot
- Offers up to 8.8 TB native capacity
- Remote library management through a standard Web interface supports flexibility and greater administrative control of storage operations
- Ultrium 3 native physical data capacities up to 8.8 TB (up to 17.6 TB using 2:1 compression) with the 22 data-cartridge slots, and the use of LTO Ultrium 3 Tape Drive with a native data rate of up to 80 MBps
**Tape drives and media**

*IBM System Storage TS1120*
- Supports IBM Systems and selected open-system platforms
- Supported on existing IBM and Sun StorageTek automation
- Offers native data transfer rate of up to 104 MBps
- Supports fast access with a 3592 Enterprise Economy Tape Cartridge (JJ) or Enterprise Economy WORM Tape Cartridge (JR)
- Supports consolidation to help reduce tape TCO
- Supports 3592 fast-access, standard-capacity and extended-capacity cartridges
- Provides up to 700 GB native capacity with extended cartridges, up to 2.1 TB with 3:1 compression.
- Supports data encryption and key management

*IBM System Storage TS3500 Tape Library*
- Designed for IBM System z, IBM Virtual Tape Server and open-systems environments
- Utilizes the IBM TotalStorage 3592 Tape Drive Model J1A and IBM System Storage TS1120 Tape Drive for System z, Virtual Tape Server and open-systems environments
- Utilizes the IBM System Storage TS1030 Tape Drive, using LTO Ultrium 3 technology for increased capacity, throughput, fast-access performance and WORM data cartridges in open-systems environments
- Optional dual-library accessor, with the IBM System Storage TS3500 Model HA1, designed to increase library performance, availability and reliability
- Supports TS1120 tape-drive encryption for data protection
- Provides native capacity of up to 2.75 petabytes (PB) with LTO cartridges, up to 4.3 PB with TS1120 cartridges
IBM System Storage TS1030 Tape Drive
- LTO Ultrium 3 tape drive for TS3500 tape library
- Offers native data transfer rate of up to 80 MBps
- Offers native capacity of 400 GB, 800 GB with 2:1 compression

IBM TotalStorage 2230 Tape Drive Express Model
- An entry-level Ultrium tape solution for the midrange and network tape-storage environments
- Designed to provide cost-effective backup, save and restore, and archival storage external to the server
- Double the storage capacity of existing half-height LTO2 drives in the market
- Offers 400 GB native capacity (up to 800 GB with 2:1 compression) and 60 MBps data transfer rate
- Adheres to widely supported LTO standards

IBM TotalStorage 3580 Tape Drive
- Integrates into the following storage environments: server (non-IBM and IBM), automated library and SAN-attached
- Adheres to the widely supported LTO specification, which promotes standardization and allows for multiple media and drive providers
- Offers 400 GB native capacity (up to 800 GB with 2:1 compression) and 80 MBps data transfer rate
- Uses advanced technologies that optimize throughput, increase cartridge capacity and provide superior data protection

IBM TotalStorage 3580 Tape Drive Express Model
- An entry-level Ultrium tape solution for the midrange and network tape-storage environments
- Designed to provide cost-effective backup, save and restore, and archival storage external to the server
- Adheres to widely supported LTO standards
- Offers 400 GB native capacity (up to 800 GB with 2:1 native compression) and 80 MBps data transfer rate
- Includes an industry-standard rack-mount kit
Other removable media products

IBM TotalStorage 7206 Model 336 External DDS Gen 5 Tape Drive
- DAT72 physical capacity of up to 36 GB is nearly twice the capacity of DDS-4 tape drives
- Designed for improved data rate compared to IBM 7206 Model 220
- Designed for read and write compatibility with previous-generation 4mm tape media
- Designed for compatibility with tape-storage devices used internally on IBM System p technology

IBM TotalStorage 7206 Model VX3 External VXA-320 Tape Drive
- Double the capacity of the VXA-2 tape drive
- Up to 160 GB capacity per cartridge (320 GB with 2:1 compression)
- Cost-effective migration path from 4 mm tape drives
- Twice the data rate of the VXA-2 tape drives such as the IBM 7206-VX2
- 12 MBps sustained data rate (24 MBps with 2:1 compression)
- Unique data-packet formatting for variable-speed operation
- Compatible with storage devices currently used on IBM System p and IBM System i technology

IBM TotalStorage 7207 External Tape Drive
- Capacities of up to 37.5 GB (75 GB when compressed) for the Model 330
- The 7207 Model 330 provides read/write compatibility with SLR100, MLR3 and MLR1 (QIC) tape formats and read compatibility with SLR5 and DC9250 media
- Sustained data rate of 4 MBps (8 MBps with compression)
- SCSI (LVD/SE) attachment to System i and System p technology
**IBM TotalStorage 7212 Storage Drive Enclosure Express Model**

- Features a compact design that can be configured with up to two storage devices in one EIA unit (1U) of a standard 19 inch server rack, or as a low-profile desktop solution
- Offers several storage-device options including: low-cost VXA-2 technology, DDS Gen 5 (DAT72), the SLR60 and SLR100 (QIC format) and the LTO Ultrium 2 tape drives; DVD-RAM and DVD-ROM optical drives
- Provides a solution choice for environments in which cabling space and server storage bays are limited
- Connects to IBM System i and System p technology and IBM RS/6000® workstations and servers

**IBM 3996 Optical Library**

- Designed for archival storage applications that require secure, long-term data retention
- Supports rewritable and permanent WORM recording technologies in a single library
- Ultra density optical (UDO) technology cartridges are durable and offer long-term archive life
- Can be a low-cost complement to high-performance magnetic disk
- UDO drives and cartridges operate only when a cartridge is inserted — keeping overall maintenance and operating costs extremely low
- Available in three models with up to four drives
- Maximum capacity of 5.2 TB
Tape and media systems: Opportunity identification

When evaluating storage media, IT managers frequently compare tape to disk. It makes sense: Hard disk technologies are the fastest growing segment of all storage media for information, according to “How much information? 2003,” a UC Berkeley School of Information Management and Systems publication. But tape has an important place in the overall storage policy of the vast majority of organizations.

Companies that need an affordable medium have long favored tape. Today’s tape-drive technology actually makes it possible for the tape media itself, once loaded in the tape drive, to acquire data as fast as a spinning disk in a disk drive. Many delays in actually storing or retrieving data from tape are rooted in a server’s attachment speed or the efficiency of tape management software.

When comparing storage strategies that include a tape component with all-disk offerings, it’s clear that those that include tape can significantly reduce TCO. Clients developing storage strategies should consider not just list prices but a number of other factors, including:

- How much data they need to store now
- The nature of that data, for example:
  - The type of data
  - The data’s value
  - What percentage of the data they need to access immediately
  - What percentage of the data they don’t frequently access, but need to keep for compliance, archival, disaster recovery or other reasons
  - Whether the data they don’t need frequent access to could or should be stored at a site other than their main data centers
- How quickly each of the preceding types of data will grow year-over-year
- How much power consumption will cost for powering disk drives compared to tape drives
- The associated costs of training, maintenance, migration and so on
- Government regulations, corporate governance rules and contractual obligations that require archiving or protection, or both, of sensitive data
- What their customers’ expectations are about how this data is managed
When a full analysis is performed, the argument for including tape as part of overall storage strategy is truly compelling. In fact, tape is suited for a wide variety of applications, including:

- Archiving
- Backup and recovery of files
- Disaster protection and subsequent recovery
- Data interchange among multiple sites
- Storing less-active data
- Sequential processing of very large data files (for example, in data-intensive applications such as seismic analysis)
- Fulfilling legal requirements (for example, by including WORM or data encryption options)

Tape has a number of advantages over disk when used for the purposes listed previously.

- Tape can be easily removed from an organization’s main sites for lower-cost off-site storage.
- Tape is suited for retaining multiple versions of backup data.
- Tape can be used to keep former, point-in-time versions of data as part of a strategy that keeps current versions of that data on disk.
- Tape systems are easy to scale simply by adding more cartridges. Adding disks, on the other hand, means adding new disk controllers and, accordingly, more floor space, which can increase overall storage costs.
- Tape is ideal for long-term retention and compliance strategies.
- Tape drives can now provide encryption of data within the drive itself, helping to avoid the need for host-based encryption of data—and the concurrent drain on host performance—or the use of specialized encryption appliances.
Storage networking
Storage networking: Education

To learn about SANs, it’s important to start at the beginning—with direct-attached storage (DAS). DAS is a predecessor of SANs, and by learning about DAS, you can more easily understand the advantages that SANs have to offer.

Direct-attached storage
The enormous amount of data and its rapid growth is regularly pushing storage technologies into uncharted territory. Traditional DAS products are severely underpowered to deal with today’s data- and storage-management problems.

DAS is the term used to describe a storage device that is attached directly to a host system. See Figure 1. The simplest example of DAS is the internal hard drive of a server computer, although storage devices housed in an external box can come under this banner as well. DAS is still by far the most-common method of storing data for computer systems.

Figure 1. Typical distributed systems or client/server infrastructure
The market has turned to storage networking technology for solutions, and that is where IBM’s storage networking offerings, such as SANs and NAS, come in. SANs and NAS help clients build an IT infrastructure that enables innovation throughout their business.

**Storage area network**

A SAN is a centralized, high-performance, dedicated, and highly scalable network combining servers, storage and network products, software and services. These resources are connected to each other and to servers that act as access points to the SAN. A SAN is enterprise focused but might require more initial IT support.

In some configurations, a SAN is also connected to the wide-area network. Router and router switches, which resemble normal Ethernet networking switches, act as the connectivity points for SANs.

A SAN differs from traditional networks, because it is constructed from storage interfaces. SAN offerings utilize a dedicated network behind the servers, based primarily (though not necessarily) on Fibre Channel architecture. See Figure 2.

A SAN offers these benefits:

- Extended scalability
- Enhanced connectivity
- Consolidation of storage
- Clustering
- Data sharing
- Disaster-recovery benefits
- LAN-free backup
Local/wide-area network
(Messaging protocol - TCP/IP, NetBIOS)

Storage area network
(I/O protocols - SCSI, IBM ESCON®, IBM FICON® and so on)

Figure 2. SAN: the network behind the servers
Storage networking: Product overviews

IBM SAN products and offerings provide integrated SMB and enterprise SAN with multiprotocol local, campus, metropolitan and global storage networking.

Enterprise SAN directors

* **IBM TotalStorage SAN256B Director**
  - High availability with built-in redundancy designed to avoid single points of failure
  - Highly scalable director with 16, 32 or 48 ports per port switch blade, and from 16 to 384 ports in a single domain
  - Multiprotocol router blade with sixteen Fibre Channel ports and two IP ports for SAN routing and distance extension over IP (Fibre Channel over IP)
  - Port switch blades support IBM FICON Director switching with a Fibre Channel/ FICON intermix, FICON Control Unit Port (CUP) and FICON cascading
  - Interoperable with other IBM TotalStorage SAN b-type switches and directors
**IBM TotalStorage SAN256M Director**

- Easy-to-manage tiered enterprise infrastructure-simplification and business-continuity solutions for IBM System x, System i, System p and System z platforms
- Highly-scalable 64- to 256-port switching backbone for tiered global enterprise SANs
- Designed to provide high availability with concurrent hardware and firmware upgrades and call-home with McDATA Enterprise Fabric Connectivity Manager (EFCM)
- Director FlexPar, designed to provide dynamic application network provisioning, can help simplify Fibre Channel and mainframe FICON SAN consolidation
- Helps to provide global business continuity solutions with 10 Gbps links up to 190 km (118 mi)
- EFCM and FICON Management Server software can help simplify management of complex SAN infrastructures

**Cisco MDS 9506, 9509 and 9513 Multilayer Directors**

- Supports Fibre Channel throughput of up to 4 Gbps per port and up to 64 Gbps with each PortChannel Inter-Switch Link (ISL) connection
- Offers scalability from twelve up to five hundred twenty-eight 4 Gbps Fibre Channel ports
- Offers Gigabit Ethernet (GbE) IP ports for iSCSI or Fibre Channel over IP (FCIP) connectivity over global networks
- High-availability design with support for nondisruptive firmware upgrades
- Includes Virtual SAN (VSAN) capability for SAN consolidation into virtual SAN "islands" on a single physical fabric
- Enterprise, SAN Extension over IP, Mainframe, Storage Services Enabler and Fabric Manager Server packages provide added intelligence and value
**Midrange SAN switches**

*IBM System Storage SAN64B-2 and IBM TotalStorage SAN32B-2 Fabric Switch*

- Simple-to-use 64-port and 32-port midrange and enterprise infrastructure-simplification and business-continuity solutions for IBM System i, System p, System x and System z platforms
- Designed for high performance with 4 Gbps ports and enhanced ISL trunking with up to 32 Gbps per logical data path
- Pay-as-you-grow scalability with Ports on Demand features (from 32 to 48 to 64 ports, or from 16 to 24 to 32 ports)
- Designed to support high availability with redundant, hot-swappable fans and power supplies and nondisruptive software upgrades
- Provides broad range of open-server Fibre Channel and mainframe FICON switching including FICON/Fibre Channel Intermix, FICON CUP and FICON cascading (FICON is currently supported only on the SAN32B-2.)
- Multiple management options for first-time SAN users and complex enterprise SAN consolidation solutions
- Interoperability with the IBM TotalStorage SAN b-type switch family helps protect switch investment

**IBM TotalStorage SAN32M-2 Fabric Switch**

- Simple-to-use SAN switch with ease-of-installation and ease-of-use features designed specifically for the needs of medium-sized and enterprise environments
- Foundation for new infrastructure-simplification and business-continuity solutions for servers running Microsoft Windows, UNIX, Linux, NetWare and IBM System i5™, IBM AIX® and IBM z/OS® operating systems
- High-performance 1, 2 and 4 Gbps links with pay-as-you-grow FlexPort scalability enables growth from 16 to 24 to 32 ports
- Designed for high availability with hot-swappable, dual power supplies and HotCAT online code activation
Cisco MDS 9216 Multilayer Fabric Switch
- Supports Fibre Channel throughput of up to 4 Gbps per port and up to 64 Gbps with each Port Channel ISL connection
- 9216A model offers scalability from 16 to 64 Fibre Channel ports
- 9216i model offers integrated 14 Fibre Channel ports and two GbE IP ports for iSCSI or FCIP connectivity over global networks
- Offers 10 Gbps ISL ports for inter-data-center links over metro optical networks
- Features modular design with excellent availability capabilities
- Includes VSAN capability for SAN consolidation into virtual SAN islands on a single physical fabric
- Enterprise, SAN Extension over IP, Mainframe Storage Services Enabler and Fabric Manager Server packages provide added intelligence and value

Entry-level SAN switches
IBM TotalStorage SAN16B-2 Fabric Switch
- Simple-to-use 16-port SAN switch with ease-of-installation and ease-of-use features designed specifically for the needs of small to medium-sized environments
- Foundation for new infrastructure-simplification and business-continuity solutions for servers running Microsoft Windows, UNIX, Linux, NetWare and IBM System i5 operating systems
- High-performance, 4 Gbps links (requires storage hardware that supports 4 Gbps throughput) with pay-as-you-grow ports for on demand scalability enable growth from 8 to 12 to 16 ports
IBM TotalStorage SAN16M-2 Fabric Switch
- Simple-to-use SAN switch with ease-of-installation and ease-of-use features designed specifically for the needs of small to medium-sized environments
- Foundation for new infrastructure-simplification and business-continuity solutions for servers running Microsoft Windows, UNIX, Linux, NetWare and IBM System i5/OS® operating systems
- High-performance, 4 Gbps links with pay-as-you-grow FlexPort scalability enable growth from 8 to 12 to 16 ports
- Designed for high availability with hot-swappable, dual power supplies and HotCAT online code activation

Cisco MDS 9020 Fabric Switch
- SAN switch with Cisco Fabric Manager software that can help simplify management of multiple switch fabrics
- Foundation for new infrastructure-simplification and business-continuity solutions
- High-performance switch ready to support 4 Gbps Fibre Channel-capable servers and storage
- Designed for high availability with support for nondisruptive firmware upgrades

IBM System Storage SAN10Q-2 Fabric Switch
- Small and capable—1U, 4 Gbps, 10-port, half-width rack
- Flexible—Rackable or stand-alone form factor
- Designed to improve manageability—No-wait routing helps maximize performance independent of data traffic
- Build your first SAN—Intuitive and affordable migration from direct-attached storage to SAN
- Complete package—SANsurfer Express software helps simplify switch installation, managing and fabric scaling
Storage networking: Opportunity identification

Businesses face many challenges today that are driving them to manage information more efficiently and effectively. There is intense pressure on cost containment in environments where storage requirements are growing dramatically, in many cases greater than 50 percent a year. There are over 20,000 regulations worldwide. There is also a growing realization that manual processes are inefficient and increasingly expose businesses to significant risks. Existing storage assets are often being inefficiently and ineffectively utilized.

The following scenarios can help you identify SAN opportunities:

- **C-level executive** — The challenge of succeeding in a globally competitive environment requires innovation and fast access to key information. Storage virtualization is the cornerstone required to build an efficient, cost-effective and responsive storage environment that supports innovation.

- **Line-of-business executive** — Business executives must deliver continually improving business results, driving sales higher and costs lower. Access to key customer, product and competitive information 24x7 is fundamental to these objectives. Storage virtualization is increasingly being viewed as the best, most-cost-effective means with which to provide efficient management and access to critical data.

- **IT director or manager** — IT infrastructures have become extremely complex. This inherent complexity can dramatically increase costs, and impact system availability and customer service levels for which IT executives are held accountable by their users. IBM storage virtualization solutions, through the creation of virtual storage pools, can dramatically simplify the IT operational environment by buffering physical hardware devices from applications and management. This can improve efficiency, lower operational costs and improve data availability, thereby helping to improve customer service levels.
Infrastructure management
Infrastructure management: 
Education

As the growth of data storage continues to explode, there is an increasing need for businesses to find ways to control the cost of storage. Managing storage infrastructure has grown in complexity as customers acquire new storage infrastructure that is heterogeneous. And businesses must identify, evaluate, control and predict the growth of data through its life cycle in order to meet storage service levels in accordance with IT Information Library (ITIL) and data-retention requirements.

Both requirements—managing storage infrastructure and the data that resides there—are highly labor intensive. Storage-infrastructure management tools such as IBM TotalStorage Productivity Center can help customers reduce the complexity of managing their storage environments by centralizing, simplifying and automating storage tasks associated with storage systems, storage networks, replication services and capacity management.
Infrastructure management: Product overview

By offering System Storage software offerings for storage-infrastructure management, you can increase your own opportunities to boost revenues, profits and customer loyalty.

System Storage infrastructure-management software can help your customers control the cost of storage and improve service levels in their storage infrastructures. It helps customers simplify, automate and optimize their storage, and offers some of the broadest support for heterogeneous storage in the industry. System Storage infrastructure-management software integrates with IBM virtualization offerings such as SAN Volume Controller, and gives customers broad views of their storage environment from a single point.

Storage-management software can help your customers protect their data from failures and other errors by storing data in a hierarchy of offline storage. Web-based management, intelligent data move-and-store techniques and comprehensive policy-based automation all work together to help increase data protection and potentially decrease time and administration costs.

**IBM TotalStorage Productivity Center**

- Designed to help centralize the management of your storage infrastructure from a single interface using role-based administration and single sign-on
- Designed to provide a single management application with modular, integrated components that are easy to install, and to provide common services for simple and consistent configuration and consistent operations across host, fabric and storage systems
- Designed to manage performance and connectivity from the host file system to the physical disk, including in-depth performance monitoring and analysis of SAN fabric performance
Infrastructure management: Opportunity identification

IBM TotalStorage Productivity Center
The following questions can help you determine if a client might benefit from IBM TotalStorage Productivity Center. Ask clients if they need a tool that:

• Gives them a single place to monitor their storage infrastructures’ performance, availability and capacity.
• Includes a central console with which they can manage their entire storage infrastructures.
• Helps them automate manual tasks such as provisioning storage.
• Measures the availability and performance of their storage infrastructures, especially storage networks and systems.
• Monitors storage capacity in file systems and databases in order to improve utilization.
• Gives line-of-business managers the ability to charge for storage usage by departments or users, or both.
• Can be a less-expensive way to effectively manage storage networks than buying additional hardware.

• Helps them retain data as a major corporate asset.
• Helps them meet service and availability levels.
• Reduces the risk of human error, which in turn reduces the risk of data loss, slow recovery and application outages.

Explain to them that Productivity Center:

• Provides the deepest management of IBM disk-storage platforms of any storage-infrastructure management tool available today.
• Provides performance, availability and capacity management for both IBM and heterogeneous storage.
• Is a crucial analysis tool that helps them assess their storage capacity, match corporate information to the right kind of storage media, and implement and enforce tiered storage strategies.
• Gives them the ability to use a single platform to monitor their entire storage environment, from hosts to back-end storage arrays.
Business continuity: Education

While data-protection challenges increase, businesses must reduce risks associated with data loss, and keep critical data and applications available 24x7. Most enterprises can’t afford the cost of downtime due to planned or unplanned system outages. Although the indirect, longer-term impacts of downtime—lost market share, decreased productivity, noncompliance with regulations, reduced competitiveness, damaged brand reputation and eroded customer loyalty—are harder to measure, they are equally important. Strengthening the resiliency of your business can help mitigate or avoid them.

To protect the security of their businesses, companies must be able to back up and recover data that has been lost because of hardware failure and other errors. To some, backup is a routine activity, but it is vitally important—losing key business information can affect an entire organization’s efficiency, productivity and profitability. Effective backup and recovery software is essential.

IBM Tivoli® Storage Manager (TSM) is a data-backup and archive solution that is designed to automatically copy and archive active, online data and move it to less-expensive disk (SATA) or offline repositories such as low-cost tape systems. Tivoli Storage Manager’s capability to migrate files between storage devices is designed to allow multiple clients to back up to a disk-storage pool from which the files automatically migrate out to tape.
Business continuity:  
Product overview

IBM Tivoli Storage Manager

- Helps manage multiple types of inactive data in a hierarchical repository
- Designed to empower rich function through use of advanced architecture
- Helps lower storage cost through intelligent hierarchy
- Designed to provide centralized, comprehensive management
- Helps reduce network bandwidth through intelligent data movement
- Designed to minimize manual backup, archive and recovery tasks through policy-based automation
- Offers improved backup capabilities through IBM Tivoli Storage Manager Extended Edition
Life cycle and retention
Life cycle and retention: Education

Businesses today face many challenges to manage information more efficiently and effectively. There’s intense pressure on cost containment in environments where storage requirements are growing dramatically. At the same time, businesses must now address more than 20,000 regulations worldwide.

Life cycle and retention: Product overviews

IBM System Storage N series with Operations Manager

- Offers comprehensive monitoring and management for N series enterprise-storage and content-delivery environments
- Provides alerts, reports and configuration tools from a central control point, helping you keep your storage and content-delivery infrastructure in line with business requirements for high availability and low TCO
- Supports your organization’s efforts to rapidly deploy, provision, and manage a comprehensive enterprise-storage and content-delivery network

IBM System Storage N series with FilerView

- Provides a Web-based administration tool that allows IT administrators to fully manage N series systems from remote locations
- Offers a simple and intuitive, single-appliance administration
**IBM System Storage N series with SnapManager for Microsoft Exchange**

- **Near-instantaneous hot backups and rapid restores**—Designed to help improve backup and restore times
- **On-the-fly scalability**—Designed to allow you to add storage capacity and expand volumes while avoiding taking the Microsoft Exchange server or the System Storage N series storage system offline
- **Storage-administration task automation with wizards**—Supports streamlining management and automating common tasks to enable administrators to spend less time on maintenance and more time on value-added tasks

**IBM System Storage N series with Single Mailbox Recovery with SnapManager for Microsoft Exchange**

- **Supports single-item recovery**—Designed to quickly and easily help you recover single mailboxes, individual folders, or any number of messages and attachments
- **Helps avoid the need for time-consuming and expensive brick-level backups**
- **Supports recovery to production server or PST file**—Designed to restore individual Microsoft Exchange items directly to a production Exchange server or to a Microsoft Outlook PST file

**IBM System Storage N series with SnapManager for Microsoft SQL Server**

- **Near-instantaneous full backups and rapid restores**—Designed to help reduce backup and recovery times, from hours or even days, to as little as minutes
- **Storage task automation with wizards**—Helps you streamline management and automate routine tasks, enabling your administrators to spend more time on value-added tasks
- **On-the-fly scalability**—Designed to allow you to easily expand or reduce storage capacity while avoiding taking the SQL Server or N series storage system offline
**IBM System Storage N series with FlexShare**
- Provides administrators with the ability to increase processing utilization without sacrificing the performance of critical business needs
- Allows administrators to consolidate different applications and data sets on a single storage system
- Gives administrators the control to prioritize applications based on how critical they are to the business
- Provides a priority mechanism to assign preferential treatment to higher priority tasks

**AutoSupport Service for IBM System Storage N series**
- Monitoring of your storage system seven days a week, 24 hours a day
- Automatic notification of critical system events to help you address problems before they become disasters
- Extensive database of previous problems and resolutions to help speed your problem solving
- Alerts automatically sent to IBM Support Center for creation of problem records and resolution support

**IBM System Storage N series IP SAN Solution**
- Helps increase storage-system performance
- Helps improve data availability and application uptime
- Helps streamline data-storage infrastructure and management
- Helps reduce technology and cost limitations

**IBM System Storage N series with Clustered Failover high-availability solution**
- **Automatic failover with notification** — Designed to support data availability for an unavailable filer and notify an administrator of failover
- **Manual failover and giveback** — Designed to enable planned maintenance on a filer while avoiding impact to data availability so that administrators can control when to restore a clustered filer to its normal state
- **Non-impacting failover** — Designed to avoid impact of a failover to end users so they can continue to access data in the same way after a failover
**IBM System Storage N series with MetroCluster**

- Extends Clustered Failover capabilities from a primary site to a remote site
- Replicates data from the primary site to a remote site to help ensure that data is completely up-to-date and available
- Enables you to rapidly resume operations at a remote site minutes after a disaster, if the primary site goes down
- Stretch MetroCluster provides a disaster-recovery option at distances up to 500 meters (1640 ft) feet between N series systems
- Fabric MetroCluster provides a disaster-recovery option at distances up to 99.75 kilometers (62 mi) using a Fibre Channel switched network

**IBM System Storage N series with FlexCache Software**

- Distributes file-access loads across multiple filers to help improve scalability
- Helps increase throughput of the network and reduce performance bottlenecks without additional complexity
- Distributes files to remote filers without the need for continuous hands-on management

**IBM System Storage N series with FlexVol and FlexCone**

- *Flexible data management*— Ability to tailor data management to the varied needs of applications.
- *Increased performance*— Can help improve application processing and reduce tradeoffs between performance and utilization. Complement IBM System Storage N series with RAID-DP.
- *Flexible cloning*— Ability to generate nearly instantaneous replicas of data sets and storage volumes. Each cloned volume is a virtual copy that can be used for enterprise operations.

**IBM System Storage N series with LockVault Compliance Software**

- *Helps to mitigate risk*— LockVault can help you avoid the need to rely on manual or policy-based methods of identifying and isolating records subject to regulatory compliance rules.
- *Addresses both backup and compliance requirements*— One data copy addresses both backup and compliance demands.
- *Supports fast access for search and discovery*— Nightly compliant archives of the enterprise are available online, for rapid search, retrieval or restore.
**IBM System Storage N series with MultiStore Software**

- *Server consolidation*—Helps to simply and easily consolidate the functionality of multiple Windows and UNIX file servers without reconfiguring
- *Secure resource partitioning*—Helps maintain separation and security of shared storage and network resources
- *Simplified data movement and migration*—Move and migrate data quickly and easily with SnapMirror, helping to reduce downtime

**IBM TotalStorage N series with SnapLock Compliance and SnapLock Enterprise**

- *Fast WORM storage on magnetic disk*—High-performance, non-rewritable, non-erasable disk storage that is designed to protect data until a specified retention date
- *Open solution using standard protocols*—Leverages industry-standard Common Internet File System (CIFS) and Network File System (NFS) protocols to support easy data access and application integration
- *Flexible and robust compliant data protection*—Supports replication between WORM volumes on IBM System Storage N series systems and near-line and primary storage systems

**IBM System Storage N series with SnapMirror Software**

- *Fast data replication and failover*—Can help reduce downtime in case of a failure at the primary site
- *Access to mirrored data*—Enables offloading tape backup, potentially increasing the value of your disaster-recovery investment
- *Volume or Qtree replication*—Mirrors selected data sets, helping to reduce networking-infrastructure requirements

**IBM System Storage N series with SnapMover Technology**

- *Fast, simple data migration*—Supports the rapid migration of workload between IBM TotalStorage N series storage systems while avoiding system overhead
- *Avoid user disruption*—Can maintain a high level of system availability during data migration
- *Improve system-resource utilization*—Can help migrate workload to meet changing business needs
**IBM System Storage N series with Snapshot Technology**

- **Stability** — Snapshot is read-only, and so it supports important data-protection capabilities. It can help organizations perform consistent backups from an IBM System Storage N series system while applications are running.
- **Performance** — Storing a Snapshot copy on an IBM System Storage N series system has virtually no impact on the performance of the N series system. In addition, creating and deleting Snapshot copies have virtually no performance impact on an N series system.
- **Scalability** — IBM System Storage N series storage volumes can support up to 255 Snapshot copies. The ability to store a large number of low-impact, frequently created Snapshot copies increases the likelihood that the desired version of data can be successfully recovered.

**IBM System Storage N series with SnapRestore capability**

- Helps an enterprise to recover data quickly and easily when disaster strikes
- Supports recovery of data ranging in size from an individual file to a multi-terabyte volume

**IBM System Storage N series with SnapDrive Software**

- Designed to simplify management of business-critical information with advanced server-based virtualization
- Supports rapid expansion of available storage space while avoiding downtime
- Supports rapid backup and restore of data with integrated Snapshot technology

**IBM System Storage N series with SnapVault Software**

- **Online backups and restores** — Can help significantly simplify the backup and restore of mission-critical data
- **Long-term incremental backups** — Are designed to use CPU and network resources more efficiently with lower disk-storage needs
- **Multiple backups online** — When used with IBM System Storage, N series with Snapshot technology can efficiently allow for multiple backups online, avoiding the need for incremental tape backups and helping to reduce restoration times compared to traditional tape media
**IBM System Storage N series with SyncMirror Software**

- *Synchronous replication* — Designed to keep production data synchronized with backup copy of data at a disaster-recovery site
- *Low maintenance operation* — Designed to allow applications to access replicated data without programming or system changes
- *Integration with clustered failover* — Designed to provide hardware redundancy with automatic failover for an even higher level of data availability

**IBM System Storage N series with SecureAdmin**

- SSH 1.x strong encryption protocol for authenticated, command-based administrative sessions with IBM System Storage N series filers
- Variable authentication key strength from 384 to 1024 bits
- 56 bit DES or 3x56 bit 3DES (triple DES) for session data encryption

**IBM System Storage N series with SnapValidator Software for Oracle**

- *End-to-end data protection* — Designed to perform additional data checking from server to storage devices
- *Modular accessibility* — Designed to extend enterprise-class checksum capabilities to modular storage
- *Cross-protocol support* — Supports iSCSI SAN, Fibre Channel SAN and NAS (NFS) protocols
- *Highly integrated* — Supports the Oracle Hardware-Assisted Resilient Data (HARD) initiative
IBM System Storage DR550
- Designed as an information-retention system
- Designed as a preconfigured, integrated solution to help store, retrieve, manage, share and secure regulated and nonregulated data
- Designed to offer automatic provisioning, migration, expiration and archiving capabilities
- Supports enterprise scalability of up to 89.6 TB physical disk capacity and supports petabytes (PB) of storage with attached tape
- Data protection through standard data encryption option
- Optional synchronous or asynchronous data replication between local and remote sites
- Dual-processor, single- or dual-server configurations for enhanced performance

IBM System Storage DR550 Express
- Designed as a preconfigured, integrated offering to help store, retrieve, manage, share and retain regulated and nonregulated data
- Advanced security and data-protection options such as encryption, authentication and policy enforcement are standard
- Very affordable, high-performance offering providing the same retention-management capabilities as the enterprise versions of the IBM System Storage DR550
For more information

To learn more about the benefits you receive as an IBM Business Partner or to get in-depth information on our comprehensive portfolio of offerings, visit:

- IBM PartnerWorld  
  ibm.com/partnerworld

- IBM System Storage  
  ibm.com/storage

Or, contact your IBM channel specialist or preferred IBM authorized distributor.