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Business Partner Guide

A Seller's Roadmap to IBM Storage Solutions

Edited by Jim Hoskins

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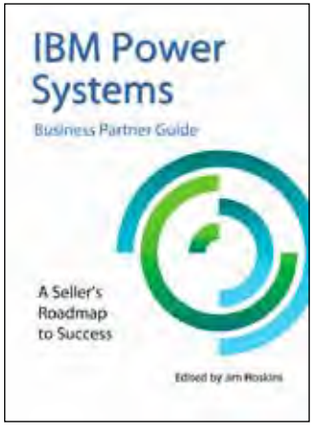

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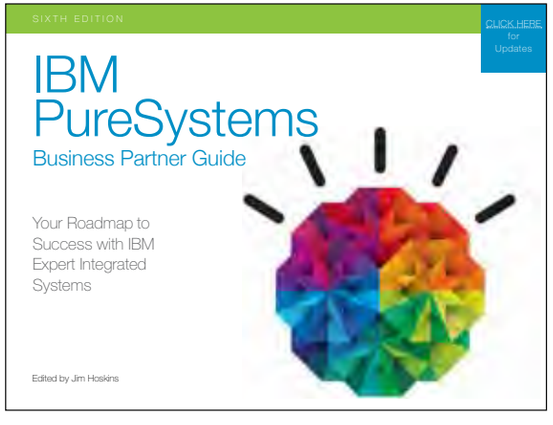

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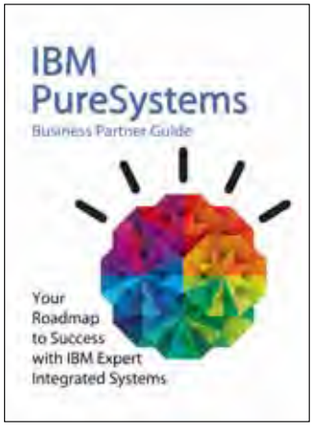

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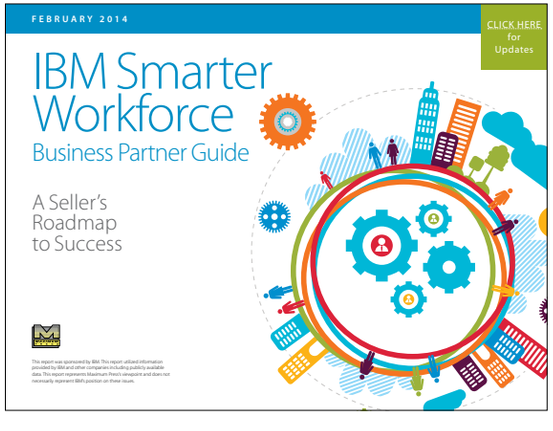

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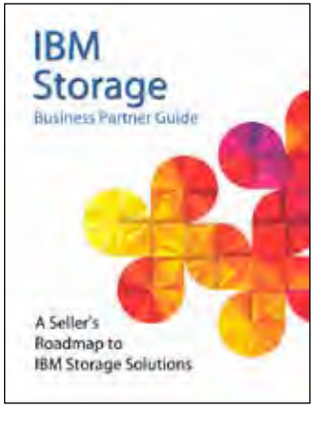

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If you are a new IBM Business Partner, take these seven steps to "hit the ground running."

1. Check for Updated Editions of This Guide

This guide has the ability to check for more current editions which are released periodically. Simply click on the "More on the Web" link provided here (or the link on the cover) and this guide will automatically check to see if you have the most current edition. If you don't, you will be able to download the latest edition immediately.

More On The Web

- Check for updates now

2. Apply for Your IBM PartnerWorld Membership

The IBM PartnerWorld Web site is your source for information on all things related to being an IBM Business Partner (e.g., Business Partner relationships, guidelines, support, product info, etc.). You will need a user ID and a password to gain access to some areas of the site. If you have any questions, call PartnerWorld for help (follow the link in the "More on the Web" box to get the correct phone number for your country).

More On The Web

- Get your PartnerWorld user ID
- Explore PartnerWorld
- PartnerWorld contact phone numbers by country

3. Plug in to IBM Product and Program Communications

Staying informed is one key to success. IBM has a special page on PartnerWorld that helps you do just that. Here you will find new product announcements, letters to Business Partners, customer success stories, educational opportunities, and more.

More on the Web

- Get plugged in to IBM product and program communications
- IBM Systems Storage Partner Portal
- Barry Whyte (Storage Virtualization) blog
- Tony Pearson (Inside IBM Storage) blog

4. Learn to Quickly Find IBM Product Information

IBM maintains a search page that allows you to quickly find detailed product information from IBM announcement letters (one of these is released for every product IBM announces), the IBM Sales Manual (a comprehensive collection of detailed info on all IBM products), and much more. Give it a try so you will know how to find what you need when you need it. Of course you

More on the Web

- IBM product information search page
- System Storage section of IBM.com

can also find product details on the System Storage section of IBM.com. This is a key resource for you and your customers.

5. Learn to Find Competitive Information

IBM consistently updates information about the competitors you will encounter and their products. One good sources of competitive information is the COMP content on PartnerWorld. You will need your user ID and password.

More On The Web

- Competitive info on COMP

6. Try Out "Know Your IBM"

Accelerate your learning and knowledge of IBM programs and products with Know Your IBM (KYI), a permission-based interactive enablement initiative which provides you with quick- learn modules featuring content specifically written to help you understand the customer benefits and value propositions of IBM products and solutions. You can get points by completing these modules which can be redeemed for merchandise at participating retailers. You can earn additional points for reporting sales through KYI.

More on the Web

- "Know Your IBM" training modules

7. Make Your Training and Certification Plan

Knowledge is power. IBM offers many opportunities to learn and to demonstrate your knowledge through certification. These certifications are regularly updated to include the roles most critical to successfully selling and technically supporting the storage product portfolio. Now is a good time to make your plans. Select your role from the list of certifications. Follow the links to complete descriptions of each role, skills, recommended education, and more. You can select courses and build tailored enablement roadmaps with the help of Systems College (formerly the STG SMART Zone). This is your one stop for all learning on IBM Systems offerings for servers and storage.

More on the Web

- Explore training and certification opportunities
- Systems College

About This Guide

This guide brings together—all in one place—the resources you need to be successful as an IBM Storage Business Partner. It contains information gathered and adapted with permission from multiple IBM and non-IBM sources. Also, there are embedded links to more-detailed information and news available on the Internet, so you always have the most current information at your fingertips. We are confident you will find this a useful reference tool.

As we are always working to better help you succeed, please forward any comments on or suggested improvements to this guide to info@maxpress.com.

Products May Vary from Country to Country

Keep in mind that the specific products and services offered by IBM sometimes vary from country to country. As such, you will need to get into the details of your own country's offerings by following the "More on the Web" links provided throughout this guide with your country selected in the upper area of the screen.

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This guide has been specially designed to be read on your computer screen using the free Adobe Acrobat Reader software or a supporting Web browser. Alternately, you can print this guide on almost any printer and read the material anywhere.

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- *Navigate through the guide using the bookmarks provided along the left side of the screen.*
- *Explore the links provided throughout this guide (anywhere you see a "More on the Web" box) which will lead you to additional information related to the topic at hand. In this way, this publication is a "three-dimensional guide" providing you with information about the topics at the level of detail you choose. Note some links will bring you to a password-protected area (e.g., on the IBM PartnerWorld or COMP Web sites). You will be prompted to enter your IBM-issued user ID and password before you are presented with information.*

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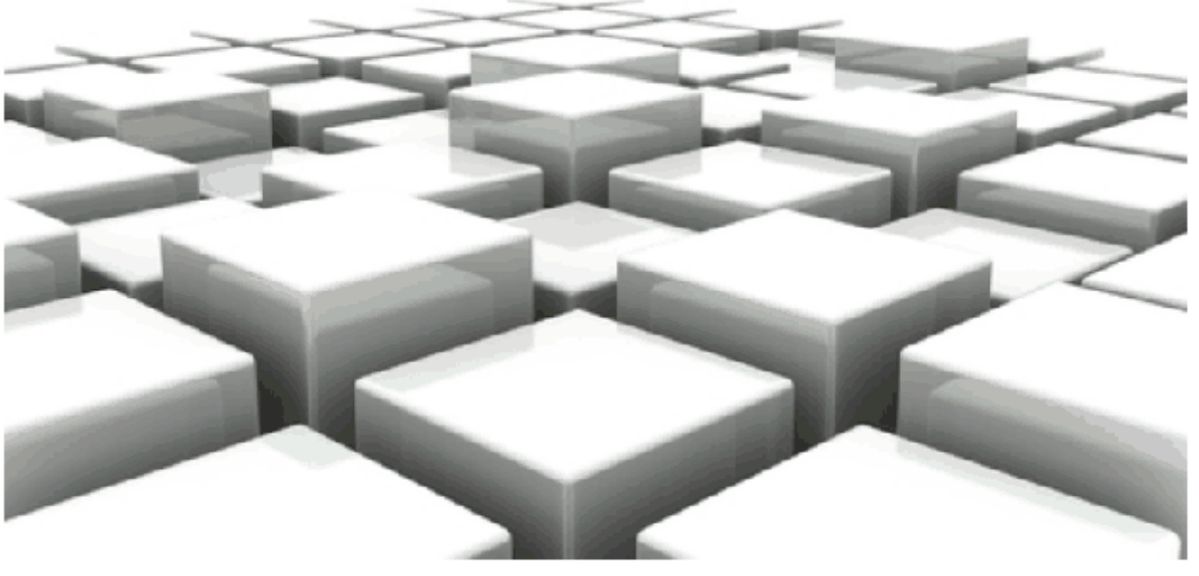
IBM and System Storage Basics



In this chapter we take a look at some business basics about IBM to consider as you move forward building your business

Why Partner with IBM?

If you are seeking to truly differentiate yourself in the marketplace by extending your market reach with more profitable end-to-end solution offerings, IBM is uniquely positioned to help you make this happen. IBM provides you with a broad portfolio of servers, software, expert integrated systems, and services, coupled with a rich array of channel programs that enable you to take your business wherever you want it to go.

By providing innovative technology that delivers flexibility and high performance, easy to administer programs, and flexible financing options, IBM has an unmatched understanding and appreciation of channel importance that translates into success and prosperity for our partners.

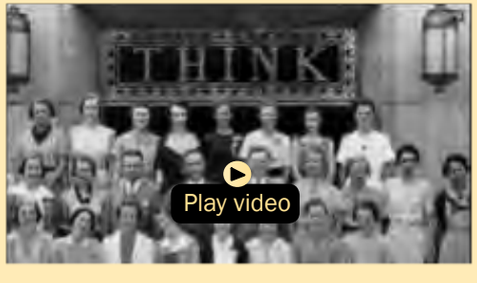
Consider these facts about IBM:

- *One of the world's top 10 most valuable brands*
- *A market leader in the storage and server industries*
- *In each year for over a decade, IBM has earned more patents than any competitor, according to the U.S. Patent Office.*

It is an exciting time to be involved with information technology. The worlds of business and computer systems are blending in ways that will result in productivity breakthroughs greater than the sum of their parts. Teaming with IBM will allow you to provide the insight, solutions, and innovation that matter to help your customers succeed.

More on the Web

- About IBM's patent portfolio



IBM History (13:14)

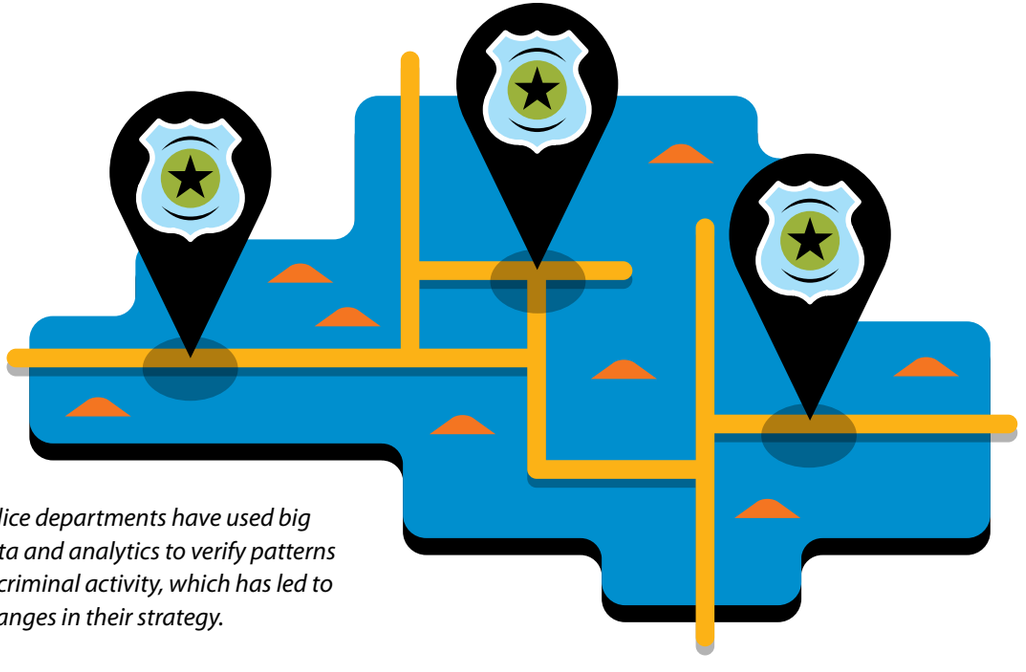
Smarter Planet

Since 2008, IBMers have been working with companies, cities, and communities around the world to build a Smarter Planet. We've seen enormous advances, as leaders have begun using the vast supply of big data to transform their enterprises and institutions through analytics, mobile technology, social business, and the cloud. Big data has changed how these leaders work, how they make decisions, and how they serve their customers. And the ability to harness big data is giving their enterprises a new competitive edge in today's era of "smart."

Using Analytics, Not Instinct

Executives have traditionally regarded experience and intuition as the keys to formulating strategy and assessing risk. That type of thinking may have worked in an earlier time of information scarcity—but not in the time of big data. When every company, every city, every country, every individual is increasingly interconnected with millions of others, the cost of a bad call can be devastating. But analytics is increasingly helping business and government leaders look beyond their own biases to discern real patterns and anticipate events.

A decade ago, a police department developed an analytics platform that created multi-layer maps and spreadsheets to identify and verify patterns of criminal activity—visualizing knowledge about where, when, and how violent crime takes place. The police department changed its patrolling strategy as a result—and reduced crime by 24 percent.



Police departments have used big data and analytics to verify patterns of criminal activity, which has led to changes in their strategy.

Social networks shift value in the workplace from knowledge that people possess to knowledge that they can communicate.

Social: The New Production Line

In today's knowledge economy, the exchange of ideas has become the new means of production. The advent of social and mobile technology is shifting employers' competitive edge from hiring workers who gather knowledge to hiring workers who communicate it.

A $15 billion cement maker wanted to create its first global brand of concrete, which required a coordination of stakeholders from each country. The company didn't build a new lab—it built a social business network. Employees in 50 countries formed one global active community whose collaboration helped launch the brand in a third of the anticipated time.

Effective marketing no longer aims publicity at broad demographic groups—it opens conversations with individuals.

No Individual Is a "Segment"

In the age of mass production and mass media, marketers generally understood and served broad population "segments." But the age of big data and analytics is revealing customers not as demographic slices—based on age, income, job title, hobby, and the like—but as individuals.

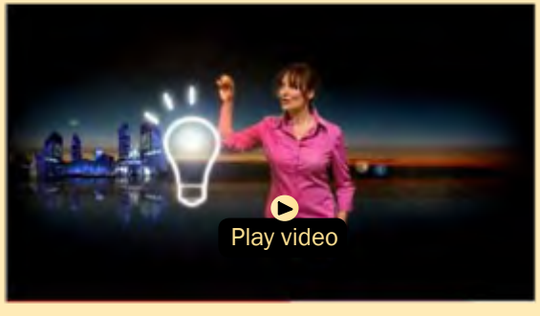
And this change is already underway. Call centers were once evaluated by how quickly they could get employees to spend more time with customers to learn about their needs. Advertising used to be only about selling. Now, smarter marketing starts conversations and delivers useful services—to one individual at a time.

Finding Success on a Smarter Planet

Organizations that adopt these principles, as thousands have, are smarter enterprises. But using technology is only part of the story. The other challenge now is culture: using this emerging technology to change entrenched work practices.

More on the Web

- A Smarter Planet info on IBM.com



A Smarter Planet (2:14)

IBM CEO Ginni Rometty on IBM Smarter Planet (58:17)

Infrastructure Matters

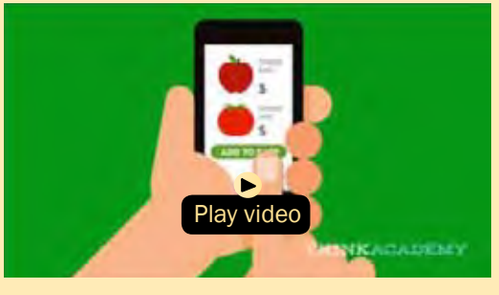
Today, this need is greater than ever as businesses and entire industries are being transformed by the growth of big data, social, mobile, and cloud technologies. With new levels of business insights, organizations are able to deliver personalized experiences and services to match the rising expectation levels of their end users. Customers now expect personalized shopping experiences, evidence-based healthcare, and real-time access to information and services.

In the retail industry, the need to deliver personalized offers to individuals based on their unique preferences and needs drives higher conversion rates and repeat business.

The banking industry is embracing multichannel bank transformation to extend personalized and unique product bundles and services across all banking channels.

Each of these business and industry transformations is being driven by big data and analytics and requires a new generation of applications that can drive specific business outcomes. These next generation applications leverage business and predictive analytics (analyzing large amounts of both structured and unstructured data) and cognitive (natural language learning) capabilities to provide real-time, data-driven business insights in unprecedented ways. Today more than ever before, infrastructure matters.

More on the Web



ThinkAcademy—Infrastructure matters (8:37)

Optimizing Data Economics

Clients need help with their data. Data is the new currency of business—their most critical asset. An enterprise that gains new business insights from data is twice as likely to outperform its competition. But, clients are spending too much money and time managing where their data is stored. They purchase 24 percent more storage every year, but use less than half of the capacity they already have. They spend 70 percent of IT budgets on operations and maintenance instead of innovation and insights. And they don't spend enough on projects that would provide value from their data. Seventy-two percent of companies have not started or are only just planning big data activities.

Mobile, social, and cloud technologies are fueling big data and analytics—requiring greater efficiency and agility in IT infrastructures. The right infrastructure allows clients to shift spending and invest in projects that improve business results. Infrastructure Matters.

Clients need better data economics so they can leverage cloud and analytics to glean business value out of the large volumes of data generated by mobile and social activity. The right storage architecture drives improved data economics by enabling data independence and providing a simple, resilient, and predictable IT environment. IBM Smarter Storage delivers data virtualization, protection, performance, and scalability features for any data architecture need.

IBM Smarter Storage

We live on a Smarter Planet where systems are highly instrumented, interconnected, and intelligent. Data is coming from new places, in greater volumes, and at faster rates. Companies able to harness data unlock patterns faster, serve customers better, and outpace competitors.

More On The Web

- IBM Smarter Storage info on IBM.com

IBM Smarter Storage, a more efficient, automated, and intelligent approach to storage, is Efficient by Design, Self-optimizing, and Cloud Agile.

Efficient by Design

With Smarter Storage, essential storage technologies are built in and tightly integrated. Efficiency is effortless—requiring no manual intervention. Management is intuitive. The benefits include reduced space requirements for active data by up to 80 percent. Clients also save up to 47 percent of administrator time and reduce complexity by up to 30 percent.

Self-optimizing

Smarter Storage analyzes data access patterns, adapts, and improves performance. Sophisticated internal analytics automatically place data on the appropriate storage tier. This can increase performance up to three times with only 3 percent of data on SSDs.

Cloud Agile

Smarter Storage fully participates in highly virtualized cloud environments. IBM and non-IBM storage are managed as one virtual pool. All systems inherit IBM's advanced capabilities. Data is automatically synchronized. Files flow to users wherever they are. This can reduce disk space needs by up to 50 percent, speed up storage deployment up to 26 percent, and improve application availability by up to 29 percent.

Software Defined Storage

New era cloud environments and applications such as analytics, mobile, and social are driving huge growth in data volumes, making data the new natural resource. But cost-effectively optimizing your current storage environments while at the same time exploiting new opportunities is straining storage budgets. The solution—IBM software defined storage.

The new IBM software defined storage offerings unlock the potential of data and increase your business agility and efficiency in ways that weren't possible until now. Software defined offerings include Elastic Storage, SAN Volume Controller, IBM Virtual Storage Center, IBM Tivoli Storage Manager Family, Linear Tape File System, and more, all covered in this guide.

More On The Web

- Software Defined Storage info on IBM.com

IBM software defined storage enhances the speed and efficiency of your storage and simplifies migration to new workloads by:

- *Accelerating global access to petabytes of data and billions of files*
- *Changing the economics of storage technology with multi-brand virtualization, intelligent tiering, and open API support (OpenStack, Hadoop, POSIX)*
- *Transforming business models with hybrid cloud storage and data protection for big data analytics*
- *Supporting any storage, any data.*

Storage Tools and Resources

This chapter provides you with general information and valuable resources that will help you sell IBM products

Identifying Storage Sales Opportunities

In this section, we offer some "trigger" questions that will help you identify and explore opportunities for selling IBM System Storage.

General

- *Is the customer buying servers? Server buyers tend to buy storage within three months of their server purchase.*
- *Is the number of users of the application increasing? Adding employees or upgrading applications generally leads to additional storage needs.*
- *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.*

Storage Efficiency

- *Is your data growing and are the costs of managing your storage infrastructure growing?*
- *Are you concerned about how well utilized your storage is or your staff's ability to support this growth?*
- *How satisfied are you with the cost effectiveness of your current storage?*
- *Is the management of your storage infrastructure complex?*
- *Are you looking for new functionality or help to manage your storage growth and costs?*

Data Protection

- *Are your data storage needs growing?*
- *How will this growth impact your ability to adequately protect critical data? With the data growth you are experiencing, what impact have you seen in your back-up & recovery?*
- *Can you electronically locate critical business information, documents, email, attachments, and messages when required?*
- *Are you looking for help to improve your company's backup and recovery time and reliability?*
- *Do you need to store all types of information (structured and unstructured) in a single repository which can be configured to archive information with compliance and non-compliance retention needs?*
- *Do you have needs to keep data for long periods of time?*

Typical Findings After Asking the Above Questions

- *Multiple islands of storage are becoming hard to manage and are driving up costs.*
- *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.*
- *Total storage costs are getting out of control as storage needs rise.*
- *Information is exposed to security risks that are not understood, or not managed.*
- *Regulatory requirements cannot consistently be met at the desired level.*

- *Personnel costs to manage storage are rising rapidly, or there is a shortage of manpower to complete all of the management work in a timely fashion.*

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 be upgraded 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 better price?*
- *Does storage management cost you money for staffing, education, and time?*
- *How much benefit would you see from having a single interface—fewer tools to learn and use—for server and storage management?*
- *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?*
- *Do you have a large number of server/storage platforms and/or operating environments?*
- *What competitive storage or server hardware is installed and which competitor(s) are bidding for the business (EMC, HP, Dell, Sun)?*
- *Do you need to run test applications against live data?*
- *Do you need the ability to set up a disaster recovery plan?*
- *Do you understand the risks and costs associated with data access delay or data unavailability? Do you have the skills to complete an analysis? (IBM does—storage study.)*
- *Are your backup windows getting shorter?*
- *Are you confronted with significant complexities of storage management and looking to simplify the environment?*
- *Do you need to improve the security of your information?*

IBM PartnerWorld Program

The IBM PartnerWorld Program provides IBM Business Partners with the support they need to understand general market trends, plan market and business strategies, and generate demand for IBM hardware, software, or services.

Business Partners who invest the most in IBM receive higher-value benefits and resources from the PartnerWorld program. This investment is recognized through three PartnerWorld membership levels: Member, Advanced, and Premier. Qualification for these membership levels is based on the Business Partner's attainment according to a point system. Points are earned by acquiring skills, developing and selling solutions, driving IBM revenue, and achieving customer satisfaction.

More on the Web

- Partner Voices on YouTube
- Partner Voices on Twitter

The IBM PartnerWorld program publishes a blog for IBM Business Partners called "Partner Voices" (see the "More on the Web" box).

Once you are an IBM Business Partner, The IBM PartnerWorld Web Site is your central source for information and tools to help you succeed.

IBM Storage on PartnerWorld Web Site

The IBM PartnerWorld Web site has a great deal of information of use to all IBM Business Partners worldwide. On the site you will find the latest presentations and marketing materials (such as brochures, data sheets, and case studies) as well as competitive information, consultant reports, IBM white papers, education and events, tools, technical support, and much more.

There is an IBM System Storage portal on PartnerWorld, which serves as a central repository of much storage information of interest to Business Partners (see the "More on the Web" box).

More on the Web

- System Storage portal on PartnerWorld
- IBM PartnerWorld Web site home page
- IBM PartnerWorld news and newsletters
- PartnerWorld membership levels
- Join PartnerWorld

In this guide, we have summarized and provided direct links to a great deal of PartnerWorld information of interest to System Storage Business Partners. As such, this publication is your personal "guide" to the PartnerWorld Web site. Just the same, we encourage you to spend some time browsing the PartnerWorld site so you can get a feel for the full scope of resources available to you.

You will need your IBM-assigned user ID and password to access some areas of PartnerWorld. If you don't have your user ID and password, you can contact IBM PartnerWorld for help.

Incentives and Promotions

IBM offers many incentives and promotions for both Business Partners and your clients to help drive sales. You can find a list of the most current incentives and promotions by following the "More on the Web" links.

More on the Web

- Incentives and promotions for storage

Storage News and Events

You can keep current with the fast paced world of IBM System Storage by frequently checking the link shown in the "More on the Web" box.

More on the Web

- IBM Storage news and events

System Storage Education

As with almost any endeavor, time spent educating yourself and your team on appropriate topics such as selling techniques and storage product offerings will help you succeed. In this chapter we discuss two ways you can get the education you need to succeed in selling IBM System Storage products.

Know Your IBM (KYI)

Know Your IBM is a permission-based interactive marketing and selling resource

More on the Web

- Know Your IBM training modules

designed for you, our Business Partner sellers. It provides net, customized, online education modules focusing on strategic product and solution areas while rewarding our Business Partners for taking the time to learn and then to sell selected products.

The education helps increase your understanding and awareness of the key features and business benefits of IBM products, solutions, and offerings. Incentives offered in conjunction with Know Your IBM are designed to encourage you to complete the education modules and provide you rewards for performance. Incentives are awarded at the individual rep level, not to the firm.

System Storage Professional Certification Program

Several certifications are offered to test an individual's knowledge and skills in a given market segment. The candidate must have general experience in disk, tape and other products in the segment. There are also several product-specific tests that provide candidates with an opportunity to demonstrate their depth of technical expertise through certification.

Follow the path to certification:

- *Select the role that most closely represents your daily tasks.*
- *Review the job role/target audience description and test objectives which describe the skills tested.*
- *Review the recommended training and study aids for the selected test, with a focus on areas where you need to improve your skills.*
- *Check your readiness to sit for the test by reviewing the sample test or taking the assessment test provided on the certification Web site. Use the results of the assessment test to identify areas where you may still need more preparation.*

More on the Web

- Professional certification program—Storage
- Find a PVUE testing center and register to take a test

IBM Systems College

IBM Systems College is your one stop for all learning on IBM Systems offerings for servers, storage, and more. The Systems Subject Matter Expert (SME) training is now part of Systems College.

You now have the option of selecting courses through the learning roadmaps which have been created for specific sales and technical roles or through the course catalog.

The roadmaps have been categorized by basic, intermediate, and advanced to address your specific skill needs and help toward earning your certification.

More on the Web

- IBM Systems College

Find the right level of education quickly with the new options provided or use the Systems College Search feature when looking for a specific topic.

Sales Tools

Through the PartnerWorld Web site, IBM offers Business Partners a wide range of sales tools to help you succeed with IBM Systems Storage solutions. Here we will look at a few key examples.

System Storage Master Resource Kit

The Master Resource Kit provides Business Partners with a package of key client-ready sales and marketing enablement resources. You'll find client-ready presentations and brochures, education resources and opportunities, seller guides, client references, and more, all to help you unleash your selling potential and the power of our unique technologies.

More on the Web

- System Storage Master Resource Kit

"FindIT" Search Tool

FindIT is a Web-accessible application optimized for desktops, laptops, iPad, and Android tablets. The intelligent filters on FindIT let you pull assets for any sales situation in seconds, without having to search PartnerWorld, IBM.com, or YouTube. You can filter by product, client role, and industry and save assets to an electronic briefcase. The application allows you to switch between roles and products to instantly change the sales discussion focus.

More on the Web

- FindIT search tool

Sales Conversations

IBM has assembled a set of sales conversations to help sellers advance more rapidly through the stages of prepare, engage, and pursue as they identify and progress opportunities. They are designed to guide meaningful solution-oriented discussions with your customers. The sales conversations assets are aligned with the sales cycle—Prepare, Engage, and Pursue. Each conversation includes:

More on the Web

- Systems Storage Sales Conversations

(a) Buyer and role-based targeted assets, (b) Best practices to help start conversations and progress/win deals, (c) Targeted client references, (d) Relevant videos, demos, and client presentations.

Sales conversations cover many topics including: Innovation with FlashSystem Storage, Managing Business Critical Data with Storage, Managing Data Intensive Business Solutions with Storage, etc.

"Know on the Go"

Know on the Go (formerly Sell IT) delivers key assets and enablement for client sales conversations (plays) in one place. Content is targeted to platform, solution, and specific job role. You can even hide internal content and use the app directly with your clients.

Know on the Go (KotG) is available as a mobile application for download on iPad and Android tablets.

More on the Web

- "Know on the Go" support page on PartnerWorld

Vito Letters (templates)

Vito letters are templates you can customize and use to generate and advance leads. IBM has created a set of Vito letters which you can access on IBM Partnerworld.

More on the Web

- Storage vito letters

Whiteboards (informal sales pitches)

IBM has developed as set of "whiteboard" presentations designed to allow you to have a conversation with a client executive on the specific topic. The goal is for the client to agree to the considerations, their importance, and the need to explore them further with the appropriate experts.

Although these presentations are delivered via a whiteboard, you could deliver it in any form, preferably a conversation

More on the Web

- Storage whiteboards

with a client. In fact, during the development of one of our whiteboards, we even tested the whiteboard with an IBM client over lunch and on a napkin, and we received the client's commitment for the recommended next steps.

Systems Storage Quick Proposals

Creating a high-quality proposal can be difficult and time consuming. To help streamline this process for you, the IBM Americas Techline team has designed "Quick Proposal" templates you can use to prepare comprehensive proposals for your sales opportunities. Simply download the QP Content Document and customize it for your specific opportunity.

More on the Web

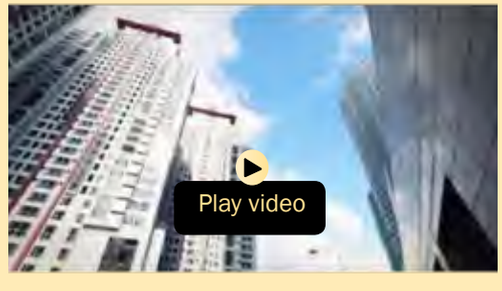
- Systems Storage Quick Proposals

Success Stories, References, Case Studies

It is often helpful to make prospective customers aware of other businesses that have successfully implemented solutions based on Power Systems. For this reason, IBM maintains a database of existing customer success stories, complete with company profiles, identified needs, solutions, and resulting benefits. IBM Business Partners can use these success stories with customers to advance the sell cycle. To see what is available, simply follow the links provided in the "More on the Web" box.

More on the Web

- Systems Storage client references on PartnerWorld
- Systems Storage success stories on IBM.com



YouTube Channel: IBM Client Videos

Competitive Marketing Information

IBM Systems Storage solutions offer many unique capabilities that help you deliver business value for your clients and beat the competition. This section describes some tools you can use to hone your competitive edge.

IBM COMP Web Site

The competitive section of PartnerWorld (COMP) is a worldwide portal for information that will help you win in competitive marketing situations. It includes a searchable set of reports, presentations, and quick reference cards about the marketplace, competitors, and competitive products. You will find materials developed by IBM as well as outside sources such as Gartner, IDC, DH Brown, and IDEAS International.

More on the Web

- IBM "COMP" Web site

Systems Storage Competitive Sales Tool

The IBM Systems Storage Competitive Sales Tool is designed to give you the help you need in competitive situations. It provides quick head-to-head comparisons between IBM storage offerings and major competitive products. It is a standalone tool which can be downloaded and used anywhere, any time.

More on the Web

- Systems Storage Competitive Sales Tool

Adding Value and Increasing the Sale

Once a solution begins to take shape for your customer, consider what other products and services can be added to the deal to bring more value to the customer and increase your sales revenue. Let's look at a few ideas to help fuel your thinking.

IBM System Clothing Pointers

Whenever you are proposing the sale of a server, it only makes sense to include the needed storage devices in the original proposal. Selling storage solutions with servers is known as "clothing." Clothing the servers with storage solutions is a proven key to selling success. Follow the links in the "More on the Web" box to see what storage devices to propose with each type of server.

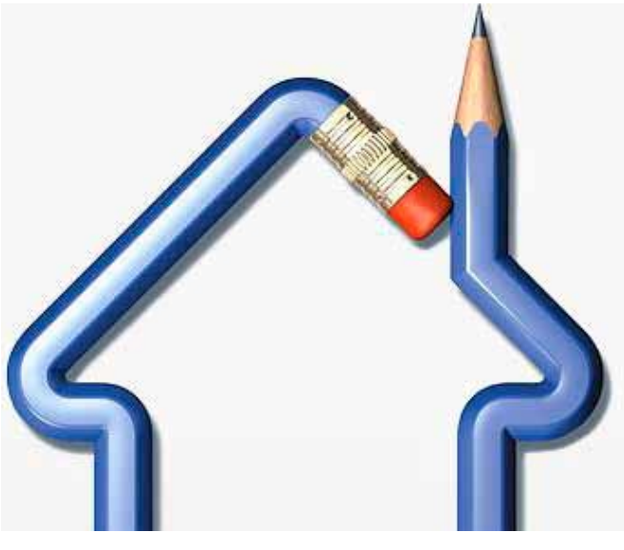
More on the Web

- Compatibility/interoperability info for IBM storage products
- Storage products for Power Systems
- Storage products for System z servers
- Storage software

Attaching Services to Your Proposal

Attaching IBM Global Technology Services to your IBM solution sales gives you a way to enhance your productivity, accelerate sales, and increase deal size today while creating ongoing revenue opportunities for the future—creating offerings that are more attractive to your clients than ever before.

CIOs, IT directors, and business leaders in client organizations of all sizes across all industries see tremendous value in IBM Global Technology Services. Our offerings can provide powerful supplements to their internal resources, opportunities to save money, and programs to enhance



More on the Web

- Service offerings for System Storage

the effectiveness of their technology investments. And IBM gives you a way to complement your resources and capabilities. The result is that IBM Global Technology Services can help increase your client satisfaction because you can offer a more complete solution.

IBM Global Services provides structured and standardized approaches backed by industry-leading experts who can help plan, design, install, configure, tune, test, and support solutions; speed time to value; reduce risk; and minimize disruption to IT and business operations.

IBM Global Financing

IBM Global Financing (IGF) continues to focus on meeting customer needs by concentrating on key business areas: leasing and lending, remarketing and refurbishing, and asset management. IGF conducts business in more than 40 countries, financing IBM and non-IBM hardware,

More on the Web

- IBM Global Financing info on IBM.com

software, and services, with a full range of flexible, low-rate offerings. IGF's customers find that financing their information technology solutions offers many advantages in both robust and difficult economic climates because financing frees up their capital for other investments. Many information technology installations, including those for customer relationship management, data mining, and e-business, require a substantial investment. IGF financing enables customers to pay for their new technology in affordable monthly payments during the life of the project. Our customers run the gamut from the smallest, family-owned business purchasing a single server and software to the largest, multinational corporation, acquiring tens of thousands of PCs for offices on several continents. In addition to working directly with customers, we work with IBM Business Partners to provide financing for their clients and to help them build their own businesses.

Moving Your Business Forward

As an IBM Business Partner, you have the opportunity to leverage IBM PartnerWorld program benefits to help build your capabilities and effectiveness in the marketplace. In this section, we look at just a few ways you can add value to your business to the benefit of your customers and your bottom line.

IBM System Storage Specialty

The IBM System Storage Specialty Offering is designed to reward IBM Business Partners who make a significant investment in skills and certifications, customer references, and have the ability to successfully sell and deploy IBM Storage solutions. The program is open to

IBM resellers and solution providers who acquire products from IBM and authorized IBM Distributors and who meet the criteria outlined on the speciality Web site, and determined by the local channel partner channel organization. Storage has two levels of Specialty:

Specialty: Advanced demonstration of skills and market success consistent with strategy.

Specialty Elite: Superior/market leadership demonstration of skills and market success consistent with strategy.

IBM is committed to continue to support and develop this specialty and to provide additional resources to our top partners as we pursue an aggressive program of growth through this year and beyond. In addition, IBM will continue to simplify our business processes and align resources and benefits to those partners who actively demonstrate a willingness to invest in IBM focused skills and resources. By achieving the Storage specialty designation, Business Partners will be able to play a greater role in helping clients meet the challenges of rapidly growing data, reduced budget, and greater customer expectations.

The benefits of participating include:

- *Support resources—Accredited System Storage Specialty Business Partners will receive an assigned storage growth team representative to help them plan for future growth and proactively work with them to find the resources and support they need to extend their storage practice and drive additional revenue with IBM.*
- *Financial rewards—Additional incentives may be available for accredited System Storage Specialty Business Partners to invest in education, marketing, and offering development.*
- *Training benefits—Receive education and certification vouchers to assist in funding the education and training of your employees.*
- *Specialty Mark—Accredited Business Partners get to raise the visibility of their leadership and capabilities in the marketplace using the System Storage Specialty mark in their advertising and collateral. The mark is evidence that their firm has acquired the skills and experience in System Storage solutions and is recognized by IBM as an expert having met the specialty criteria.*
- *Additional benefits are provided for those Partners achieving the "Elite" level .*

You must apply for the specialty to participate, and your company must meet the specified criteria through eligible certifications and verified customer references, and achieve and maintain the minimum annual IBM System Storage revenue requirements. Higher levels of certification and revenue contribution are required for Specialty Elite.

More on the Web

- System Storage Specialty info on PartnerWorld

IBM Digital Content Marketing (Web Content Syndication)

IBM's Digital Content Marketing benefit is an integrated suite of marketing tools—web content syndication, email marketing, and social automation—designed to help you generate leads while saving you time and money. Use one, two, or all three capabilities to create digital marketing campaigns to increase your visibility in the marketplace.

Ninety three percent of business-to-business purchases start with an online search. You can use Web site syndication to unlock more leads:

- *Help clients find you in the digital world*
- *Attract new buyers and new clients*
- *Put the power of digital marketing to work.*

More on the Web

- Digital Content Marketing info on PartnerWorld
- Digital Content Marketing registration

Digital Event Resource Kit

The Digital Event Resource Kit provides event execution enablement and tools for IMT-executed events. It helps you host your own events raising the profile of your business and engage both existing customers and prospects. Event-in-a-Box provides presentation materials and introductory videos. Demand generation offers such as analyst reports, brochures, and infographics are also provided.

More on the Web

- Digital Event Resource Kit
- Event-in-a-Box

Social Media Resources for IBM Business Partners

Social media is an important tool for businesses of all sizes. Whether you are already involved in social media or just getting interested, the "More on the Web" box provides some links that will be of interest to you. Join the IBM System Storage conversation!

More on the Web

- System Storage on Twitter
- System Storage on LinkedIn
- System Storage YouTube channel
- System Storage communities on IBM.com
- IBM PartnerWorld communities
- LinkedIn social network (has an IBM Business Partner Group)

Getting Help

Everyone benefits when Business Partners can quickly find answers to questions that inevitably arise during the sales cycle. To this end, the IBM PartnerWorld program and your distributor stand ready to help you. Following are a few of the most useful resources the IBM PartnerWorld program provides to Business Partners—with the goal of identifying, proposing, and ultimately installing solutions that will provide value for your clients.

Technical Support for Business Partners

Technical Sales Support from IBM provides Business Partners with extensive pre-sales support through the PartnerWorld program online via the Web and by voice. Voice support can be accessed via PartnerWorld Contact Services, the single point of entry to all key support organizations. PartnerWorld Contact Services provides access to Techline for hardware and software technical sales support, and to Competeline (Americas only) for win strategies and competitive information. CompeteCenter (Europe only) is accessed through the CompeteCenter Web site. Systems Business Partners entitled through the PartnerWorld program have access to IBM System x and IBM System Storage solutions and selected major competitive platform support including:

- *Remote solution design assistance/review*
- *Technical marketing assistance*
- *Product and promotion information*
- *Configuration assistance*
- *Competitive product information*
- *Sales strategy information*
- *Solution assurance assistance.*

Follow the links in the "More on the Web" box to access Technical Sales Support online.

More on the Web

- Contact Techline
- Technical Sales Library
- PartnerWorld technical resources and support

Systems Presales Advisor Tool

Follow the links in the "More on the Web" box to explore the IBM Presales Advisor tool. This is invaluable in helping you define specific solutions that include servers and storage products.

More on the Web

- Presales Advisor tool
- More sizing guides and configuration tools

IBM Support Portal

The IBM Supply Portal is your gateway to all technical support downloads, content, tools, and resources for IBM products.

More on the Web

- IBM Support Portal

System Storage Quick Reference

In this chapter we explore the IBM System Storage hardware, software, and solutions you will be selling and offer some resources that will help you succeed

More On The Web

- System Storage portal on PartnerWorld
- System Storage on IBM.com
- System Storage Product Guide (pdf)

Flash Storage Appliances

The IBM flash portfolio, including the market leading IBM FlashSystem family, will drive extreme performance to enable real-time business decisions, the efficiency around your data ecosystem, and the resiliency to make the data available and accessible. In this section, we look at the IBM FlashSystem solutions.

More On The Web

- Flash Storage info on IBM.com

FlashSystem 840

IBM FlashSystem 840 is data center-optimized to strategically harness the value of stored data. By providing extreme performance for the most demanding applications, including online-transaction processing and analytics databases, virtual desktop infrastructures, technical-computing applications, and cloud environments, FlashSystem 840 delivers a competitive advantage for today's organizations. The IBM system reduces response times with MicroLatency—that is, less than 135-microsecond access times. It is this consistent low latency that enables FlashSystem to deliver application performance improvements.

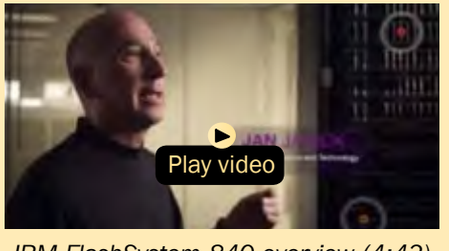
Easy to deploy and manage, FlashSystem 840 delivers savings across the entire organization, from improved productivity of IT staff to energy efficiency within the data center. The efficiency benefits of FlashSystem 840 are a result of the high performance, high density, and low power consumption of the system's architecture. FlashSystem 840 is hardware accelerated, using energy-efficient IBM PowerPC processors, field-programmable gate arrays (FPGAs), and large arrays of high-density enterprise multi- level cell (eMLC) flash.

Here are some quick FlashSystem 840 facts:

- *Supports more concurrent users, improves query response times, shortens batch processes, accelerates backups and lowers virtual desktop costs with all-flash storage*

More on the Web

- FlashSystem 840 assets on PartnerWorld
- FlashSystem 840 info on IBM.com
- FlashSystem 840 Competitive Insights
- FlashSystem 840 blog search
- FlashSystem 840 Twitter search



IBM FlashSystem 840 overview (4:43)

- *Improves IT economics by improving server efficiency with IBM MicroLatency data accesses*
- *Reduces IT waste with extreme performance, high-density, energy-efficient flash storage*
- *Integrates with existing infrastructure with support for Fibre Channel, iSCSI, InfiniBand, and FCoE interfaces*
- *Expands capacity and performance incrementally to match changing requirements*
- *Improves availability with IBM Variable Stripe RAID, redundant and hot swappable components, and concurrent code load.*

FlashSystem V840

IBM FlashSystem V840 Enterprise Performance Solution merges IBM software-defined storage with the scalable performance of IBM FlashSystem storage to accelerate critical business applications and decrease data center costs simultaneously. As a result, your organization can gain a competitive advantage via a more flexible, responsive, and efficient storage environment.

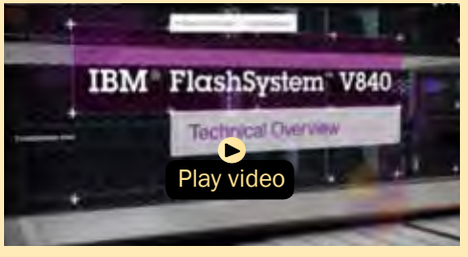
FlashSystem V840 is designed to accelerate all types of applications and infrastructures, but it is most often deployed to support high-performance database applications, such as Oracle, SAP, or IBM DB2. The solution can support high numbers of concurrent users, demanding queries, and strict requirements for performance. By accelerating multiple workloads—both physical and virtual—FlashSystem V840 can help organizations reduce costs, increase revenue, and improve customer satisfaction.

Here are some quick FlashSystem V840 facts:

- *Delivers all-flash storage for less than the cost of HDDs with IBM Real-time Compression*

More on the Web

- FlashSystem V840 assets on PartnerWorld
- FlashSystem V840 info on IBM.com
- FlashSystem V840 Competitive Insights
- FlashSystem V840 blog search
- FlashSystem V840 Twitter search



IBM FlashSystem V840 overview (6:45)

- *Scales up and out to accelerate mixed workloads with up to 1.6 PB and 2.5 million IOPS*
- *Integrates with VMware using vStorage APIs for Array Integration (VAAI)*
- *Enables quality of service to deliver performance to applications that need it and use IBM Easy Tier to migrate less frequently accessed data off your all-flash array*
- *Protects your data with a full suite of disaster-recovery tools including snapshots, clones, and replication*

- *Achieves advanced visualization, provisioning and performance management with IBM SmartCloud Virtual Storage Center.*

FlashSystem 810 and 710

IBM FlashSystem 810 and IBM FlashSystem 710 are designed to speed up the performance of critical enterprise applications, including data warehousing and OLAP applications, content delivery networks, video rendering and editing software, and 3D modeling and simulation applications. These systems deliver extreme performance per gigabyte so organizations can quickly uncover business insights from IBM DB2, Oracle, and other database applications. In addition, FlashSystem 810 and FlashSystem 710 eliminate storage bottlenecks with MicroLatency that enables faster decision making.

FlashSystem 810 and 710 Specifications

Series	IBM FlashSystem 810	IBM FlashSystem 710
Model	9830-AE1	9830-AS1
Flash type	eMLC	SLC
Usable capacity (terabyte [TB]/ tebibyte [TiB]	10.3 TB/9.4 TiB	5.2 TB/4.7 TiB
Raw maximum capacity (TB/TiB)	13.7 TB/12.5 TiB	6.9 TB/6.3 TiB
Incremental usable capacity upgrade (TB/TiB)	2.1 TB/1.9 TiB	1.0 TB/0.9 TiB
Minimum latency (write)	60 µs	60 µs
Minimum latency (read)	110 µs	100 µs

More On The Web

- FlashSystem 710 assets on PartnerWorld
- FlashSystem 810 assets on PartnerWorld
- FlashSystem 710 and 810 info on IBM.com
- FlashSystem 710 Competitive Insights
- FlashSystem 810 Competitive Insights
- FlashSystem 710 blog search
- FlashSystem 810 blog search
- FlashSystem 710 Twitter search
- FlashSystem 810 Twitter search

Here are some quick FlashSystem 810 and 710 facts:

- *Gain enterprise-class reliability with IBM Variable Stripe RAID technology—without sacrificing performance or usable capacity*
- *Reduces time to decisions with faster applications, including data warehouses and online analytical processing (OLAP) databases*
- *Improves IT efficiency with IBM MicroLatency, high bandwidth, and extreme input/output operations per second (IOPS) performance in a small footprint*
- *Realizes macro efficiencies with green storage designed for fast data access at low wattage*

- *Extract immediate value from your investment with quick time to deployment.*

FlashSystem 820 and 720

IBM FlashSystem 820 and IBM FlashSystem 720 are designed to speed up the performance of multiple enterprise-class applications, including OLTP and OLAP databases, virtual desktop infrastructures, technical computing applications, and cloud-scale infrastructures. These IBM systems deliver extreme performance per gigabyte so organizations can quickly uncover business insights using traditional data analytics as well as new, big-data technologies. In addition, FlashSystem 820 and FlashSystem 720 eliminate storage bottlenecks with IBM MicroLatency—that is, less than 100-microsecond access times—to enable faster decision making. With these low latencies, the storage disk layer can operate at speeds comparable to those of the CPUs, DRAM, networks, and buses in the I/O data path.

FlashSystem 820 and 720 Specifications

Series	820	820	720	720
Model	9831-AE2	9831-AE2	9831-AS2	9831-AS2
Flash type	eMLC	eMLC	SLC	SLC
	10 TB	20 TB	5 TB	10 TB
Usable capacity (terabyte [TB]/ tebibyte [TiB]	12.4 TB/11.3 TiB	24.7 TB/22.5 TiB	6.2 TB/5.6 TiB	12.4 TB/11.3 TiB
Usable capacity RAID 5 (TB/TiB)	10.3 TB/9.4 TiB	20.6 TB/18.8 TiB	5.2 TB/4.7 TiB	10.3 TB/9.4 TiB
Raw maximum capacity (TB/TiB)	16.5 TB/15 TiB	33 TB/30 TiB	8.3 TB/7.5 TiB	16.5 TB/15 TiB
Minimum latency (write)	25 µs	25 µs	25 µs	25 µs
Minimum latency (read)	110 µs	110 µs	100 µs	100 µs

Here are some quick FlashSystem 820 and 720 facts:

- *Reduces business interruptions without sacrificing performance or usable capacity with IBM Variable Stripe RAID technology*
- *Accelerates decision making across multiple applications, including online transactional processing (OLTP) and online analytical processing (OLAP) databases*

More On The Web

- FlashSystem 720 assets on PartnerWorld
- FlashSystem 820 assets on PartnerWorld
- FlashSystem 720 and 820 info on IBM.com
- FlashSystem 720 Competitive Insights
- FlashSystem 820 Competitive Insights
- FlashSystem 720 blog search
- FlashSystem 820 blog search
- FlashSystem 720 Twitter search
- FlashSystem 820 Twitter search

- *Boosts IT efficiency and gain high bandwidth and extreme input/output operations per second (IOPS) performance in exceptionally dense, 1U storage systems—without compromising on latency*
- *Realizes macro efficiencies with green storage for data centers, designed for fast data access at low wattage*
- *Extracts immediate value from your investment with quick time to deployment.*

Disk Storage

The IBM System Storage family includes a variety of disk storage products ranging from direct-attached disk drives to complete enterprise storage systems. In this section, we look at the product offerings in the disk storage arena.

Disk Storage Cross Reference by Workload Size

It is often a mistake to associate entry-level, midrange, and enterprise-class storage products with small, medium, and large size businesses respectively. For example, did you know that 30 percent of DS8000s are used by small and medium businesses? Did you know that 70 percent of SAN Volume Controllers are used by small and medium businesses?

Conversely, did you know that nearly every large enterprise uses entry-level and midrange storage products in addition to enterprise-class devices? For example, some large enterprises have branch offices or remote areas where smaller storage systems are more appropriate. Measurements often used to classify business size, such as the number of employees or sales revenue, do not always correlate with the amount of information those businesses store. For this reason, product recommendations based on workloads often make more sense, though they still should be considered only as general guidelines. In this section, you will find a list of disk storage products organized by workload size (entry, mid-size, and enterprise) to help you find the best solution for your client.

Disk Storage for Entry-Level Workloads

Here is a list of disk storage products designed for businesses with entry-level workloads. Click on the links and you will jump to the section of this ebook that describes the product.

- *Storwize V3700*
- *DS3500 Express*

Disk Storage for Mid-size Workloads

Here is a list of disk storage products designed for mid-size workloads. Click on the links and you will jump to the section of this ebook that describes the product.

- *IBM Storwize V7000 and Storwize V7000 Unified*
- *IBM Flex System V7000*
- *IBM Storwize V5000*
- *DS5000*
- *DS5020*
- *DCS3700*
- *DCS3860*

Disk Storage for Enterprise Workloads

Here is a list of disk storage products designed for large enterprise workloads. Click on the links and you will jump to the section of this ebook that describes the product.

- *DS8000*
- *IBM XIV*
- *SONAS*

DCS3700

The IBM System Storage DCS3700 storage system is ready to meet the challenge. Designed for applications with high-performance streaming data requirements, DCS3700 offers optimal space utilization, low power consumption, and high performance. By combining proven IBM storage controllers with up to 60 drives in just 4U of rack space, DCS3700 can reduce operational costs for capacity-intensive applications.

DCS3700 provides a simple, efficient, and flexible approach to storage that is based on seven generations of design knowledge and firmware development. DCS3700 can act as a cost-effective, fully integrated complement to IBM System x, IBM BladeCenter, and IBM Power Systems

More On The Web

- DCS3700 Express assets on PartnerWorld
- DCS3700 info on IBM.com
- DCS3700 Express Competitive Insights
- DCS3700 Express blog search
- DCS3700 Express Twitter search

DC3700 Specifications

Models	DCS3700 storage system DCS3700 with Performance Modules storage system DCS3700 expansion unit
RAID controller	Dual-active, intelligent controllers
Cache	Base DCS3700 storage system: 4 GB cache (2 GB per controller) with field or plant upgrades to 8 GB (4 GB per controller) DCS3700 with Performance Modules storage system: 12, 24 or 48 GB (6, 12, 24 GB per controller)
Drive interface	Two 6 Gbps SAS drive ports
Data protection levels	Single controller subsystem: One 6 Gb SAS drive expansion port Dual controller subsystem: Two 6 Gb SAS drive expansion ports
Software features	Base DCS3700 storage system: Thin provisioning with DDP, 128 storage partitions, 32 Enhanced FlashCopy images, host-attachment support for Microsoft Windows and Linux on x86/IBM POWER, IBM AIX, Mac OS and Solaris DCS3700 with Performance Modules: Thin provisioning with DDP, 512 storage partitions, 32 Enhanced FlashCopy images, host-attachment support for Windows and Linux on x86/POWER, AIX, Mac OS and Solaris
Maximum drives supported	Thin provisioning with DDP, 128 storage partitions, 32 Enhanced FlashCopy images, host-attachment support for Microsoft Windows and Linux on x86/IBM POWER, IBM AIX, HP-UX, Solaris and MAC OS
Maximum drives supported	Base DCS3700 storage system: Up to 180 drives per system with the attachment of two DCS3700 expansion units (60 drives per enclosure), 20 drives minimum drive quantity per enclosure* DCS3700 with Performance Modules: Up to 360 drives per system with the attachment of five DCS3700 expansion units (60 drives per enclosure), 20 drives minimum drive quantity per enclosure*
Fans & power supplies	Two each per enclosure
Rack support	Slim 4U, 19-inch rack mount enclosure
Management software	System Storage DS Storage Manager

servers for a wide variety of intensive computing environments.

Here are some quick DCS3700 facts:

- *Gains fast, highly available, dense storage capabilities at an affordable price*
- *Delivers simplified data protection management and automated recovery with Dynamic Disk Pooling (DDP)*
- *Improves backup and restores capabilities with enhanced IBM FlashCopy technology*
- *Achieves solid uptime, massive scalability, and green efficiencies*
- *Helps optimize the flow of large, file-based data while retaining ease-of-data access*
- *Leverages multi-level data protection using a mix of replication features*
- *Ensures data integrity with support for the T10 Protection Information (T10-PI) standard.*

DCS3860

The IBM System Storage DCS3860 storage system delivers the performance and scalability organizations need to succeed in this new era of big data. Designed for high-performance computing applications, DCS3860 supports up to 60 drives in just 4U of rack space—and it can scale up to 360 drives, including up to 24 solid-state drives (SSDs), with the attachment of five expansion units. This high-density system also helps make the most of today's IT budgets by increasing capacity while reducing the storage footprint, power consumption, and related operational costs.

DCS3860 provides a versatile, easy-to-use solution for storage area network (SAN) deployments. It works as a cost-effective, fully integrated complement to IBM System x and IBM BladeCenter servers for a wide variety of intensive computing environments.

DCS3860 Specifications

Models	DCS3860 storage system (181386H) DCS3860 storage system (181386C)
RAID controller	Dual-active, intelligent controllers
Cache per controller	12 GB
Drive interface	6 Gbps SAS
Data protection levels	RAID levels 0, 1, 3, 5, 6, 10 and Dynamic Disk Pooling
RAID levels	0, 1, 3, 5, 6, 10 and Dynamic Disk Pooling
Storage partitions	512
Maximum drives supported	360, including up to 24 SSD
Fans and power supplies	Two each per enclosure
Rack support	Slim 4U, 19-inch rack mount enclosure
Management software	System Storage DS Storage Manager

More On The Web

- DCS3860 Express assets on PartnerWorld
- DCS3860 info on IBM.com
- DCS3860 Express Competitive Insights
- DCS3860 Express blog search
- DCS3860 Express Twitter search

Here are some quick DCS3800 facts:

- *Expands performance, flexibility, and operational efficiency with scalable, high-density storage systems*
- *Simplifies data protection management and automates recovery tasks with Dynamic Disk Pooling*
- *Helps ensure data integrity with support for the T10 Protection Information (T10 PI) standard.*

EXP2500 Express Expansion Unit

IBM has combined best-of-breed development with leading 6 Gbps host interface and drive technology in the IBM System Storage EXP2500 Express, a cost-effective, fully integrated complement to IBM System x and IBM BladeCenter servers. Offering substantial improvements at a price that will fit most budgets, the EXP2500 Express delivers superior price-to-performance ratios, functionality, scalability, and ease-of-use for the entry-level storage user.

Easy to manage, flexible, and extendable, IBM System Storage EXP2500 Express is designed to work as a direct-attached external disk storage solution for IBM System x and IBM BladeCenter servers using ServeRAID controllers. EXP2500 Express helps organizations enhance capacity seamlessly to address their current and future data needs.

EXP2500 Express is a performance-oriented SAS platform designed to increase both bandwidth and throughput with

EXP2500 Specifications

Model	1747-HC1 (PN 174712X)—System Storage EXP2512 Express Storage Enclosure; 1747-HC2 (PN 174724X)—System Storage EXP2524 Express Storage Enclosure
RAID controller	EXP2500 Express supports: Direct attachment to selected System x servers using: • IBM ServeRAID M5025 SAS/SATA Controller (part number 46M0830) • IBM ServeRAID M5120 SAS/SATA Controller (PN 81Y4478) Direct attachment to select BladeCenter servers using: • BladeCenter SAS Connectivity Module (part number 39Y9195) • IBM ServeRAID MR10ie (CIOv) Controller (part number 46C7167)
Drive interface	SAS
Supported drives	EXP2512: 300 GB, 450 GB and 600 GB 15k rpm 6 Gbps SAS 3.5-inch HDD 1 TB, 2 TB, 3 TB and 4 TB 7.2k rpm 6 Gbps SAS nearline 3.5-inch HDD* EXP2524: 146 GB and 300 GB 15k rpm 6 Gbps SAS 2.5-inch HDD 600 GB, 900 GB and 1.2 TB 10k rpm 6 Gbps SAS 2.5-inch HDD 1 TB 7.2k rpm 6 Gbps SAS nearline 2.5-inch HDD 200 GB and 400 GB 6 Gbps SAS 2.5-inch SSD
RAID levels	Supports RAID levels supported by ServeRAID Controllers: Standard 0, 1, 10, 5, 50; Optional 6, 60
Maximum drives supported	12 in the EXP2512 enclosure 24 in the EXP2524 enclosure
Fans & power supplies	Two hot-swappable 515 watt (115–230 V ac) power supplies
Rack support	19" industry-standard rack

More On The Web

- EXP2500 assets on PartnerWorld
- EXP2500 info on IBM.com

next-generation storage technology. It also includes support for IPv6, meeting the latest government requirements to help ensure compliance.

Here are some quick EXP2500 facts:

- *Based on 6 Gbps SAS interface connectivity, IBM System Storage EXP2500 Express provides an affordable external disk solution for direct attachment to IBM System x and IBM BladeCenter servers via ServeRAID controllers*
- *Provides flexible support for high-performance and nearline disk drives, as well as solid state drives (SSDs)*
- *Improves scalability with a high-density 2U enclosure that supports up to 12 3.5-inch disk drives on IBM System Storage EXP2512 Express and 24 2.5-inch disk drives on IBM System Storage EXP2524 Express*
- *Delivers high availability and reliability with dual-AC power supplies and fans.*

DS3500 Express

IBM System Storage DS3500 Express combines best-of-breed development with leading 6 Gbps host interface and drive technology. With its simple, efficient, and flexible approach to storage, DS3500 Express is a cost-effective, fully-integrated complement to IBM System x servers, IBM BladeCenter, and IBM Power Systems. By offering substantial improvements at a price that fits most budgets, DS3500 Express delivers superior price/performance ratios, functionality, scalability, and ease of use for the entry-level storage user.

Building on the solid foundation of 3 Gbps SAS technology, 6 Gbps SAS is the enterprise version of SAS. This 6 Gbps SAS offers increased performance, scalability, and reliability enhancements to support the ever-increasing reliance on information, while delivering the outstanding value that organizations demand.

More On The Web

- DS3500 Express assets on PartnerWorld
- DS3500 info on IBM.com
- DS3500 Express Competitive Insights
- DS3500 Express blog search
- DS3500 Twitter search

Here are some quick DS3500 Express facts:

- *Delivers mid-range performance and scalability at entry-level prices*
- *Leverages built-in management expertise in intuitive and powerful storage management software*
- *Delivers simplified data protection management and automated recovery*
- *Supports Enhanced Global Mirroring over IP and/or Fibre Channel*
- *Delivers continuous data security with full disk encryption and supports high-performing solid-state drives (SSDs)*
- *Ensures data integrity with support for the T10 Protection Information (T10-PI) standard.*
- *Complies with Network Equipment Building System (NEBS) and European Telecommunication Standards Institute (ETSI) and supports 48 V DC power supplies.*

DS3500 Specifications

Part number	1746A2S DS3512 Express Single Controller Storage System 1746A2D DS3512 Express Dual Controller Storage System 1746A4S DS3524 Express Single Controller Storage System 1746A4D DS3524 Express Dual Controller Storage System 1746T4D DS3524 Express DC Dual Controller Storage System
RAID Controller	Single or dual active, hot-swappable controllers
Cache	1 gigabyte (GB) cache per controller with 2 GB upgrade (battery-backed)
Drive interface	Single controller subsystem: One 6 Gb SAS drive expansion portDual controller subsystem: Two 6 Gb SAS drive expansion ports
Data protection levels	RAID levels 0, 1, 3, 5, 6, 10 and/or DDP
Maximum drives supported	Up to 192 drives - high-performance SAS drives, nearline SAS drives, SSDs and SED SAS drives EXP3512 (2U 12 3.5-inch drives) and EXP3524 (2U 24 2.5-inch drives) enclosures, which can be intermixed behind a DS3500 Express enclosure
Fans and power supplies	Dual redundant, hot-swappable
Rack support	2U, 19-inch, industry-standard rack
Management software	IBM System Storage DS Storage Manager

EXP3500

The IBM System Storage EXP3500 Express consists of two models—EXP3512 and EXP3524 expansion units—designed to affordably meet the demanding data requirements of today and tomorrow by building on more than 30 years of design expertise. The IBM legacy in enterprise storage systems, with 6 Gbps SAS drive technology, enables the System Storage EXP3500 expansion units to deliver best-of-breed technology, reliability, and performance. EXP3500 expansion units are 2U cabinet-mountable 6 Gbps drive enclosures that are designed to support either a total of twelve 3.5-inch SAS drives (EXP3512) or twenty-four 2.5-inch SAS drives (EXP3524) for optimal flexibility and efficiency. EXP3500 expansion units can be a key component of a high-performance storage solution. With each external SAS port on the environmental service module (ESM) supporting a 6 Gbps x4-wide connection, EXP3500 can achieve excellent throughput to the host.

With global commerce and 24×7 information available on demand, businesses require continuous access to information in order to be productive, competitive, and able to ensure customer satisfaction. EXP3500 expansion units offer the assurance of high availability with redundant power supplies and ESMs, which help ensure that contact with the drives continues even in the rare instance of a component failure. With hot-swappable components, you can remove and replace ESMs, power supplies, and drives with minimal or no downtime.

More On The Web

- EXP3500 assets on PartnerWorld
- EXP3500 info on IBM.com

EXP3500 Specifications

Part number	1746A2E – EXP3512 Express 1746A4E – EXP3524 Express
Drive interface	6 Gbps SAS
Supported drives	6 Gbps SAS 3.5-inch drives: 300 GB, 450 GB and 600 GB 15k rpm, 2 TB and 3 TB 7.2k rpm nearline 6 Gbps SAS 2.5-inch drives: 146 GB 15k rpm, 300 GB 10k rpm 300 GB 15k rpm, 600 GB 10k rpm, 900 GB 10k rpm, 1 TB 7.2k rpm nearline, 300 GB 10k rpm SED Solid-state SAS 2.5-inch drives: 200 GB and 400 GB SSD
Maximum drives supported	Single controller subsystem: One 6 Gb SAS drive expansion portDual controller subsystem: Two 6 Gb SAS drive expansion ports
Data protection levels	RAID levels 0, 1, 3, 5, 6, 10 and/or DDP
Maximum drives supported	EXP3512: twelve 3.5-inch drives; EXP3524: twenty-four 2.5-inch drives. Scalability up to 192 drives (optional mix of expansion enclosures)
Fans and power supplies	Dual
Rack support	Included standard

Here are some quick EXP3500 facts:

- *Provides a highly available storage system by supporting attachment to the IBM DS3500 Express storage system*
- *Supports high bandwidth and random I/O applications with 6 Gbps x4-wide SAS ports*
- *Supports up to 36 TB of SAS disk storage in a single enclosure and up to 576 TB when fully expanded up to 192 drives*
- *Provides high-performance SAS, capacity-optimized SAS hard disk drives, self-encrypting drives (SEDs) and solid-state drives (SSDs) with intermixed support*
- *Helps support continuous access to data for data availability 24×7 with redundant components*
- *Enhances data integrity with support of T10-PI protocol.*

DS5000 series

The IBM System Storage DS5000 series is designed to meet the demanding open-systems requirements of today—and tomorrow—while establishing a new standard for life cycle longevity. Building on many decades of design expertise, the DS5000 storage system's architecture delivers industry-leading performance, real reliability, multidimensional scalability, and unprecedented investment protection. DS5000 supports IBM AIX and IBM Power Systems T10-PI Data Integrity Initiative.

DS5000 storage systems are equally adept at supporting transactional applications such as databases and online transaction processing (OLTP), throughput-intensive applications such as high-performance computing (HPC) and rich media, and concurrent workloads for consolidation and virtualization. With relentless performance and superior reliability and availability, DS5000 series storage systems can support the most demanding service level agreements (SLAs) for the most common operating

systems, including Microsoft Windows, UNIX, Linux, and Apple Macintosh. When requirements change, you can add or replace host interfaces, grow capacity, add cache and reconfigure the system on the fly—ensuring that it will keep pace with your growing organization.

Here are some quick DS5000 facts:

- *Provides balanced performance—up to 700,000 input/output operations per second (IOPS) and 6,400 MB/s—that is well-suited for virtualization and consolidation*
- *Scales up to 448 drives (1.34 PB) using the EXP5000 enclosure and up to 480 drives (1.44 PB) of high-density storage with the EXP5060 enclosure*
- *Allows for intermixing drive types (Fibre Channel, FC-SAS, FC-SAS nearline, self-encrypting drives [SEDs], SATA and solid-state drives [SSDs]) and host interfaces (Fibre Channel and iSCSI) for investment protection and cost-effective tiered storage*
- *Supports high availability with hot-swappable components and nondisruptive firmware upgrades.*

More On The Web

- DS5000 Express assets on PartnerWorld
- DS5000 info on IBM.com
- DS5000 Express Competitive Insights
- DS5000 blog search
- DS5000 Twitter search

DS5000 Specifications

Model	DS5100 -1818-51A, DS5300 -1818-53A
RAID Controller	Dual active
Cache	Up to a total of 64 GB cache • Options include 4 GB, 8 GB, 16 GB, and 32 GB of cache per controller • Dedicated cache mirroring channels • Persistent cache backup in the event of a power outage • Field-upgradable
Host interface	DS5100: • 8 × 4/8 Gbps Fibre Channel host interface cards (4 Gbps cards auto-negotiate to 1 Gbps, 2 Gbps and 4 Gbps speeds; 8 Gbps cards auto-negotiate 2 Gbps, 4 Gbps and 8 Gbps speeds) • 1 Gbps iSCSI—dual ported (sixteen total host ports) • 10 Gbps iSCSI—dual ported (eight total host ports) DS5300: • Up to 16 × 4/8 Gbps host interface cards (4 Gbps cards auto-negotiate to 1 Gbps, 2 Gbps and 4 Gbps speeds; 8 Gbps cards auto-negotiate 2 Gbps, 4 Gbps and 8 Gbps speeds) • 1 Gbps iSCSI—dual ported (16 total host ports) • 10 Gbps iSCSI—dual ported (8 total host ports)
Drive interface	Sixteen 4 Gbps Fibre Channel drive interfaces support up to: • 28 EXP5000 drive enclosures or 8 EXP5060 drive enclosures
Supported drives with EXP5060	SATA: 1 TB and 2 TB 7.2k rpm FC-SAS nearline: 3 TB 7.2k rpm
RAID levels	RAID 0, 1, 3, 5, 6, and 10
Storage partitions	8, 16, 32, 128, 256, or 512 storage partitions
Maximum drives supported	448 drives maximum with use of 28 EXP5000 drive enclosures; 480 drives with EXP5060 drive enclosures

DS5020

Optimized data management requires storage solutions with high data availability, strong storage management capabilities, and powerful performance features. IBM System Storage DS5020 Express is designed to provide low total cost of ownership, high performance, robust functionality, and unparalleled ease of use.

Facing relentless data growth and shrinking budgets, organizations continue to look for ways to improve efficiency and reduce costs. Utilizing 8 Gbps Fibre Channel connections allows companies to reduce the number of host bus adapters per server and the number of overall ports in their Fibre Channel SAN infrastructure without sacrificing performance, thus saving acquisition and operational costs.

Additionally, auto-negotiating 8 Gbps Fibre Channel interfaces allow DS5020 Express to integrate seamlessly into an existing 2 Gbps or 4 Gbps infrastructure, while offering investment protection going forward when the SAN inevitably becomes 8 Gbps.

DS5020 Specifications

Model	1814-20A
RAID Controller	Dual active
Cache	4 GB battery backed
Host interface	Four 8 Gbps Fibre Channel Eight 8 Gbps Fibre Channel Four 8 Gbps Fibre Channel Four 1 Gbps iSCSI
Drive interface	4 drive ports—Fibre Channel Switched and Fibre Channel Arbitrated Loop standard, auto-sensing 2 Gbps/4 Gbps
Supported drives	4 Gbps Fibre Channel full disk encryption (FDE): 300 GB, 450 GB and 600 GB 15k rpm 6 Gbps FC-SAS: 300 GB, 600 GB and 900 GB 10k rpm 6 Gbps FC-SAS FDE: 300 GB and 900 GB 10k rpm FC-SAS: 300 GB 15k rpm FC-SAS FDE: 300 GB 15k rpm SSD: 200 GB and 400 GB 4 Gbps SATA: 1 TB and 2 TB 7.2k rpm 6 Gbps FC-SAS nearline: 3 TB 7.2k rpm 6 Gbps FC-SAS nearline FDE: 3 TB 7.2k rpm
RAID levels	0, 1, 3, 5, 6, and 10
Storage partitions	4, 8, 16, 64, or 128 storage partitions
Maximum capacity	Up to 336 TB of FC-SAS nearline physical storage capacity, or up to 224 TB of SATA physical storage capacity, or up to 100.8 TB of FC-SAS physical storage capacity, or up to 8 TB of SSD physical storage capacity
Maximum drives supported	112 Fibre Channel, SED, FC-SAS, FC-SAS nearline, SSD or SATA drives (using 6 EXP520 expansion units)

Here are some quick DS5020 facts:

- *Enables storage area network (SAN) tiering with support for mixed Fibre Channel/iSCSI interfaces*
- *Supports virtualization/consolidation with balanced performance*
- *Supports low power, fast solid-state disks (SSDs)*
- *Secures data throughout the drive's lifecycle with self-encrypting drives (SEDs)*
- *Intermix Fibre Channel, SED, SATA, FC-SAS, FC-SAS nearline and SSDs for cost-effective tiered storage*

More On The Web

- DS5020 Express assets on PartnerWorld
- DS5020 info on IBM.com
- DS5020 Express Competitive Insights
- DS5020 blog search
- DS5020 Twitter search

- *Maximizes use and minimizes storage total cost of ownership with feature-rich management software*
- *Ensures confidence with key application certifications*
- *Supports IBM AIX and IBM Power Systems T10-PI Data Integrity Initiative.*

EXP5000 Drive Enclosure

The EXP5000 drive enclosure is more than "just a bunch of disks." The enclosure is designed to optimize performance, availability, and serviceability by offering:

- *4 Gbps Fibre Channel interfaces for connectivity*
- *Up to 16 dual-ported Fibre Channel, FC-SAS, FC-SAS nearline, SED, SSDs, or SATA disk drives that are intermixable in the same enclosure*

More On The Web

- EXP5000 Express assets on PartnerWorld

- *An environmental service module (ESM)-embedded "loop switch"*
- *Redundant 4 Gbps Fibre Channel drive loops to ensure complete accessibility to all drives in the event of a loop or cable failure*
- *Redundant power supplies, cooling fans, and ESMs*
- *A 24×7 four-hour response warranty.*

All primary components are hot-swappable and can be easily accessed, removed, or replaced.

Storwize V3700

The IBM Storwize family, including IBM Storwize V3700, helps organizations achieve better data economics by supporting these new workloads that are critical to their success. Storwize family systems can handle the massive volumes of data from mobile and social applications, enable rapid and flexible cloud services deployments, and deliver the performance and scalability needed to gain insights from the latest analytics technologies.

IBM Storwize V3700, the entry-level system in the IBM Storwize family, is an efficient, easy-to-use system designed to complement virtual server environments while delivering flexibility and innovative storage functions.

To help address block storage requirements, Storwize V3700 is designed to provide small and midsize organizations with the ability to consolidate and share data at an affordable price, while leveraging advanced software capabilities usually found in more expensive systems. Providing up to 240 drives of capacity, Storwize V3700 delivers proven ease of management, functionality and interoperability.

Here are some quick Storwize V3700 facts:

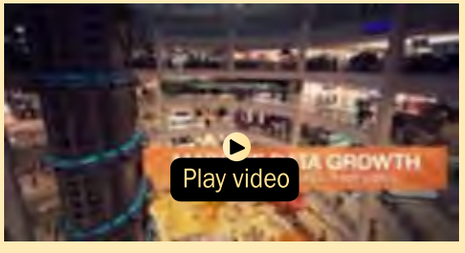
- *Easily manages and deploys storage using a breakthrough graphical user interface*
- *Gains efficiency with internal storage virtualization and high-performance thin provisioning*

Storwize V3700 Specifications

Host interface	1 Gbps iSCSI and 6 Gbps SAS (optional 8 Gbps Fibre Channel, 1 Gbps iSCSI, 6 Gbps SAS or 10 Gbps iSCSI/Fibre Channel over Ethernet)
User interface	Storwize V3700 graphical user interface
Single/dual controller	Dual controller
Cache per controller	4 GB upgradable to 8 GB
Drive type	Dual-port, hot-swappable 6 Gb SAS disk drives
Supported drives	Small form-factor 2.5-inch disk drives: ● 1 TB at 7.2k rpm SAS nearline ● 600 GB, 900 GB, 1.2 TB and 1.8 TB at 10k rpm ● 146 GB, 300 GB and 600 GB at 15k rpm Large form-factor 3.5-inch disk drives: ● 2 TB, 3 TB, 4 TB and 6 TB at 7.2k rpm ● 900 GB, 1.2 TB and 1.8 TB at 10k rpm (2.5-inch 1.8 TB drive in a 3.5-inch drive carrier) ● 300 GB and 600 GB at 15k rpm Solid-state drives (SSD) drives: ● 200 GB, 400 GB and 800 GB
RAID levels	RAID 0, 1, 5, 6, 10
Maximum drives supported	240 drives per system
Fans & power supplies	Fully redundant, hot-swappable
Rack support	Standard 19" rack-mount enclosure
Management software	Storwize V3700 machine code
Advanced functions included with each system	Internal virtualization, thin provisioning, one-way data migration and FlashCopy (up to 64 targets)
Optional licensed functions	FlashCopy upgrade (up to 2,040 targets), Easy Tier, Remote Mirror and turbo performance

More On The Web

- Storwize V3700 assets on PartnerWorld
- Storwize V3700 info on IBM.com
- Storwize V3700 Competitive Insights
- Storwize V3700 blog search
- Storwize V3700 Twitter search



IBM Storwize V3700 overview (2:30)

- *Has continuous access to data with integrated nondisruptive migration*
- *Improves network utilization for remote mirroring with innovative replication technology*
- *Optimizes costs for mixed workloads, with up to three times performance improvement with only five percent flash storage capacity using IBM Easy Tier*
- *Complies with Network Equipment Building System (NEBS) Level 3 and European Telecommunication Standards Institute (ETSI) specifications.*

Storwize V5000

IBM Storwize V5000 is a highly flexible, easy to use, virtualized storage system that enables mid-size organizations to meet the challenges of rapid data growth and limited IT budgets. As an intermediate Storwize family offering, Storwize V5000 enables organizations to consolidate and provide new capabilities to their existing infrastructures. With flexible licensing options, Storwize V5000 makes it easy to deploy complementary solutions, such as IBM ProtecTIER.

More On The Web

- Storwize V5000 assets on PartnerWorld
- Storwize V5000 info on IBM.com
- Storwize V5000 Competitive Insights
- Storwize V5000 blog search
- Storwize V5000 Twitter search

IBM Storwize V5000 overview

Storwize V5000 Specifications

Host interface	1 Gb iSCSI, 6 Gb SAS, and 8 Gb Fibre Channel or 10 Gb iSCSI/FCoE
User interface	Graphical User Interface (GUI)
Single/dual controller	Dual
Maximum cache	32 GB (with two-way clustered systems)
Drive type	Dual-port, hot-swappable, 6 Gb SAS disk drives
Supported drives	Small form factor 2.5-inch disk drives: • 146 GB, 300 GB @ 15k rpm • 600 GB, 900 GB, 1.2 TB @ 10k rpm • 1 TB @ 7.2k rpm SAS nearline Large form factor 3.5-inch disk drives: • 300 GB @ 15k rpm, SAS 2.5-inch • 900 GB, 1.2 TB @ 10k rpm, SAS 2.5-inch • 2 TB, 3 TB, 4 TB @ 7.2k rpm SSD 2.5-inch drives: • 200 GB, 400 GB, 800 GB
RAID levels	RAID 0, 1, 5, 6, 10
Maximum drives supported	Up to six Storwize V5000 expansion enclosures (maximum of 168 drives per system and 336 drives in two-way clustered systems): Small form factor enclosure: 24 x 2.5-inch drives Large form factor enclosure: 12 x 3.5-inch drives
Fans & power supplies	Fully redundant, hot-swappable
Rack support	Standard 19-inch rack-mount enclosure
Management software	IBM Storwize family software for Storwize V5000
Advanced features included with each system	Embedded GUI, Dual-system clustering, Virtualization of internal storage, Thin provisioning, One-way data migration, Interoperability with most major server platforms and operating systems
Optional advanced functions	Easy Tier, External virtualization, FlashCopy, Remote mirroring

Here are some quick Storwize V5000 facts:

- *Simplifies management with industry-leading graphical user interface*
- *Easily customizes your storage system with flexible software options*
- *Boosts performance up to three times using only five percent flash storage with optional IBM Easy Tier technology*
- *Consolidates and provides IBM Storwize V5000 capabilities to existing storage infrastructures using optional external virtualization*
- *Improves network utilization for remote mirroring with innovative replication technology.*

Storwize V7000 and Storwize V7000 Unified Disk System

IBM Storwize V7000 Unified and IBM Storwize V7000 are virtualized, enterprise-class storage systems that provide the foundation for implementing an effective storage infrastructure and transforming the economics of data storage. Designed to complement virtual server environments, these modular storage systems deliver the flexibility and responsiveness required for changing business needs.

Storewize V7000 Specifications

Maximum drives supported	504per control enclosure; 1,056 per clustered system
Cores per controller/ control enclosure/clustered system	8/16/64
Cache per controller/ control enclosure/clustered system	32 or 64 GB/ 64 or 128 GB/ up to 512 GB

In fact, Storwize V7000 Unified and Storwize V7000 provide the latest storage technologies for unlocking the business value of stored data, including virtualization and Real-time Compression™. In addition, the systems include a powerful new hardware platform that can support the massive volumes of data created by today's demanding cloud and analytics applications. They are designed to deliver outstanding efficiency, ease of use, and dependability for organizations of all sizes.

Here are some quick Storwize V7000 facts:

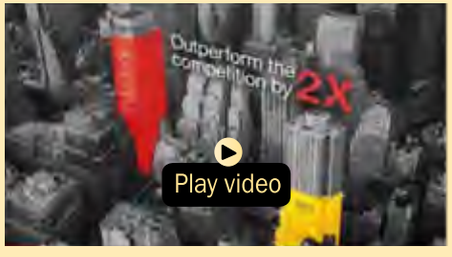
- *Meets changing business needs with virtualized, enterprise-class, flash-optimized modular storage*
- *Transforms the economics of data storage with hardware-accelerated data compression*
- *Leverages integrated support for file and block data to consolidate workloads*
- *Optimizes performance with fully automated storage tiering*
- *Improves network utilization for remote mirroring with innovative replication technology.*
- *Deploys storage quickly with easy-to-use management tools and built-in support for leading software platforms.*

Flex System V7000

IBM Flex System V7000 Storage Node is a powerful block storage system designed

More On The Web

- Storwize V7000 assets on PartnerWorld
- Storwize V7000 info on IBM.com
- Storwize V7000 Competitive Insights
- Storwize V7000 blog search
- Storwize V7000 Twitter search



IBM Storwize V7000 overview (1:48)

Flex System V7000 Specifications

Host interface	SAN- attached 8 Gbps Fibre Channel, 10 Gigabit Ethernet (GbE) FCoE and iSCSI host connectivity
Cache per controller/control enclosure/ clustered system	8 GB/ 16 GB/ 64 GB
Supported drives	2.5- inch disk drives ● 500 GB and 1 TB 7.2k nearline SAS ● 146 GB and 300 GB 15k SAS ● 300 GB, 600 GB, 900 GB and 1.2 TB 10k SAS ● 200 GB, 400 GB and 800 GB SSD
Maximum drives supported	240 per control enclosure; 960 per clustered system
Chassis support	IBM Flex System Enterprise Chassis
Management software	IBM Flex System Manager
Advanced features included with each system	Easy Tier, IBM FlashCopy, internal virtualization and thin provisioning, data migration, system clustering
Optional features	Remote mirroring (over Fibre Channel, FCoE and IP), Real- time Compression, external virtualization

to enable exceptionally rapid storage deployment and breakthrough management simplicity through full integration with IBM compute, storage, networking, virtualization and management infrastructures.

IBM PureFlex System and IBM Flex System represent a new category of computing that integrates multiple server architectures, networking, storage and system management capabilities into a single system that is easy to deploy and manage. These next-generation integrated systems support open industry standards—such as operating systems, networking and storage fabrics, virtualization, and system management protocols—to easily fit within existing and future data center environments. IBM PureFlex System and IBM Flex System solutions are scalable and extendable with multi-generation upgrades to protect and maximize IT investments.

Here are some quick Flex System V7000 facts:

- *Automates and speeds deployment with integrated storage for IBM PureFlex System or IBM Flex System*
- *Simplifies management with an integrated, intuitive user interface*
- *Reduces network complexity with FCoE and iSCSI connectivity*

More On The Web

- Flex System V7000 assets on PartnerWorld
- Flex System V7000 info on IBM.com
- Flex System V7000 Competitive Insights
- Flex System V7000 blog search
- Flex System V7000 Twitter search

- *Stores up to five times more active data in the same disk space using IBM Real-time Compression*
- *Virtualizes third- party storage for investment protection*
- *Optimizes costs for mixed workloads, with up to three times better performance with only 5 percent flash storage capacity using IBM Easy Tier*
- *Improves network utilization for remote mirroring with innovative replication technology.*

DS8000 series (DS8870)

Smarter storage, such as IBM DS8870, can help organizations spend less time managing storage and more time exploring ways to exploit data to grow their businesses. Quick and reliable data access is the driving force behind important data initiatives such as cloud, business analytics, and mobile computing, and the sixth-generation DS8870 system sets the standard for what an enterprise storage system should be with extraordinary performance, reliability and agility.

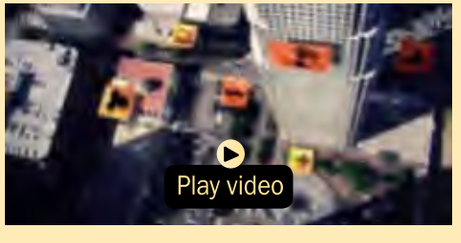
As the latest model in the IBM DS8000 series, DS8870 can bring simplicity to your data architecture with self-optimizing performance for both random and sequential application workloads for the mainframe and an extensive variety of distributed server platforms. And with the agility and automation to manage all these workloads simultaneously, DS8870 can greatly reduce the challenge of managing your increasingly complex storage environment as your business requirements change.

Here are some quick DS8870 Storage facts:

- *Accelerate database performance by up to 3.2 times with next-generation, IBM DS8870 High-Performance Flash Enclosure*
- *Optimizes performance with all-flash and hybrid-flash configurations for fast transaction processing and real-time operational analytics*
- *Delivers extreme data availability with full hardware redundancy and advanced business-continuity*
- *Maximizes performance and costs with new drive options, IBM Easy Tier, and other self-optimizing features*
- *Consolidates storage with high scalability, automated quality-of-service management, self-tuning performance, automated tiering, and support for many platforms and application workloads.*

More On The Web

- DS8000 Sales Kit on PartnerWorld
- DS8000 info on IBM.com
- DS8000 Competitive Insights
- DS8000 blog search
- DS8000 Twitter search



DS8870 video:
Smarter storage for enterprise systems

D8870 Specifications

Models	DS8870 (961, 96E)
Shared SMP processor configuration	IBM POWER7/POWER7+ dual 2-core, 4-core, 8-core or 16-core*
Other major processors	IBM PowerPC, ASICs
Processor memory for cache and non-volatile storage (min./max.)	16 GB/1024 GB
Host adapter interfaces (min./max.)	2/16
Host ports (min./max.)	8/128
Maximum physical storage capacity*	3,072 TB
RAID levels	5, 6, 10

XIV Storage System

IBM XIV Storage System is high-end flash-optimized data storage built to deliver out-of-the-box simplicity, resiliency, and predictability that are ideal for cloud and big-data analytics environments. Designed to simplify storage, XIV Storage System is enabling thousands of organizations to take control of their storage and gain business insights from their data. XIV storage is deployed in diverse industries worldwide, including financial, healthcare, telecommunications, managed services, energy, and manufacturing. It integrates easily with virtualization, email, database, analytics, data protection, and other solutions from leading providers such as VMware, Microsoft, SAP, Oracle Solaris, SAS, and Symantec.

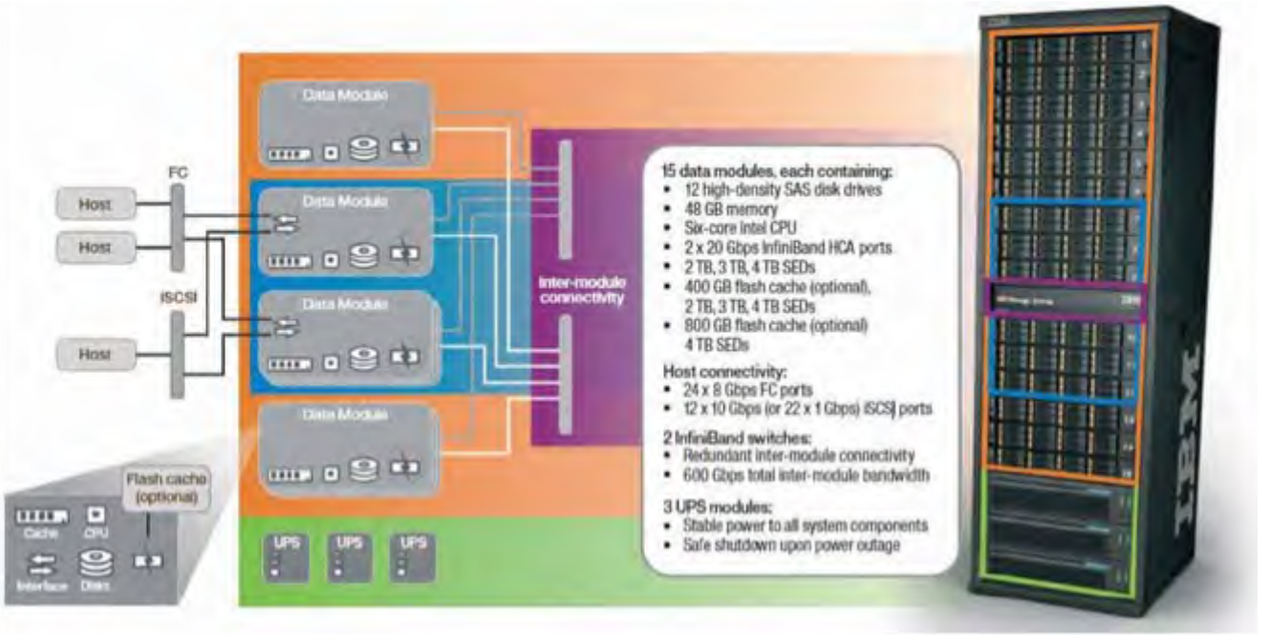
Designed for consistent, enterprise-level performance and five-nines availability, XIV storage handles static and dynamic workloads with ease. Never compromising performance for reliability, the XIV grid architecture delivers massive parallelism—resulting in uniform allocation of system resources at all times. XIV storage sets a new standard for ease of use by automating most tasks and providing an extraordinarily intuitive user interface. IBM XIV Mobile Dashboard can make life that much easier with anytime, anywhere XIV monitoring from mobile devices.

Here are some quick XIV Storage System highlights:

- *Delivers consistent, tuning-free high performance and ease of use via a grid-based architecture*

More On The Web

- XIV assets on PartnerWorld
- XIV info on IBM.com
- XIV Competitive Insights
- XIV configuration and functionality table
- XIV blog search
- XIV Twitter search



- *Scales cloud storage capacity and performance linearly and manages up to 144 frames using IBM Hyper-Scale*
- *Enables elasticity, open-standards support and mixed-workload affinity for optimized compute clouds and virtualized environments*
- *Offers business continuity with three-site mirroring, full redundancy, self-healing and unprecedented rebuild speed*
- *Provide compelling data economics through superb price-performance, power and footprint efficiencies, all-inclusive software licensing, and flexible acquisition options ideal for service providers.*

SAN Volume Controller

An industry-leading storage virtualization system, SVC has been delivering availability, reliability, flexibility, and efficiency for more than 10 years. Its innovative data virtualization capabilities provide the foundation for the entire Storwize family.

SVC provides the latest storage technologies for unlocking the business value of stored data, including virtualization and Real-time Compression. SVC is designed to deliver unprecedented levels of efficiency, ease of use, and dependability for organizations of all sizes.

Here are some quick SAN Volume Controller facts:

- *Enhances storage functions, economics, and flexibility with sophisticated virtualization*
- *Leverages a new data engine and hardware-accelerated data compression*
- *Stores up to five times more active data using IBM Real-time Compression*
- *Moves data among virtualized storage systems without disruptions*
- *Optimizes tiered storage—including flash storage—automatically with IBM Easy Tier*
- *Improves network utilization for remote mirroring and helps reduce costs*
- *Implements multi-site configurations for high availability and data mobility.*

More On The Web

- SAN Volume Controller Sales Kit on PartnerWorld
- SAN Volume Controller info on IBM.com
- SAN Volume Controller Competitive Insights
- SAN Volume Controller blog search
- SAN Volume Controller Twitter search

Scale Out Network Attached Storage (SONAS)

IBM Scale Out Network Attached Storage (SONAS) is designed to embrace and deliver cloud storage in the petabyte age. SONAS can meet today's storage challenges with quick and cost-effective IT-enabled business enhancements designed to grow with unprecedented scale.

SONAS can also deliver storage services that make the supporting technology almost invisible. It allows applications and services to be uncoupled from the underlying infrastructure, enabling businesses to adjust to change quickly. As a result, SONAS can easily integrate with your organization's strategies to develop a more dynamic enterprise.

SONAS Specifications

Host interface	CIFS, NFS, FTP, HTTP
Management software	SONAS software Optional Tivoli Storage Manager client (requires license) Optional Tivoli Productivity Center 5.1 (requires license)
Supported drives	SAS: 300 GB (15k rpm) Nearline SAS: 2 TB and 3 TB (72k rpm) SSD: 200 GB and 400 GB SAS 2.5-inch
RAID levels	RAID 6
Maximum drives supported	7200

Organizations with fast-growing, rapidly multiplying file systems are beginning to discover that traditional network-attached storage (NAS)—even clustered NAS—has serious problems. Managing and supporting storage as it scales to millions and billions of active files is extremely complex. When such massive numbers of files require separate file systems connected with many separate servers, operational complexity grows exponentially. Consolidating tens, even hundreds, of these file servers into high-end scale-out NAS becomes a necessity. This is where SONAS helps. SONAS is designed to scale out to store millions to billions of active files in a single namespace. SONAS offers operational efficiency and administrative sav-

ings, combining massive scalability with automated file management to quickly deliver information around the world.

Here are some quick IBM SONAS facts:

- *Accommodates capacity growth with scale-out performance for both random-access and streaming file workloads*
- *Enables ubiquitous access to files between SONAS and IBM Storwize V7000 systems across the globe quickly and cost effectively with IBM Active Cloud Engine, leveraging its disaster recovery and business continuity capacity*
- *Enables cloud storage via seamless integration with IBM SmartCloud Storage Access*
- *Lowers TCO by up to 40 percent with automated lifecycle management and migration to tape*
- *Provides gateway option for IBM XIV, IBM System Storage DCS3700, and Storwize V7000 disk systems*
- *Delivers high performance with a new performance module and twice the drive support with up to 360 drives.*

More On The Web

- SONAS assets on PartnerWorld
- SONAS info on IBM.com
- SONAS Competitive Insights
- SONAS blog search
- SONAS Twitter search

Real-time Compression Appliances STN7800

IBM Real-time Compression Appliance STN7800 increases the effective capacity of the existing storage infrastructure to help users meet the demands of rapid data growth while also enhancing storage performance and utilization. The IBM Real-time Compression Appliance applies patented IBM real-time data compression techniques to primary and existing storage, delivering optimization and savings throughout the entire storage lifecycle. The result is unprecedented cost savings and return on investment, along with operational and environmental efficiencies.

The patented Random Access Compression Engine (RACE) technology used in the IBM Real-time Compression Appliance is based on proven Lempel-Ziv data compression algorithms. RACE enables the appliance to deliver real-time, random-access, deterministic and lossless data compression, maintaining reliable and consistent performance and data integrity.

Here are some quick STN6800 facts:

- *Shrinks primary network-attached storage (NAS) data in real time, without performance degradation*
- *Deploys and administers quickly and easily*
- *Supports 10 GbE and 1 GbE NAS ports for maximum flexibility*
- *Leverages automated failover option for high-availability environments.*

More On The Web

- STN7800 assets on PartnerWorld
- STN7800 info on IBM.com
- STN7800 Competitive Insights
- STN7800 blog search
- STN7800 Twitter search

STN7800 Specifications

Model	2452-780
1 GbE ports	16 or 8 with mixed 1 GbE (copper) and 10 GbE (optical) option
10 GbE ports	8 or 4 with mixed 1 GbE (copper) and 10 GbE (optical) option
ECC memory (GB)	96 GB
Processor	2 Intel Xeon CPU E5-2680 @ 2.70 GHz 8-core processors
Host interface	TCP/IP or UDP
Storage interface	NAS: SMB v1 and SMB v2, Microsoft CIFS and UNIX NFS v3
Connectivity	10 GbE (optical), 1 GbE (copper), or mixed 10 GbE (optical) and 1 GbE (copper) options
Hot swap components	Power supplies, fan modules, disk
Rack support	2U form factor
Management software	• Intuitive web GUI • Command line interface (CLI) for management tasks • Comprehensive SNMP MIB provides statistics information and alerts • Active Directory integration supports external Syslog server for sending notifications and audit information • Simple per-appliance software licensing
High Availability	• Transparent path failover, when deployed in pairs • Predictive failure analysis for hardware components • Link Aggregation (IEEE 802.3ad) • Ethernet Trunking (Cisco EtherChannel)

Tape Storage

Server systems are woven deeply into today's business processes and are at the core of day-to-day operations. This information is thus a valuable corporate asset that must be protected. Tape storage provides a cost-effective and efficient means of backing up and archiving the information held on disk storage. Tape storage plays a vital role in reducing storage costs, maintaining data availability in the event of hardware failures, restoring data files accidentally or maliciously erased, restoring operations after a disaster, and so forth.

IBM offers tape storage, backup and recovery solutions for data protection and retention.

IBM invented the concept of magnetic tape storage back in 1952. Since then, IBM has delivered many innovations in tape storage and that innovation continues today.

More On The Web

- All tape offerings on IBM.com

In this section, we examine IBM's tape storage offerings.

Tape Storage Cross Reference by Workload Size

It is often a mistake to associate entry-level, midrange, and enterprise-class storage products with small, medium, and large size businesses, respectively. The amount of data stored often does not correlate with the number of employees or revenue metrics often cited in determining size. For this reason, recommendations on products based on actual workloads often makes more sense, though still should be considered only a general guideline. In this section, you will find a list of tape storage products organized by workload size (entry, mid-size, and enterprise) to help you find the best solution for your client.

Tape Storage for Entry-Level Workloads

Here is a list of tape storage products designed for entry-level workloads.

- *TS2240 Express*
- *TS2250 Express*
- *TS2260 Express*
- *TS2340 Express*
- *TS2350 Express*
- *TS2360 Express*
- *TS2900 Tape Autoloader*
- *TS3100 Express*
- *TS3200 Express*
- *TS7620 ProtecTIER*
- *Linear Tape File System*

Tape Storage for Mid-size Workloads

Here is a list of tape storage products designed for mid-size workloads.

- *TS3100 Library*
- *TS3200 LIbrary*
- *TS3310 Library*
- *TS3500 Library*
- *TS4500 LIbrary*
- *TS7650 ProtecTIER*
- *Crossroads ReadVerify Appliance (RVA)*
- *Linear Tape File System*
- *7226 Enclosure*

Tape Storage for Enterprise Workloads

Here is a list of tape storage products designed for large enterprise workloads.

- *TS1120 Tape Drive*
- *TS1130 Tape Drive*
- *TS1140 Tape Drive*
- *TS1150 Tape Drive*
- *TS3500 Library*
- *TS4500 Library*
- *TS7700 Virtualization System*
- *Crossroads ReadVerify Appliance (RVA)*
- *Linear Tape File System*

Crossroads ReadVerify Appliance (RVA)

Crossroads ReadVerify Appliance provides full visibility into the utilization, performance, and health of the tape drives and media in a tape library environment. The detailed insight provided by ReadVerify Appliance can lead to operational improvements by helping to complete backup jobs on time, minimize purchases of unnecessary resources, and prevent premature wear of overused resources.

ReadVerify Appliance collects data directly from the tape drives and library during data transactions, without impacting the storage applications.

ReadVerify Appliance also supports two advanced features. ArchiveVerify (optional feature) offers the fully automated ability to verify readability of long-idle or suspicious media, providing an audit trail for regulatory compliance policies. The Read Verify Advanced Reporting integrated feature gives customers the dynamic ability to generate fully customized, multivariable reports for identifying hidden patterns and relationships between the different components of their tape environment.

Here are some quick RVA facts:

- *Helps reduce data risk by monitoring library activity and providing alerts on the health and integrity of the tape drives and media*
- *Optimizes tape resources by providing visibility into the root cause of incomplete backups, unbalanced drive usage, and low performing assets*
- *Helps meet regulatory compliance and reduce long-term data risk through fully automated, policy-driven validation of tape media readability (requires ArchiveVerify optional feature)*
- *Provides dynamic, multivariable user-managed reporting for understanding complex system interactions and projecting future budget and system needs.*

More On The Web

- Crossroads ReadVerify Appliance assets on PartnerWorld
- Crossroads ReadVerify Appliance info on IBM.com
- Crossroads ReadVerity Competitive Insights
- Crossroads ReadVerify blog search
- Crossroads ReadVerify Appliance Twitter search

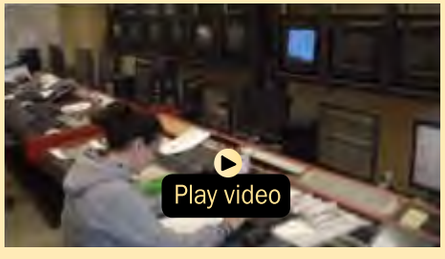
Linear Tape File System Single Drive Edition

IBM Linear Tape File System Single File Edition (LTFS SDE) provides direct, intuitive, and graphical access to data stored on Linear Tape-Open (LTO) Ultrium 6 or 5 tape cartridges, as well as IBM 3592 tape cartridges. It eliminates the need for additional tape management and software to access data.

Tape browsing on Linux

More On The Web

- LTFS Single Drive Edition specifications
- LTFS Single Drive Edition assets on PartnerWorld
- LTFS info on IBM.com
- LTFS Competitive Insights
- LTFS blog search
- LTFS Twitter search



AlphaTV—IBM LTFS Client Success (3:28)

LTFS is a significant step in moving tape storage away from its reputation as complex and difficult to use. Unlike disk storage, tape has previously required device-specific software to read, write, and manage data stored on its cartridges in libraries. But LTFS is the first file system that works in conjunction with LTO Ultrium tape technology to set a new standard for ease of use and portability for open-systems tape storage. Users can run any application designed for disk files against tape data without concern for the fact that the data is physically stored on tape.

LTFS SDE allows access to all data on a tape cartridge in a standalone drive attached directly to a server or via bridge box as easily as if it were on disk. LTFS SDE uses the file system's format and operating system (OS) resources to graphically display the contents of a tape cartridge in the OS graphical user interface (GUI) format, typically a folder/tree structure. The metadata of each cartridge, once mounted, is cached in server memory. Metadata operations, such as browse directory and filename search, do not require tape movement.

Here are some quick LTFS Single Drive Edition facts:

- *Accesses and manages files on tape as easily as if they were on hard disk*
- *Drags and drops files to and from tape without requiring device-specific software*
- *Shares file data across platforms, similar to using a USB drive.*

Linear Tape File System Storage Manager

The IBM Linear Tape File System (LTFS) format provides direct, intuitive, and graphical access to data stored in IBM tape drives and libraries using Linear Tape-Open (LTO) Ultrium 6 or 5 tape cartridges, as well as IBM 3592 tape cartridges in libraries with IBM TS1140 tape drives. It eliminates the need for additional tape management and software to access data.

With IBM Linear Tape File System Storage Manager (LTFS SM) software, accessing data stored on an IBM tape cartridge—instead of on disk—is transparent. LTFS SM software integrates with IBM Linear

More On The Web

- LTFS Storage Manager specifications
- LTFS Storage Manager assets on PartnerWorld
- LTFS info on IBM.com
- LTFS Competitive Insights
- LTFS blog search
- LTFS Twitter search

Tape File System Library Edition (LTFS LE) to help users better manage and monitor archive and restore files. It enables high performance and reliable access across the storage infrastructure. This allows data centers to add extensive capacity with lower media, floor space, and power costs. And with policy-based migration, archive capacity can be expanded without impacting data availability.

Here are some quick LTFS Storage Manager facts:

- *Accesses and manages files in IBM Linear Tape File System (LTFS) tape libraries without tape volume directories*
- *Fully manages the location and usage of both online and offline files*
- *Utilizes hierarchical storage management functionality to load balance resources for file writes and recalls*
- *Creates operational storage tiers with tape—rather than storing static, unchanging files on costly disk*
- *Takes advantage of on-disk metadata support, which allows faster searches for archived files based on user-defined metadata.*

Linear Tape File System Library Edition

IBM Linear Tape File System (LTFS) provides direct, intuitive, and graphical access to data stored in IBM tape drives and libraries using Linear Tape-Open (LTO) Ultrium 6 or 5 tape cartridges, as well as IBM 3592 tape cartridges in libraries with IBM TS1150 or IBM TS1140 tape drives. It eliminates the need for additional tape management and software to access data.

LTFS is a significant step in moving tape storage away from its reputation as complex and difficult to use. Unlike disk storage, tape has previously required device-specific software to read, write, and manage data stored on its cartridges in libraries. But LTFS is the first file system that works in conjunction with LTO Ultrium tape technology to set a new standard for ease of use and portability for open-systems tape storage. Users can run any application designed for disk files against tape data without concern for the fact that the data is physically stored on tape.

Similar to using a USB drive or memory stick, LTFS enables users to share data across platforms by simply dragging and dropping files. Access to data is faster and easier—when a library loads a tape into the drive and mounts it into the file system, files become visible as if they were on a disk. Because access is not through backup software, cartridges formatted with LTFS can be exchanged more easily between users working in different operating systems, using different software and in different locations. Users' operational agility and efficiency is increased because using LTFS does not require extensive knowledge of tape.

More On The Web

- LTFS Library Edition specifications
- LTFS Library Edition assets on PartnerWorld
- LTFS info on IBM.com
- LTFS Competitive Insights
- LTFS blog search
- LTFS Twitter search

Here are some quick LTFS Library Edition facts:

- *Accesses and manages files in IBM tape libraries as easily as if they were on disk*
- *Performs metadata operations such as browse directory and filename search without tape movement*
- *Eliminates the need for an external database for access to—or creation of—files*
- *Provides direct, intuitive, and graphical access to data stored in IBM tape drives and libraries*
- *Sets a new standard for ease and portability for open-systems tape storage*
- *Shares data across platforms by simply dragging and dropping files.*

Linear Tape File System Enterprise Edition

IBM Linear Tape File System Enterprise Edition (LTFS EE) gives organizations an easy way to use cost-effective IBM tape drives and libraries within a tiered storage infrastructure. By using tape libraries instead of disks for Tier 2 and Tier 3 data storage—data that is stored for long-term retention—organizations can improve efficiency and reduce costs. In addition, LTFS EE seamlessly integrates with the scalability, manageability, and performance of GPFS, an IBM enterprise file management platform that enables organizations to move beyond simply adding storage—to optimizing data management.

More On The Web

- LTFS Enterprise Edition specifications
- LTFS Enterprise Edition assets on PartnerWorld
- LTFS info on IBM.com
- LTFS Competitive Insights
- LTFS blog search
- LTFS Twitter search

LTFS EE provides direct, intuitive, and graphical access to data stored in IBM tape drives and libraries using Linear Tape-Open (LTO) Ultrium generation 6 or 5 tape cartridges, as well as IBM 3592 cartridges in libraries with IBM TS1140 tape drives. It eliminates the need for additional tape management and software to access data.

Here are some quick LTFS Enterprise Edition facts:

- *Simplifies tape storage with IBM Linear Tape File System (LTFS) format, combined with the scalability, manageability, and performance of IBM General Parallel File System (GPFS)*
- *Helpd reduce IT expenses by replacing tiered disk storage (Tier 2 and Tier 3) with IBM tape libraries*
- *Expandd archive capacity simply by adding and provisioning media—without impacting the availability of data already in the pool.*

7226 Multimedia Storage Enclosure

For organizations with rack-mount servers, the IBM 7226 Multimedia Storage Enclosure provides reliable and flexible data backup and security in the data center. With high-speed SAS, USB, and Fibre Channel interface options, as well as compatibility with a range of storage devices, 7226 Multimedia Storage Enclosure can help protect data on critical IBM Power Systems, POWER, BladeCenter, PureFlex,

More On The Web

- 7226 assets on PartnerWorld
- 7226 info on IBM.com
- 7226 Competitive Insights
- 7226 blog search
- 7226 Twitter search

and other compatible OEM systems. High-density applications using half-high LTO Ultrium 6 and LTO Ultrium 5 SAS tape drives are available on IBM POWER7 Systems.

The 7226 system is a rack-mounted enclosure that features two drive bays that can hold one or two tape drives, one or two RDX removable disk drives, and up to four slim-design DVD-RAM drives. These drives can be mixed in any combination of any available drive technology or electronic interface in a single 7226 Multimedia Storage Enclosure.

Here are some quick 7226 facts:

- *Features a low-profile design for configuration with up to four storage devices in a 1U space in a 19-inch rack*
- *Offers Linear Tape-Open (LTO) Ultrium 6 (6.25 TB), LTO Ultrium 5 (3.0 TB), and DAT160 (160 GB) tape drives, DVD-RAM or RDX removable disk drives*
- *Provides multiple options to connect to high-performance IBM POWER7, IBM POWER6, IBM POWER, IBM BladeCenter, IBM PureFlex, and other compatible original equipment manufacturer (OEM) systems*
- *Enables the performance and capacity enhancements of half-high LTO Ultrium 6 and 5 tape drives, with the additional versatility of RDX removable disk drives and DVD-RAM options.*

7226 Specifications

Number of storage devices	4 maximum (assumes 4 DVD drives)
Electronics	Optional SAS or USB electronic bus
Typical compression	2:1 for tape drives and 3:1 for DVD optical drives; Compression on RDX disk drives is typically 2:1 and is supported by a Power Systems server
Color	Black
Warranty options	One year

TS1120 Tape Drive

The IBM System Storage TS1120 Tape Drive offers a solution to address applications that need high-capacity, fast access to data or long-term data retention. It is supported in IBM tape libraries, IBM frames that support stand-alone installation, and in an IBM 3592 Tape Frame Model C20 (3592 C20 frame) attached to a Sun StorageTek 9310 library.

The tape drive uses IBM 3592 Cartridges, which are available in limited capacity (100 GB) for fast access to data, standard capacity (500 GB), or extended capacity (700 GB) that help to reduce resources

More On The Web

- TS1120 assets on PartnerWorld
- TS1120 info on IBM.com
- TS1120 Competitive Insights
- TS1120 blog search
- TS1120 Twitter search

to lower total cost. All three cartridges are available in rewritable or write-once-read-many (WORM) format.

Here are some quick TS1120 facts:

- *Supports backup and archive for IBM Systems and selected open system platforms*
- *Helps support regulatory compliance requirements for records retention with WORM media*
- *Helps to enable secure sharing of information with support for data encryption and key management*
- *Offers native data transfer rate of up to 104 MBps*
- *Supports native cartridge capacities of up to 700 GB.*

TS1120 Specifications

Recording technique	Linear Serpentine
Number of tracks	896
Native capacity	700 GB (using JB/JX media), 3003/500 GB (using JA/JW media) or 603/100 GB (using JJ/JR media)
Native data rate	104 MBps
Adaptive data rates	104, 85, 70, 55, 41 and 35 MBps for 3592 cartridges initialized in Gen 2 format 54, 41, 36, 31 and 27 MBps for 3592 cartridges initialized in Gen 1 format

TS1130 Tape Drive

The IBM System Storage TS1130 Tape Drive features storage capability to help you establish easy access to data, better security, long-term retention and data governance, and regulatory compliance. The TS1130 tape drive offers high-performance flexible data storage with support for data encryption. The TS1130 tape drive can help you protect your investments in tape automation by offering compatibility with existing automation. To further protect your investment, an upgrade model is available for your existing IBM System Storage TS1120 Tape Drives. And to support a heterogeneous server environment, the TS1130 offers multiplatform support.

The TS1130 Tape Drive supports IBM System Storage TS3400 and TS3500 Tape Libraries, IBM TotalStorage 3494 Tape Libraries, IBM Virtualization Engine TS7700, IBM racks that enable standalone installation, and IBM 3952 Tape Frame Model C20 (3952C20 frame) attached to a Sun 9310 library.

TS1130 Specifications

Recording technique	Linear Serpentine
Number of tracks	1152
Native capacity	1 TB (using JB/JX media), 640 GB (using JA/JW media), or 128 GB (using JJ/JR media)
Native sustained data rate	160 MBps (uncompressed)
Adaptive instantaneous data rates	163, 134, 109, 83, 56, 43 MBps for 3592 JB cartridges initialized in Gen 3 format; 150, 127, 104, 78, 52, 40 MBps for 3592 JB cartridges initialized in Gen 2 format; 71, 59, 47, 36, 24, 19, 13 MBps for 3592 JA cartridges initialized in Gen 1 format
Burst data rate	400 MBps
High-speed search (max)	12.4 mps
Warranty	One year

Here are some quick TS1130 facts:

- *Provides information security with support for encryption and key management*
- *Optimizes information retention with support for existing IBM tape automation*
- *Supports write-once-read-many (WORM) cartridges to help satisfy compliance requirements*
- *Offers high performance and high capacity for storage consolidation.*

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TS1140 Tape Drive

The IBM TS1140 tape drive features storage capabilities to help you establish easy, rapid access to data, improve security, provide long-term retention, and help maintain data governance and regulatory compliance. TS1140 offers high-performance, flexible data storage with support for data encryption. The drive can help you protect your investments in tape automation by offering compatibility with existing automation. To further protect your investment, an upgrade model is available for your existing IBM TS1130 tape drives. For flexible storage in heterogeneous server infrastructures, TS1140 offers multiplatform support and can scale from midrange to enterprise environments.

TS1140 supports IBM TS3500 and IBM TS4500 tape libraries as well as IBM racks that enable stand-alone installation. TS1140 features three options for Type C media. The IBM 3592 Advanced data tape cartridge, JC, provides up to 4 TB native capacity, and up to 4 TB are provided by the IBM 3592 Advanced WORM cartridge, JY. A limited capacity of up to 500 GB IBM 3592 Economy cartridge, JK, offers fast access to data. TS1140 can also read and write on previous media, type B (JB and JX), and read only on type A (JA, JW, JJ, and JR).

Here are some quick TS1140 facts:

- *Leverages high-performance, high-capacity tape processing for storage consolidation*
- *Helps enhance information security with support for encryption and key management*
- *Improves information retention with support for existing IBM tape automation*
- *Supports write-once-read-many (WORM) cartridges to help satisfy compliance requirements.*

TS1140 Specifications

Recording technique	Linear Serpentine
Number of tracks	2560
Native capacity	4 TB (using JC/JY media), 1.6 TB (using JB/JX media), or 500 GB (using JK media)
Native sustained data rate	250 MBps
Adaptive data rates	13 speeds, from 76 MBps to 251 MBps for 3592 JC/JK/JY cartridges initialized in Gen 4 format 13 speeds, from 74 MBps to 203 MBps for 3592 JB/JX cartridges initialized in Gen 4 format 13 speeds, from 41 MBps to 163 MBps for 3592 JB/JX cartridges initialized in Gen 3 format 13 speeds, from 39 MBps to 151 MBps for 3592 JB/JX cartridges initialized in Gen 2 format 13 speeds, from 18 MBps to 72 MBps for 3592 JA/JJ/JR/JW cartridges initialized in Gen 1 format 13 speeds, from 36 MBps to 144 MBps for 3592 JA/JJ/JR/JW cartridges initialized in Gen 2 or Gen 3 format
Burst data rate	800 MBps
High-speed search	12.4 mps
Warranty	One year

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TS1150 Tape Drive

The IBM TS1150 tape drive gives organizations an easy way to deliver fast access to data, improve security, and provide long-term retention—and for less expense than disk solutions. TS1150 offers high-performance flexible data storage with support for data encryption. This fifth-generation drive can help protect investments in tape automation by offering compatibility with existing automation. Plus, an upgrade model is available for existing IBM TS1140 tape drives. What's more, TS1150 supports the LTFS format for direct, intuitive, and graphical access to data.

TS1150 supports IBM TS4500 and IBM TS3500 tape libraries as well as IBM racks that enable stand-alone installation.

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TS1150 Specifications

Native capacity (uncompressed)	10 TB (using JD/JZ media), 7 TB (using JC/JY media) or 2 TB (using JL media)
Native sustained data rate (uncompressed)	360 MBps (type D media) 300 MBps (type C media re-formatted)
Burst data rate	800 MBps
High-speed search (maximum)	12.4 mps end-end search rate

TS1150 features three options for type D media. The IBM 3592 Advanced data tape cartridge, JD, provides up to 10 TB native capacity, and up to 10 TB are provided by the IBM 3592 Advanced WORM cartridge, JZ. A type D 3592 Economy cartridge, JL, is also available, storing 2 TB and providing fast access to data. TS1150 can also read and write on previous media, type C (JC, JY, and JK).

Here are some quick TS1150 facts:

- *Delivers high-performance, high-capacity storage with a proven, cost-effective tape drive*
- *Leverages IBM Linear Tape File System (LTFS) support for fast access to data*
- *Protects, retains, and secures critical data with encryption*
- *Extends storage investments with support for existing IBM tape automation*
- *Takes advantage of write-once-read-many (WORM) cartridges for long-term data retention.*

TS2240 Tape Drive Express

The IBM System Storage TS2240 Tape Drive Express Model H4V—one of the entry-level IBM System Storage tape product family offerings—is the answer to growing storage requirements and shrinking backup windows. Incorporating the fourth generation of advanced Linear Tape-Open (LTO) technology, the TS2240 Tape Drive is suited for handling the backup, save and restore, and archival data storage needs of a wide range of small systems. In addition, the TS2240 provides up to 6 Gbps Serial Attached SCSI (SAS) connectivity and the security of LTO-based data encryption.

The System Storage TS2240 Tape Drive is an excellent tape storage solution for businesses requiring backup or low-cost, real-time archival storage of their data. The TS2240, with a half-height form factor, offers the same high capacity of full-height LTO-4 tape drives. The TS2240 has a physical storage capacity of up to 1.6 TB (with 2:1 compression) in conjunction with the IBM System Storage LTO Ultrium 800 GB data cartridge,

which provides up to twice the capacity of Ultrium 3 cartridges. The native data transfer performance of the TS2240 Tape Drive has increased over the previous LTO half-height generation to up to 120 MB/sec. The TS2240 Tape Drive continues to provide an excellent alternative to slower and smaller capacity 1/4-inch, 4 mm, and 8 mm digital linear tape (DLT or SDLT) drives.

Here are some quick TS2240 facts:

- *Provides high-capacity tape storage in a small, half-height form factor to address backup and archiving requirements*
- *Offers highly secure data storage using available hardware encryption*
- *Provides a native data transfer rate of up to 120 MB/sec*
- *Designed for the midrange open systems environment*

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- *Supports two TS2240 Model H4Vs side by side in a standard 19-inch rack using the optional rack mount shelf.*

TS2250 Tape Drive Express

The IBM TS2250 tape drive express—the entry-level IBM tape product family offering—is the answer to growing storage requirements. Incorporating the industry-leading LTO Ultrium technology, the TS2250 tape drive is suited for handling backup, save and restore, and archival data storage needs with higher capacity and higher data transfer rate than previous generations. In addition, IBM LTO Ultrium 5 technology is designed to support media partitioning, and LTFS technology. It also continues to support encryption of data and write-once-read-many (WORM) media.

The TS2250 tape drive is an excellent tape storage solution for businesses requiring backup and low-cost, archival storage of their data. TS2250 provides a physical storage capacity of up to 3.0 TB (with 2:1 compression) in conjunction with the IBM LTO Ultrium 1.5 TB data cartridge, nearly double the capacity of LTO Ultrium 4 cartridges. The data transfer performance of the TS2250 tape drive has increased over the previous LTO Ultrium half-height generation with a transfer rate of up to 140 MBps with 6 Gbps SAS interface connectivity. The drive offers two SAS and one Ethernet port per drive to improve availability. For plug-and-play installation, a USB 3.0 option is available.

Here are some quick TS2250 facts:

- *Helps reduce costs with lower power consumption, consolidation, and space reduction*

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- *Supports media partitioning on LTO Ultrium 5 Media and new IBM Linear Tape File System technology*
- *Plug-and-play with SuperSpeed USB 3.0 option*
- *Addresses backup and archiving requirements with lower cost implementation.*

TS2260 Tape Drive Express

The IBM TS2260 tape drive express is the answer to growing storage requirements and shrinking backup windows. Incorporating the latest generation of industry-leading LTO technology, the TS2260 tape drive is suited for handling backup, save and restore, and archival data storage needs with higher capacity and higher data transfer rates than the previous generation. In addition, the LTO Ultrium 6 technology is designed to support media partitioning and IBM Linear Tape File System Single Drive Edition (LTFS SDE). It also continues to support encryption of data and write-once-read- many (WORM) media.

The TS2260 tape drive is an excellent tape storage solution for organizations requiring backup and low-cost, archival storage of data. TS2260, with a half- height form factor, offers more capacity than the full-height LTO Ultrium 5 tape drive in less space. TS2260 provides a physical storage capacity of up to 6.25 TB (with 2.5:1 compression). The data transfer performance has increased over the previous LTO Ultrium half-height generation with a transfer rate of up to 160 MBps with 6 Gbps SAS interface connectivity. The drive offers two SAS and one Ethernet port per drive to improve availability. For plug-and-play installation, a USB 3.0 option is available.

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Here are some quick TS2260 facts:

- *Provides long-term backup and archive storage data protection while lowering overall storage costs*
- *Easily accesses data stored on Linear Tape-Open (LTO) Ultrium 6 and 5 cartridges through the use of IBM Linear Tape File System (LTFS) technology*
- *Improves energy efficiency over previous generations*
- *Supports media partitioning on LTO Ultrium 6 media and LTFS*
- *Plug-and-play with SuperSpeed USB 3.0 option.*

TS2340 Tape Drive Express

The IBM System Storage TS2340 Tape Drive—the entry-level IBM System Storage tape product family offering—is the answer to growing storage requirements and shrinking backup windows. Incorporating the fourth generation of advanced linear tape-open (LTO) technology, the TS2340 Tape Drive is suited for handling the backup, save and restore, and archival data storage needs of a wide range of small systems. In addition, the TS2340 provides added security features by supporting encryption of data with 3 Gbps SAS connectivity.

The IBM System Storage TS2340 Tape Drive is an excellent tape storage solution for businesses requiring backup or low-cost, real-time archival storage of their data within a small window of time—it offers high-capacity and performance

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to help address the most demanding requirements. The TS2340 has a physical storage capacity of up to 1.6 TB (with 2:1 compression) in conjunction with the new IBM Ultrium 800 GB data cartridge, which provides up to double the capacity of previous Ultrium 3 technology. Along with its higher capacity, the data transfer performance of the TS2340 Tape Drive has increased over the previous generation for a native data transfer rate of up to 120 MBps. The TS2340 Tape Drive continues to provide an excellent alternative to slower and smaller capacity 1/4-inch, 4 mm, and 8 mm DLT/SDLT tape drives.

Here are some quick TS2340 facts:

- *Designed to provide high-capacity and performance to address the most demanding backup and archiving requirements*
- *Doubles the cartridge capacity of previous generation LTO drives*
- *Available hardware encryption designed to offer highly secure data storage along with high performance*
- *Native data transfer rate of up to 120 MBps*
- *Choice of SCSI or SAS interfaces.*

TS2350 Tape Drive Express

The IBM System Storage TS2350 Tape Drive Express—part of the entry-level IBM System Storage tape product family—supports these needs by leveraging the newest generation of Linear Tape-Open (LTO) technology to help cost-effectively handle growing storage requirements.

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The TS2350 Tape Drive is suited for handling backup, save and restore, and archival data storage needs with higher capacity and higher data transfer rate than previous generation. In addition, the IBM Ultrium 5 technology is designed to support media partitioning, and the new IBM Linear Tape File System technology. It also continues to support encryption of data and WORM media.

The TS2350 Tape Drive is an excellent tape storage solution for businesses requiring backup and archival storage of their data. The TS2350 offers high physical storage capacity of up to 3.0 TB (with 2:1 compression) in conjunction with the new IBM Ultrium 1.5 TB data cartridge, which provides nearly double the capacity of previous Ultrium 4 cartridges. The data transfer rate of the TS2350 Tape Drive has increased over the previous LTO generation to up to 140 MBps with 6 Gbps SAS interface connectivity. It also offers two SAS and one Ethernet port per drive to improve availability.

Here are some quick TS2350 facts:

- *Helps reduce costs with lower power consumption, consolidation, and space reduction*
- *Supports media partitioning on LTO Ultrium 5 Media and new IBM Linear Tape File System technology*
- *Nearly double the cartridge capacity of previous-generation LTO Ultrium 4 drives*
- *Designed to provide greater capacity and performance to address the most demanding backup and archiving requirement.*

TS2360 Tape Drive Express

The IBM System Storage TS2360 Tape Drive Express—part of the entry-level IBM System Storage tape product family—supports the storage, security, and compliance requirements of today's organizations. The TS2360 leverages the newest generation of LTO Ultrium technology, helping to cost-effectively handle growing storage requirements.

The TS2360 Tape Drive Express is suited for handling backup, save and restore, and archival data storage needs with higher capacity and a higher data transfer rate than the previous generation. In addition, the LTO Ultrium 6 technology is designed to support media partitioning and Linear Tape File System Single Drive Edition. It also continues to support encryption of data and write-once-read-many (WORM) media.

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Here are some quick TS2360 facts:

- *Helps reduce costs with lower power consumption, consolidation, and space reduction*
- *Supports media partitioning on Linear Tape-Open (LTO) Ultrium 6 media and IBM Linear Tape File System*
- *Double the compressed cartridge capacity and over 40 percent better performance compared to LTO Ultrium 5 drives*
- *Designed to provide greater capacity and performance to address the most demanding backup and archiving requirements*
- *More energy efficient than previous generations.*

TS2900 Tape Autoloader Express

The IBM System Storage TS2900 Tape Autoloader Express is designed for entry-level automated backup for rack system and small-to-medium business environments. With a low profile, high-density storage capacity, the TS2900 is ideally suited for backup and archival operations. The TS2900 is available with IBM HH LTO-6, HH LTO-5, HH LTO-4, or HH LTO-3 tape technology for a high-capacity, entry-priced tape storage solution.

The TS2900 is equipped with standard features designed to provide ease-of-use and secured data backup. Web-based remote management, a barcode reader, and a removable tape magazine help provide ease of use. The TS2900 can be used in a rack system, or on a desktop next to a server in an office. These types of features help reduce the requirements of IT personnel staff, as well as help centralize backup in the data center. The TS2900

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is also designed to support the encryption of sensitive user data in combination with HH LTO-6, HH LTO-5, or LTO-4 tape technology from IBM. With 6 Gbps SAS attach, the TS2900 is supported on IBM Power Systems, IBM System x, Intel, and other competitive open system server platforms.

Here are some quick TS2900 facts:

- *1U slim profile designed for rack system environments for automated, high-capacity tape storage*
- *Features the newest generation of LTO with IBM Ultrium 6 half-height (HH) technology designed for reliable performance in small-to-medium open system environments*
- *Lowest entry price of any IBM tape automation offering IBM half-height tape technology.*

TS3100 Tape Library Express

The IBM System Storage TS3100 Tape Library Express model and its storage management applications are designed to address capacity, performance, data protection, reliability, availability, affordability, and application requirements. It is designed as a functionally rich, entry tape-storage solution incorporating LTO tape technology. The IBM TS3100 Express model is an excellent solution for large-capacity or high-performance tape backup with or without random access. The TS3100 is also an excellent choice for tape automation for IBM Power Systems, IBM System x, and other open systems.

The IBM TS3100 Tape Library Express is well-suited for handling backup, save and restore, and archival data-storage needs for small to medium-size environments. With the use of one LTO full height tape drive or up to two LTO half-height tape drives and 24 tape cartridge capacity, the IBM TS3100 is designed to take advantage of LTO technology to cost-effectively handle growing storage requirements.

Here are some quick TS3100 facts:

- *Designed to support the newest generation of LTO with one Ultrium LTO 6 full-height tape drive or up to two LTO Ultrium 6 half-height tape drives, as well as LTO Ultrium 5 and 4 tape drives using a 2U form factor to help increase capacity and performance*

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- *Designed to support cost-effective back-up, save and restore, and archival storage in sequential or random access mode with a standard barcode reader*
- *Designed to offer outstanding capacity, performance, and reliability for midrange and network tape-storage environments in a 2U form factor with 24 data cartridge slots and a mail slot*
- *Remote library management through a standard Web interface supports flexibility and greater administrative control of storage operations.*

TS3200 Tape Library Express

The IBM System Storage TS3200 Tape Library Express Model leverages the newest generation of LTO technology to help cost-effectively handle growing storage requirements. The TS3200 Express Model and its storage management applications are designed to address capacity, performance, data protection, reliability, affordability, and application requirements. It is designed as a functionally rich, high-capacity, entry-level tape-storage solution incorporating LTO Ultrium tape technology. The IBM TS3200 Express model is an excellent solution for large-capacity or high-performance tape backup with or without random access. The TS3200 is also an excellent choice for tape automation for IBM Power Systems, IBM System x, and other open systems.

The IBM TS3200 Tape Library Express is well-suited for handling the backup, restore, and archive data-storage needs for small to medium-size environments. With the use of up to two LTO full-height tape drives or up to four LTO half-height tape drives and 48 tape cartridge capacity, the IBM TS3200 model is designed to use LTO technology to cost-effectively handle growing storage requirements. The TS3200 Tape Library is configured with four removable cartridge magazines, two on the left side (24 data cartridge slots) and two on the right (24 data cartridge slots). Additionally, the lower left magazine includes a three-slot I/O station to help support continuous library operation while importing and exporting media. A barcode reader is standard in the library, supporting the library's operation in sequential or random access mode. The TS3200 also comes standard with remote management capabilities to allow for remote administration of the tape library through a Web interface. Path Failover, an optional feature, is designed to provide automatic control path failover to a pre-configured redundant control path in the event that a host adapter or control path drive is lost without aborting the current job in process.

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Here are some quick TS3200 facts:

- *Designed to support the latest Linear Tape-Open (LTO) technology with up to two LTO Ultrium 6 full-height tape drives or up to four LTO Ultrium 6 half-height tape drives, as well as LTO Ultrium generation 4 and 5 tape drives using a 4U form factor*
- *Designed to offer outstanding capacity, performance, and reliability for a cost-effective backup, restore, and archive for midrange storage environments*
- *Remote library management through a standard web interface supports flexibility and greater administrative control of storage operations.*

TS3310 Tape Library

The IBM System Storage TS3310 Tape Library is a modular scalable tape library designed to address the tape storage needs of rapidly growing companies who find themselves space- and resource-constrained with tape backup and other tape applications.

Designed around a 5U high modular base library unit, the TS3310 can scale vertically with expansion for Linear Tape-Open (LTO) cartridges, drives, and redundant power supplies.

The base library module, model L5B, is the entry point for the product family. It contains all of the necessary robotics and intelligence to manage the 5U high library system, which houses up to 41 cartridges—35 storage slots and six input/output (I/O) slots; and two LTO generation 6, generation 5, generation 4, and generation 3 tape drives.

The TS3310 model L5B can be expanded with the addition of expansion units, the model E9U.

Here are some quick TS3310 facts:

- *Provides a modular, scalable tape library designed to grow as your needs grow*
- *Features desktop, desk-side, and rack-mounted configurations*
- *Delivers optimal data storage efficiency with high cartridge density using standard or WORM LTO Ultrium data cartridges*
- *Can simplify user access to data stored on LTO Ultrium 6 and 5 cartridges through the use of IBM Linear Tape File System software*
- *Doubles the compressed cartridge capacity and provides over 40 percent better performance compared to 5th generation LTO Ultrium drives.*

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TS3500 Tape Library

The IBM TS3500 tape library is designed to provide a highly-scalable, automated tape library for mainframe and open-systems backup and archive that can scale from mid-size to large enterprise environments.

TS3500 continues to lead the industry in tape drive integration with features such as persistent worldwide name, multipath architecture, drive/media exception reporting, remote drive/media management, and host-based path failover. The L23 and D23 frames support IBM TS1150, IBM TS1140, IBM TS1130, IBM TS1120, or IBM 3592 J1A tape drives. The L53 and D53 frames support LTO Ultrium 6 tape drives as well as previous-generation LTO Ultrium tape drives. L-frame models support improved cartridge handling, hot-

swappable drive packaging and the option of an additional 16- slot I/O station. The TS3500 model D23 and D53 frames can be attached to existing model L22 or D52 frames. Mixed media is supported by combining LTO Ultrium tape drives and TS1150, TS1140, TS1130, TS1120, or 3592 J1A tape drives within the TS3500 library, frame by frame.

Here are some quick TS3500 facts:

- *Supports highly-scalable, automated data retention on tape using Linear Tape-Open (LTO) Ultrium and IBM 3592 tape drive families*
- *Delivers extreme scalability and capacity, growing from one to 16 frames per library and from one to 15 libraries per library complex*
- *Provides up to 2.25 exabytes (EB) of automated, low-cost storage under a single library image, improving floor space utilization and reducing storage cost per TB with IBM 3592 JD enterprise advanced data cartridges*
- *Enables data security and regulatory compliance via support for tape drive encryption and write-once-read-many (WORM) cartridges.*

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TS4500 Tape Library

The IBM TS4500 tape library is a next-generation storage solution designed to help mid-size and large enterprises respond to storage challenges. Among these are high data volumes and the growth in data centers, increasing cost of data center storage footprints, the difficulty of migrating data across vendor platforms, and

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TS4500 Specifications

Frame definition	L25—Base frame for TS1150 and TS1140 (3592) drives and cartridges – includes 36 I/ O slots D25—Drive- capable and storage expansion frame for TS1150 and TS1140 (3592) drives and cartridges S25—Storage- only expansion frame for TS1140 (3592) cartridges L55—Base frame for LTO drives and cartridges – includes 32 I/ O slots D55—Drive- capable and storage expansion frame for LTO drives and cartridges S55—Storage- only expansion frame for LTO cartridges
Tape drive types	TS1150 and TS1140 (3592), LTO Ultrium 6 and LTO Ultrium 5 tape drives
Number of frames per library	One base frame, up to 3 expansion frames
Number of drives	Up to 16 per frame (up to 12 in frame 1) Up to 60 per library string
Number of tape cartridges	L25—up to 660 (up to 550 in frame 1); D25—up to 740 (up to 590 in frame 1); S25—up to 1,000 (up to 798 in frame 1); Total supported per library: up to 3,550 L55—up to 882 (up to 730 in frame 1); D55—up to 970 (up to 774 in frame 1); S55—up to 1,320 (up to 1,054 in frame 1); Total supported per library: up to 4,690
Capacity	3592 advanced cartridges: up to 35.5 PB per library (106.5 PB with 3:1 compression) LTO Ultrium 6 cartridges: up to 11.7 PB per library (up to 29.3 PB with 2.5:1 compression)

increased complexity of IT training and management as staff resources shrink.

In TS4500, IBM delivers the density that today's and tomorrow's data growth requires—along with the cost efficiency and the manageability to grow with business data needs while preserving existing investments in IBM tape library products. Now, organizations can achieve both a low cost per terabyte (TB) and a high TB density per square foot. In fact, TS4500 can store up to 5.5 PBs of data in a single 10 square foot library frame, more than three times more capacity than the IBM TS3500 tape library.

TS4500 provides advanced capabilities for integrated tape drive and media management, delivered within a single-pane-of-glass management console. The TS4500 graphical user interface (GUI) is based on the unified interface used in other IBM storage solutions. It includes key features to help guide storage administrators in completing critical tasks. For example, it enables them to monitor their tape library via persistent, at-a-glance library utilization and health status indicators.

Here are some quick TS4500 facts:

- *Stores up to 5.5 petabytes (PBs) of data in a single frame library—more than three times as much capacity as previous generations of IBM tape libraries*
- *Improves storage density with more than two times the expansion frame capacity—and support for 33 percent more tape drives*

- *Manages storage using the Advanced Library Management System*
- *Improves business continuity and disaster recovery with automatic control path and data path failover*
- *Helps ensure security and regulatory compliance with tape-drive encryption and write-once-read-many (WORM) media*
- *Supports Linear Tape-Open (LTO) Ultrium 6, LTO Ultrium 5 and IBM TS1150 and TS1140 tape drives.*

TS7620 ProtecTIER Deduplication Appliance Express

Designed for mid-size companies needing a more holistic approach to data protection, the IBM System Storage TS7620 ProtecTIER Deduplication Appliance Express leverages unique data deduplication technology to help solve critical backup and recovery challenges.

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Available in two configuration options, the TS7620 ProtecTIER Deduplication Appliance Express is an integrated server and storage hardware platform that ships with IBM ProtecTIER deduplication software preinstalled. This solution has a preconfigured repository and can be configured with either a Virtual Tape Library or Symantec OpenStorage interface. The TS7620 ProtecTIER Deduplication Appliance Express provides the essential capacity, price/performance, reliability, availability, and scalability features your business demands.

Here are some quick TS7620 facts:

- *Improves backup and recovery performance with high-speed, disk-based data protection*
- *Accelerates recovery of critical data*
- *Optimizes storage infrastructure and helps reduce total cost of ownership (TCO)*
- *Helps achieve business resilience objectives without changing existing backup procedures and practices*
- *Leverages data deduplication technology to help solve backup and recovery challenges in mid-size environments.*

TS7650G ProtecTIER Deduplication Gateway

The IBM System Storage TS7650G ProtecTIER Deduplication Gateway is designed to meet the disk-based data protection needs of the enterprise data center while enabling significant infrastructure cost

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reductions. The solution offers industry-leading inline deduplication performance and scalability up to 1 petabyte (PB) of physical storage capacity per system, and can provide up to 25 PB or more backup storage capacity. Combined with IBM or third-party storage, the TS7650G ProtecTIER Deduplication Gateway provides a powerful disk-based repository to improve the performance, retention, and availability of backup and archive data.

Here are some quick TS7650G facts:

- *Improves backup and recovery and simplifies disaster-recovery operations*
- *Lowers operational costs and energy usage*
- *Manages more data with less infrastructure.*

TS7700 Virtualization Engine

IBM TS7700 is a family of mainframe virtual tape solutions that optimizes data protection and business continuance for System z data. Through the use of virtualization and disk cache, the TS7700 family operates at disk speeds while maintaining compatibility with existing tape operations. Its fully integrated tiered storage hierarchy takes advantage of both disk and tape technologies to deliver performance for active data and best economics for inactive and archive data.

The TS7700 family of System z tape virtualization is offered in two models:

- *IBM TS7720 features encryption-capable high-capacity cache using 3 TB SAS disk drives with RAID 6, providing the ability to scale to very large capacities with the highest level of data protection.*
- *IBM TS7740 features encryption-capable 600 GB SAS drives with RAID 6 protection.*

Both models write data by policy to physical tape through attachment to high-capacity, high-performance IBM TS1140 and earlier IBM 3592 model tape drives in-

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stalled in IBM TS3500 tape libraries. Physical tape support is optional on TS7720.

Here are some quick TS7700 facts:

- *Gains innovative data protection and business continuance for IBM System z servers*
- *Keeps data secure, continuously available and easy to manage*

- *Simplifies System z-connected tape operations and improves batch window performance*
- *Supports disk and physical tape.*

Storage Software

Bringing together the best in infrastructure management, virtualization, and productivity software, IBM storage software utilizes the best in storage technology to answer your information on demand needs. In this section, we will examine some of the key storage software offerings.

More On The Web

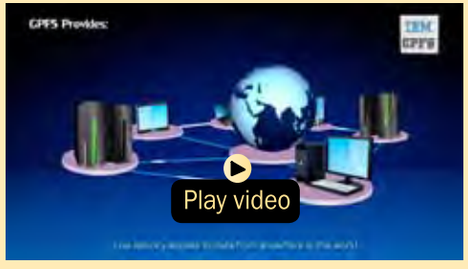
- Browse all IBM storage software on IBM.com

Elastic Storage (GPFS)

New code-named Elastic Storage is a proven, scalable, high-performance data and file management solution (based upon GPFS technology) that's being used extensively across multiple industries worldwide. Elastic Storage provides simplified data management and integrated information lifecycle tools capable of managing petabytes of data and billions of files, in order to arrest the growing cost of managing ever growing amounts of data.

More On The Web

- Elastic Storage assets on PartnerWorld
- Elastic Storage info on IBM.com



Elastic Storage overview (6:02)

Elastic Storage provides world-class storage management delivered in software and used on any hardware, with extreme scalability flash accelerated performance, and automatic policy-based storage tiering from flash through disk to tape, reducing storage costs 90 percent while improving security and management efficiency in cloud, big data & analytics environments.

Here are some fast Elastic Storage facts:

- *Enhanced security—native encryption and secure erase, NIST SP 800-131A encryption compliance*
- *Increased performance—Server-side Elastic Storage Flash caches increase IO performance up to 6X*
- *Improved usability—data migration; AFM, FPO, and backup/restore enhancements; reliability, availability, and serviceability enhancements.*

SmartCloud Storage Access

IBM SmartCloud Storage family helps customers become cloud agile by improving agility, security, and functionality for storage—in the cloud. As part of this family, IBM offers IBM SmartCloud Storage Access, an easy-to-deploy, simple-to-use software solution that features a self-service portal for storage provisioning, moni-

More On The Web

- SmartCloud Storage Access assets on PartnerWorld
- SmartCloud Storage Access info on IBM.com

toring, and reporting. It is designed to provide users with a self-service file-serving facility over the Internet. With a few clicks, users can create an account, provision storage, and start uploading files.

In addition, IBM SmartCloud Storage Access allows developers, application owners, and technical staff to quickly provision their own storage, such as for testing a new application or expanding the SAN capacity for a database application. Administrators can easily monitor and report storage usage for chargeback purposes. Plus, they can create different classes of storage for different users or departments within an organization. This allows for more efficient use of the underlying infrastructure.

Here are some quick SmartCloud Storage Access facts:

- *Quickly implements a private cloud storage service*
- *Provision storage capacity on demand*
- *Easily stores and accesses files*
- *Offers simple reporting, monitoring, and chargeback services*
- *Improves overall IT efficiency and service quality*
- *Increases end-user and administrator productivity*
- *Deploys with selected IBM storage area network (SAN) and network-attached storage (NAS) storage infrastructures*
- *Enables third-party developers to integrate applications using top-level Representational State Transfer (REST) application programming interface (API).*

SmartCloud Virtual Storage Center

IBM SmartCloud Virtual Storage Center v5.2 enables IT storage managers to easily migrate to an agile, cloud-based, software-defined storage environment—and manage it effectively. This powerful solution enables organizations to optimize provisioning, capacity, availability, reporting, and management for virtualized storage.

IBM SmartCloud Virtual Storage Center includes core functionality from three top IBM offerings, including data and storage management from IBM Tivoli Storage Productivity Center, including its advanced functions; external virtualization found in IBM System Storage SAN Volume Controller and the IBM Storwize family; and application-aware snapshot backup and restore capabilities from IBM Tivoli Storage FlashCopy Manager.

IBM SmartCloud Virtual Storage Center enables all three smarter storage characteristics for existing storage infrastructures.

Here are some quick SmartCloud Virtual Storage Center facts:

- *Migrates storage to an agile, cloud-based, software-defined environment without replacing existing storage systems*
- *Reduces unit cost for storage with automated analytics-driven data management that enables tiered storage optimization across the data center*

More On The Web

- SmartCloud Virtual Storage Center assets on PartnerWorld
- SmartCloud Virtual Storage Center info on IBM.com

- *Boosts availability and augments daily backups with advanced data protection capabilities*
- *Reduces administration complexity with the advanced IBM storage graphical user interface (GUI)*
- *Implements a robust management system to keep your storage infrastructure functioning smoothly*
- *Optimizes storage provisioning, capacity utilization, availability, reporting, and management.*

Tivoli Storage Manager

IBM Tivoli Storage Manager is a family of software offerings designed to help organizations manage and protect their data by simplifying backup administration, delivering more scalable solutions, and helping to reduce costs related to backup and recovery.

Backups can be managed by IBM Tivoli Storage Manager Operations Center or VMware vCenter. Tivoli Storage Manager Operations Center delivers breakthrough visibility and ease of use, reducing the level of expertise required. Restores are simplified with item-level and near-instant recovery for virtual machines and for Linux and Microsoft Windows servers and workstations.

More On The Web

- Tivoli Storage Manager assets on PartnerWorld
- Tivoli Storage Manager info on IBM.com

IBM Tivoli Storage Manager Suite for Unified Recovery helps clients get up and running fast, with simplified capacity-based licensing for Tivoli Storage Manager and popular agents. Users can deploy advanced agents for virtual environments, databases, email, and enterprise resource planning as needed, with no additional licensing costs.

Here are some quick Tivoli Storage Manager facts:

- *Simplifies backup administration with advanced IBM Tivoli Storage Manager Operations Center dashboard and VMware vCenter plug-in*
- *Scales up to manage billions of objects per backup server, and scales down to support entry-level environments*
- *Reduces backup infrastructure costs up to 38 percent with proven efficiency capabilities built in*
- *Optimizes data protection for virtual environments, core applications, remote facilities, and critical workstations*
- *Protects data with built-in multi-site replication and flexible restore capabilities.*

Tivoli Storage Manager for Virtual Environments

IBM Tivoli Storage Manager for Virtual Environments provides an effective solution to this challenge. With it, the burden of running backups on a virtual machine is eliminated by offloading backup workloads from a VMware ESX or ESXi-based server to a centralized vStorage backup server. The vStorage backup server, which itself may be run from within a virtual machine, takes full and incremental snap-

More On The Web

- Tivoli Storage Manager for Virtual Environments assets on PartnerWorld
- Tivoli Storage Manager for Virtual Environments info on IBM.com

shots of virtual machines, processes backups without the disruption and overhead of running backup tasks from within each virtual machine, and sends the results to an IBM Tivoli Storage Manager (v5.5 or higher) server for management and distribution to the organization's backup storage pool.

Tivoli Storage Productivity Center

Tivoli Storage Productivity Center is a comprehensive, end-to-end storage infrastructure management solution that provides an easy-to-use, next-generation user interface that monitors, reports, and manages storage capacity, performance, devices, and replication services.

Tivoli Storage Productivity Center provides a single point of control that helps administrators manage every aspect of the storage infrastructure—between the hosts, through the fabric, and down to the physical disks—across multi-site storage environments.

Here are some quick Tivoli Storage Productivity Center facts:

- *Provides comprehensive visibility, control, and automation for heterogeneous storage environments*
- *Simplifies provisioning by using intelligent presets and integrated best practices*
- *Enables context-sensitive performance management from within the storage management graphical user interface (GUI)*
- *Simplifies data replication for copy management and disaster recovery*
- *Improves consistency and control for basic configuration and operations of storage systems, devices, and storage area network (SAN) fabrics.*

More On The Web

- Tivoli Productivity Center assets on PartnerWorld
- Tivoli Productivity Center info on IBM.com
- Tivoli Productivity Center Information Center

Tivoli Storage FlashCopy Manager

IBM Tivoli Storage FlashCopy Manager delivers high levels of protection for key applications and databases using integrated application-aware snapshot backup and restore capabilities. Tivoli Storage FlashCopy Manager is designed to easily integrate with numerous software and storage system snapshot technologies to help create a high-performance, low-impact solution for advanced data protection.

Here are some quick Tivoli Storage FlashCopy manager facts:

- *Protects data with an easy-to-install, quick-to-deploy storage snapshot solution*
- *Improves application availability and service levels with high-performance, near-instant restore capabilities that help reduce downtime*

More On The Web

- Tivoli Storage FlashCopy Manager assets on PartnerWorld
- Tivoli Storage FlashCopy Manager info on IBM.com

- *Simplifies database cloning to support uses outside of backup and recovery*
- *Use as a standalone solution or integrate easily with IBM Tivoli Storage Manager, IBM Metro Mirror, and IBM Global Mirror*
- *Supports a wide range of applications, operating systems, and storage devices.*

Tivoli Storage Manager Fastback

IBM Tivoli Storage Manager FastBack is a smarter data protection and near-instant recovery software solution for business-critical Windows and Linux servers, in data centers, remote offices, and small- to mid-size enterprises. Tivoli Storage Manager FastBack helps clients eliminate backup windows, reduce the amount of data at risk between backups to almost zero, and reduce the time to recover from almost any data loss.

More On The Web

- Tivoli Storage Manager FatBack assets on PartnerWorld
- Tivoli Storage Manager FastBack info on IBM.com

Here are some quick Tivoli Storage Manager FastBack facts:

- *Helps provide continuous data protection and recovery management for Microsoft Windows and Linux servers, both in the data center and in remote or branch offices*
- *Gets applications and users back up and running within minutes following any data loss, while full data recovery is performed in the background*
- *Helps eliminate the need for traditional backup windows by continuously capturing data changes at the block level*
- *Helps reduce storage and bandwidth requirements with block-level incremental backup and integrated data deduplication*
- *Schedules automated data transfers for disaster recovery based on flexible, policy-based settings.*

TDMF/zDMF Migration Solutions

IBM provides two host-based software solutions for migrating data across multivendor storage attached to IBM z/OS mainframes—with near-continuous application availability, reduced risk of data loss, and high data integrity. IBM Transparent Data Migration Facility (TDMF) z/OS provides non-disruptive data migration at the volume level.

More On The Web

- TDMF/zDMF assets on PartnerWorld
- TDMF/zDMF Migration Solutions on IBM.com

IBM z/OS Data Set Mobility Facility (zDMF) enables data set-level migration for storage attached to z/OS mainframes. Deploying TDMF z/OS and zDMF together provides a complete mainframe storage migration solution.

Here are some quick TDMF/zDMF facts:

- *Reduces risk and downtime in volume-level and data set-level migrations*
- *Provided host-based migration capabilities for heterogeneous environments*
- *Automated data moves in a complete mainframe storage migration solution*
- *Deliverd flexibility, efficiency, and reliability to help reduce costs*
- *Supportd dynamic environments where applications and data are often in use 24x7.*

Storage and Data Services

Demands on your storage environment are greater than ever. To keep up with explosive data growth and the latest technology advancements, you need an efficient and effective storage infrastructure.

IBM provides a broad portfolio of storage services designed to optimize your storage environment and reduce complexity. Our skilled specialists can assess, plan, design, implement, and manage your storage infrastructure based on your needs. And by creating a more optimized environment, you can position your organization to respond to demands both now and in the future.

More On The Web

- Storage and data services info on IBM.com

Systems Lab Services and Training—Storage Consulting Services

Rapid innovation in cloud computing, mobile and social technologies, big data, and analytics is what's moving business forward. And each of these advancements require a solid underlying infrastructure that matters. IBM Systems Lab Services and Training provides IT consulting rooted in vast system and storage experience to deploy infrastructure that supports new and legacy technologies. We also provide training and host worldwide events to advance skills and make the most of our clients' IT investments.

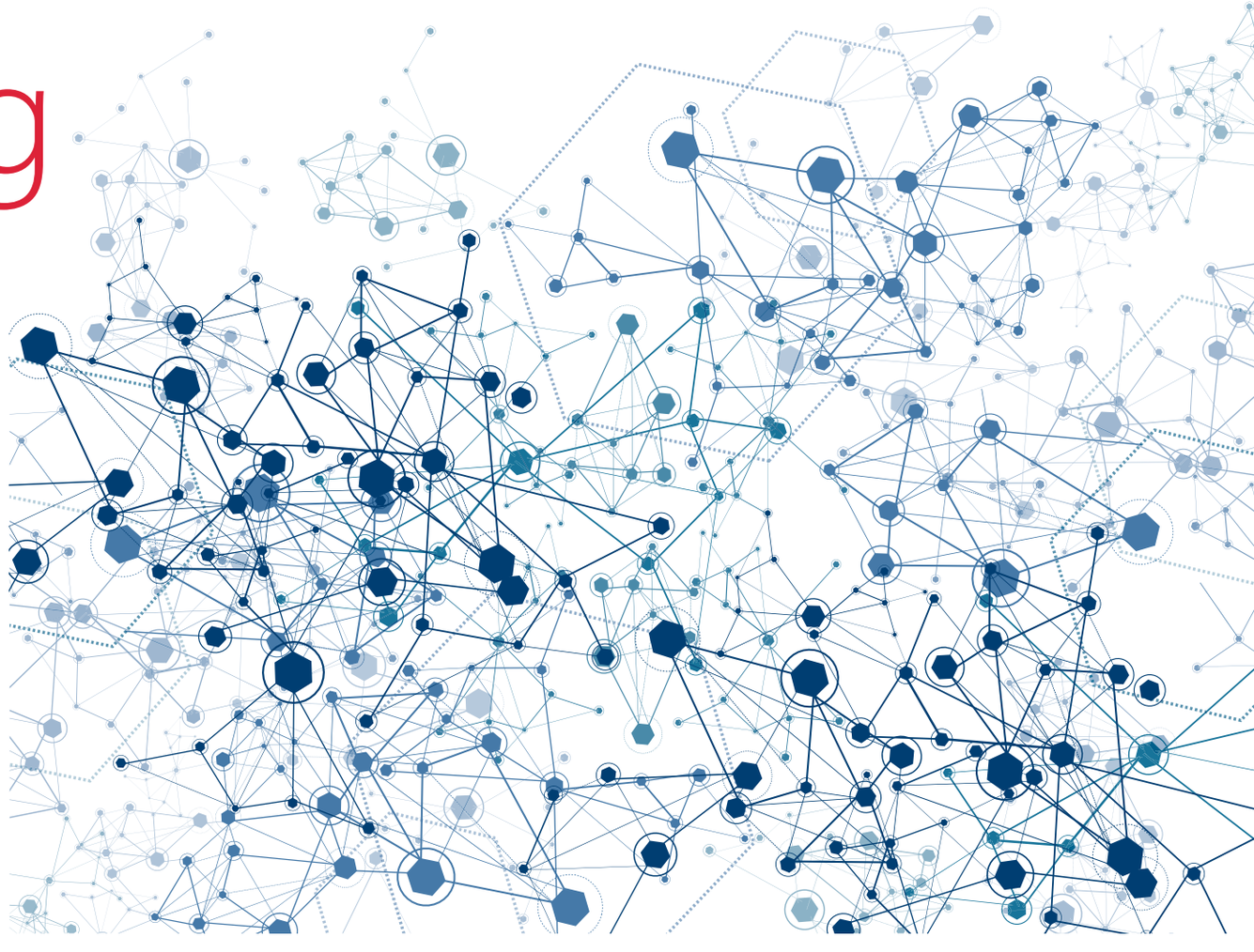
More On The Web

- Storage services info on IBM.com

We also guide IBM Business Partners worldwide through pre–sales situations by delivering service and training to accelerate the adoption of IBM technologies and close client business. Working together, we can help:

- *Grow sales and increase profits*
- *Improve client satisfaction and business scope*
- *Compete for more strategic opportunities and pursue larger clients*
- *Reduce risks working with new technologies*
- *Gain essential technical skills and expertise*
- *Collaborate for joint deliveries.*

System Networking and SAN



In this chapter, we will explore the IBM System Networking portfolio, which includes advanced networking software and high performance switching hardware.

IBM System Networking and SAN

IBM System Networking solutions are designed for complex workloads that are tuned for performance, virtualization, and massive scale. For the Smarter Data Center in the modern era, IBM understands that infrastructure matters.

IBM System Networking Solutions are:

- *Responsive—Automate virtualization for dynamic data centers: Advanced network virtualization capabilities reduce the cost and complexity of deploying physical, virtual, and cloud infrastructures.*
- *Simplified—Accelerate deployment, keep pace with complexity: IBM takes an interoperable, standards-based approach to implement the latest advances in today's high-speed, converged data center network designs with optimized applications and integrated systems.*
- *Adaptive—Fortify system resiliency and harness big data: IBM networking is part of a software defined environment for fast provisioning and scalability with enhanced security.*

More on the Web

- Overview of all IBM System Networking on IBM.com

IBM Software Defined Network for Virtual Environments

Today's enterprises and cloud operators need to significantly increase data center agility to be more responsive to dynamic business requirements. Software Defined Networks (SDN) enable businesses to deliver applications faster with the adaptability and security needed to compete in today's environment. Interest in SDN is strong with industry analysts projecting an $8B market by 2018.

More on the Web

- IBM SDN VE assets on PartnerWorld
- IBM SDN VE info on IBM.com

IBM SDN for Virtual Environments creates virtual networks for dynamic, cloud-based workloads. SDN VE includes a service chaining infrastructure enabling services such as firewalls, load balancers, and traffic monitors to be virtually inserted into the flow of network traffic. A unified data model allows end points to be grouped together without restriction to a subnet or location. And an OpenStack Neutron plug-in enables easy integration with orchestration managers.

The SDN VE approach provides several advantages:

- *Virtual networks can be created without changes to the existing network.*
- *Provisioning and administration can be automated and simplified.*
- *IP and MAC addresses can be reused permitting logical separation of networks for multi-tenancy.*

IBM Flex System Fabric

IBM can help you reduce cost, complexity, and risk with IBM Flex System Fabric—a portfolio of high performance networking products that can help simplify connectivity of your data and storage infrastructure. The portfolio includes support for Ethernet, Fibre Channel over Ethernet (FCoE), and even Fibre Channel protocols. Flex System Fabric also supports extraordinary convergence of NAS, iSCSI, and even FCoE where the Fibre Channel can be broken out directly in the chassis or upstream in the network. The portfolio offers easy standards-based interoperability with your existing networking environment, including Cisco, Brocade, Juniper, and other networking infrastructures.

More on the Web

- Flex System Fabric

SI4093 System Interconnect Module

The IBM Flex System Fabric SI4093 System Interconnect Module enables a simplified integration of the IBM Flex System into your existing networking infrastructure. The default configuration of the SI4093 requires no management for most data center environments, eliminating the need to configure each device or individual ports, thus reducing the number of management points.

The device provides a low latency, loop-free interface that does not rely upon spanning tree protocols, thereby removing one of the greatest deployment and management complexities of a traditional switch. The SI4093 offers administrators a simplified deployment experience while maintaining the performance of intra-chassis connectivity, yet provides the simplicity of a single aggregated connection to the upstream network.

More on the Web

- SI4093 System Interconnect Module assets on PartnerWorld
- SI4093 System Interconnect Module info on IBM.com

Here are some quick SI4093 facts:

- *Preconfigured device designed for easy network connectivity to reduce deployment time*
- *Reduces management complexity without compromising performance*
- *Investment protection with "pay-as-you-grow" scalability with the ability to turn on additional 10 Gb or 40 Gb ports*
- *Flexible port mapping allows clients to dynamically configure active ports*
- *Easy interoperability with multi-vendor network infrastructures—no change to existing network*
- *Reduces networking CAPEX by up to 60 percent when compared with a pass-thru module*
- *Designed for Fibre Channel over Ethernet (FCoE) as a transit device, where FC is broken out further upstream in the network.*

EN4093R 10 Gb Scalable Switch

The IBM Flex System Fabric EN4093R 10 Gb Scalable Switch provides unmatched scalability and performance, while also delivering innovations to help address a number of networking concerns today and providing capabilities that will help you prepare for the future.

With the growth of virtualization and the evolution of cloud, many of today's applications require low latency and high bandwidth performance. To enable integration into the higher bandwidth networks supporting cloud services, the industry-leading EN4093R is the first blade switch to feature 40 Gb external ports. Additionally, the Flex System Fabric EN4093R is the first blade switch to support sub-microsecond latency, while also delivering full line-rate performance of up to 1.28 Tbps, making it ideal for managing dynamic workloads across your network.

More on the Web

- EN4093R 10 Gb Scalable Switch assets on PartnerWorld
- EN4093R 10 Gb Scalable Switch info on IBM.com

Here are some quick EN4093R 10 Gb Scalable Switch facts:

- *"Pay-as-you-grow" scalability with the ability to turn on additional 10 Gb or 40 Gb ports*
- *Flexible port mapping allows clients to dynamically configure active ports*
- *Reduces cost and complexity via network convergence, stacking, and Virtual Fabric*
- *Performance and low latency with 1.28 Tbps and less than 1 microsecond latency*
- *Investment protection when migrating from 1 Gb to 10 Gb and to a converged network*
- *Designed for Fibre Channel over Ethernet (FCoE) as a transit switch, where FC is broken out further upstream in the network.*

CN4093 10 Gb Converged Switch

Many clients today are connecting Ethernet and Fibre Channel from their servers into their data and storage networks. As a result, IT organizations are looking for ways to reduce the cost and complexity of these environments by leveraging the capabilities that exist today with 10/40 Gb Ethernet and/or 8 Gb Fibre Channel. Some solutions require a complete rip-n-replace of existing infrastructure.

The IBM Flex System Fabric CN4093 10 Gb Converged Scalable Switch is an ideal solution for clients with these concerns because it can fit into their existing infrastructure and offers the benefits of a converged infrastructure today, plus it can scale with their needs in the future. The CN4093 supports multiple protocols like Ethernet, FCoE, FC, and iSCSI. With multi-protocol support it can connect directly to the IBM integrated storage node, offering an integrated solution that is easy to setup and manage or to an external SAN.

More on the Web

- CN4093 10 Gb Converged Scalable Switch assets on PartnerWorld
- CN4093 10 Gb Converged Scalable Switch info on IBM.com

Here are some quick CN4093 facts:

- *10 Gb Ethernet, Fibre Channel, and Fibre Channel over Ethernet (FCoE) in one module*
- *OmniPorts offer extreme flexibility, connecting 10 Gb Ethernet and/or 8 Gb Fibre Channel*
- *"Pay-as-you-grow" scalability with the ability to turn on additional internal and external uplink ports*
- *Flexible port mapping allows clients to dynamically configure active ports*
- *Full Fibre Channel fabric service with easy connectivity to IBM storage nodes or SANs*
- *Ability to configure in easy connect mode for transparent connectivity to your existing LAN and SAN*
- *High performance (up to 1.28 Tbps) and low latency.*

EN2092 1 Gb Ethernet Scalable Switch

The IBM Flex System EN2092 1 Gb Ethernet Scalable switch provides outstanding flexibility, allowing you to buy one today and enhance its functionality in the future. The scalable architecture allows you to support 2-port or 4-port 1 Gb adapters with only a pair of EN2092s. The EN2092 supports up to 28 x 1 Gb internal ports, plus up to 20 x 1 Gb and four 10 Gb external ports. Designed with top performance in mind, the EN2092 provides high availability with legendary IBM quality and switch failover capability.

This switch is an exceptionally flexible integrated switch with extreme scalability and performance, while also delivering best-in-class networking innovations to help you address today's networking requirements. It also provides advanced capabilities to address future needs.

More on the Web

- EN2092 1 Gb assets on PartnerWorld
- EN2092 1 Gb Scalable Switch info on IBM.com

Here are some quick 1 Gb Scalable Switch facts:

- *"Pay-as-you-grow" scalability and investment protection with the ability to turn on additional 1 Gb ports or 10 Gb capacity*
- *Flexible port mapping allows clients to dynamically configure active ports*
- *Simpler management with innovative IBM VMready virtualization-aware networking for automated Virtual Machine mobility*
- *Industry-proven Layer 2 and Layer 3 networking features.*

EN4091 10 Gb Ethernet Pass-Thru

The data center is changing. To efficiently network today, IT has to move from a discrete, traditional operating design to a more flexible and optimized model. This smarter model must support more workloads and operate under flat or decreasing IT budgets, so it is crucial that

the platform has the ability to adapt to increased demands.

The network architecture on the IBM Flex System platform has been specifically designed to address these challenges, giving you a very scalable way to integrate, optimize, and automate your data center. The Flex System EN4091 10 Gb Ethernet Pass-Thru Module offers easy connectivity of the Flex System Chassis to any external network infrastructure. This unmanaged device enables direct connectivity of the compute node in the chassis to an external top-of-rack data center switch. This module can function at both 1 Gb and 10 Gb. It has 14 internal 10 Gb links, and 14 external 10 Gb SFP+ uplinks.

More on the Web

- EN4091 10 Gb assets on PartnerWorld
- EN4091 10 Gb info on IBM.com

Here are some quick EN4091 10 Gb Ethernet Pass-Thru Module facts:

- *Offers easy connectivity of the Flex System Chassis to any external network infrastructure*
- *Enables direct connectivity of the compute node in the chassis to an external top-of-rack data center switch*
- *Can function at both 1 Gb and 10 Gb*
- *Provides 14 internal 10 Gb links, and 14 external 10 Gb SFP+ uplinks.*

IBM RackSwitch Portfolio

Data centers can standardize on a unified and affordable rack-level, or top of rack, network infrastructure to provision and scale out Web 2.0 environments, high-performance clusters, and virtualized data centers. IBM's Ethernet RackSwitch family is designed to bring speed and intelligence to the edge of your network; where it's closer to your business, users, and innovations. IBM's top of rack products are lossless, low latency, and low power.

More on the Web

- System Networking RackSwitch Sales Kit
- System Networking RackSwitch info on IBM.com

RackSwitch G7052

The IBM System Networking RackSwitch G7052 is an entry-level enterprise-class 1 GbE switch designed for the data center.

The G7052 offers forty-eight 1 GbE RJ45 ports in addition to four 10 GbE SFP+ ports in a 1U form factor. The G7052 provides low power consumption with only 76 W. It is available with rear to front airflow, matching most servers and storage airflow which allows clients to maximize hot and cold aisle designs for lower operational costs. For clients looking for higher availability, an optional external redundant power supply option is available and can support up to four RackSwitch G7052s.

More on the Web

- G7052 assets on PartnerWorld
- G7052 info on IBM.com

The RackSwitch G7052 is designed with exceptional performance in mind and provides port-density, wire-speed switching with cut-through architecture. The G7052 is ideal for clients looking for cost-effective 1 Gb Ethernet Layer 2 switching solutions with the ability to easily transition to 10 Gb Ethernet.

RackSwitch G7028

The IBM System Networking RackSwitch G7028 is an entry-level enterprise-class 1 GbE switch designed for the data center.

The G7028 offers 24 1 GbE RJ45 ports in addition to four 10 GbE SFP+ ports in a 1U form factor. The G7028 provides low power consumption with only 45 W. It is available with rear to front airflow, matching most servers and storage airflow,

More on the Web

- G7028 assets on PartnerWorld
- G7028 info on IBM.com

which allows clients to maximize hot and cold aisle designs for lower operational costs. For clients looking for higher availability, an optional external redundant power supply option is available and can support up to four RackSwitch G7028s. The RackSwitch G7028 is designed with exceptional performance in mind and provides non-blocking, wire-speed switching with cut-through architecture. The G7028 is ideal for clients looking for cost-effective 1 Gb Ethernet Layer 2 switching solutions with the ability to easily transition to 10 Gb Ethernet.

Here are some quick G7028 facts:

- *24 × 1 Gigabit Ethernet (GbE) RJ45 ports and four standard 10 GbE SFP+ ports*
- *Rear to front airflow direction, with I/O ports facing the hot-aisle, allowing for significant savings in cooling costs*
- *Low 45 W power rating helps reduce power consumption*
- *Optional external redundant power supply available*
- *Ideal for clients looking for cost-effective 1 Gb Ethernet Layer 2 switching solutions.*

RackSwitch G8000

The IBM System Networking RackSwitch G8000 is an Ethernet switch specifically designed for the data center, providing a virtualized, cooler, and simpler network solution.

The G8000 is virtualized—for the first time providing rack-level virtualization of networking interfaces for a rack full of server and storage systems—decoupling the scaling of networking and computing capacity via on-switch VMready software. VMready enables the movement of virtual machines—providing matching movement of VLAN assignments, ACLs, and other networking and security settings. VMready works with all leading VM providers.

More on the Web

- G8000 assets on PartnerWorld
- G8000 info on IBM.com

The G8000 is cooler—implementing a choice of directional cooling options to maximize data center layout and provisioning. Its superior airflow design complements the hot-aisle and cold-aisle data center cooling model.

Here are some quick G8000 facts:

- *44 x 1 GbE RJ45 ports, four 1 GbE SFP ports, and up to four optional 10 GbE SFP+ or CX4 ports*
- *Low 120 W power draw and variable speed fans help reduce power consumption*
- *Network virtualization—IBM VMready automatically detects virtual machine movement from one physical server to another.*

RackSwitch G8052

The IBM System Networking RackSwitch G8052 is an Ethernet switch specifically designed for the data center, providing a virtualized, cool, and easy network solution.

The RackSwitch G8052 is virtualized—supporting IBM VMready technology, an innovative, standards-based solution to manage virtual machines (VMs) in small to large-scale data center and cloud environments. VMready works with all leading VM providers.

The RackSwitch G8052 is cool—implementing a choice of directional cooling to maximize data center layout and provisioning. Its superior airflow design complements the hot-aisle and cold-aisle data center cooling model.

The RackSwitch G8052 is easy—with server-oriented provisioning via point-and-click management interfaces, along with the optional System Networking Switch Center software package for updating large groups of switches.

Here are some quick G8052 facts:

- *48 × 1 GbE RJ45 ports and 4 standard 10 GbE SFP+ ports*

More on the Web

- G8052 assets on PartnerWorld
- G8052 info on IBM.com

- *Choice of airflow direction, allowing for significant savings in cooling costs*
- *Low 130 W power rating and variable speed fans help reduce power consumption*
- *Network virtualization—VMready automatically detects virtual machine movement from one physical server to another.*

RackSwitch G8124E

The IBM RackSwitch G8124E is a 10 Gigabit Ethernet switch specifically designed for the data center, providing a virtualized, cooler, and easier network solution. The G8124E offers 24 10 Gigabit Ethernet ports in a high-density, 1U footprint. Designed with top performance in mind, the RackSwitch G8124E provides line-rate, high-bandwidth switching, filtering and traffic queuing without delaying data, and large data-center grade buffers to keep traffic moving. The G8124E also supports Converged Enhanced Ethernet (CEE) and

Data Center Bridging for support of Fibre Channel over Ethernet (FCoE) and can be leveraged for NAS or iSCSI.

The G8124E is virtualized—supporting IBM VMready technology, an innovative, standards-based solution to manage virtual machines (VMs) in small to large-scale data center and cloud environments. VMready works with all leading VM providers. The G8124E also supports Virtual Fabric, which allows for the carving up of a physical NIC into 2–8 virtual NICs (vNICs) for improved performance, availability, and security, while reducing cost and complexity.

Here are some quick G8124E facts:

- *24 SFP+ ports that operate at 10 Gigabit or 1 Gigabit Ethernet speeds*
- *Optimal for high-performance computing and applications requiring high bandwidth and low latency*
- *All ports are nonblocking 10 Gigabit Ethernet with deterministic latency of 570 nanoseconds*
- *IBM VMready helps reduce configuration complexity and improves security levels in virtualized environments*
- *Virtual Fabric capability allows for the carving up of a physical NIC into multiple virtual NICs.*

More on the Web

- G8124E assets on PartnerWorld
- G8124E info on IBM.com

RackSwitch G8264

Built with top performance in mind, the IBM RackSwitch G8264 is ideal for today's big data, cloud, and optimized workloads. It is an enterprise-class and full-featured data-center switch that delivers linerate, high-bandwidth switching, filtering, and traffic queuing without delaying data. Large data-center grade buffers keep traffic moving. Redundant power and fans along with numerous high availability features equip the switch for business-sensitive traffic. The G8264 supports IBM VMready technology, an innovative, standards-based solution to manage virtual machines (VMs) in small to large-scale data center and cloud environments.

More on the Web

- G8264 assets on PartnerWorld
- G8264 info on IBM.com

The RackSwitch G8264 is ideal for latency-sensitive applications such as high performance computing clusters and financial applications and is a key piece when connecting multiple chassis together with Pure System Solutions. The G8264 supports stacking for up to eight switches for simplified switch management as well as IBM Virtual Fabric to enable clients to diminish the number of I/O adapters by creating virtual NICs out of a 10 Gb adapter, helping reduce cost and complexity. The G8264 supports the newest protocols—including Data Center Bridging/Converged Enhanced Ethernet (DCB/C EE) for support of Fibre Channel over Ethernet (FCoE), in addition to iSCSI and NAS.

Here are some quick G8264 facts:

- *Optimized for applications requiring high bandwidth and low latency*
- *Supports Virtual Fabric and OpenFlow*
- *Up to sixty-four 10 Gb SFP+ ports in a 1U form factor*
- *Future-proofed with four 40 Gb QSFP+ ports*
- *Stacking—A single switch image and configuration file can be used for up to eight switches, sharing only one IP address and one management interface.*

RackSwitch G8264T

The IBM RackSwitch G8264T is ideal for clients looking to expand into 10 Gb environments without compromising their data center's overall TCO. It provides flexible connectivity for high-speed server and storage devices across distances up to 100m at a low cost.

The G8264T is an enterprise-class and full-featured data center switch that delivers line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data. Large data-center grade buffers keep traffic moving. Redundant power and fans along with numerous high availability features equip the switch for business-sensitive traffic. The G8264T supports IBM VMready technology, an innovative, standards-based solution to manage virtual machines (VMs) in small to large-scale data center and cloud environments.

The RackSwitch G8264T also supports OpenFlow1, the first protocol designed specifically for software defined networking (SDN), providing high-performance, traffic control, improved automation, and centralized management across multiple network devices.

Here are some quick G8264T facts:

- *Forty-eight 10GBase-T/1000Base-T RJ45 connections plus four 40 Gb QSFP+ connections in a 1U form factor*
- *Flexible and low-cost connectivity option for 10 Gb environments supporting distances up to 100 meters*

More on the Web

- G8264T assets on PartnerWorld
- G8264T info on IBM.com

- *Supports OpenFlow and IBM VMready.*

RackSwitch G8264CS

Built with top performance and convergence in mind, the IBM RackSwitch G8264CS is ideal for today's big data, cloud, and optimized workloads looking to exploit the advantages of Fibre Channel over Ethernet (FCoE) today or in the future. It is an enterprise-class and full-featured data center switch that delivers line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data. Large data-center grade buffers keep traffic moving. Redundant power and fans along with numerous high availability features equip the switch for business-sensitive traffic. The G8264CS supports IBM VMready technology, an innovative, standards-based solution to manage virtual machines (VMs) in small to large-scale data center and cloud environments.

More on the Web

- G8264CS assets on PartnerWorld
- G8264CS info on IBM.com

The IBM RackSwitch G8264CS also simplifies deployment with its innovative IBM Omni Port technology. Omni Ports give clients the flexibility to choose 10 Gb Ethernet, 4/8 Gb Fibre Channel, or both for upstream connections, and in FC mode. Omni Ports provide convenient access to FC storage. G8264CS's Omni Port technology helps consolidate enterprise storage, networking, data, and management onto a simple to manage single fabric and reduces costs associated with energy and cooling, management and maintenance, and capital costs.

Here are some quick GS8264CS facts:

- *Lossless Ethernet, Fibre Channel, and Fibre Channel over Ethernet (FCoE) in one switch*
- *Extreme flexibility with IBM Omni Ports that support 10 Gb Ethernet and/or 4/8 Gb Fibre Channel*
- *Ideal for clients looking to aggregate FC/FCoE converged traffic with ability to connect to existing SANs*
- *Proven IBM end-to-end convergence testing delivering easy interoperability throughout network.*

RackSwitch G8316

The IBM System Networking RackSwitch G8316 is a 40 Gigabit Ethernet (GbE) aggregation switch designed for the data center, providing speed, intelligence, and interoperability on a proven platform.

The RackSwitch G8316 offers up to 16×40 GbE ports, which can also be used as a high-density 10 GbE switch, with 1.28 Tbps—in a 1U footprint. The G8316 provides a cost-efficient way to aggregate multiple racks of servers compared to other expensive core switches, while allowing massive scalability for your data center network. It is an ideal aggregation layer switch when used with the 10/40 GbE RackSwitch G8264 at the access layer.

More on the Web

- G8316 assets on PartnerWorld
- G8316 info on IBM.com

Designed with top performance in mind, the RackSwitch G8316 provides line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data. Large data center grade buffers keep traffic moving. Hot-swappable, redundant power and fans along with numerous high availability features enable the RackSwitch G8316 to be available for business-sensitive traffic.

Here are some quick G8316 facts:

- *Optimized for applications requiring high bandwidth and low latency*
- *Sixteen 40 Gb QSFP+ ports in a 1U form factor*

- *Up to sixty-four 10 Gb SFP+ ports to form a high-density 10 Gb cluster*
- *Powerful control plane providing higher performance to aggregate multiple racks of servers*
- *1.28 Tbps non-blocking throughput.*

RackSwitch G8332

Built with top performance in mind, the IBM RackSwitch G8332 is ideal for today's big data, cloud, and optimized workloads. It is an enterprise-class; full-featured L2 and L3 data center switch that delivers linerate, high-bandwidth switching, filtering, and traffic queuing without delaying data. Large data-center grade buffers keep traffic moving. Redundant power and fans along with numerous high availability features equip the switch for business-sensitive traffic. The RackSwitch G8332 supports 32 QSFP+ ports and is suitable for clients using 10 Gigabit Ethernet (GbE) or 40 GbE connectivity (or both).

More on the Web

- G8332 assets on PartnerWorld
- G8332 info on IBM.com

The G8332 provides ultra-low latency and high performance with 2.56 Tbps throughput. This makes the high-density switch an ideal solution for latency-sensitive applications such as high performance computing, financial applications, hosting environments, and Cloud Designs in Enterprise, Web 2.0 and virtualized data centers. The G8332 also supports IBM VMready with Virtual Vision technology, an innovative, standards-based solution to manage virtual machines (VMs) in small to large-scale data center and cloud environments. In addition, the G8332 supports key SDN features such as OpenFlow and overlay networks that help in virtualizing networks without changing the physical networking infrastructure and simplifying and automating network provisioning.

Here are some quick G8332 facts:

- *Thirty-two 40 Gb QSFP+ ports in a 1U form factor*
- *Purpose-built for applications requiring high bandwidth and ultra-low latency*

- *Support for advanced features like Network Address Translation (NAT), Precision Timing (PTP) and Software Defined Networking (SDN) features such as OpenFlow and Software Defined Networking for Virtual Environments (SDN VE) gateway.*

SAN Fabric

To stay competitive in the global marketplace, your people need to have access to the right information at the right time in order to be effective, creative, and highly innovative. IBM offers a comprehensive portfolio of SAN switches, storage, software, services, and solutions to reliably bring information to people in a cost effective way. IBM provides flexible, scalable, and open standards-based business-class and global enterprise-class storage networking solutions for the on demand world.

More on the Web

- SAN Fabric info on IBM.com

In this section, we look at these SAN fabric products. IBM SAN products and solutions provide integrated SMB and enterprise SAN solutions with multiple local, campus, metropolitan, and global storage networking options.

SAN Fabric for Entry-Level Workloads

Here is a list of SAN fabric products designed for entry-level workloads.

- *SAN24B-5*
- *SAN24B-4 Express*

More on the Web

- SAN fabric for entry-level workloads

SAN Fabric for Mid-Size Workloads

Here is a list of SAN fabric products designed for mid-size workloads.

- *SAN48B-5*
- *SAN96B-5*
- *Cisco MDS 9148*

More on the Web

- SAN fabric for mid-size workloads

SAN Fabric for Enterprise Workloads

Here is a list of SAN fabric products designed for large enterprise workloads.

- *SAN384B-2 and SAN768B-2*
- *Cisco MDS 9500 series Multilayer Directors*
- *Cisco MDS 9710 Multilayer Director*

More on the Web

- SAN fabric for enterprise workloads

SAN Specialty Switches

We also offer the following SAN Specialty Switches. These SAN specialty switches deliver capabilities ranging from connecting heterogeneous SAN fabrics, to enabling distance extension using Fibre Channel over IP, to converging SAN and Ethernet traffic on a single platform. Click on the links and you will jump to the section of this ebook that describes the product.

- *SAN06B-R*
- *SAN32B-E4*
- *Brocade VDX 6730 Converged Switch*
- *Cisco MDS 9222i*
- *Cisco MDS 9250i*

SAN b-type Switches

The IBM System Storage SAN b-type family provides entry, midrange, and specialty switches and enterprise directors.

More on the Web

- SAN specialty switches

SAN24B-4 Express

The IBM System Storage SAN24B-4 Express fabric switch is designed specifically to address the needs of small- to medium-sized storage area network (SAN) environments. It can be used to create a wide range of high-performance SAN solutions, from simple, single-switch configurations

More on the Web

- SAN24B-4 specifications
- SAN24B-4 Express assets on PartnerWorld
- SAN24B-4 Express info on IBM.com

to larger, multi-switch configurations that support fabric connectivity and advanced business continuity capabilities. Infrastructure simplification solutions for IBM System x, IBM BladeCenter, and IBM Power Systems servers include storage consolidation and high availability server clustering with System Storage disk storage arrays. Business continuity solutions include data protection with System Storage tape libraries and devices and IBM Tivoli Storage Manager data protection software.

Here are some quick SAN24B-4 Express facts:

- *Benefit from easy-to-install and easy-to-use features designed specifically for small- to medium-size environments*
- *Reach new performance levels with 8 Gbps Fibre Channel technology*
- *Scales from 8 to 16 to 24 ports with Ports on Demand*

- *Protects existing 4, 2, and 1 Gbps infrastructure investments while positioning for future technologies*
- *Use as the foundation for new infrastructure simplification and business continuity solutions for servers running Microsoft Windows, UNIX, Linux, and IBM AIX and OS/400 operating systems.*

SAN24B-5

The IBM System Networking SAN24B-5 switch is designed to provide outstanding price to performance value, combining flexibility, simplicity, Gen 5 Fibre Channel technology, and enterprise-class functionality in an entry-level switch. SAN24B-5 is configurable in 12 or 24 ports and supports 2, 4, 8, or 16 Gbps speeds in an efficiently designed 1U form factor. The base unit includes one (249824G/2498-X24) or two (2498-F24) integrated power supplies and fans. A second power supply provides additional redundancy for increased resiliency.

SAN24B-5 provides a critical building block for today's highly virtualized, private cloud storage environments. It can simplify server virtualization and virtual desktop infrastructure management while meeting the high-throughput demands of solid-state disks. It can also help minimize downtime in mission-critical environments by delivering high reliability, availability, and serviceability.

Here are some quick SAN24B-5 facts:

- *Gain flexibility, simplicity, and enterprise-class functionality in a 24-port, 1U form factor, entry-level switch*
- *Scales up to 24 ports using ports-on-demand capabilities*
- *Simplifies management with Fabric Vision technology, which helps reduce operational costs and optimize application performance*
- *Maximizes resiliency with nondisruptive software upgrades and redundant power supply*

More on the Web

- SAN24B-5 assets on PartnerWorld
- SAN24B-5 info on IBM.com

- *Helps boost performance with dynamic fabric provisioning, critical monitoring, and advanced diagnostics, including ClearLink diagnostic technology (D_Ports)*
- *Leverages dual functionality as either a full-fabric SAN switch or an N_Port ID virtualization (NPIV) gateway.*

SAN48B-5

The IBM System Storage SAN48B-5 switch is designed to meet the demands of hyper-scale private or hybrid cloud storage environments by delivering Gen 5 Fibre Channel technology and capabilities with 16 Gbps performance that supports highly virtualized environments.

To enable greater flexibility and investment protection, SAN48B-5 is configurable in 24, 36, or 48 ports and supports 2, 4, 8, 10, or 16 Gbps speeds in an efficiently designed 1U package. This switch—now enhanced with enterprise connectivity options that add support for IBM FICON connectivity—can provide a highly reliable infrastructure when used with fast, scalable IBM System z servers.

More on the Web

- SAN48B-5 assets on PartnerWorld
- SAN48B-5 info on IBM.com

Here are some quick SAN48B-5 facts:

- *Gain greater flexibility for diverse deployment strategies with the Gen 5 Fibre Channel switch, which delivers 16 Gbps performance with up to 48 ports in an energy-efficient, 1U form factor*
- *Leverages Ports on Demand (PoD) capabilities to achieve fast, easy, and cost-effective scaling from 24 to 48 ports in 12-port increments*
- *Simplifies management with Fabric Vision technology, which helps reduce operational costs and optimize application performance*

- *Maximizes availability with nondisruptive software upgrades and redundant, hot-pluggable components.*

SAN96B-5

The IBM System Networking SAN96B-5 switch is a high-density, purpose-built, foundational building block for large and growing storage area network (SAN) infrastructures.

It is designed to provide highly resilient, scalable, and simplified network infrastructure for storage. By delivering market-leading, Gen 5 Fibre Channel technology and capabilities with 16 Gbps performance, SAN96B-5 meets the demands of growing, dynamic workloads; evolving, virtualized data centers; and highly virtualized private and hybrid cloud storage environments.

More on the Web

- SAN96B-5 assets on PartnerWorld
- SAN96B-5 info on IBM.com

Here are some quick SAN96B-5 facts:

- *Supports virtualized private and hybrid cloud storage environments and data center consolidation with high scalability in an ultra-dense, Gen 5 Fibre Channel 96- port switch*
- *Enables "pay-as-you-grow" flexibility using the Ports on Demand feature with speeds up to 16 Gbps*
- *Simplifies management with Fabric Vision technology, which helps reduce operational costs and optimize application performance*
- *Provides data center-to-data center security and bandwidth savings with up to eight in-flight encryption and compression ports*
- *Helps maximize application uptime and performance while reducing expenses with ClearLink diagnostic technology (D_Ports).*

b-type Specialty Switches

In this section, we will explore b-type specialty switches.

SAN06B-R

The IBM System Storage SAN06B-R extension switch leverages advanced Fibre Channel and Fibre Channel over IP (FCIP) technology to provide a fast, highly reliable, cost-effective network infrastructure for remote data replication, backup, and migration.

Whether configured for simple point-to-point or comprehensive multi-site SAN extension, the SAN06B-R extension switch addresses the most demanding business continuity, compliance, and global data access requirements. Up to 16 8 Gbps Fibre Channel ports and six 1 Gigabit Ethernet (GbE) ports provide the Fibre Channel and FCIP bandwidth, port density, and throughput required to help maximize application performance over WAN links.

More on the Web

- SAN06B-R assets on PartnerWorld
- SAN06B-R info on IBM.com

Here are some quick SAN06B-R facts:

- *Enables fast, reliable, and cost-effective remote data replication, backup, and migration*
- *Reduces operational costs, maximize uptime, and optimize application performance*
- *Maximizes replication, backup, and migration throughput over distance*
- *Enables consolidation while providing traffic isolation in mixed environments*
- *Boosts wide area network (WAN) link utilization and resiliency*
- *Expands flexibility to support a broad range of storage area network (SAN) extension requirements with an extensible hardware platform and flexible software licensing.*

SAN32B-E4

The IBM System Storage SAN32B-E4 Encryption Switch is a high-performance

stand-alone device designed for protecting data-at-rest in mission-critical environments. In addition to helping IT organizations achieve compliance with regulatory mandates and meeting industry standards for data confidentiality, the SAN32B-E4 Encryption Switch also protects them against potential litigation and liability following a reported breach.

Data is one of the most highly valued resources in a competitive business environment. Protecting that data, controlling access to it, and verifying its authenticity while maintaining its availability are priorities in our security-conscious world. Increasing regulatory requirements are also helping to drive the need for the adequate security of data. Encryption is a powerful and widely used technology that helps protect data from loss and inadvertent or deliberate compromise.

More on the Web

- SAN32B-E4 specifications
- SAN32B-E4 assets on PartnerWorld
- SAN32B-E4 info on IBM.com

In the context of data center fabric security, IBM provides advanced encryption services for storage area networks (SANs) with the IBM System Storage SAN32B-E4 Encryption Switch. The switch is a high-speed, highly reliable hardware device that delivers fabric-based encryption services to protect data assets either selectively or on a comprehensive basis. The 8 Gbps SAN32B-E4 Fibre Channel Encryption Switch scales non-disruptively, providing from 48 up to 96 Gbps of encryption processing power to meet the needs of the most demanding environments with flexible, on-demand performance. It also provides compression services at speeds of up to 48 Gbps for tape storage systems. Moreover, it is tightly integrated with one of the industry-leading, enterprise-class key management systems, the IBM Tivoli Key Lifecycle Manager (TKLM), which can scale to support key life-cycle services across distributed environments.

Here are some quick SAN32B-E4 facts:

- *Enforces data confidentiality and privacy requirements using high-performance, scalable fabric-based encryption*
- *Centralizes administration of data-at-rest encryption services to ensure data protection on both disk and tape*
- *Reduces operational costs and simplifies management through the IBM Tivoli Key Lifecycle Manager solution*
- *Meets regulatory mandates for securing data while maintaining application performance with on-demand encryption and compression processing power*
- *Industry-standard AES-256 encryption algorithms for both disk and tape in a centralized security platform for SAN environments*
- *High-performance encryption processing at up to 96 Gbps to support heterogeneous enterprise data centers*
- *Plug-in encryption services available to all host servers, including virtual machines, attached to data center fabrics*
- *Frame redirection technology to enable easy, non-intrusive deployment of fabric-based security services.*

Brocade VDX 6730 Converged Switch

IBM is partnering with Brocade, an industry-leading SAN Switch provider, to deliver converged data center solutions. Converging FC storage and regular Ethernet traffic on one platform allows administrators to reduce the number of adapters, simplify management, and protect storage investments by utilizing the existing SAN infrastructure.

IBM delivers interoperability by providing end-to-end FCoE testing with the latest System x servers, Brocade VDX 6730 Converged switches, IBM System Storage SAN b-type, and Brocade SAN switches and IBM Storage.

Here are some quick Brocade VDX 6730 facts:

- *10 Gigabit Ethernet (GbE) FCoE switch with LAN and native Fibre Channel ports*
- *Supports multiple protocols including Fibre Channel over Ethernet (FCoE), iSCSI and NAS*

More on the Web

- Brocade VDX 6730 specifications
- Brocade VDX 6730 assets on PartnerWorld
- Brocade VDX 6730 info on IBM.com

- *Streamlines management by utilizing Brocade Network Advisor and available integration with IBM System Director*
- *Ideal for customers looking to connect to existing Brocade SANs.*

SAN b-type Directors

In this section, we will explore SAN b-type directors.

SAN384B-2 and SAN768B-2

IBM System Storage SAN768B-2 and SAN384B-2 fabric backbones are among the industry's most powerful Fibre Channel switching infrastructure offerings. They provide reliable, scalable, high-performance foundations for mission-critical storage.

These fabric backbones also offer enterprise connectivity options to add support for IBM FICON connectivity, delivering a high-performing and reliable FICON infrastructure with fast and scalable IBM System z servers.

Here are some quick SAN384B-2 and SAN768B-2 facts:

- *Unleashes the full potential of private or hybrid cloud storage with outstanding scalability, performance, and reliability*
- *Reduces network complexity, management, and costs with ultra-scale chassis connectivity*
- *Simplifies and centralizes end-to-end storage area network (SAN) management with Fabric Vision technology*
- *Protects investments in existing SAN fabrics and automation tools while reducing operational costs and minimizing business disruption*
- *Maximizes performance for I/O- and bandwidth-intensive applications*

More on the Web

- SAN384B-2/SAN768B-2 specifications
- SAN384B-2 assets on PartnerWorld
- SAN768B-2 assets on PartnerWorld
- SAN384B-2/SAN768B-2 info on IBM.com

- *Optimizes data center connectivity over distance with integrated, high-performance metro and global connectivity.*

Cisco MDS

The Cisco MDS family provides a full suite of switches, directors, and specialty switches.

Cisco MDS 9148

The Cisco MDS 9148 for IBM System Storage Multilayer Fabric Switch (2417-C48) is designed to provide an affordable, highly capable, and scalable storage networking solution for small, midrange, and large enterprise customers. The switch provides line-rate 8 Gbps ports with high-performance, high-density, and enterprise-class availability. The switch is designed to offer outstanding value by providing flexibility, high availability, security, and ease of use at an affordable price in a compact, one rack-unit (1RU) form factor. With the ability to expand from 16 to 48 ports in eight-port increments, the Cisco MDS 9148 can be used as the foundation for small, stand-alone SANs, as a top-of-rack switch, or as an edge switch in larger, core-edge storage area network (SAN) infrastructures.

The Cisco MDS 9148 Multilayer Fabric Switch is designed to support quick configuration with zero-touch plug-and-play features and task wizards that allow it to be deployed quickly and easily in networks of any size. Powered by Cisco MDS 9000 NX-OS Software, it includes advanced storage networking features and functions and is compatible with Cisco MDS 9000 Series Multilayer Directors and Switches, providing transparent, end-to-end service delivery in core-edge deployments.

More on the Web

- Cisco MDS 9148 specifications
- Cisco MDS 9148 assets on PartnerWorld
- Cisco MDS 9148 info on IBM.com

Here are some fast Cisco MDS 9148 facts:

- *Extraordinary price/performance with up to 48 8 Gbps line rate ports in a compact 1 RU platform.*
- *Scales from 16 ports to 48 ports in eight-port increments.*
- *Redundant power supplies and fans and other availability features help minimize downtime and improve business resiliency.*
- *Built-in management, operational and configuration tools, and plug-and-play features support quick deployment and easy end-to-end SAN management.*
- *All-in-one licensing with no hidden charges.*

Cisco MDS 9250i

Cisco MDS 9250i Multiservice Fabric Switch for IBM System Storage is an optimized platform for deploying high-performance SAN extension solutions, distributed intelligent fabric services, and cost-effective multiprotocol connectivity for open systems. With a compact form factor and advanced capabilities normally available only on director-class switches, MDS 9250i

is an ideal solution for departmental and remote branch-office SANs as well as large-scale SANs in conjunction with the Cisco MDS 9710 Multilayer Director.

MDS 9250i offers up to 40 16-Gbps Fibre Channel ports, two 1/10-Gigabit Ethernet IP storage services ports and eight 10-Gigabit Ethernet Fibre Channel over Ethernet (FCoE) ports in a fixed, two-rack unit (2RU) form factor. MDS 9250i connects to existing native Fibre Channel networks, protecting current investments in storage networks.

Here are some fast Cisco MDS 9205i facts:

- *Provides 16-Gbps connectivity in a high-density Fibre Channel switch*
- *Enables storage area network (SAN) consolidation with integrated multiprotocol support*
- *Delivers high-performance Fibre Channel over IP (FCIP) and fast disaster recovery*

More on the Web

- Cisco MDS 9205i assets on PartnerWorld
- Cisco MDS 9205i info on IBM.com

- *Supports hardware-based virtual fabric isolation with virtual SANs (VSANs) and Fibre Channel routing with Inter-VSAN routing (IVR)*
- *Enables cost-effective, high-performing Fibre Channel and FCIP connectivity for open-systems*
- *Cisco Data Mobility Manager (DMM) as a distributed fabric service.*

Cisco MDS 9222i

A wide range of IBM System Storage medium-size and enterprise storage area network (SAN) IT simplification and business continuity solutions can be created with the Cisco MDS 9222i for IBM System Storage multiservice modular switch. Infrastructure simplification solutions for the IBM Power Systems, System i, System p, System x, and System z families of servers include storage consolidation and high-availability server clustering with IBM System Storage disk storage arrays. Business continuity solutions include data protection with IBM System Storage tape libraries and devices and IBM Tivoli Storage Manager data protection software; and disaster protection with IBM System Storage disk metro and global mirroring disaster recovery solutions.

Here are some quick MDS 9222i facts:

- *Multiservice design for high performance business continuity solutions with Windows, UNIX, Linux, NetWare, IBM OS/400, and IBM z/OS servers*
- *Storage media encryption (SME) for secure encryption of data stored on heterogeneous tapes, virtual tape libraries, and disk arrays*
- *Cost-effective "green" switch design requires up to 27 percent less power per port*
- *Modular design provides "pay-as-you-grow" scalability and configuration flexibility*
- *Excellent availability with redundant, hot swappable components and non-disruptive firmware upgrades*

More on the Web

- Cisco MDS 9222i specifications
- Cisco MDS 9222i assets on PartnerWorld
- Cisco MDS 9222i info on IBM.com

- *Intelligent network services such as Virtual SAN (VSAN) capability for SAN consolidation into virtual SAN islands on a single physical fabric*
- *Enterprise, Mainframe, and Data Center Network Manager (DCNM) Advanced*
- *Packages provide added intelligence and value.*

Cisco MDS 9506, 9509, and 9513

The Cisco MDS 9500 Series Multilayer Directors for IBM System Storage are director-class storage area networking (SAN) switches designed for deployment in scalable enterprise and service provider clouds to enable flexibility, resiliency, and reliability. Layering a comprehensive set of intelligent features onto a high-performance, protocol-independent switch fabric, the MDS 9500 Series Multilayer Directors address the critical requirements of large virtualized data center storage environments such as high availability, security, scalability, ease-of-management, and simple integration of new technologies for extremely flexible data center SAN solutions.

Sharing the same operating system and management interface with other Cisco data center switches, the MDS 9500 Directors can help enable smooth deployment of unified fabrics with high-performance Fibre Channel and FCoE connectivity for low total cost of ownership (TCO). Compatible with all generations of Cisco MDS 9000 Family Fibre Channel Switching Modules, the MDS 9500 Series Multilayer Directors can help provide outstanding investment protection.

The Cisco MDS 9513 offers up to 528 1, 2, 4, and 8 Gbps autosensing Fibre Channel ports and up to 264 10 Gbps Fibre Channel ports in an 11-slot modular chassis. The MDS 9513 provides up to 1056 Fibre Channel ports in a single rack.

The Cisco MDS 9509 offers up to 432 1, 2, 4, and 8 Gbps autosensing Fibre Channel ports and up to 216 10 Gbps Fibre Channel ports in a nine-slot modular chassis. The MDS 9509 provides up to 864 Fibre Channel ports in a single rack.

The Cisco MDS 9506 provides up to 288 1, 2, 4, and 8 Gbps autosensing Fibre Channel ports and up to 144 10 Gbps Fibre Channel ports in a six-slot modular chassis.

Here are some quick MDS 9500 director facts:

- *Offers scalability to 192, 336, and 528 maximum Fibre Channel port count at 1, 2, 4, 8, and 10 Gbps Fibre Channel speed*
- *Multilayer architecture transparently integrates Fibre Channel, Fibre Channel over Ethernet (FCoE), IBM FICON, Internet Small Computer System Interface (iSCSI), and Fibre Channel over IP (FCIP) in one system*

More on the Web

- Cisco MDS 9500 series Multilayer Director specifications
- Cisco MDS 9500 Series Multilayer Directors assets on Partnerworld
- Cisco MDS 9500 Series Multilayer Directors info on IBM.com

- *32- and 48-port 8 Gbps Advanced Fibre Channel switching modules designed to allow a port to be configured as either 1, 2, 4, 8, or 10 Gbps, consolidating all ports into the same Fibre Channel switching module*
- *High-performance Inter-Switch Links (ISLs) that provide additional availability at the fabric level; PortChannel capability allows users to aggregate up to 16 physical links into one logical bundle*
- *Supports all generations of Cisco MDS 9000 Family switching modules, providing outstanding investment protection*
- *Delivers comprehensive security and unified SAN management*
- *Includes Virtual SAN (VSAN) capability for SAN consolidation into virtual SAN islands on a single physical fabric.*

Cisco MDS 9710 Multilayer Director

A next-generation, director-class SAN switch designed for deployment in large-scale storage networks, Cisco MDS 9710 Multilayer Director for IBM System Networking enables not only enterprise clouds, but business transformation.

By adding enterprise connectivity options that support FICON, MDS 9710 delivers a high-performing and reliable FICON infrastructure designed to support fast and scalable System z servers. The MDS 9700 platform also provides multi-protocol flexibility for SANs delivering both 16-Gbps Fibre Channel and 10-Gbps Fibre Channel over Ethernet (FCoE) capabilities.

Here are some quick Cisco MDS 9710 facts:

- *Helps future-proof the data center for cloud and big data with next-generation capabilities*
- *Meets scalability requirements and manages TCO; scales up to 384 Fibre Channel or Fibre Channel over Ethernet ports per chassis*
- *Supports IBM System z IBM FICON and Fibre Channel protocol environments*
- *Combines large-scale storage networks and multiple storage protocols on a single converged network to reduce complexity and enable hyper agility*
- *Attains high availability with fully redundant components*
- *Benefits from intelligent network features such as virtual storage area network (SAN) technology, access control lists, and intelligent frame processing.*

More on the Web

- Cisco MDS 9710 Multilayer Director specifications
- Cisco MDS 9710 Multilayer Director assets on Partnerworld
- Cisco MDS 9710 Multilayer Director info on IBM.com