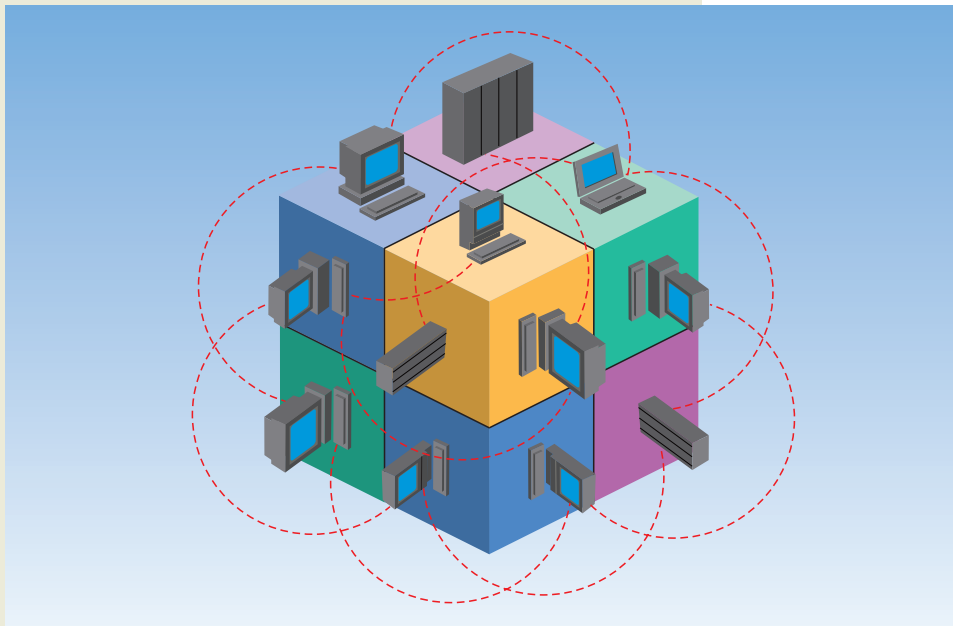# IBM System x and BladeCenter Business Partner Guidebook

Your Road Map to Success with IBM System x and BladeCenter

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Edited by Jim Hoskins

IBM System x and BladeCenter Business Partner Guidebook

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IBM System x and BladeCenter Business Partner Guidebook

Eighteenth Edition

Your Road Map to Success with IBM System x and BladeCenter

Edited by Jim Hoskins

(version 18.0e)

Clear Horizon

Notices

Acknowledgments

Many people gave assistance in preparation of this guidebook. Some provided information concerning their product area of expertise. Others reviewed the manuscript and provided helpful comments. To all of those who assisted…THANK YOU!!

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What's New in This Edition?

This edition of the guidebook has been updated to include IBM System x and BladeCenter products announced through November 2010.

Here are some of the offerings that have been introduced or enhanced since the last edition:

x3200 M3 enhancements

x3250 M3 enhancements

x3630 M3 enhancements

x3755 M3 enhancements

x3850 M3/x3950 M3 enhancements

dx360 M3 enhancements

HS22V enhancements

Intelligent Cluster enhancements

Your 10-Step Quick Start

Take these ten steps to "hit the ground running" as a new IBM Business Partner.

1. Check for Updated Editions of This eBook

This guidebook 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 guidebook

MORE ON THE WEB
• Check for updated editions of this guidebook

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.

2. Apply for Your IBM PartnerWorld Membership

The IBM PartnerWorld Web site is your source for information for 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

MORE ON THE WEB
• Explore PartnerWorld
• PartnerWorld contact phone numbers by country
• Get your PartnerWorld user ID

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 right phone number for your 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 communciations

4. Enroll in the Systems Connect eXpert Program

Enroll in Systems Connect eXpert to easily locate online education and get the guidance you need to prepare for the System x and BladeCenter certification exams. The eXpert program also offers training on strategic topics that are not part of a specific certification track but are critical to help drive your business forward.

Get started by enrolling in four easy steps. Select your education road map of choice; sales or technical. Then, start progressing through the education.

MORE ON THE WEB

• Systems Connect eXpert

5. Review the System x Express Advantage Portfolio

The IBM Express Advantage portfolio is a set of IBM products and services (e.g., servers, storage, printers, services, etc.) specially configured and priced for the small and medium business environment. Most System x and BladeCenter

products are now offered as Express models, which offer more aggressive pricing, faster availability, and ease of

MORE ON THE WEB
• IBM Express Advantage E-catalog

installation. Become familiar with IBM Express Advantage and you will have solutions for your customers that you can deploy quickly and grow as needed.

6. Understand the Express Seller Program

Express Seller is designed to help IBM Business Partners accelerate sales of IBM products and services to small and medium businesses. IBM provides key offerings that meet your clients' business needs at competitive prices and provides extensive mar-

MORE ON THE WEB
• Express Seller Toolkit

keting support including "air cover" advertising and customizable materials to help you generate leads.

7. 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.

8. Learn to Find Competitive Information

IBM consistently updates information about the competitors you will encounter and their products. Explore this valuable tool so you will

be ready when you need it. You will need your user ID and password.

9. Try Out "Know Your IBM"

IBM offers eligible Business Partners some "quick-learn training modules" under the name "Know Your IBM (KYI)," which can help you learn what you need to know about IBM offerings. You can earn points by completing these modules and redeem the points for merchandise at participating retailers. You can earn additional points for reporting sales through KYI.

KYI is more general training that will give you a "high-level" view of IBM offerings. The road maps provided by IBM will guide you to more detailed training opportunities.

10. Make Your Training and Certification Plan

Knowledge is power. IBM offers many opportunities to learn and to demonstrate your knowledge through certification. Now is a good time to make your plans.

Introduction

About This Guidebook

This MaxFacts™ interactive guidebook brings together—all in one place—the resources you need to be successful as an IBM System x 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 guidebook 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 guidebook with your country selected in the upper area of the screen.

How to Use This MaxFacts™ Interactive Guidebook

This guidebook 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 guidebook on almost any printer and read the material anywhere.

Reading on a computer screen at your desk isn't as cozy as reading a printed page while lying on a towel at the beach. If you give it a fair chance, however, you will find that navigating the bookmarks along the left side of the screen provides an effective way to get to the information you need—quickly. Further, the instant access to expanded information provided by the many embedded Web links, along with the "search" function, also makes using this guidebook "on screen" worthwhile. We recommend that you copy this PDF file to your desktop so it will always be only "one click away." If you still want a hard copy, you can print it out on almost any printer.

Links provided throughout this guidebook (anywhere you see a "More on the Web" box or embedded within some figures) will lead you to additional information related to the topic at hand resident on the Web. In this way, this guidebook is a "three-dimensional guide" providing you with information about the topics at the level of detail you choose. To follow a link, simply click on it and a Web browser window will appear on your screen with the requested information. If the link brings 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.

When you are finished exploring, just close or minimize the Web browser window and you will arrive back at the guidebook. You are encouraged to explore all links that interest you

to get the most out of this guidebook. You must have an active connection to the Internet to use the embedded links.

To navigate around within this guidebook, you can:

- Step forward or backward a page at a time using the standard Acrobat Reader navigation toolbar shown along the bottom of your screen

- Click on the "Bookmark" links shown on the left side of your screen to go directly to that part of the guidebook

- Click on the "Table of Contents" section and click on the links to go directly to that part of the guidebook

- Search for keywords in the document using the Acrobat Reader "Find" function (found on the toolbar).

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• Maximum Press Web site

1

Welcome to the Team

In this chapter, we cover some basics about working with IBM.

Why Team 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 an integrated portfolio of tower, rack-mount, and blade hardware offerings and channel programs that when coupled with our software, options, services, and storage expertise creates a channel partner that can take your business wherever you want it to go.

Innovation That Matters

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.

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 al-

low you to provide the insight, solutions, and innovation that
matter to help your customers succeed.

A Smarter Planet

The Smarter Planet leadership agenda was born out of a need
for change coupled with the unique opportunities now emerg-
ing for leaders of businesses and institutions worldwide. We
find ourselves at this moment because the crisis in our finan-
cial markets jolted us awake. We are seriously focused now
on the nature and dangers of highly complex global systems.
And this isn't our first such jolt. Indeed, the first decade of
the 21st century has been a series of wake-up calls with a
single theme: the reality of global integration. The world is
increasingly becoming instrumented, interconnected, and
intelligent.

The problems of global climate change and energy, global
supply chains for food and medicine, new security concerns
ranging from iden-
tity theft to terror-
ism—all issues of
a hyper-connected
world—have sur-
faced since the

start of this decade. The world continues to get "smaller" and
"flatter." But we see now that being connected isn't enough.

Fortunately, something else is happening that holds new potential: the planet is becoming smarter.

That is, intelligence is being infused into the way the world literally works—into the systems, processes, and infrastructure that:

- Enable physical goods to be developed, manufactured, bought, and sold

- Allow services to be delivered

- Facilitate the movement of everything from money and oil to water and electrons

- Help billions of people work and live.

One key element of the Smarter Planet agenda is the notion of a dynamic infrastructure that can adapt to meet changing needs. In fact, the dynamic infrastructure strategy will help guide the development and deployment of IBM hardware, software, and services. Let's take a closer look at dynamic infrastructure and the vital role IBM System x and BladeCenter play.

Dynamic Infrastructure

A key element of IBM's smarter planet initiative is known as the dynamic infrastructure highlighted in Figure 1.1. This is IBM's strategy to help IBM clients create an IT infrastructure that is designed for today's instrumented, interconnected, and intelligent world, transforming physical and digital assets into higher-valued services. A dynamic infrastructure helps

IBM clients transform their current business and IT infrastructure to address their top three imperatives (improve service, reduce cost, manage risk) through a structured approach. A dynamic infrastructure is highly optimized to achieve greater results and deliver superior business and IT services with agility and speed. IBM System x and BladeCenter products and services help implement the information infrastructure element of a dynamic infrastructure.

For example, IBM and VMware can help clients implement a dynamic infrastructure with hardware and software designed for virtualization. As the first authorized reseller of VMware products, IBM offers the broadest portfolio of industry-standard System x and BladeCenter servers that can help clients lower IT costs with unparalleled performance, extraor-

Figure 1.1.   IBM's dynamic infrastructure strategy helps IBM clients transform their current business and IT infrastructures to address their top three imperatives: improve service, reduce costs, and manage risk.

dinary energy efficiency, and rock-solid reliability. Whether clients need a virtual desktop solution or an enterprise-class server optimized for virtualization workloads, IBM System x and BladeCenter provide the innovative technology and exceptional services and support needed to build a dynamic infrastructure and make for a smarter planet.

Why IBM System x and BladeCenter?

IBM relies on deep business experience, renowned research capabilities, world-class technology, and cutting-edge innovation to help businesses move forward. Here are some key points about how IBM System x and BladeCenter deliver this value.

Realize Innovation

Combining open, industry standards with our deep business experience and renowned research capabilities, System x and BladeCenter servers include innovative technology that boosts performance, adds flexibility, and makes IT easier and more reliable; proactive tools that help clients manage complexity and support growth of clients' businesses and data centers; and capabilities that help business become more efficient so clients can go green and start saving. The ultimate goal is to help clients realize innovation in their own business. Imagine enterprise servers, blade servers, rack servers, and solutions that are open, easy, and green with innovation that can help set your clients apart from their competition.

IBM eX5 Servers

Over the years, IBM has continued to evolve the scope of Enterprise X-Architecture technology to support the types of demanding, enterprise-class workloads that increasingly are being migrated from reduced instruction set computer (RISC)–based UNIX systems to x86. Today, IBM continues its tradition of balanced systems design—focusing on three major engineering goals:

- Unleashing memory

- Providing affordable scalability

- Simplifying deployment.

IBM System x enterprise servers are designed to maximize memory, minimize cost, and simplify deployment. eX5 (pronounced "X5"—the "e" is silent) is the broadest portfolio of systems optimized for clients' most demanding workloads. eX5 systems are the ideal platform for today's business-critical applications—like database processing, customer relationship management, and enterprise resource planning—and highly consolidated, virtual server environments. With multiple workloads running on the same server, performance remains important; but reliability and availability become more critical than ever. IBM System x enterprise servers are built with eX5 innovations, which include the MAX5 memory expansion and other advanced capabilities that give you higher throughput, exceptional reliability, and the ideal platform for virtualization, database, and enterprise workloads.

IBM System x Rack Servers

The philosophy regarding IBM System x rack-mount servers is "innovation comes standard." IBM delivers next-generation technology today that the competition can't match. Some server vendors view uni- and two-socket servers as commodities, using off-the-shelf components to produce cookie-cutter servers with no added value. IBM X-Architecture system design, on the other hand, begins with standard parts and adds innovation to create something more practical: outstanding dual- and quad-core performance, high availability, scalability, power efficiency, and proactive manageability.

IBM BladeCenter Blade Servers

By integrating servers, storage, and networking, IBM BladeCenter is helping companies in every industry sweep complexity aside. The blades contain all the necessities to run an application—processors, memory, I/O, and storage. The chassis contains shared redundant power, shared hot-swap cooling, DVD, integrated Ethernet, storage, switching, and consolidated powerful management. Its innovative, open design offers a true alternative to today's sprawling racks and overheated server rooms. So toss your cables. You have nothing to lose but complexity.

IBM System x iDataPlex Servers

Designed for massive scale-out data centers or high-performance computing applications, IBM System x iDataPlex introduces a new category that is designed to help your business

use less space by doubling the number of servers you can run in a single rack while using less power and air conditioning. iDataPlex uses up to 40 percent less energy while increasing data center computing power by FIVE times. Reduce your energy costs even further with an optional liquid-cooled IBM Rear Door Heat eXchanger for iDataPlex, which allows the solution to run at "room temperature." iDataplex provides customers a single point of support for an integrated and energy-efficient solution to easily roll out in their data center. Customer case studies show savings of up to 40 percent on energy costs and four times the processing power compared to the solution replaced by iDataPlex.

Reduce Costs

In today's financial climate, reducing costs is the top priority for CIOs, not just to drive down costs overall, but to use the dollars better. This requires not just incremental improvements in savings or cost reductions, but dramatic improvements in total cost of ownership as well. These improvements are brought about by leveraging energy efficiency, virtualization, and consolidation with optimized systems and networks across all resources in the data center, alternative service delivery models, and standardization. With IBM System x and BladeCenter, organizations can help simplify the management of the IT infrastructure, improve utilization, and reduce costs.

IBM System x and BladeCenter can significantly reduce operating costs without compromising reliability and performance.

Improve Service

A smarter planet is characterized by increasingly savvy customers and a proliferation of agile competitors. To succeed and win in today's fast-paced business landscape, organizations must transform their service delivery models to achieve superior, differentiated delivery of goods and services. Smarter service delivery requires comprehensive visibility into the full breadth of business and IT assets that support services, effective control over those assets and the business processes they enable, as well as extensive automation of those processes so that services can be delivered more reliably and economically. Combining open industry standards with deep business experience and renowned research capabilities, the IBM X-Architecture blueprint equips System x and BladeCenter servers with innovative technology that makes IT easier and more reliable. IBM servers come standard with proactive tools that help customers manage complexity and support growth of their business and data center. Add innovation and you have best-of-breed System x and BladeCenter systems built to industry standards that support leading third-party technology and operating systems for your customers' diverse computing workloads.

IBM System x and BladeCenter help improve the service of IT in both the enterprise and mid-market.

Manage Risk

Enterprises of all sizes and industries are seeing that global expansion, emerging technologies, and the rising volume

and sophistication of new threats have increased the need for improved security and resiliency measures. By enhancing security and resiliency, IT becomes more responsive and better prepared to meet the needs of a business. Some of these critical areas include infrastructure security and resiliency, information and data protection, and regulatory compliance. Proactive, secure integrated tools provided by System x and BladeCenter—for tracking and deploying assets, optimizing performance, and even enabling remote maintenance—provide a single, consistent interface so customers can more securely manage their IT. An intelligent system design that includes multiple layers of redundancy and memory protection, combined with advanced availability tools, provides the kind of critical resiliency customers need. The ultimate goal is to help customers realize innovation in their business. Imagine enterprise servers, blade servers, rack servers, and solutions that include risk-mitigation innovations that help set them apart from the competition.

> *IBM System x and BladeCenter provide the ability to manage present and future risks in challenging economic conditions.*

IBM System x Rack and Tower Server Basics

Your clients are facing rising power and cooling costs, their IT infrastructure lacks reliability and flexibility, their IT is inadequate for current business needs, and their data center administration is complex and expensive. IBM System x helps clients address these challenges and take back control by simplifying systems for industry-standard computing environ-

ments. System x servers provide innovative technology features focused on high performance, quality, and ease of use. With outstanding value, System x servers showcase the best of IBM engineering.

IBM BladeCenter Server Basics

You need to make IT decisions that will drive business success. You face management challenges and technological complexity such as space constraints, power and cooling limitations, heterogeneous environments, and I/O connectivity issues.

To meet your broad and diverse needs, you want your IT infrastructure to be flexible and modular. IBM BladeCenter offers a comprehensive portfolio of compatible chassis, blades, and switches that are easily managed from a common point. The IBM BladeCenter S is designed with everything a small office with limited IT skills needs.

You need enterprise-class reliability to keep your business up and running. IBM BladeCenter is designed with extensive redundancy to reduce failures. Add tools that can help you quickly diagnosis a problem such as IBM Predictive Failure Analysis and light path diagnostics to help preserve application uptime.

MORE ON THE WEB

- Blade Open Specification
- Blade.org
- Article on racks vs. blades in NetworkWorld Magazine

"In the world of data-center computing, there's a lot of contention over whether deploying rackable servers is better than deploying blade servers to host consolidated or virtualized applications. Because IBM has been a top performer in recent server tests, for this hands-on exploration of blades vs. rackable servers, we tested IBM's state of the art in both categories. . . ."

—NetworkWorld Magazine

Virtualizing on System x and BladeCenter

Utilization and efficiency can be increased by consolidating and virtualizing server workloads and applications. Your customers can simplify virtual-server deployments—especially when application requirements are growing or unpredictable—using System x enterprise servers with extra processor, memory, and I/O capacity that the competition can't match. If power consumption is your primary concern, consolidate onto BladeCenter servers and virtualize applications to better utilize resources and amplify the already-significant advantages of BladeCenter efficiencies. Virtualizing with BladeCenter also allows customers to choose from a broad range of reliable networking and storage with BladeCenter Open Fabric. When it comes to business-critical applications, IBM System x and BladeCenter offer the performance, availability, and resiliency your customers need. If your need for virtual machines continues to grow in an accelerated number and the cost of power or hardware begins to add up, iDataPlex can also be a viable virtualization platform that will save the cost of hardware redundancy for virtualized applications that are parallel and non-mission-critical.

Save with IBM Energy Efficiency

The IBM X-Architecture platform equips System x and BladeCenter servers with technology to help your customers realize the innovation to become more efficient so they can go green and start saving. Innovations include Calibrated Vector Cooling design to maximize air flow, Active Energy Manager to control power usage, IBM Rear Door Heat eXchanger which can remove 50,000 BTUs from a rack, and low-power memory, processors, and drives. And the iDataPlex 2U chassis design draws about one-third the typical fan power of a standard 1U server. All this engineering is designed to increase system reliability and availability while making the data center much more affordable to operate.

Systems Management Made Easy

Because of the enterprise-level technology standard in IBM System x and BladeCenter servers, customers sometimes worry how to bring these servers into their IT infrastructure in a seamless fashion. Enter Systems Director 6.1, the latest version of our advanced management software. IBM servers come with a comprehensive management software portfolio which allows the servers to be managed either locally or remotely. Systems Director 6.1 comes standard, is simple to start, offers comprehensive management of both the physical and virtual system, allows for an automated, fast deployment, provides a single interface for the entire data center, and seamlessly plugs into many existing enterprise management solutions such as Tivoli and other non-IBM solutions. Products like Systems Director VMControl help you move

beyond managing virtualization to using virtualization to better manage your IT infrastructure, and products like IBM Systems Director Network Control provide integration of server, storage, and network management for virtualization environments across multiple platforms. With additional tools like Active Energy Manager and BladeCenter Open Fabric Manager, System x and BladeCenter reduce the complexity of managing your data center.

What Are IBM Express Offerings?

While the needs of small and mid-size businesses (SMB) often are conceptually similar to the needs of larger enterprises, the scale typically is smaller. For this reason, IBM developed an "Express" portfolio of offerings that has been specially designed for the SMB business sector. The Express portfolio of offerings is composed of IBM software, servers, storage, printers, services, education, and financing. These offerings are developed with input from IBM's small and mid-size customers and the IBM Business Partners that help service them. Express offerings retain the functions and features sought most by mid-size businesses and drop the more-complex functions needed by larger enterprises. Yet, they still provide a non-disruptive way to scale up as a growing business . . . well . . . grows.

IBM Express offerings must meet very specific requirements in terms of usability, scalability, size, and price. To make them easier to install and manage, default configurations suitable for most implementations are provided. IBM offers many System x and BladeCenter products through the IBM Express program.

2

General System x and BladeCenter Resources

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

The IBM PartnerWorld Web Site

IBM maintains a Web site called PartnerWorld which 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.

Business Partners who invest the most in IBM receive higher-value benefits and resources. 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.

In this guidebook, we have summarized and provided direct links to a great deal of Partner-World information of interest to System x and BladeCenter Business Partners. As such, this

guidebook 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. (Follow the link provided in the "More on the Web" box.)

System x Specialty/Solution Specialty Advisor

The IBM PartnerWorld System x Specialty offers unique benefits to our business partners. The IBM PartnerWorld System x Specialty rewards a business partner for the investment in sales and technical skills and the market performance they achieve in System x technology and solutions. Certification, as an industry-recognized validation of skills, is a proven differentiator in the marketplace. Within the growing opportunity in the x86 market, this differentiation can help a business partner stand out from the competition.

The criteria for the System x Specialty is available immediately and business partners are encouraged to begin preparing to meet these criteria. Business partners around the world can begin applying now. Business partners in North America will begin receiving benefits in January 2011.

IBM has enhanced the Solution Specialty Advisor to help you track your progress with System x Specialty. This Web-based application will offer you guidance on the processes needed to become a System x Specialty partner.

Solution Specialty Advisor helps you:

- See why you should participate in the System x Specialty via a Flash file

- Understand the steps to becoming a System x Specialty Business Partner

- See where your firm stands in meeting the certification requirements through the Partner Profiling System (PPS).

IBM System x and BladeCenter Education

As with almost any endeavor, time spent educating yourself and your team on appropriate topics such as selling techniques and System x product offerings will help you succeed. In this chapter, we discuss options for you to obtain the System x–related education you need.

IBM Systems College

The IBM Systems College is your one-stop education resource for all STG brands including System z, Power, Storage, System x, BladeCenter, and Retail Store Solutions. Find the most current education as well as road maps, certification information, tools, resources, and much more by platform or job role. With hundreds of on demand learning opportunities, there is sure to be something you can use to help you be successful today and over the long term. The IBM Systems College also provides information on IBM skills mastery, mastery tests, and certifications.

> **MORE ON THE WEB**
>
> - IBM Systems College
> - System x Sales
> - System x Technical

Systems Connect eXpert Education Offering

The IBM Systems Connect eXpert offering is specific to System x and BladeCenter. eXpert delivers System x and BladeCenter education in the form of easy-to-follow, flexible road maps designed to lead to IBM certification while helping you remain current on those urgent skills needed in the business world today.

Systems Connect eXpert tracks your education achievements as you progress through the education road maps. Additionally, take advantage of the education modules delivered through the sales and technical pools to obtain additional training on strategic topics that are not part of a spe-

> **MORE ON THE WEB**
>
> - Systems Connect eXpert Program

cific certification track but are critical to help drive your business forward.

Get started by enrolling in four easy steps. Select your education road map of choice—sales or technical. Then, start progressing through the education.

Systems Connect eXpert is also the exclusive home of the IBM Techline Data Repository, the same library that the IBM Techline team uses to research System x product requirements.

MORE ON THE WEB

- System x training listed on PartnerWorld
- BladeCenter training listed on PartnerWorld

IBM Professional Certifications

Industry-recognized IBM Professional Certifications offer IT professionals the opportunity to develop and demonstrate their IBM expertise to the world. IBM certifications validate your skills and demonstrate your proficiency in the latest IBM technology and solutions. They help make certain that you have the capability to perform role-related tasks and activities at a specified level of competence.

At the firm level, IBM certifications are required for an IBM Business Partner to move from the Member PartnerWorld level to the Advanced level and then Premier. IBM certifications are also required to participate in some Business Partner programs available in each geography. Over 70 percent of the firms producing over $100K annual-

MORE ON THE WEB

- IBM Professional Certification info
- System x & BladeCenter Specialist Certification Guide

ly in IBM revenue have at least one individual within the firm with an IBM certification.

Here are the basic steps in the certification process:

1. Select the certification you would like to pursue.

2. Determine which tests are required by reading the certification role description.

3. Prepare for the test. A great way to prepare for your System x Sales and Technical Certifications is by enrolling in the Systems Connect eXpert offering described above. Or, attend an IBM conference event where classroom training opportunities are offered.

4. Register to take a test by contacting one of our worldwide testing vendors.

5. Take the test.

6. Repeat steps 3 through 5 until all required tests are successfully completed for the desired certification role.

The System x and BladeCenter Specialist Certification Guide (see the link in the "More on the Web" box) provides more information about the IBM certification process. Earn an industry-recognized IBM certification.

Other Education Listed on PartnerWorld

IBM PartnerWorld posts various educational opportunities as they arise. From time to time you will want to check the links provided in the "More on the Web" box to see what is available.

Know Your IBM (KYI)

Know Your IBM is a permission-based interactive marketing and selling resource designed for you, our Business Partner sellers. It provides net, customized, online education modules focusing on strategic product and solution areas. 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.

MORE ON THE WEB

- Know Your IBM training modules

Social Media Resources for IBM Business Partners

Social media is quickly growing in importance 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.

MORE ON THE WEB

- IBM PartnerWorld communities
- Twitter search results for IBM System x or BladeCenter
- Search Twitter for mentions of your business or competitors
- Google blog search results for IBM System x or BladeCenter
- Search blog for mentions of your business or competitors
- LinkedIn social network (has an IBM Business Partner Group)
- Use Twitter to Grow Your Business (IBM Software Business Partner Blog)

Performance Benchmarks

Trying to judge the performance of servers by comparing the individual component (processor, disk, memory, etc.) specifications can be misleading. A better way to compare the performance of servers is to run specially designed software that simulates various types of workloads and measures the time it takes to complete tasks. This is known as benchmark testing. You can find detailed information on benchmark testing and the latest benchmark testing results for System x and BladeCenter by following the links in the "More on the Web" box.

> **MORE ON THE WEB**
>
> - System x performance benchmarks
> - BladeCenter performance benchmarks

Success Stories, References, Case Studies

It is often helpful to make prospective customers aware of other businesses that have successfully implemented solutions based on System x and BladeCenter. For this reason, IBM maintains a database of existing customer success sto-

> **MORE ON THE WEB**
>
> - System x and BladeCenter success stories

Play video

Customer testimonials (multiple videos)

ries, 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.

Sources for Competitive Marketing Information

IBM maintains a Web site called "Comp" which 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.

At the "Comp" site you can also download the "IBM System x Competitive Sales Tool" (after requesting a password via email), which is updated regularly and is the most extensive source of competitive information. Be sure you also sign up to automatically receive email notification (along with the new password you will need) when a new version of the tool is posted.

> **MORE ON THE WEB**
>
> - IBM "Comp" Web site
> - IBM System x competitive sales tool

Playbook/Sales Kits for System x and BladeCenter

This IBM Playbook includes a great selection of System x and BladeCenter plays to help you generate new opportunities in your territory. Each play focuses on a set of common client

pain points and recom-
mends specific solutions
to address them. To offer
your clients more complete

> **MORE ON THE WEB**
>
> • Playbook for System x and BladeCenter

solutions, make your deals more profitable, and increase your
win odds, you'll also want to check out the sections on financ-
ing, services, and storage.

Web Content Syndication (for Your Web site)

IBM Business Partners who market and sell IBM servers, stor-
age, workstations, services, and software can improve their
Web presence for FREE by leveraging syndicated Web con-
tent from ibm.com to their own Web
sites. IBM has teamed with WebCol-
lage, Inc., to provide the capability
for Premier, Advanced, and Member

> **MORE ON THE WEB**
>
> • Web content syndication

level PartnerWorld participants to receive Web content dy-
namically delivered into their Web sites.

Configurator Tools for Specifying Servers

IBM has created several tools to help you configure specific
server solutions as necessary to get pricing and place an or-
der. There are tools (wizards, PDF files,
spreadsheets, etc.) that help you con-
figure System x servers, BladeCenter
servers, racks of servers, and even

> **MORE ON THE WEB**
>
> • Configurator tools

cluster solutions. You can explore these tools by following the
link provided in the "More on the Web" box.

Attaching Accessories and Upgrades to Your Proposals

There are many optional accessories and upgrades for all IBM System x and BladeCenter servers. These options include things like memory upgrades, processor upgrades, storage devices, racks, power solutions, net-working devices, monitors, and input devices. Don't forget to include options that improve the value of the solution you are proposing to your customers. You will find a comprehensive listing of these options by following the links in the "More on the Web" box.

MORE ON THE WEB

- [System x accessories](#)
- [Tape storage](#)
- [Rack, stack & power](#)

Attaching Operating Systems to Your Proposals

All IBM System x and BladeCenter servers need an operating system, so it makes sense that you should discuss with your customers what OS is going to be deployed on the hardware. You can now deliver a more convenient and complete solution for your customers by including the operating system on new hardware. Operating systems from Microsoft, Novell/SUSE Linux, Red Hat, Sun Solaris, and VMware are available from IBM on a server. You can consult the configurator tools (see above) for a comprehensive list of which operating systems are available with each server. You will find a comprehensive list of operating systems within the software accessories by following the link in the "More on the Web" box.

MORE ON THE WEB

- [System x operating systems](#)

Attaching Storage to Your Proposals

Whenever you are proposing the sale of a System x or Blade-Center server (IBM or other brand), it only makes sense to include the needed storage devices in the original proposal. Selling storage with servers is known as "clothing" the servers with storage devices. Properly clothing a server allows you to offer a complete solution while also increasing your profits. IBM's line of storage devices falls under the System Storage brand and includes disk storage, tape storage, and storage management software.

The IBM System Storage DS3000 series product family replaces the IBM TotalStorage DS300 and DS400 disk systems. The award-winning DS3000 family of entry storage products is S.A.F.E.R—Scalable, Affordable, Flexible, Easy, and Reliable. It is scalable because you can grow to over 14 TB of capacity. It is affordable because it is an excellent value starting at just under $4,500 USD. It is flexible because the DS3000 series attaches to System x, BladeCenter, and select third-party servers, making it perfect for a mixed-vendor environment. It is easy because the DS3000 Storage Manager (included at no charge) makes deployment and installation simple. It is reliable because the system comes from IBM, one of the most trusted vendors in the industry. With the new DS3000 series family, you get the same outstanding quality and support that you have come to expect from IBM's DS family of disk storage systems.

MORE ON THE WEB

- Storage products for System x and BladeCenter servers on IBM.com

The DS3000 series offers both direct-attach and SAN-attach models.

The IBM System Storage DS4000 series mid-range storage systems offer affordability, flexibility, and high-performance. The DS4000 models are designed to deliver high-bandwidth performance to both Windows and UNIX environments. With modular designs and models at multiple price points, DS4000 storage systems can be used as storage add-ons or integral components of multi-tiered enterprise infrastructures.

Here are some additional considerations for clothing System x and BladeCenter servers with System Storage products:

- IBM System Storage with System x or BladeCenter servers can provide integrated storage solutions with a broad range of operating system support to deliver exceptional price, performance, and availability.

- Server consolidation storage networking options enable tape library and disk sharing to support lower TCO by spreading the cost of the library and storage arrays across multiple servers.

- There are "IBM Express" models of System Storage products that provide System x solutions specially configured and priced for the small and mid-size business environment. (See "What Are 'IBM Express' Offerings?" in Chapter 1.)

Attaching Services to Your Proposal

Attaching IBM Global Technology Services to your IBM solution sales gives you a way to enhance your productivity, ac-

celerate 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 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.

> **MORE ON THE WEB**
>
> • Service offering info on PartnerWorld

Cross Brand Selling Advisor

The Cross Brand Selling Advisor is designed to supersize your sales by helping you sell more IBM hardware, software, and services with each sales opportunity. This cross-selling tool carefully walks you through a sale by providing the right questions to ask to uncover new opportunities and to deliver more-complete solutions. As you select an IBM point product, a list of the most common attach elements is suggested. The

tool also provides key play opportunities where you can pass discounts and promotions to clients, as well as the IBM competitive advantage—why choose IBM over other specific companies?

When you buy a suit, a salesman will undoubtedly ask if you want a shirt and tie. Likewise, when we sell servers, we want to ask if the client wants storage, software, or services, because underneath every product sale there is a much larger cross-brand opportunity. The Cross Brand Selling Advisor helps sales reps mine that larger deal by showing natural product pairings to roll your own custom solution.

System x Turnkey Solutions

Working closely with IBM Business Partners, IBM has tuned up and optimized the System x portfolio of servers in order to provide a flexible, cost-effective platform for building so-

lutions. The result—highly reliable servers that can scale quickly, easily, and inexpensively so you can stretch your IT budget and confidently execute your business objectives, even as conditions change.

There is a growing set of solutions in areas such as client consolidation, collaboration, database, ERP/CRP, grid computing, high availability and clustering, HPC clusters, security, server consolidation, systems management, virtualization, and VoIP, just to name a few.

To gain further insight into these solutions, let's look at two examples: integrated virtualization with VMware ESXi 3.5 and SAP Solutions for small and mid-size businesses.

Integrated Virtualization with VMware ESXi

With industry-leading technology from IBM and VMware, the transition to virtualization just got easier to manage with VMware ESXi 3.5 integrated on select System x and BladeCenter servers. Simply power up your IBM server and deploy virtual machines in a matter of minutes. This intelligent, integrated solution delivers outstanding performance and scalability, rock-solid reliability, and enhanced security with a robust foundation designed to help reduce costs and keep your virtualized infrastructure up and running.

VMware ESXi 3.5 is an operating system-independent, thin hypervisor designed for rock-solid reliability, simplified management, and enhanced security. For more advanced capabilities, VMware ESXi 3.5 may be upgraded to VMware Infrastructure 3 Foundation, Standard, or Enterprise edition licenses. IBM offers System x and BladeCenter servers pretested and integrated with VMware ESXi 3.5, allowing you to deploy and manage virtual machines quickly and easily with robust platforms built for reliable virtualization.

> **MORE ON THE WEB**
>
> - IBM solutions for VMware ESXi

SAP Solutions for Small and Mid-size Businesses

SAP offers a complete range of enterprise software applications and business solutions to drive businesses ranging from

enterprise to small. It offers these business applications and solutions to handle every aspect of the business. The Windows and Linux markets are important to SAP and IBM System x/BladeCenter is an ideal platform for SAP solutions. SAP and IBM have worked closely on many levels, from joint product development to end-customer support, to providing turnkey solutions to customers.

To stay profitable and remain competitive, small and midsize businesses (SMBs) must manage their operations efficiently and cost-effectively—while overcoming the unique challenges that SMBs face. IBM and SAP understand these challenges. That's why we offer SAP Business One and SAP Business All-in-One: solutions designed specifically for SMBs.

SAP Business One is an easy-to-use business and operational management solution for emerging and dynamic businesses ranging in size from ten to several hundred employees. The solution is simple yet powerful, allowing an immediate and complete view of both business operations and customer activities. If your company is located in the United States, please visit the new SAP Business One collaboration site to discover a new and different way to work with SAP Business Partners.

MORE ON THE WEB

- SAP applications for System x and BladeCenter info on IBM.com
- SAP on System x info on PartnerWorld
- The benefits of running SAP solutions on System x and BladeCenter Redbook
- SAP solutions for SMB info on SAP.com

SAP Business All-in-One is a prepackaged, industry-specific version of SAP Business Suite with built-in content, tools, and methodologies for a cost-effective, turnkey implementation. SAP Business All-in-One solutions offer out-of-the-box flexibility combined with the power of SAP's world-class business solutions.

SAP Business One and SAP Business All-in-One are affordable solutions that can be implemented quickly and easily. They're scaled to grow with you as your business grows. And they're delivered through a network of qualified, professional partners.

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, 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.

MORE ON THE WEB
• IBM Global Financing

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.

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, as well as Competeline for win strategies and competitive information. 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 (region selectable).

MORE ON THE WEB
• Contact Techline
• Technical Sales Library
• PartnerWorld technical resources and support

3

System x Product Quick Reference

In this chapter, we explore the System x products you will be selling and offer some resources that will help you succeed. System x servers are divided into three groups: tower servers, rack-mount servers, and enterprise servers. Let's take a look at each.

Tower Servers

In this section, we look at the specific IBM System x models that use traditional (and some not-so-traditional) "tower" mechanical packaging. This packaging offers flexibility by providing internal expansion capability. Though most tower servers are intended to rest on the floor beside a user's desk, IBM also offers conversion kits that allow these servers to be used in industry-standard 19-inch racks.

x3200 M3

The IBM System x3200 M3 (Figure T.1) offers enhanced performance to help you take on the dynamic challenges of running IT with an emphasis on security, simplicity, efficiency,

Chat now with IBM tech support

Specifications

Processor (CPU GHz/L2 cache/front-side bus max)	Intel Xeon 3400 Series (quad-core) up to 3.06 GHz/8 MB/1333 MHz or Intel Celeron, Pentium, or Core i3 (dual-core) up to 3.20 GHz/4 MB/1333 MHz
Number of processors (std/max)	1/1
Memory (max)	Up to 32 GB DDR-3 1066/1333 MHz ECC memory, 1, 2, and 4 GB UDIMMs; 1, 2, 4, and 8 GB RDIMMs
Expansion slots	Two PCIe x8 Gen2, one PCIe x4, two PCI (32-bit/33 MHz), one dedicated PCIe x4 for RAID-0, -1 controller
Disk bays (total/hot-swap)	Four 3.5" simple-swap or hot-swap SATA hard disk drives (HDDs); eight 2.5" hot-swap SAS HDDs (special bid only)
Maximum internal storage	Up to 8.0 TB SAS or SATA HDDs
Network interface	Dual Gigabit Ethernet
Hot-swap components	Four 3.5" SATA/SAS HDDs, eight 2.5" SAS HDDs
RAID support	Hot-swap hardware RAID-0, -1 (standard), simple-swap hardware RAID-0, -1 (optional); upgrade to RAID-5 optional
Ports	Seven USB (2 front/4 rear/1 internal), two Ethernet, one serial and video
Systems management	Integrated Management Module with IPMI 2.0 and Serial over LAN, IBM Systems Director, IBM ServerGuide, optional Virtual Media Key for remote presence, Trusted Platform Module 1.2
Operating systems	Microsoft Windows Server 2008 STD, EE, R2/Microsoft Windows Server 2008 x64 STD, EE, DC/Windows Small Business Server 2008, Red Hat Linux, SUSE Linux, VMware ESX/ESXi
Limited warranty	1- or 3-year customer replaceable unit/on-site

- x3200 M3 details on PartnerWorld
- x3200 M3 details on IBM.com
- x3200 M3 competitive info on COMP
- x3200 M3 configuration details
- x3200 M3 options
- x3200 M3 blog search
- x3200 M3 Twitter search

Play video

x3200 M3 animated demo

Figure T.1. IBM System x3200 M3 at a glance (and links to more detail).

and reliability—delivered at the right price in a single-socket tower server.

The x3200 M3 supports the latest Intel Xeon quad-core and Celeron, Pentium, and Core i3 dual-core processors for exceptional performance. Because your organization must manage growing volumes of data while maintaining high performance, the x3200 M3 offers vast memory capacity and disk storage.

To enable energy savings, the x3200 M3 provides high-efficiency power supplies (model dependent) and support for IBM Systems Director Active Energy Manager, an energy usage monitoring tool.

Managing your IT environment and addressing security concerns don't have to be difficult, resource-intensive tasks. The x3200 M3 offers enhanced manageability and security to help you streamline processes with features such as the Integrated Management Module (IMM) and Trusted Platform Module (TPM) 1.2.

Select configurations of the x3200 M3 are part of the IBM Express Advantage Portfolio, designed and priced to meet the needs of mid-size businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3200 M3 facts:

- Boost productivity with new high-performance capabilities, vast memory and expanded storage capacity.

- Save on energy costs with integrated power-management tools.

- Improve manageability and security with powerful built-in features.

x3400 M2

The IBM System x3400 M2 (<u>Figure T.2</u>) offers the availability and reliability you need at a price you can afford. Designed for flexibility and growth, this dual-socket server offers exceptional value and accommodates expanding business needs.

The x3400 M2 offers flexible configuration options and easy migration through support for a wide range of technologies. Start with a single Intel Xeon four-core processor and add a second to double your processing capability. Select the right combination of hard disk drive size, capacity, and performance for today and easily incorporate additional drives tomorrow.

Out-of-the-box systems-management support, including predictive-failure analysis and an integrated management module with optional remote-presence key, helps reduce on-site IT support costs. In addition, RAID capabilities enhance application resiliency and performance. Select configurations of the x3400 M2 are part of the IBM Express Advantage Portfolio designed to meet the needs of mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick x3400 M2 facts:

- Helps lower IT lifecycle costs while providing outstanding performance

- Customizable design with configuration flexibility for affordable growth

- Provides extensive systems-management capabilities right out of the box.

Specifications

Form factor/height	Tower/5U (rack-mountable)
Processor (max)	Intel Xeon E5540 up to 2.53 GHz and up to 8 MB cache
Number of processors (std/max)	1/2
Cache (max)	4 MB or 8 MB per processor socket
Memory (std/max)	2 GB/96 GB registered DDR-3 DIMMs
Expansion slots	Five PCI-Express and one PCI; two PCI-X or one PCI-E (optional)
Disk bays (total)	4/4 or 8/8 (model dependent)
Max internal storage	4.0 TB hot-swap Serial ATA hard disk drives (HDDs); 1.2 TB hot-swap SAS, 3.0 TB simple-swap Serial ATA, or 1.17 TB hot-swap SFF SAS
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	670 W 1/1
Hot-swap components	Hard disk drives, fans
RAID support	Integrated RAID-0, -1, -1E (software or hardware, model dependent), optional RAID-10, -5, -50, -6, -60
Systems management	Integrated management module (IMM); optional remote presence hardware key; IBM Systems Director; IBM Systems Director Active Energy Manager
Operating systems	Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware ESX
Limited warranty	1-year or 3-year customer-replaceable unit and on-site limited warranty

- [x3400 M2 details on PartnerWorld](#)
- [x3400 M2 details on IBM.com](#)
- [x3400 M2 competitive info on COMP](#)
- [x3400 M2 configuration details](#)
- [x3400 M2 options](#)
- [x3400 M2 blog search](#)
- [x3400 M2 Twitter search](#)

x3400 M2 animated demo

Figure T.2.   IBM System x3400 M2 at a glance (and links to more detail).

x3400 M3

The IBM System x3400 M3 (<u>Figure T.3</u>) leverages the latest Intel Xeon processors and memory capacity to deliver greater processing power and flexibility. Enhanced with cost-optimized RAID technology, mainframe-inspired reliability and additional memory, the x3400 M3 can provide superior performance per cost for virtualization and other intensive applications.

The x3400 M3 offers flexible configuration options to help you scale easily as business grows. Higher storage capacity as well as choice in storage interface lets you transform your business as you require. Select the right combination of hard disk drive size, processor, and memory capacity for today, and easily incorporate more tomorrow.

Now with low-voltage memory built into its already efficient design—as well as tools for managing energy components—the x3400 M3 helps you better manage power consumption and costs. Extensive systems-management capabilities are also available right out of the box to help save time and money on administration. Select configurations of the x3400 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick x3400 M3 facts:

- Provides optimum performance and processing capability at a lower cost

- Offers large storage capacity and flexible configurations to scale as needs grow

Specifications

Form factor/height	Tower/5U (rack-mountable)
Processor (max)	Four-core Intel Xeon E5640 2.66 GHz with 12 MB of cache per processor socket standard or six-core Intel Xeon X5670 2.93 GHz with 12 MB of cache per processor socket (configure to order only)
Number of processors (std/max)	1/2
Cache (max)	4 MB or 12 MB per processor socket
Memory (max)	16 DIMM slots maximum, 128 GB with DDR-3 1333 MHz RDIMMs or 48 GB with DDR-3 1333 MHz UDIMMs
Expansion slots	Five PCIe and one PCI standard; additional two PCI-X or one PCIe (configure to order only)
Disk bays (total/ hot-swap)	Standard with four 3.5" simple-swap Serial ATA(SATA) or 3.5" hot-swap SATA/SerialAttached SCSI (SAS) HDDs or 8 or 16 2.5" hot-swap SAS HDDs. Eight 3.5" hot-swap SAS/SATA HDDs (model dependent).
Maximum internal storage	3 TB of 3.5" simple-swap SATA HDDs; 8 TB of 3.5" hot-swap SATA HDDs; 4.8 TB of 3.5" hot-swap SAS HDDs; or 8 TB of 2.5" hot-swap SATA/SAS HDDs (model dependent)
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	920 W (1/2) or 670 W (1/1) (model dependent)
Hot-swap components	Fans and hard disk drives standard, power supply (model dependent)
RAID support	Integrated 6 Gbps or 3 Gbps RAID-0, -1, -1E (model dependent), optional RAID-10, -5, -50, -6, -60
Systems management	Integrated systems-management processor
Operating systems	Microsoft Windows Server 2008 R2, Red Hat Linux, SUSE Linux, VMware ESXServer; integrated hypervisor key
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- x3400 M3 details on PartnerWorld
- x3400 M3 details on IBM.com
- x3400 M3 competitive info on COMP
- x3400 M3 configuration details
- x3400 M3 options
- x3400 M3 blog search
- x3400 M3 Twitter search

Figure T.3.   IBM System x3400 M3 at a glance (and links to more detail).

- Helps reduce energy costs and eases management with efficient design.

x3500 M2

The IBM System x3500 M2 (Figure T.4) delivers outstanding quad-core performance and availability to help keep mission-critical applications and virtualized environments up and running. Redundant components to reduce points of failure and light path diagnostics provide resiliency, while integrated support features like a remote-presence key optimize systems-management efficiency.

A long-life platform, the x3500 M2 provides exceptional stability in a volatile marketplace. Flexible configurations and a generous storage capacity enable emerging enterprise environments to meet the demands of today and easily grow to accommodate additional applications as business requirements evolve.

The x3500 M2 harnesses the benefits of the latest Intel Xeon quad-core technology, including faster processing, simultaneous multi-threading, and dynamic power management. It builds on standard technology to offer superior power efficiency and proactive manageability through built-in capabilities for monitoring, measurement, and management of energy consumption. Select configurations of the x3500 M2 are part of the IBM Express Advantage Portfolio, designed to meet the needs of mid-size businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3500 M2 facts:

Specifications

Form factor/height	Tower/5U (rack-mountable)
Processor (max)	Intel Xeon X5570 up to 2.93 GHz and up to 8 MB cache
Number of processors (std/max)	1/2
Cache (max)	8 MB per processor socket
Memory (max)	2 GB/128 GB max 1333 MHz DDR-3 registered DIMMs via 16 DIMM slots
Expansion slots	Six PCI-Express, one PCI, two PCI-X (optional—requires removal of one PCI-Express)
Disk bays (total/hot-swap)	16/16 (SFF) (eight standard with additional eight available)
Maximum internal storage	2.3 TB hot-swap Serial Attached SCSI (SAS)
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	920 W 1/2
Hot-swap components	Power supply, fans, and hard disk drives
RAID support	Integrated Hardware RAID-0, -1, -1E, optional RAID-5, -6, -10, -50, -60
Systems management	Automatic Server Restart; IBM Predictive Failure Analysis on hard disk drives, processors, voltage regulator modules (VRMs), fans and memory; light path diagnostics; integrated management module; optional remote presence hardware key; IBM Systems Director and IBM Systems Director Active Energy Manager
Operating systems	Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware ESX and ESXi
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- x3500 M2 details on PartnerWorld
- x3500 M2 details on IBM.com
- x3500 M2 competitive info on COMP
- x3500 M2 configuration details
- x3500 M2 options
- x3500 M2 blog search
- x3500 M2 Twitter search

x3500 M2 animated demo

Figure T.4.   IBM System x3500 M2 at a glance (and links to more detail).

- High-availability features and integrated systems-management tools maximize uptime.

- Stability combined with flexible growth options delivers increased investment protection.

- The latest processor technology with superior energy management and cooling efficiency.

x3500 M3

The IBM System x3500 M3 (<u>Figure T.5</u>) is a high-performance dual-socket tower server that provides generous bandwidth, storage, and expanded memory capacity up to 192 GB. Start with a single Intel Xeon six-core processor, and add a second to double your processing capability. You can even add processors, storage, and memory independently of one another for maximum configuration flexibility.

With no single point of failure, the x3500 M3 is designed to run the most demanding applications reliably. New 6 Gbps RAID, more RAID adapters, and more concentrated memory support higher availability, while integrated systems management tools provide control of resources from anywhere for simplified serviceability.

The x3500 M3 takes advantage of the latest Intel Xeon technology with extreme processing power and superior energy efficiency. Low-voltage memory, cooling features, and energy-smart design enable lower power, lower heat, and less noise. At the same time, IBM Systems Director Active Energy Manager can help you keep costs down and track, monitor, and measure power consumption.

Specifications

Form factor/height	Tower/5U (rack-mountable)
Processor (max)	Intel Xeon 5500/5600 processors (six-core Intel Xeon X5680 3.33 GHz or four-core Intel Xeon X56773.46 GHz up to 6.4 GTps QPI system speed)
Number of processors (std/max)	1/2
Cache (max)	12 MB
Memory (max)	16 DIMM slots maximum, 192 GB with DDR-3 1333 MHz RDIMMs or 48 GB with DDR-3 1333 MHz UDIMMs
Expansion slots	Six PCIe and one PCI standard; additional two PCI-X available via configure to order and requires removal of one PCIe slot
Disk bays (total/hot-swap)	8/8 or 16/16 2.5" hot-swap standard; 24/24 2.5" hot-swap or 8/8 3.5" hot-swap or 4/0 3.5" simple swap (available via configure to order only)
Maximum internal storage	14.4 TB of 2.5" hot-swap SAS/SATA (HDD upgrade options required) or 16.0 TB of 3.5" hot-swap SAS/SATA (via configure to order only)
Network interface	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE
RAID support	Integrated 6 Gbps or 3 Gbps hardware RAID-0, -1, -1E, optional RAID-5, -6, -10, -50, -60
Systems management	Automatic Server Restart; Predictive Failure Analysison hard disk drives, processors, voltage regulator modules (VRMs), fans and memory; light path diagnostics; integrated management module; remote presence; IBM Systems Director and IBM Systems Director Active Energy Manager
Operating systems	Microsoft Windows Server 2008 R2, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware ESX and ESXi
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- x3500 M3 details on PartnerWorld
- x3500 M3 details on IBM.com
- x3500 M3 competitive info on COMP
- x3500 M3 configuration details
- x3500 M3 options
- x3500 M3 blog search
- x3500 M3 Twitter search

IBM   System x3500 & x3400 M3
MAIN MENU | NOW PLAYING: Introduction

x3500 M3

▶
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x3500 M3 animated demo

Figure T.5.   IBM System x3500 M3 at a glance (and links to more detail).

Select configurations of the x3500 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick x3500 M3 facts:

- Allows greater flexibility with storage upgrade options and increased memory capacity

- Enables high availability with enhanced RAID support and integrated systems management tools

- Leverages the latest Intel Xeon technology for faster processing speeds and energy-smart design.

Rack-Mount Servers

In this section, we explore the IBM System x rack servers. These are designed compactly to fit into industry-standard 19-inch server racks that save valuable data center floor space.

MORE ON THE WEB

- Overview of all System x rack servers

x3250 M2

The IBM System x3250 M2 (Figure R.1) is a single-socket server with power consumption, noise reduction, and space optimizations that make it perfect for any business looking for a reliable, compact workgroup or departmental server. It can be dedicated to a single application, and is priced right for your budget.

Specifications

Form factor/height	Rack/1U
Processor (CPU GHz/L2)	Intel Xeon 3370 (quad-core) (up to 3.0 GHz/12 MB/1333 MHz) or Intel Xeon 3100 (dual-core) (up to 3.16 GHz/6 MB/1333 MHz) or Intel Core 2 Duo E7200 (up to 2.80 GHz/3 MB/1066 MHz) or Intel Pentium (dual-core) (up to 2.66 GHz/2 MB/800 MHz) or Intel Celeron® (up to 2.0 GHz/512 KB/800 MHz)
Number of processors (std/max)	1/1
Memory (std/max)	1 GB standard/8 GB maximum 667 MHz or 800 MHz via 4 DIMM slots
Expansion slots	1 PCI-Express (x8),1 PCI-Express (x4)
Disk bays (total/ hot-swap)	Two 3.5" simple-swap SATA or 3.5" hot-swap SAS/SATA or four 2.5" hot-swap SAS HDDs
Maximum internal storage	2.0 TB SATA or 600 GB SAS
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	350W 1/1
RAID support	Integrated hardware RAID-0,-1 standard hot-swap models and op-tional simple swap models; RAID-5 optional for hot-swap and simple swap models
Systems management	IPMI 2.0-compliant mini-BMC2, optional Remote Supervisor Adapter II SlimLine
Operating systems	Microsoft Windows Server 2008, Microsoft Windows Server 2003, Windows Small Business Server 2003 R2, Red Hat Enterprise Linux 5,SUSE Linux Enterprise Server 10
Limited warranty	1-year or 3-year customer replaceable unit and on-site limited warranty

- x3250 M2 details on PartnerWorld
- x3250 M2 details on IBM.com
- x3250 M2 competitive info on COMP
- x3250 M2 blog search
- x3250 M2 Twitter search
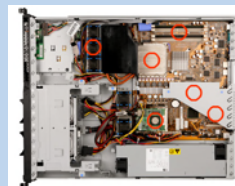
x3250 M2 visual tour

Figure R.1.   IBM System x3250 M2 at a glance (and links to more detail).

Designed for infrastructure applications, the x3250 M2 leverages the latest dual-core and quad-core processor technology, making it ideal for large enterprise specialized applications, SMB infrastructure workloads, branch office general purpose applications, or appliance solutions.

The x3250 M2 fits into about the same area as many Ethernet switches, enabling more efficient use of existing data center space. Quiet fans won't disturb your office environment. And since it plugs into a 110-volt outlet, you can deploy it anywhere.

The x3250 M2 offers built-in reliability features such as mini-BMC2 and optional Remote Supervisor Adapter II Slim-Line that enable remote manageability from a single console. Select configurations of the x3250 M2 are part of the IBM Express Advantage Portfolio, designed and priced to meet the needs of mid-size businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3250 M2 facts:

- Maximize return on IT investments with low entry price, small form factor, and less power consumption

- Manage risk with enhanced reliability features and full remote management

- Manage complexity of IT with greater flexibility to meet a wide range of stateless infrastructure needs.

x3250 M3

The IBM System x3250 M3 (Figure R.2) is a single-socket server that offers new levels of performance and flexibility to

Specifications

Form factor/height	Rack/1U
Processor (max) (CPU GHz/L3 cache/front-side bus MHz max)	Intel Xeon 3400 Series (quad-core) up to 3.06 GHz/8 MB/1333 MHz or Intel Celeron, Pentium, or Core i3 (dual-core) up to 3.2 GHz/4 MB/1333 MHz
Number of processors (std/max)	1/1
Cache (max)	8 MB L3
Memory	Up to 32 GB DDR-3 ECC memory, up to 1333 MHz; 1 GB, 2 GB, 4 GB UDIMMs; 1 GB, 2 GB, 4 GB, 8 GB RDIMMs
Expansion slots	2 PCIe x8 Gen2, dedicated PCIe x4 for RAID-0, -1, optional PCI-X (CTO or special bid only)
Disk bays (total/hot-swap)	Two 3.5" simple-swap SATA or 3.5" hot-swap SAS/SATA, or four 2.5" hot-swap SAS HDDs
Max internal storage	4.0 TB SATA or 2.4 TB SAS; optical drive device optional
Network Interface	Dual Gigabit Ethernet
Power supply	351 W 1/1
Hot-swap components	Two 3.5" hot-swap SAS/SATA or four 2.5" hot-swap SAS HDDs
RAID support	Hot-swap hardware RAID-0, -1 (standard), simple-swap models - hardware RAID-0, -1 (optional); optional RAID-5
Ports	7 USB, 2 Ethernet, 1 serial and video
Systems management	Integrated Management Module with IPMI 2.0 and Serial over LAN, IBM Systems Director, ServerGuide, optional Virtual Media Key, Trusted Platform Module 1.2
Operating systems	Microsoft Windows Server 2008 STD, EE, R2/Microsoft Windows Server 2008 x64 STD, EE, DC/Windows Small Business Server 2008, Red Hat Linux, SUSE Linux
Limited warranty	1-year or 3-year customer-replaceable unit and on-site limited warranty

- x3250 M3 details on PartnerWorld
- x3250 M3 details on IBM.com
- x3250 M3 competitive info on COMP
- x3500 M3 configuration details
- x3500 M3 options
- x3250 M3 blog search
- x3250 M3 Twitter search

x3250 M3 animated demo

Figure R.2.   IBM System x3250 M3 at a glance (and links to more detail).

help you respond quickly to changing business demands. Cost effective and compact, it is well-suited for small to mid-sized businesses as well as large enterprises, whether for general-purpose workloads or specialized applications.

Built with the latest Intel Xeon 3400 Series or Celeron, Pentium or Core i3 dual-core processors, the x3250 M3 has industry-leading computing capabilities in a small, 1U foot-print. It also offers substantial memory and storage capacity to help you manage your data efficiently.

The x3250 M3 features support for IBM Systems Director Active Energy Manager to help you monitor and control power consumption in your IT environment. An option to upgrade to a high-efficiency power supply is also available.

To help you stay focused on your core business, the x3250 M3 offers easy deployment, update management, and much more with its built-in IBM Tool Center. It delivers leadership reliability, management, and flexibility while helping you pro-tect your IT investments and lower your operating costs.

Here are some quick x3250 M3 facts:

- Maximize performance with the latest Intel technology in a robust, flexible platform

- Achieve energy savings with built-in power-management tools

- Minimize risks with easy serviceability and maintenance.

x3550 M2

The IBM System x3550 M2 (Figure R.3) offers robust, proven technology and a flexible, energy-smart design that, accord-

Specifications

Form factor/height	Up to 8 MB
Processor (CPU GHz/ L2 MHz max)	Up to two quad-core Intel Xeon 5500 Series with Intel QuickPath Interconnect (QPI) technology, up to 2.93 GHz and up to 1333 MHz front-side bus
Number of processors (std/max)	1/2
Cache (max)	Up to 8 MB
Memory slots (std/max)	1 GB, 2 GB, 4 GB or 8 GB DDR-3 RDIMMs with 16 DIMM slots—up to 128 GB maximum memory
Expansion slots	2 PCI-Express x16 Gen 2 slots; one is half-length, full-height and one is low-profile (each slot convertible to PCI-X with riser option)
Disk bays (total/hot-swap)	Up to six (2.5") hot-swap Serial Attached SCSI (SAS)/Serial ATA (SATA) or solid-state drives (SSDs)
Maximum internal storage	Up to 3.0 TB hot-swap SAS or up to 3.0 TB hot-swap SATA or up to 300 GB hot-swap SSD storage
Network interface	Integrated 2 ports, plus 2 ports optional Gigabit Ethernet
Hot-swap components	Power supplies, fans, disks
RAID support	Hardware RAID-0, -1, -1E or RAID-0, -1, -10, -5, -50 (with additional option -6,-60) model dependent
Systems management	IBM IMM with Virtual Media Key for optional remote presence enablement, Predictive Failure Analysis, Integrated Service Processor, Diagnostic LEDs, light path diagnostics panel, Automatic Server Restart, IBM Systems Director and IBM Systems Director Active Energy Manager, IBM ServerGuide
Operating systems	Microsoft Windows Server 2003 and 2008, Red Hat Enterprise Linux, SUSE Linux Enterprise Server and VMware ESXi 3.5 embedded hypervisor
Limited warranty	3-year customer replaceable unit and on-site limited warranty

- x3550 M2 info on PartnerWorld
- x3550 M2 info on IBM.com
- x3550 M2 competitive info on COMP
- x3550 M2 configuration details
- x3550 M2 options
- x3550 M2 blog search
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Play video

x3550 M2 animated demo

Figure R.3.   IBM System x3550 M2 at a glance (and links to more detail).

ing to Specpower, beats HP and Dell in energy efficiency. Delivering quad-core computing on Intel Xeon 5500 Series processors with QuickPath Interconnect technology, this server delivers significant performance improvement per watt compared to previous generation servers by integrating low-wattage components for an energy-smart thermal profile.

This server offers feature-rich systems-management capabilities from power management to proactive hardware monitoring. The Integrated Management Module (IMM) increases server availability by continuously monitoring your system and notifying you of potential system failures or changes. The virtual media key option provides remote presence capabilities without taking up a slot on the planar, while IBM Systems Director Active Energy Manager provides advanced power monitoring and notification.

Designed to provide leadership virtualization, the x3550 M2 supports the VMware ESXi 3.5 embedded hypervisor, the industry-leading solution for virtualization. In addition, the x3550 M2 provides exceptional memory capacity per core, enabling you to implement virtualization efficiently and cost-effectively. Select configurations of the x3550 M2 are part of the IBM Express Advantage Portfolio, designed to meet the needs of mid-size businesses.

Here are some quick x3550 M2 highlights:

- Reduce costs with an energy-smart design that provides optimal quad-core computing performance per watt

- Improve service with a highly flexible design that is easy to deploy, integrate, and manage

- Manage risk with resilient architectures and virtualized environments.

x3550 M3

The IBM System x3550 M3 (Figure R.4) builds on the latest Intel Xeon processor technology with extreme processing power and superior energy-management and cooling features. With twice the performance of previous generations and a flexible, energy-smart design that integrates low-wattage components, the x3550 M3 can help you meet demanding workloads at a lower cost per watt.

The x3550 M3 offers a flexible, scalable design and simple upgrade path from four to eight hard disk drives. Comprehensive systems-management tools such as advanced diagnostics and the ability to control resources from a single point make it easy to deploy, integrate, service, and manage.

Integrated with new 6 Gbps RAID adapters and double the I/O performance, the x3550 M3 provides a resilient architecture ideal for mission-critical applications as well as virtualization environments. Advanced memory support and greater disk capacity let you take advantage of higher processing speeds without sacrificing uptime.

Select configurations of the x3550 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of mid-size businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3550 M3 highlights:

- Get higher performance per watt for greater cost efficiency

Specifications

Form factor/height	Rack/1U
Processor (CPU GHz/ L2 MHz max)	Up to two 3.33 GHz six-core (3.46 GHz four-core) Intel Xeon 5600 series processors with QuickPath Interconnect technology, up to 1333 MHz memory access speed, supports select Intel Xeon 5500 series via configure to order
Number of processors (std/max)	1/2
Cache (max)	Up to 12 MB L3
Memory (max)	192 GB DDR-3 RDIMMs via 18 DIMM slots or 48 GB DDR-3 UDIMMs via 12 DIMM slots
Expansion slots	Two
Disk bays (total/hot-swap)	Up to eight 2.5" hot-swap Serial Attached SCSI (SAS)/Serial ATA (SATA) HDDs or solid-state drives (SSDs)
Maximum internal storage	Up to 4.0 TB hot-swap SAS or up to 4.0 TB hot-swap SATA or up to 400 GB hot-swap SSD storage
Network interface	Integrated 2 ports, plus 2 ports optional Gigabit Ethernet
Power supply	1/2; 675 W each
Hot-swap components	Power supplies, fan modules, disks
RAID support	Hardware RAID-0, -1, -1E or RAID-0, -1, -10 (additional option RAID-5 with Self Encrypting Disk (SED) function) or RAID-0, 1, -10, -5, -50 with 256 MB or 512 MB cache (additional option RAID-6, -60 with SED function and additional option battery backup), model dependent
Systems management	IBM Integrated Management Module with Virtual Media Key for optional remote presence enablement, Predictive Failure Analysis, Integrated Service Processor, Diagnostic LEDs, light path diagnostics panel, Automatic Server Restart, IBM Systems Director and IBM Systems Director Active Energy Manager, IBM ServerGuide
Operating systems	Microsoft Windows Server 2008 R2 and 2008, Red Hat Enterprise Linux, SUSE Linux Enterprise Server and VMware ESXi 4.0 embedded hypervisor

- x3550 M3 info on PartnerWorld

- x3550 M3 info on IBM.com

- x3550 M3 competitive info on COMP

- x3550 M3 configuration details

- x3550 M3 options

- x3550 M3 blog search

- x3550 M3 Twitter search

Figure R.4.   IBM System x3550 M3 at a glance (and links to more detail).

- Simplify management and serviceability with flexible design

- Maintain availability and lower risk through a resilient architecture.

x3620 M3

The IBM System x3620 M3 (<u>Figure R.5</u>) gives growing businesses an affordable alternative to traditional enterprise server offerings. Built on the latest Intel Xeon technology, the x3620 M3 helps keep costs down by providing energy efficiency, integrated software RAID and support for up to eight high-capacity, low-cost 3.5-inch hard disk drives.

Reliable and easy to manage, the x3620 M3 is backed by IBM service and support. Embedded RAID and an optional 6 Gbps adapter can protect your data, while optional redundant power and cooling promote uptime. Access to IBM Systems Director, ToolsCenter, and IBM Integrated Managed Module (IMM) capabilities offer proactive support to help maintain availability.

The x3620 M3 offers a customizable design and multiple configurations that let you start small and grow at your own pace. As your requirements change, you can cost-effectively add enterprise features—including advanced RAID, full redundancy, hot-swap hard disk drives and remote management capabilities.

Here are some quick x3620 M3 highlights:

- Provides a value alternative to traditional enterprise offerings with cost-optimized performance and functionality

Specifications

Form factor/height	Rack/2U
Processor (CPU GHz/ L2 MHz max)	Up to two 2.93 GHz Intel Xeon 5600 series processors with QPI technology. Also supports select Intel Xeon 5500 series processors.
Number of processors (std/max)	1/2
Cache (max)	Up to 12 MB L3
Memory (max)	Up to 96 GB in 12 slots, using RDIMMs
Expansion slots	Two x8 PCIe Gen II slots and one x4 PCIe Gen II buried slot
Disk bays (total/hot-swap)	Up to four 3.5" simple-swap SATA HDDs or up to eight 3.5" hot-swap SAS/SATA HDDs
Maximum internal storage	Up to 16.0 TB hot-swap SAS or SATA
Network interface	Integrated two ports
Power supply (std/max)	1/2; 675 W each
Hot-swap components	Power supplies, HDDs
RAID support	Embedded software RAID-0, -1 or hardware RAID-0, -1, -1E or RAID-0, -1, -10 (optional -5 with SED function) or RAID-0, -1, -10, -5, -50 (optional -6,-60 with SED function and optional battery), model dependent
Systems management	IBM IMM with Virtual Media Key, Predictive Failure Analysis, Integrated Service Processor, light path diagnostics panel, Automatic Server Restart, IBM Systems Director and Active Energy Manager, IBM ServerGuide
Operating systems	Microsoft Windows Server 2008 R2,2008, 2003 R2, 2003 SBS R2, Red Hat Enterprise Linux, SUSE Linux Enterprise Server and VMware ESXi 4.0 embedded hypervisor

- x3620 M3 details on PartnerWorld
- x3620 M3 details on IBM.com
- x3620 M3 competitive info on COMP
- x3620 M3 configuration details
- x3620 M3 options
- x3620 M3 blog search
- x3620 M3 Twitter search
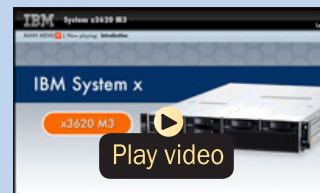
x3620 M3 animated demo

Figure R.5.   IBM System x3620 M3 at a glance (and links to more detail).

- Delivers ultimate reliability and simplified management with IBM-backed service, support, and tools

- Offers customizable design and flexible configurations for affordable growth.

x3630 M3

The IBM System x3630 M3 (Figure R.6) is a storage-rich dual-socket 2U server that integrates the leadership features of traditional enterprise server offerings with affordable components to deliver outstanding value to cost-conscious buyers. Based on the latest Intel Xeon processor technology, the x3630 M3 offers high performance and maximum storage capacity. It provides up to 28 TB of internal storage capacity for a much lower cost per terabyte than external storage, making it an ideal solution for storage-intensive workloads.

The x3630 M3 helps keep your business running smoothly with availability features that include redundant cooling fan modules and hot-swap/redundant power supplies, RAID protection, and predictive failure analysis. The x3630 M3 also offers a comprehensive suite of systems management tools that help simplify management tasks.

Here are some quick x3630 M3 highlights:

- Meet growing performance and storage demands with a cost-effective, high-capacity solution

- Achieve high levels of system availability, backed by IBM's legendary support

Specifications

Form factor/height	Rack/2U
Processor (CPU GHz/ L2 MHz max)	Up to 2.93 GHz 6-core (2.66 GHz 4-core) Intel Xeon 5600 series processors, or up to 2.26 GHz 4-core Intel Xeon 5500 series processors, with up to 1333 MHz memory access speed
Number of processors (std/max)	1/2
Cache (max)	Up to 12 MB L3
Memory (max)	Up to 96 GB DDR-3 RDIMM memory via 12 DIMM slots
Expansion slots	3 PCIe slots
Disk bays (total/hot-swap)	Up to 14 3.5" hot-swap SAS/SATA or up to 28 2.5" hot-swap SAS/SATA
Maximum internal storage	Up to 28 TB
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	1/2; 675 W each
Hot-swap components	Power supplies, hard disk drives
RAID support	6 Gbps RAID -0, -1, -10 standard, upgradeable to hardware RAID-5 or RAID-6 (model dependent)
Systems management	IBM Systems Director, IBM Systems Director Active Energy Manager, IMM (Integrated Management Module) with IPMI 2.0 support, UEFI (Unified Extensible Firmware Interface), IBM ToolsCenter, status LEDs
Operating systems	Microsoft Windows Server, Red Hat Linux, SUSE Linux, VMware
Limited warranty	3-year customer replaceable unit and on-site limited warranty

- x3630 M3 details on PartnerWorld
- x3630 M3 details on IBM.com
- x3630 M3 competitive info on COMP
- x3630 M3 configuration details
- x3630 M3 options
- x3630 M3 blog search
- x3630 M3 Twitter search

Play video

x3630 M3 animated demo

Figure R.6. IBM System x3630 M3 at a glance (and links to more detail).

- Design the configuration that meets your needs today, with the freedom to upgrade as needs change over time.

x3650 M2

The IBM System x3650 M2 ([Figure R.7](#)) offers robust, proven technology and a flexible, energy-smart design that, according to Specpower, beats HP and Dell in energy efficiency. Delivering quad-core computing on Intel Xeon 5500 Series processors with QuickPath Interconnect technology, this server delivers significant performance improvement per watt compared to previous-generation servers by integrating low-wattage components for an energy-smart thermal profile.

The x3650 M2 offers feature-rich management capabilities from power management to proactive hardware monitoring. The Integrated Management Module (IMM) increases server availability by continuously monitoring your system and notifying you of potential system failures or changes. The Virtual Media key option provides remote-presence capabilities without taking up a slot on the planar, while IBM Systems Director Active Energy Manager delivers advanced power monitoring and notification.

Designed to provide leadership virtualization, the x3650 M2 supports the VMware ESXi 3.5 embedded hypervisor, the industry-leading solution for virtualization. In addition, the x3650 M2 provides exceptional memory per core, enabling you to implement virtualization efficiently and cost-effectively. Select configurations of the x3650 M2 are part of the IBM Express Advantage Portfolio, designed to meet the needs of mid-size businesses.

Specifications

Form factor/height	2U rack
Processor (max)	Up to 2 quad-core Intel Xeon 5500 Series with Intel QuickPath Interconnect (QPI) technology, up to 2.93 GHz and up to 1333 MHz memory access speed
Number of processors (std/max)	1/2
Cache (max)	Up to 8 MB
Memory (max)	1 GB, 2 GB, 4 GB, or 8 GB DDR-3 RDIMMs with 16 slots up to 128 GB maximum memory
Expansion slots	4 PCI-Express (4x8) Gen 2 slots: 2x8 full-length, full-height; 1x8 half-length, full-height; 1x8 low-profile. 4x8 are convertible to 2x16 via optional risers. Also, 2x PCI-X via optional risers
Disk bays (total/hot-swap)	Up to twelve 2.5" hot-swap Serial Attached SCSI (SAS)/Serial ATA (SATA) HDDs or solid state drives (SSDs)
Maximum internal storage	Up to 6 TB hot-swap SAS or up to 3.6 TB hot-swap SATA or up to 600 GB hot-swap SSD storage
Network interface	Integrated 2 ports, plus 2 ports optional Gigabit Ethernet
Power supply	1/2; 675 W each
Hot-swap components	Power supplies, fans, disks
RAID support	Hardware RAID-0, -1, optional RAID-5, -6
Systems management	IBM IMM with Virtual Media Key for optional remote presence enablement, Predictive Failure Analysis, Integrated Service Processor, Diagnostic LEDs, light path diagnostics panel, Automatic Server Restart, IBM Systems Director and IBM Systems Director Active Energy Manager, IBM ServerGuide
Operating systems	Microsoft Windows Server 2003 and 2008, Red Hat Enterprise Linux, SUSE Linux Enterprise Server and VMware ESXi 3.5 embedded hypervisor
Limited warranty	3-year customer replaceable unit and on-site limited warranty

- x3650 M2 details on PartnerWorld
- x3650 M2 details on IBM.com
- x3650 M2 competitive info on COMP
- x3650 M2 configuration details
- x3650 M2 options
- x3650 M2 blog search
- x3650 M2 Twitter search

x3650 M2 animated demo

Figure R.7.   IBM System x3650 M2 at a glance (and links to more detail).

Here are some quick x3650 M2 highlights:

- Reduce costs with an energy-smart design that provides optimal computing performance per watt

- Improve service with a flexible design that is easy to deploy, integrate, and manage

- Manage risk with resilient architectures and virtualized environments.

x3650 M3

The IBM System x3650 M3 (Figure R.8) provides outstanding performance for your mission-critical applications. Its energy-efficient design supports more cores, memory, and disk capacity in a scalable 2U package that's easy to service and manage. With more computing power per watt and the latest Intel Xeon processors, you can reduce costs while maintaining speed and availability.

The x3650 M3 offers a flexible, scalable design and simple upgrade path to 16 HDDs or SSDs, and 192 GB of memory. Comprehensive systems-management tools such as advanced diagnostics, a cable-management arm, and the ability to control resources from a single point make it easy to deploy, integrate, service, and manage.

With new 6 Gbps RAID adapters integrated and double the I/O performance, the x3650 M3 provides a resilient architecture ideal for mission-critical applications as well as virtualization environments. Advanced memory support and greater disk capacity let you take advantage of higher processing speeds without sacrificing uptime.

Specifications

Form factor/height	Rack/2U
Processor (max)	Up to two 3.33 GHz six-core (3.46 GHz four-core) Intel Xeon 5500/5600 series processorswith QuickPath Interconnect technology
Number of processors (std/max)	1/2
Cache (max)	Up to 12 MB L3
Memory (max)	192 GB DDR-3 RDIMMs via 18 DIMM slots or 48 GB DDR-3 UDIMMs via 12 DIMM slots
Expansion slots	Four
Disk bays (total/hot-swap)	Up to 16 hot-swap SAS/SATA HDDs or SSDs
Maximum internal storage	8.0 TB of 2.5" hot-swap SAS/SATA or 800 GB hot-swap SSD
Network interface	Integrated 2 ports, plus 2 ports optional Gigabit Ethernet
Power supply (std/max)	1/2; 675 W each
Hot-swap components	Power supplies, fan modules, disks
RAID support	3 Gbps RAID -0, -1, -1E or 6 Gbps RAID -0, -1, -10, -5, -50 with 256 MB or 512 MB cache and additional option battery backup,model dependent
Systems management	IBM IMM with Virtual Media Key for optional remote presence enablement, Predictive Failure Analysis, Diagnostic LEDs, light path diagnostics panel, IBM Systems Director and IBM Systems Director Active Energy Manager
Operating systems	Microsoft Windows Server 2008 R2 and 2008, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESX and ESXi 4.0, Sun Solaris 10

- x3650 M3 details on PartnerWorld
- x3650 M3 details on IBM.com
- x3650 M3 competitive info on COMP
- x3650 M3 configuration details
- x3650 M3 options
- x3650 M3 blog search
- x3650 M3 Twitter search

Figure R.8.   IBM System x3650 M3 at a glance (and links to more detail).

Select configurations of the x3650 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of mid-size businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3650 M3 highlights:

- Improve cost-effectiveness with higher performance per watt

- Simplify management and serviceability with flexible design

- Manage risk with resilient architectures and virtualized environments.

x3650 T

The IBM System x3650 T (Figure R.9) takes carrier-grade servers and next-generation networks to new levels. Built especially for network equipment providers and service providers, this powerful NEBS-3/ETSI-compliant server is rich in design and functionality. The x3650 T is equipped with dual, redundant hot-swap DC or AC power supplies for high availability, up to six PCI slots for extreme expandability, and an external alarm panel providing 24/7 surveillance of system outages. The x3650 T features a long production lifecycle, providing businesses investment protection.

Here are some quick x3650 T facts:

- Delivering superior performance, this carrier-grade, industry-standard Intel processor-based solution is optimized for the telecommunications environment.

- Two 3.2 GHz/800 MHz front-side bus Intel Xeon processors provide the engine for high-compute environments.

Specifications

Form factor/height	2U rack-optimized
Processor (max)	Up to two Intel Xeon 3.2 GHz/800 MHz front-side bus
Number of processors (std/max)	2/2
Cache (max)	2 MB L2
Memory (max)	16 GB ECC DDR II 400 ECC
Expansion slots	Six maximum
Disk bays (total/hot-swap)	Two
Maximum internal storage	293.6 GB Ultra320 SCSI
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	2/2 (DC or AC models)
Hot-swap components	Power supply (same cage for DC/AC power supply)
RAID support	Integrated RAID-0, -1
Systems management	Integrated Intel BMC
Operating systems	Microsoft Windows, Red Hat Linux, SUSE Linux
Limited warranty	3-year limited warranty

- x3650 T details on PartnerWorld
- x3650 T details on IBM.com
- x3650 T blog search
- x3650 T Twitter search

Figure R.9.   IBM System x3650 T at a glance (and links to more detail).

- Featuring a 20-inch-deep chassis ideal for space-constrained environments, the x3650 T is built especially for network equipment providers and service providers.

- First Intel Extended Memory 64 technology-enabled telecommunications rack-mount server.

Enterprise Servers

In this section, we examine the most powerful System x servers. Here, the focus is on maximizing performance, capacity, and availability in order to meet mission-critical business needs.

MORE ON THE WEB
• Overview of all System x Enterprise Servers

x3690 X5

The IBM System x3690 X5 (Figure E.1) delivers four-socket performance, memory capacity, and reliability features in a breakthrough two-socket system that incorporates scalable Intel Xeon processors and fifth-generation IBM X-Architecture (eX5) technology. By purchasing a system with two fewer sockets, you can cut your licensing costs in half while using less energy for a lower total cost of ownership. And you won't have to trade performance for a denser form factor. The x3690 X5 offers leadership performance, including the ability to handle 12% more database transactions per minute than industry-standard two-socket servers.

The x3690 X5 features greater scalability and expansion to help you meet changing workload demands as your business

Specifications

Form factor/height	Rack/2U per chassis
Processor (max)	Intel Xeon up to 2.27 GHz (8 core)/1066 MHz memory access
Number of processors (std/max)	1/2 per chassis (optional 2 chassis support)
Cache (max)	Up to 24 MB
Memory (max)	Up to 512 GB PC3-10600 DDR III
Expansion slots	Four total PCI half-length
Disk bays (total/hot-swap)	16/16 2.5 Serial Attached SCSI (SAS) or 24/24 SAS SSD DASD
Maximum internal storage	800 TB SAS per chassis (supports 73.4 GB, 146.8 GB, 300 GB and 500 GB hard disk drives, 50 GB SSD)
Network interface	Integrated dual Gigabit Ethernet with TCP-IP off-load engine
Power supply (std/max)	675 W 220 V 1/4
Hot-swap components	Power supplies, fans, hard disk drives
RAID support	Integrated RAID-0, -1, optional RAID-5
Systems management	Alert on LAN 2, automatic server restart, IBM Director, IBM Server-Guide, Remote Supervisor Adapter II SlimLine, light path diagnostics (independently powered), predictive failure analysis on hard disk drives, processors, VRMs, fans and memory, Wake on LAN, dynamic system analysis
Operating systems	Microsoft Windows Server 2008 (Standard, Enterprise and Datacenter editions 32-bit and 64-bit), 32- and 64-bit Red Hat Enterprise Linux and SUSE Enterprise Linux, (Server and Advanced Server), VMware ESX Server

- [x3690 X5 details on PartnerWorld](#)
- [x3690 X5 details on IBM.com](#)
- [x3690 X5 competitive info on COMP](#)
- [x3690 X5 configuration details](#)
- [x3690 X5 options](#)
- [x3690 X5 blog search](#)
- [x3690 X5 Twitter search](#)

x3690 X5 animated demo

Figure E.1.   IBM System x3690 X5 at a glance (and links to more detail).

grows. With MAX5, double the memory capacity of your two-socket system to 64 DIMM slots. You can also scale from two sockets and 32 DIMMs to four sockets and 64 DIMMs—and up to four sockets and 128 DIMMs with MAX5. Increase utilization and optimize your investments by fitting 100% more virtual machines per system at half the cost per virtual machine with MAX5 memory expansion. An easy upgrade path and customizable growth options offer freedom of choice—for example, you can add more memory without having to purchase unneeded processing.

Here are some quick x3690 X5 facts:

- Achieve four-socket performance at a two-socket investment

- Grow to meet changing workload demands with unmatched memory expansion

- Own and operate your systems with less complexity and cost

- Get peace of mind with enterprise-class reliability and availability.

x3755 M3

The IBM System x3755 M3 (Figure E.2) is a four-socket server that provides outstanding performance and capacity in a slim 2U design. Based on the 8- or 12-core AMD Opteron 6000 Series platform, the x3755 M3 helps organizations scale as workload demands increase, accommodating up to 48 processor cores and providing 32 DIMM slots for cost-effective memory scaling.

Specifications

Form factor/height	Rack/2U
Processor (max)	Up to 2.3 GHz 12-core AMD Opteron 6000 Series processors
Number of processors (std/max)	2/4
Cache (max)	12 MB L3
Memory (max)	Up to 512 GB DDR-3 RDIMM memory or 128 GB DDR-3 UDIMM memory via 32 DIMM slots
Expansion slots	Four PCIe slots
Disk bays (total/hot-swap)	Up to 8 hot-swap SAS/SATA, optional up to 6 simple-swap SATA
Maximum internal storage	Up to 16 TB
Network interface	Integrated quad Gigabit Ethernet ports
Power supply (std/max)	1/3 1100 W
Hot-swap components	Power supplies, fan modules, HDDs
RAID support	6 Gbps RAID-0, -1, -10 standard, upgradeable to hardware RAID-5
Systems management	IBM Systems Director, light path diagnostics panel, KVM over IP for remote management
Operating systems	Microsoft Windows Server, SUSE Linux, Red Hat Linux, VMware
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- x3755 M3 details on PartnerWorld
- x3755 M3 details on IBM.com
- x3755 M3 competitive info on COMP
- x3755 M3 configuration details
- x3755 M3 options
- x3755 M3 blog search
- x3755 M3 Twitter search

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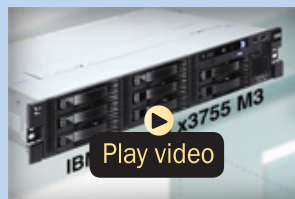
x3755 M3 overview (3:28)

Figure E.2. IBM System x3755 M3 at a glance (and links to more detail).

The x3755 M3 is an ideal server for mid-sized workloads, including Java workloads, databases, virtualization workloads, and enterprise applications such as ERP. The increased processor density helps reduce networking complexity and cost for high-performance computing workloads, and the available 16 TB of internal storage facilitates data-intensive workloads like business intelligence.

Offering flexible configuration options, the x3755 M3 is a natural choice for two-socket workloads that are outgrowing the performance and capacity available on their legacy servers. The x3755 M3 helps IT organizations bridge the gap between two-socket and four-socket servers by providing a high-performance four-socket option in a 2U design. With features for reliability and serviceability, backed by IBM worldwide service and support, the x3755 M3 offers a powerful solution for addressing today's demanding workloads.

Here are some quick x3755 M3 facts:

- Meet growing workload demands with cost-effective processor and memory scaling

- Delivers value, performance, and memory for mid-size workloads

- Realize the benefits of four-socket architecture in a slim 2U server.

x3850 X5/x3950 X5

The new IBM System x3850 X5 and x3950 X5 (Figure E.3) are built on the next generation of IBM Enterprise X-Architecture technology and Intel Xeon processors. The x3850 X5

Specifications

Form factor/height	Rack/4U per chassis
Processor (max)	Intel Xeon up to 2.26 GHz (8-core)/1066 MHz memory access
Number of processors (std/max)	2/4 per chassis (up to 2 node)
Cache (max)	Up to 24 MB
Memory (max)	16 GB/1.0 TB max PC3-10600 DDR III
Expansion slots	7 total PCI half-length, (2 hot-plug)
Disk bays (total/ hot-swap)	8/8 2.5" Serial Attached SCSI (SAS) or 16/16 SAS SSD
Maximum internal storage	4.0 TB SAS per chassis (supports 8 x 73.4 GB, 146.8 GB, 300 GB, and 500 GB hard disk drives or 16 x 50 GB SSDs)
Network interface	10 Gbps Fibre Channel over Ethernet Dual Channel Converged Network Adapter plus integrated dual Gigabit Ethernet with TCP-IP off-load engine
Power supply (std/max)	1975 W 220 V 2/2
Hot-swap components	Power supplies, fans, hard disk drives, and solid-state-drives
RAID support	Integrated RAID-0, -1; optional RAID-5
Systems management	Alert on LAN 2, Automatic Server Restart, IBM Systems Director, IBM ServerGuide, Integrated ManagementModule (IMM), light path diagnostics (independently powered), Predictive Failure Analysis on hard disk drives, processors, VRMs, fans, and memory, Wake on LAN, Dynamic System Analysis, QPI Faildown, single-node failover
Operating systems	Microsoft Windows Server 2008 (Standard, Enterprise, and Data Center Editions, 32-bit and 64-bit), 32- and 64-bit Red Hat Enterprise Linux, SUSE Enterprise Linux (Server and Advanced Server), VMware ESXServer/ESXi 4.0
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- x3850 X5/x3950 X5 details on PartnerWorld
- x3850 X5/x3950 X5 details on IBM.com
- x3850 X5/X3950 X5 competitive info on COMP
- x3850 X5/x3950 X5 configuration details
- x3850 X5/x3950 X5 options
- x3850 X5 blog search
- x3850 X5 Twitter search

Figure E.3.   IBM System x3850 X5/x3950 X5 at a glance (and links to more detail).

offers superior performance and unbeatable reliability within an energy- and wallet-friendly design. Best of all, it offers ultimate flexibility to help you get what you need, when you need it. The x3850 X5 server allows freedom of choice with extremely flexible configurations plus memory expansion ca-pabilities. A modular building block design lets you customize your system for current needs while providing the ability to react to changing workloads. Expand your 4-socket, 64-DIMM x3850 X5 to 4 sockets and 96 DIMMs or up to 8 sockets and 128 DIMMs. Reallocate resources as your environment chang-es. The x3850 X5 meets your needs today, while providing an easy, cost-effective upgrade path to change your environment when you're ready.

The x3950 X5 workload-optimized systems are turnkey solutions configured for high-performing database or virtual-ization environments. Choose among models configured with the right balance of processing power, memory, high IOPS storage, networking and software for your virtualized environ-ment or database application.

Here are some quick x3850 X5/x3950 X5 facts:

- Unmatched flexibility to meet changing workload demands

- Workload-optimized systems with customizable configurations for target workloads

- Achieve greater performance and utilization at a lower total cost

- Keep consolidated workloads up and running with mainframe-inspired reliability

- Easy-to-own, simplified power and systems management with an energy-smart design and remote access

x3950 M2

Engineered with the needs of enterprise organizations in mind, the IBM x3950 M2 (<u>Figure E.4</u>) provides a scalable, efficient, and highly reliable solution. This fourth-generation X-Architecture enterprise server combines 64-bit performance in a balanced design. The x3950 M2 can help organizations meet business demands with confidence, and since many organizations require servers that expand as business grows, the x3950 M2 provides the flexibility to run more applications on the same piece of hardware. These features deliver an optimized solution for large database enterprise applications and virtualization services.

The x3950 M2 provides an uncomplicated, cost-effective, and highly flexible solution. With the ability to scale up to a maximum of 96 cores using Intel six-core processors, while maintaining balanced performance between processors, memory, and I/O, the x3950 M2 can easily accommodate business expansion and the resulting need for additional application space. Unique flexibility of the configurations allows the system to populate a minimum of two CPUs per chassis for additional access to memory and I/O that addresses an organization's specific application requirements. This flexibility allows for the creation of a 12-core, 32-DIMM server utilizing only two processor sockets for processor licensing-constrained applications, and can be scaled to a 48-core, 128-DIMM server utilizing only eight processors.

Specifications

Form factor	Rack/4U per chassis
Processor	Intel Xeon Processor 7400 series up to 2.66 GHz (six cores)/1066 MHz front-side bus
Number of processors (std/max)	2/4 per chassis (optional 2, 3, 4 chassis support)
Cache (max)	Up to 16 MB
Memory (max)	4 GB or 8 GB/256 GB max PC2-5300 DDR II
Expansion slots	Seven total PCI-Express half-length, (two active PCI-Express)
Disk bays (total/hot-swap)	4/4 2.5" serial attached SCSI (SAS)
Maximum internal storage	587 GB SAS per chassis (supports 73.4 GB and 146.8 GB hard disk drives)
Network interface	Integrated dual Gigabit Ethernet with TCP IP Offload Engine
Power supply (std/max)	1440 W 220 V 2/2
Hot-swap components	Power supplies, fans, memory, HDDs and PCI-Express adapters
RAID support	Integrated RAID-0, -1, optional RAID 5
Systems management	Alert on LAN2, Automatic Server Restart, IBM Director, IBM ServerGuide, Remote Supervisor Adapter II SlimLine, light path diagnostics (independently powered), Predictive Failure Analysis onhard disk drives, processors, VRMs, fans and memory, Wake on LAN, Dynamic System Analysis (DSA)
Operating systems	Microsoft Windows Server 2003 (Standard,Enterprise and Data-center editions 32-bit and 64-bit), 32- and 64-bit Red Hat Enterprise Linux and SUSE Enterprise Linux, (Server and Advanced Server), VMware ESX Server
Limited Warranty	3-year customer-replaceable unit and on-site limited warranty

- x3950 M2 details on PartnerWorld
- x3950 M2 details on IBM.com
- x3950 M2 competitive info on COMP
- x3950 M2 blog search
- x3950 M2 Twitter search

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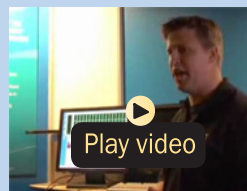
*x3950 overview
(2:04)*

Figure E.4.   IBM System x3950 M2 at a glance (and links to more detail).

Here are some quick x3950 M2 facts:

- Scalable solution delivers outstanding performance for realizing business demands with an easy pay-as-you-grow design

- Balanced design provides additional memory, processing power, and I/O on demand

- Consistent, reliable performance delivers advanced data protection to help manage your risk.

iDataPlex/Cluster Servers

Next we explore the iDataPlex and System x Clusters used for Internet-scale and high performance computing.

iDataPlex

For large-scale computing, iDataPlex Intel Xeon processor-based servers help pack more processors into the same power and cooling envelope, better utilizing floor space, and creating the right-size data center design.

The innovation embodied in the iDataPlex product line has been widely recognized. Here are just two examples:

- Thirty iDataPlex Systems listed in the latest Top 500 Super-computer list (top500.org)

- Top 10 Product Innovation of the Year 2008—eWeek.

iDataPlex dx360 M2

The IBM System x iDataPlex dx360 M2 (Figure I.1) provides an innovative, half-depth solution optimized for maximum

Specifications

Form factor/height	Half-depth, 2U Flex chassis or 3U storage chassis
Processor (max)	Intel Xeon 5500 series quad-core up to 2.93 GHz
Number of processors (max)	Two
Cache (max)	4 MB to 8 MB
Memory (max)	Up to 128 GB DDR-3 1333 MHz via 16 DIMM slots
Expansion slots	One slot PCI-Express x16 electrical/x16 mech (Gen 2), 2 x 8 PCI-Express
Disk bays (total)	Up to five 3.5" (2U) or 123.5" (3U storage density)
Max internal storage	12.0 TB (3U storage chassis)
Interconnect Fabric (std)	Ethernet Adapters • Integrated 1 Gb dual-port Ethernet • Integrated 1 Gb configurable management port • 10 Gb dual-port Ethernet (optional) Fibre Channel • 4 GB dual-port HBA (optional) • 8 GB dual-port HBA (optional) Infiniband • DDR dual-port HCA (optional) • QDR dual-port HCA (optional) Solid State Devices (SSDs) • IBM 160 GB High IOPS SSD PCIe (optional) • IBM 320 GB High IOPS SSD PCIe (optional)
Power supply	900 W high efficiency (per two servers)
Hot-swap components	Hot-swap HDDs in 3U storage dense configuration
RAID support	Optional RAID-0,-1,-5,-6,-10 via optional I/O controller Systems
Systems management	IBM Systems Director including IBM Systems Director Active Energy Manager, Integrated Management Module (IMM) with optional remote KVM support
Operating systems	Red Hat Enterprise Linux versions 5 and 4, SUSE Linux Enterprise Server versions 11 and 10, Microsoft Windows Server 2008 (Datacenter, HPC, Enterprise and Web), VMware Infrastructure 3.5 and VMware vSphere 4
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- dx360 M2 details on PartnerWorld
- dx360 M2 details on IBM.com
- iDataPlex Sales Kit
- dx360 M2 competitive info on COMP
- dx360 M2 blog search
- dx360 M2 Twitter search
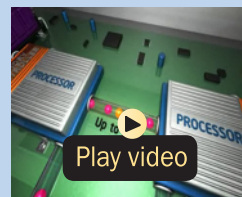
dx360 M2 animated demo

Figure I.1.   IBM iDataPlex dx360 M2 at a glance (and links to more detail).

density and incredible efficiency. Featuring the Intel Xeon Processor 5500 series and DDR-3 memory, the dx360 M2 is easy to manage and delivers outstanding performance in a flexible platform that can be tailored to your data center's processing, storage, or I/O needs.

For high-performance computing, the dx360 M2 allows you to pack more processors into the same power and cooling envelope as traditional servers, better utilizing floor space and optimizing the data center. The flexible design of the dx360 M2 enables the right compute, storage, or I/O capabilities required in your data center.

The innovative, half-depth form factor of the dx360 M2 reduces the airflow required across the components, lowering the power needed for cooling. High-efficiency power supplies, larger better-optimized fans in the 2U and 3U chassis, and power-management capabilities provide further efficiencies to minimize the dx360 M2's power requirements.

The dx360 M2 is simple to manage on a server level or at a rack level as part of an iDataPlex rack and supports VMware Virtualization solutions. IBM ToolsCenter provides common management across all System x servers, making the dx360 M2 easy to incorporate into a cloud or HPC data center.

MORE ON THE WEB

- Overview of iDataPlex servers
- Linux Magazine article on iDataPlex

iDataPlex Overview (2:30)

Here are some quick dx360 M2 facts:

- Award-winning design optimizing efficiencies in energy, cooling, and floor space for data centers

- Operational costs drastically reduced based on innovative shallow depth server form factor

- High-performance computing embracing a broad, flexible portfolio of offerings with simplified systems management and tools.

iDataPlex dx360 M3

The IBM System x iDataPlex dx360 M3 (Figure I.2) provides an innovative, half-depth solution optimized for maximum density and incredible efficiency. Featuring the latest Intel Xeon Processor 5600 series with 16 DDR-3 DIMM sockets and two PCIe x16 Gen 2 slots, the dx360 M3 is easy to manage and delivers outstanding performance in a flexible platform that can be tailored to your data center's processing, storage, or I/O needs.

For high performance computing, the dx360 M3 allows you to pack accelerated processing into the same power and cooling envelope as traditional servers, better utilizing floor space and optimizing the data center. The flexible design of the dx360 M3 integrates the right compute, storage, or I/O capabilities required in your data center while optimizing density.

The innovative, shallow-depth form factor of the dx360 M3 reduces the airflow required across the components, lowering the power needed for cooling. High-efficiency power supplies, larger, better optimized fans in the 2U chassis, and power

Specifications

Form factor/height	Half-depth, 2U Flex chassis or 3U storage chassis
Processor (max)	Intel Xeon 5600 series up to 3.06 GHz (6-core)
Number of processors (max)	2 CPU, 2 GPU adapters (optional)
Cache (max)	4 MB to 12 MB
Memory (max)	Up to 256 GB DDR-3 1333 MHz via 16 DIMM slots
Expansion slots	Up to 2 slots PCIe x16 electrical/x16 mech (Gen 2), 2 x8 PCIe
Disk bays (total/hot-swap)	Up to eight 2.5" (2U) or 12 3.5" (3U storage density)
Maximum internal storage	24.0 TB (3U storage chassis)
Interconnect Fabric Adapters (std)	Ethernet—Integrated 1 Gb dual-port Ethernet, 10 Gb (optional); Fibre Channel—8 GB dual-port HBA (optional); InfiniBand—QDR or DDR single or dual-port HCA (optional); solid-state drives—160 or 320 GB High IOPS PCIe (optional)
Hot-swap components	Hot-swap HDDs in 3U storage-dense configuration
RAID support	RAID-0, -1, -5, -6, -10 via optional I/O controller
Systems management	IBM Systems Director including IBM Systems Director Active Energy Manager, Integrated Management Module (IMM) with optional remote KVM support, integrated 10/100 configurable management port
Operating systems	Red Hat Enterprise Linux versions 5 and 4, SUSE Linux Enterprise Server versions 11 and 10, Microsoft Windows Server 2008 R2, 2008 (Datacenter, HPC, Enterprise, and Web), VMware Infrastructure 3.5 and VMware vSphere 4.1

- dx360 M3 details on PartnerWorld
- dx360 M3 details on IBM.com
- iDataPlex Sales Kit
- dx360 competitive info on COMP
- dx360 M3 blog search
- dx360 M3 Twitter search

▶ Play video

iDataPlex energy efficiency (2:33)

Figure I.2.   IBM iDataPlex dx360 M3 at a glance (and links to more detail).

management capabilities provide further efficiencies to mini-mize the dx360 M3's power requirements.

Here are some quick dx360 M3 facts:

- Award-winning design optimizing efficiencies in energy, cool-ing, and density for data centers

- Operational costs drastically reduced based on innovative shallow depth server form factor

- High performance computing embracing a broad, flexible portfolio of offerings with simplified system management and tools.

Intelligent Cluster (formerly Cluster 1350)

IBM Intelligent Cluster integrated solutions (formerly Cluster 1350) are built on the highly-innovative IBM System x rack, BladeCenter, and iDataPlex (Figure I.3). Whether you are building a small departmental cluster or a super computer, IBM's broad portfolio of server solutions can be optimized to meet client-specific requirements.

High performance computing (HPC) workloads will benefit by up to twice the performance. Our integrated cluster solu-tions offer significant price/performance advantages for many high-performance workloads by harnessing the advantages of highly innovative servers. By design, a range of applica-tion environments will benefit, including those optimized for industrial design and manufacturing, financial services, life sciences, government, and education.

Specifications

Systems	Blade servers: HX5, HS22, HS22V, JS23, JS43; Enterprise servers: x3850 X5; iDataPlex servers: dx360 M3; Rack servers: x3550 M3, x3650 M3, x3690 X5, x3755 M3
Ethernet switches	IBM Data Center Networking, BLADE NetworkTechnologies, Cisco, Force10Networks, SMC, Voltaire
Ethernet adapters	Chelsio, Mellanox
InfiniBand	Mellanox, QLogic, Voltaire
Fibre Channel	Brocade, QLogic, Emulex
Storage servers	System Storage DS5020, DS5100, DS5300, DS3950, DS3500, DS3400, DS3200
Storage expansion	EXP5000 Storage Expansion Unit; DS4000 EXP810 Storage Expansion Unit; EXP3000 SAS JBOD, Single ESM
Graphic Processing Units (GPUs)	NVIDIA Tesla M1060, M2050, M2070, and M2070-Q Computing Modules
Operating systems	Red Hat Enterprise Linux (RHEL) 5, SUSE Linux Enterprise Server (SLES) 11, Microsoft Windows HPC Server 2008
Cluster management software	xCAT (Extreme Cloud Administration Toolkit), Moab Adaptive HPC Suite, Moab Adaptive Computing Suite, IBM General Parallel File System (GPFS) for Linux

- Intelligent Cluster details on PartnerWorld
- Intelligent Cluster info on IBM.com
- Intelligent Cluster competitive info on COMP
- Intelligent Cluster blog search
- Intelligent Cluster Twitter search

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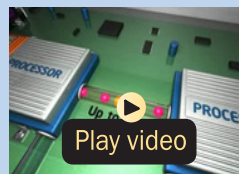
Cineca, Italy's largest computing center (4:39)

Figure I.3. IBM Intelligent Cluster at a glance (and links to more detail).

Intelligent Cluster solutions that integrate BladeCenter or iDataPlex servers can reduce power and cooling costs by up to 50 percent, while maximizing performance density, which is critical for HPC workloads.

Intelligent Cluster integrated HPC solutions include servers, storage and industry-leading OEM interconnects that are factory-integrated, fully tested and delivered to your door, ready to plug into your data center, all with a single point of contact for support.

Here are some quick Intelligent Cluster facts:

- Leading-edge technology with flexibility of choice
- High performance
- Energy and space efficient
- Easily deployed, operated, and maintained.

4

BladeCenter Product Quick Reference

What Is a BladeCenter Blade Server?

The term "blade server" refers to a thin, ultra-dense enclosure that houses microprocessors, memory, disk storage, networking, and other functions. Multiple blade servers are inserted into a standardized, rack-mounted, mechanical box called a "chassis" like books are placed into a bookshelf. The resulting computer system is called a BladeCenter. The chassis is equipped with interconnecting midplanes (which provide the electrical connection between blades) and redundant components to achieve increased density, reduced electrical power requirements, higher reliability, and lower costs compared with other servers. Systems-management software helps with deployment, reprovisioning, updating, trouble-

MORE ON THE WEB

- Overview of BladeCenter servers
- Info on Blade.org
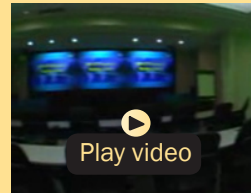
IBM BladeCenter: The right choice (6:55)

MORE ON THE WEB

IBM BladeCenter
Video Library
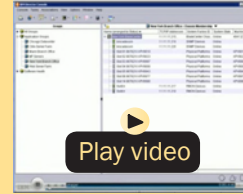
IBM BladeCenter
Configuration Manager
Demo (4:46)

shooting, etc., for local or remote configurations consisting of hundreds of server blades. Collectively, these characteristics are making the BladeCenter concept very popular in the marketplace.

The blade servers offered by IBM fall under the IBM BladeCenter name. BladeCenter is a broad platform that allows users to integrate and centrally manage a collection of servers, storage devices, and networking functions that collectively provide more computing power at a lower cost and in a smaller space (i.e., smaller footprint) than traditional server "box" approaches. To achieve this, BladeCenter uses a modular design packaged in high-density rack enclosures that enable using more-powerful microprocessors. You can quickly respond to changing workloads by re-purposing existing server blades or installing additional server blades in a "pay-as-you-grow" fashion.

IBM BladeCenter can help you implement new applications and functions affordably to address more and better business opportunities. With easily integrated IBM products providing

a highly secure and robust platform for information sharing, you can more easily attain a collaborative working environment, keep your business up and running, and attain high levels of business resiliency.

BladeCenter servers have four elements:

- Chassis—The mechanical enclosure that holds everything else, including various optional modules that fit into bays in the chassis to provide additional function. The chassis is designed to be installed in a rack.

- Modules—Components that are installed in hot-swap module bays provided in the BladeCenter chassis. These modules provide a number of common functions needed by the installed blades, the chassis, and the other modules. Modules include things like power supplies, systems-management modules, cooling fans, and network switches. IBM has published the specifications for the BladeCenter modules and options. This should result in a greater variety of options from a wider range of vendors than before.

- Blade servers—Processors, memory, and other circuitry packaged on a card that is installed in the chassis. The server blades used in BladeCenter are of three basic types: Intel/AMD processor-based, IBM POWER microprocessor-based, or Cell Broadband Engine-based.

- Expansion options—Cards installed in the blades that add function like additional network Ethernet attachments, fibre channel attachment, etc.

Chassis

In this section, we look at the chassis for the basic mechanical structure of a BladeCenter server.

BladeCenter S Chassis

The IBM BladeCenter S (Figure C.1) is the industry's first blade chassis uniquely designed for small and mid-size offices and distributed environments. Building in simplicity and economy, BladeCenter S is designed to get big IT results from the smallest IT staffs.

Small enough to sit under your desk, the new BladeCenter S chassis makes it easy and cost effective for small and mid-size businesses to obtain IT results at levels traditionally reserved for large enterprises. With six blade servers and shared storage capability, the chassis simply plugs into an average wall socket, helping eliminate the need to own and operate costly data centers. Within a single chassis, BladeCenter S supports virtually all of your applications, including those running on Microsoft Windows, IBM AIX, IBM i, and Linux— and integrates the hardware and software most used by mid-size businesses.

BladeCenter S is compatible with the BladeCenter family of products, helping provide investment protection and seamless growth. The new chassis shares many of the IBM BladeCenter blades and switches. Leveraging a single, compatible architecture can help you reduce costs and complexity, while helping deliver investment protection.

Specifications

Form factor	Rack/7U incorporates blade server bays and hot-swap storage high-availability midplane
Blade bays	Up to six 1- or 2-processor, and up to three 4-processor
Disk bays	Up to two disk storage modules that can incorporate six 3.5" SAS or SATA disks each
Standard media	Optional DVD multi-burner accessible from each blade server
Switch modules	Four switch module bays
Power supply module	Up to four (hot-swap and redundant 950W/1450W with load balancing, auto-sensing, and failover capabilities)
Cooling modules	Four hot-swap and redundant blowers standard
Systems management	One management module standard hardware
I/O ports	Keyboard, video, mouse, Ethernet, USB
Systems management	Open and easy systems management and deployment tools
Predictive failure analysis	Hard disk drives, processors, blowers, memory
Light path diagnostics	Blade server, processor, memory, power supplies, blowers, switch module, management module, hard disk drives and expansion card
Integrated storage	Support for hot-swap SAS or hot-swap SATA disks
External storage	Support for IBM System Storage solutions (including DS and NAS family of products) and many widely adopted non-IBM storage offerings
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- BladeCenter S chassis details on PartnerWorld
- BladeCenter S chassis details on IBM.com
- BladeCenter S chassis competitive info on COMP
- BladeCenter S configuration details
- BladeCenter S options
- BladeCenter S blog search
- BladeCenter S Twitter search

7U high
28" deep
fits 19" ra

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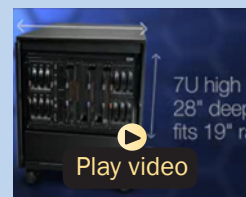
*IBM BladeCenter S—
Jim Hughes (6:55)*

Figure C.1.   IBM BladeCenter S chassis at a glance (and links to more detail).

Here are some quick BladeCenter S chassis facts:

- All in one—integrates servers, storage, networking, and I/O into a single chassis.

- No special wiring needed—uses standard office power plugs with 100–240V.

- Flexible modular technology—integrates a family of IBM blade servers supporting a wide range of operating systems and applications.

- Easy to deploy, use, and manage—allows you to focus on your business, not your IT.

- Helps build greener IT infrastructures—IBM Cool Blue technology delivers a portfolio of tools that help plan, manage, and control power and cooling.

BladeCenter E Chassis

IBM BladeCenter E (Figure C.2) delivers a powerful platform to meet these requirements; it integrates servers, storage, networking, and applications so organizations can build robust IT infrastructures. The result is a data center packed with more operating horsepower that leaves a small carbon footprint.

With its best-in-class energy-efficient design, BladeCenter E enables organizations to reduce power consumption without compromising processing performance. In fact, the system is up to 11 percent more efficient in power and cooling compared to the HP c-Class chassis to run the same configuration in the data center. With these power savings, an organization

Specifications

Form factor/height	Rack-mount chassis/7U
Blade bays	Up to 14
Switch modules	Four switch module bays
Power supply module	Up to four 2000 W or 2320 W (hot-swap and redundant with load-balancing and failover capabilities)
Cooling modules	Two hot-swap and redundant blowers standard
Standard media	Optional DVD multi-burner
Systems-management hardware	One Advanced Management Module standard; add an optional second module for redundancy
I/O ports	Keyboard, video, mouse, Ethernet, USB
Systems management	Open and easy systems management and trial deployment tools
Light path diagnostics	Blade server, processor, memory, power supplies, blowers, switch module, management module, HDDs and expansion card
External storage	Support for IBM System Storage solutions (including DS and Network Attached Storage (NAS) family of products) and many widely adopted non-IBM storage offerings
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- BladeCenter E chassis details on PartnerWorld
- BladeCenter E chassis details on IBM.com
- BladeCenter E chassis Announcement Letter, Feb 06
- BladeCenter E chassis competitive info on COMP
- BladeCenter E blog search
- BladeCenter E Twitter search

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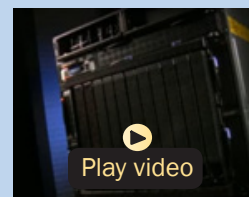
IBM leadership with 8 Gb Fibre (2:39)

Figure C.2.   IBM BladeCenter E chassis at a glance (and links to more detail).

can operate at full potential with lower energy costs—and can go green and save.

Here are some fast BladeCenter E facts:

- Maximizes productivity and minimizes power usage through energy-efficient design and innovative features

- Delivers extreme density and integration to ease data center space constraints

- Protects an organization's IT investment through IBM BladeCenter family longevity, compatibility, and innovation leadership in blades

- Supports the latest generation of IBM BladeCenter blades, providing investment protection

- Choice of 2000 W or 2320 W power supply to meet your IT infrastructure needs.

BladeCenter H Chassis

The BladeCenter H (Figure C.3) is a powerful platform built with the enterprise customer in mind, providing industry-leading performance, innovative architecture, and a solid foundation for virtualization. This next-generation chassis is a workhorse—it runs applications quickly and efficiently, enabling organizations to maximize their investment and succeed in a highly competitive market. The powerful BladeCenter H delivers the performance customers need to make informed decisions.

With IBM Open Fabric Manager, BladeCenter H can help organizations run applications even more efficiently by de-

Specifications

Form factor/height	Rack-mount chassis/9U
Blade bays	Up to 14
Switch modules	Up to 4 traditional, up to 4 high-speed, and up to 4 bridge module baysUp to 4 traditional, up to 4 high-speed, and up to 4 bridge module bays
Power supply module	Up to 4 hot-swap and redundant 2980 W ac high-efficiency power supplies with load-balancing and failovercapabilities. Operating at 200-240 V
Cooling modules	Two hot-swap and redundant blowers standard, additional fan packs on power supplies
Systems-management hardware	Advanced Management Module standard; add an optional Advanced Management Module for redundancy
I/O ports	USB-based keyboard, video, mouse (KVM), Ethernet, USB
Media	Two USB connections and an optional DVD multi-burner
Systems management	Systems management and trial deployment tools
Predictive failure analysis	Internal storage, processors, blowers, memory
Light path diagnostics	Blade server, processor, memory, power supplies, blowers, switch module, management module, internal storage and expansion card
External storage	Support for IBM System Storage solutions (Including DS and NAS family of products) and many widely adopted non-IBM storage offerings
Limited warranty	Three-year customer-replaceable unit and on-site limited warranty

- BladeCenter H chassis details on PartnerWorld

- BladeCenter H chassis details on IBM.com

- BladeCenter H chassis competitive info on COMP

- BladeCenter H configuration details

- BladeCenter H options

- BladeCenter H blog search

- BladeCenter H Twitter search

Figure C.3.   IBM BladeCenter H chassis at a glance (and links to more detail).

livering a flexible, open, and connected infrastructure. IBM continues to build on its reputation for helping customers find innovative IT solutions with BladeCenterH, which delivers even more capabilities to the BladeCenter family. The 9U chassis provides the standard BladeCenter functionalities with the added performance of high-speed I/O and the fastest blades.

Here are some fast BladeCenter H facts:

- Delivers high performance, energy efficiency, and versatility to run the most demanding applications in larger data centers

- Integrates new high-efficiency power supplies for leading energy efficiency

- Provides easy integration to promote innovation and help manage growth, complexity, and risk

- Protects your investment by being compatible with the entire IBM BladeCenter family

- Provides more than 12% greater performance per watt compared to the competition.

BladeCenter T Chassis

Designed to satisfy the rugged demands of the telecom industry, the BladeCenter T is NEBS 3/ETSI-compliant, compact, tough, flexible, and proven to meet the most stringent industry standards and testing (Figure C.4).

BladeCenter T transforms the way telecommunication services and products are created, deployed, operated, and

- [BladeCenter T chassis details on PartnerWorld](#)
- [BladeCenter T chassis details on IBM.com](#)
- [BladeCenter T chassis competitive info on COMP](#)
- [BladeCenter T (8720) configuration details](#)
- [BladeCenter T (8730) configuration details](#)
- [BladeCenter T (8720) options](#)
- [BladeCenter T (8730) options](#)
- [BladeCenter T blog search](#)
- [BladeCenter T Twitter search](#)

Figure C.4. IBM BladeCenter T chassis (and links to more detail).

maintained. It marries the power, agility, innovation, and cost structures of enterprise computing with the ruggedness and reliability demands of the telecom marketplace to launch the new era of on-demand, next-generation communications.

Here are some quick BladeCenter T chassis facts:

- A commercial off-the-shelf platform designed to help lower total cost of ownership and help accelerate new revenue-generation opportunities for telecommunications and service providers

- Innovative, modular design that delivers the reliability, flexibility, and performance density capable of supporting an IP-based, next-generation network application infrastructure integrating voice, data, and multimedia

- Integration of servers, I/O, storage, operating systems, and applications into a single, compact network platform that is ideal for deploying autonomic capabilities, enabling an on-demand operating environment.

BladeCenter HT Chassis

IBM BladeCenter HT (Figure C.5) is a telecommunications-optimized version of IBM BladeCenter H. It delivers outstanding core telecom network performance and high-speed connectivity (more than 1.2 Tbps of aggregate throughput on the backplane) to the BladeCenter family. It is uniquely designed to support end-to-end, next-generation-network (NGN) applications, spanning the control, transport, and service planes for telecommunications equipment manufacturers and service providers.

Here are some quick BladeCenter HT chassis facts:

- With a design that delivers investment protection, IBM BladeCenter HT integrates the server blades, switches, net-

- BladeCenter HT chassis details on PartnerWorld
- BladeCenter HT chassis details on IBM.com
- BladeCenter HT chassis competitive info on COMP
- BladeCenter HT (8740) configurations details
- BladeCenter HT (8750) configuration details
- BladeCenter HT (8740) option
- BladeCenter HT (8750) option
- BladeCenter HT blog search
- BladeCenter HT Twitter search

Figure C.5.   IBM BladeCenter HT chassis (and links to more detail).

working, storage, I/O, and management platforms that are supported across the BladeCenter family

- Network infrastructure costs may be reduced with an open, standards-based, commercial off-the-shelf (COTS) platform

supporting a large portfolio of world-class, next-generation network (NGN) solutions and applications

- Network infrastructure performance is increased with dual-core and quad-core Intel, AMD, and IBM POWER processor blades

- High-speed connectivity and throughput are dramatically increased with multi-terabit networking (more than 1.2 Tbps throughput on backplane) and 40 Gbps per blade server

- Network flexibility and interoperability are improved by bridging new services to control gateways supporting SS7, VoIP, legacy PSTN, WAN devices, and network interfaces with special-purpose telecommunications blades

- Network resources are efficiently consolidated while high scalability for NGN applications such as IPTV, VoD, and IMS are delivered, with higher port concentrations and 10 Gbps Ethernet network bandwidth

- Numerous operating systems and applications are supported, including Linux, Windows, AIX, and Sun Solaris 10—allowing you to choose the ones that best suit your needs in a single platform

- Certified testing by Underwriters Laboratories (UL) of the BladeCenter HT chassis is in progress, and when complete the BladeCenter HT chassis will be covered under a UL-certified NEBS Level 3/ETSI test report, which will be available for customer review

- Management tools integrated into BladeCenter help simplify administration and maximize the efficiency of network management staffs to help lower costs and improve control of the central office or data center (IBM Director)

- Flexibility and choice are increased with a single family of compatible systems, designed for deployment in a telecom central office or data center environment.

Blade Servers

Here we look at the different types of server blades that can be used in BladeCenter, which can be divided into three groups:

- x86 Blades—Intel Xeon and AMD Opteron blades

- POWER blades

- Cell/B.E. blades.

x86 Blades

These blade servers are based on x86 processors by Intel (those with an "HS" prefix) and AMD processors (those with an "LS" prefix).

HS12

The IBM BladeCenter HS12 (Figure H.1) is a uniprocessor blade that offers the same uptime and availability features as dual-processor servers—at a lower price.

Specifications

Processor (max)	Single- or Dual-Core Intel Xeon up to 3.0 GHz or Quad-Core Intel Xeon up to 2.83 GHz and up to 1333 MHz front-side bus
Number of processors (std/max)	1/1
Cache (max)	Up to 6 MB L2 shared (dual-core) or 2x6 MB L2 (quad-core)
Memory (max)	24 GB
Internal hard disk drives	Choice of hot-swap solid-state, hot-swap SAS, or non-hot-swap SATA HDDs (support for up to three hot-swap SAS drives with optional Storage and I/O blade)
Maximum internal storage	293.6 GB
Network interface	Dual Gigabit Ethernet, up to 8 ports optional
I/O upgrade	1 PCI-Express expansion card connection and 1 PCI-Express high-speed connection
RAID support	Integrated RAID-0 or -1 standard on hot-swap models; optional hardware RAID-5 on SIO to protect critical data (select models)
Systems management	Integrated systems-management processor (BMC), UpdateXpress, Remote Deployment Manager, IBM Director, IBM Systems Director Active Energy Manager, ServerGuide 7.x, Scripting Toolkit 1.x
Operating systems	Red Hat Enterprise Linux, SUSE Linux Enterprise, Microsoft Windows Server, Windows Small Business Server, and IBM OS 4690
Limited warranty	1-year or 3-year customer-replaceable unit and on-site limited warranty

- HS12 details on PartnerWorld

- HS12 details on IBM.com

- HS12 competitive info on COMP

- HS12 (8014) configuration details

- HS12 (8028) configuration details

- HS12 (8014) options

- HS12 (8028) options

- HS12 blog search

- HS12 Twitter search
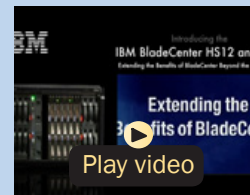
HS12 overview

Figure H.1.   IBM BladeCenter HS12 at a glance (and links to more detail).

The HS12 combines power and easy integration to offer a flexible, low-cost option for small businesses, a wide choice of processors, and the same availability features found on dual-processor servers—so organizations can run their IT without investing in a data center.

Here are some quick HS12 facts:

- Provides similar performance, integration, and reliability as dual-processor servers, at a more affordable price point.

- Deploys quickly and manages tasks with no loss of uptime.

- Helps reduce power and cooling costs to boost data center efficiency.

HS22

The IBM BladeCenter HS22 (Figure H.2) offers flexible options to support a broad range of workloads, including virtualization and enterprise applications. Along with intuitive UEFI-based tools, the HS22 can be customized and deployed quickly while best-in-class reliability features help keep you up and running. Mix and match the HS22 with the industry's most diverse set of chassis and blades and that go beyond x86.

The HS22 provides outstanding performance with support for the latest Intel Xeon processors, high-speed I/O, and support for high memory capacity and fast memory throughput. The HS22 can run applications up to twice as fast compared to previous generation blades. In fact, you can run many applications faster than even competitor four-socket blades.

Specifications

Form factor	Single-wide (30 mm)
Processor (max)	Choice of two Intel Xeon 5600 series processors, up to 3.06 GHz
Number of processors (std/max)	1/2
Memory (max)	Twelve DDR-3 VLP DIMM slots (up to 192 GB of total memory capacity and memory speeds up to 1333 MHz) with memory sparing
Expansion slots	One CIOv slot (standard PCIe daughter card) and one CFFh slot (high-speed PCIe daughter card) for a total of eight ports of I/O to each blade, including 4 ports of high-speed I/O
Disk bays (total/hot-swap)	Two hot-swap bays supporting SAS HDDs or solid-state drives
Maximum internal storage	Up to 1.0 TB total internal storage
Network interface	Virtual Fabric Adapter ships integrated in some models Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE
Hot-swap components	Internal storage bays
RAID support	RAID-0, -1 and -1E (optional RAID-5 with battery-backed cache)
Systems management	Unified Extensible Firmware Interface (UEFI), IBM Integrated Management Module (IMM), Predictive Failure Analysis, optional embedded hypervisor for virtualization, IBM Systems Director Active Energy Manager, light path diagnostics, IBM Systems Director and IBM ServerGuide
Operating systems	Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware, Oracle Solaris

- HS22 details on PartnerWorld
- HS22 details on IBM.com
- HS22 competitive info on COMP
- HS22 configuration details
- GPU Expansion Blade
- HS22 options
- HS22 blog search
- HS22 Twitter search

Figure H.2.   IBM BladeCenter HS22 at a glance (and links to more detail).

The HS22 features an innovative mechanical design optimized for cooling capability to help keep the blade running smoothly even under demanding conditions. Combined with low-voltage components, the industry's most energy-efficient chassis, and robust power management tools, the HS22 helps control power consumption and maximize efficiency.

Select configurations of the HS22 are part of the IBM Express Advantage Portfolio designed to meet the needs of midsized businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick HS22 facts:

- Improve service with unparalleled RAS features and innovative management

- Reduce costs through increased performance, utilization, and efficiency

- Manage growth and reduce risk on a BladeCenter platform with proven stability.

HS22V

The IBM BladeCenter HS22V (Figure H.3) has been designed specifically for use in virtualized environments. With 18 DIMM slots supporting up to 288 GB of DDR3 memory, the HS22V allows you to fit more and larger virtual machines per blade. Durable solid-state drives and hardware RAID-0 and -1 provide outstanding reliability when virtualizing multiple workloads on a single blade. An embedded hypervisor enables easy deployment of industry-leading third-party virtualization solutions. Combine the HS22V with Virtual Fabric for IBM

Specifications

Form factor	Single-wide (30 mm)
Processor (max)	Choice of two Intel Xeon 5500 or 5600 series processors; supports advanced, standard, basic, and low voltage
Number of processors (std/max)	1/2
Cache (max)	At least 4 MB L3 cache (12 MB max)
Memory (max)	18 DDR-3 VLP DIMM slots (up to 288 GB of total memory capacity and memory speeds up to 1333 MHz) with memory sparing
Expansion slots	1 CIOv slot (standard PCIe daughter card) and 1 CFFh slot (high-speed PCIe daughter card) for a total of 8 ports of I/O to each blade, including 4 ports of high-speed I/O or 8 ports of virtual I/O using Virtual Fabric for IBM BladeCenter
Disk bays (total/hot-swap)	Up to two 1.8" solid-state drives (fixed)
Maximum internal storage	Up to 100 GB
Network interface	Virtual Fabric Adapter ships integrated in some models; Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE
RAID support	RAID-0, -1 and -1E (optional RAID-5 with battery-backed cache)
Systems management	Unified Extensible Firmware Interface (UEFI), IBM Integrated Management Module, Predictive Failure Analysis, optional embedded hypervisor for virtualization, IBM Systems Director Active Energy Manager, light path diagnostics, IBM Systems Director and IBM ServerGuide
Operating systems	Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware, Oracle Solaris

- HS22V details on PartnerWorld
- HS22V details on IBM.com
- HS22V competitive info on COMP
- HS22V configuration
- HS22V options
- HS22V blog search
- HS22V Twitter search

IBM BladeCenter Presents:
Very short demos with Ned. (0:25)

Figure H.3.   IBM BladeCenter HS22V at a glance (and links to more detail).

BladeCenter for a flexible, easy, fast, and reliable I/O solution that helps reduce cost and complexity.

The HS22V provides outstanding performance with support for the latest Intel Xeon processors, support for maximum memory capacity, fast memory throughput, and high-speed I/O.

The HS22V offers a flexible, energy-smart design. The HS22V supports up to two 1.8-inch solid-state drives that consume significantly less power than traditional spinning hard disk drives. New enhanced power management capabilities assist in power planning for the data center while IBM Systems Director Active Energy Manager provides tracking, monitoring, and measuring of energy usage.

Here are some quick HS22V facts:

- Outstanding performance for virtualization with maximum memory capacity and CPU performance

- Improve service with unparalleled RAS features and innovative management

- Manage growth and reduce risk on a BladeCenter platform with proven stability.

HX5

Going beyond the industry standards with unique innovations from fifth-generation IBM X-Architecture technology (eX5), the IBM BladeCenter HX5 (Figure H.4) enables unprecedented performance and utilization in a blade form factor for database and virtualization. With MAX5 scalability, the HX5 blade offers memory capacity of up to 640 GB—in a four-wide blade. The result is optimal server utilization with more virtual machines per system and larger and faster databases.

Specifications

Form factor/height	Single-wide (30 mm), quad-wide (120 mm)
Processor (max)	Intel Xeon 7500 and 6500 processors; 4/6/8 cores, up to 2.66 GHz; Up to two processors per single-wide HX5; scalable to four processors and beyond
Number of processors (std/max)	1/2 (scalable to 4)
Cache (max)	Up to 24 MB per processor (8 core)
Memory (max)	16 DDR-3 VLP DIMM slots, capacity up to 128 GB, per single-wide HX5 (scalable up to 640 GB max, at speeds up to 1067 MHz, via 80 DIMM slots, using 2 MAX5 expansion blades)
Expansion slots	One CIOv slot (standard PCIe daughter card) and one CFFh slot (high-speed PCIe daughter card) for a total of eight ports of I/O to each blade, including four ports of high-speed I/O; scalable up to 16 ports of I/O in 4-socket, double-wide form factor
Disk bays (total/hot-swap)	Two non-hot-swap bays supporting solid-state drives per single-wide HX5
Maximum internal storage	Up to 100 GB of solid-state storage per single-wide HX5 (with 50 GB SSDs)
Network interface	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE
RAID support	Optional RAID-0, -1, -1E
Systems management	Integrated systems-management processor
Operating systems	Microsoft Windows, Red Hat Linux, SUSE Linux, VMware
Limited warranty	3-year customer replaceable unit and on-site limited warranty

- HX5 details on PartnerWorld
- HX5 details on IBM.com
- HX5 competitive info on COMP
- HX5 configuration details
- HX5 options
- HX5 blog search
- HX5 Twitter search

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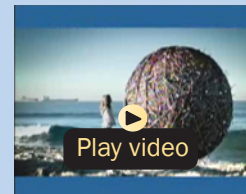
IBM BladeCenter viral video (1:15)

Figure H.4.   IBM BladeCenter HX5 at a glance (and links to more detail).

With MAX5, HX5 offers the most memory of any server in its class. Reduce software license costs by expanding memory capacity with MAX5 without purchasing additional processors. Easy to own, manage, and upgrade with pay-as-you-grow expansion, the HX5 blade server helps protect your investments over the long term. Capabilities such as advanced light path diagnostics, error handling, and around-the-clock remote access management help simplify systems management and minimize downtime. Automatic node failover and QPI faildown help promote greater system uptime. In addition, an energy-smart design and IBM Systems Director Active Energy Manager help lower power consumption and costs.

Flexible configurations make it easy to implement the right system. Get up and running up to four times faster by standardizing on a single platform for two- and four-socket server needs. Harness the MAX5 module to boost memory without adding processors or software license costs. And flexible, no-touch node partitioning from four processors to two lets you optimize licensing and other operational costs.

Here are some quick HX5 facts:

- Provide optimal performance for your demanding virtualization and database applications

- Reduce qualification time by standardizing on the same system for two- and four-socket server needs

- Scale memory without adding CPUs or software licenses

- Get faster time to value by deploying workload-optimized systems.

LS22

The IBM BladeCenter LS22 blade server (<u>Figure L.1</u>) is a two-socket blade server delivering high performance for memory-intensive applications. For even greater performance and value, the IBM BladeCenter LS42 is the ultimate scalable solution for both two- and four-socket workloads.

Select configurations of the LS22 blade are part of the IBM Express Advantage Portfolio, designed and priced to meet the needs of mid-size businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick LS22 facts:

- Run demanding, high-performance workloads fast with the latest AMD Opteron six-core processors

- Control power consumption with an energy-efficient blade using high-efficiency processors, low power memory, optional solid-state drives, and IBM Systems Director Active Energy Manager

- Accelerate memory performance with fast 800 MHz options and a standard memory booster.

LS42

The IBM BladeCenter LS42 blade server (<u>Figure L.2</u>) is an affordable, scalable two-processor blade server that you can easily upgrade to four processors as your business grows. The LS42 blade server features the latest AMD Opteron processors for industry-leading performance.

Specifications

Form factor	30 mm two-socket blade
Processor (max)	Latest six-Core AMD Opteron processor 2000-series, including standard power and high-efficiency models
Number of processors (std/max)	1/2
Cache (max)	Up to 6 MB shared
Memory (max)	Up to 64 GB DDR II VLP (up to 800 MHz)
Internal storage	Up to two SAS or solid-state HDDs installed on each blade (support for up to three hot-swap SAS drives with optional storage and I/O expansion blade)
Maximum internal storage	1.5 TB with optional storage and I/O expansion blade
Network interface	Two integrated Gigabit Ethernet controllers
I/O upgrade	One PCI-X expansion connector and 1 PCI-Express expansion connector
Systems management	Integrated systems-management processor
Max blades per chassis	BladeCenter E 14, BladeCenter H 14, BladeCenter S 6, BladeCenter T 8, BladeCenter HT 12
Operating systems	Microsoft Windows, Linux, VMware, and Sun Solaris
I/O ports (max)	Eight
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- LS22 details on PartnerWorld
- LS22 details on IBM.com
- LS22 competitive info on COMP
- LS22 configuration
- LS22 options
- LS22 blog search
- LS22 Twitter search

Figure L.1.   IBM BladeCenter LS22 at a glance (and links to more detail).

Specifications

Form factor	30 mm two-socket blade or 60 mm four-socket blade
Processor	Latest six-core or quad-core AMD Opteron processor 8000-series, including standard power and high-efficiency models
Number of processors (std/max)	1 or 2/4
Cache (max)	Up to 6 MB shared
Memory (max)	Up to 128 GB DDR II VLP (up to 800 MHz)
Internal storage	Up to two SAS or solid-state HDDs installed on each blade (support for up to three hot-swap SAS drives with optional storage and I/O expansion blade)
Maximum internal storage	1.5 TB with optional storage and I/O expansion blade
Network interface	Two or four integrated Gigabit Ethernet controllers
I/O upgrade	Two PCI-X expansion connectors and 1 PCI-Express expansion connector
Systems management	Integrated systems-management processor
Max blades per chassis	BladeCenter E: 7 or 14; BladeCenter H: 7 or 14; BladeCenter S: 3 or 6; BladeCenter T: 4 or 8; BladeCenter HT: 6 or 12
Operating systems	Microsoft Windows, linux, VMware and Sun Solaris
I/O ports (max)	8 or 12
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- LS42 details on PartnerWorld
- LS42 details on IBM.com
- LS42 competitive info on COMP
- LS42 configuration details
- LS42 options
- LS42 blog search
- LS42 Twitter search

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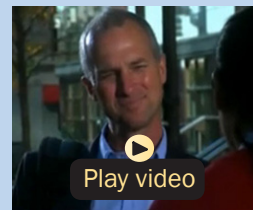
BladeCenter LS42 AMD Blade (2:30)

Figure L.2.   IBM BladeCenter LS42 at a glance (and links to more detail).

Supporting high-memory-capacity 16 DIMM slots and memory speeds up to 800 MHz, the LS42 can help drive your most demanding memory-intensive workloads such as virtualization, databases, and high-performance computing (HPC) applications.

The LS42 blade server offers an energy-efficient design along with low-voltage processors, integrated memory controller, and available solid-state drives to help keep power consumption down and reduce cooling demands in your data center.

When workloads demand more performance, this blade server is ready to scale to four processors with the addition of a multi-processor expansion unit (MPE). Simply snap the MPE to the original blade and it becomes a four-processor, 60 mm blade server with the additional performance you need.

Here are some quick LS42 facts:

- Maximize performance and minimize costs; consolidate workloads and virtualization on an energy-efficient platform that supports up to four AMD Opteron six-core processors or quad-core processors

- Pay as you grow; start with a two-processor blade and upgrade to a four-processor blade when ready without scrapping your initial investment

- Save time and money; standardize on a single platform for both two- and four-processor server application needs.

POWER Blades

These blade servers use the IBM POWER processors and are named using a "JS" prefix.

PS700, PS701, and PS702 Express

The IBM BladeCenter PS700 (Figure J.1), PS701 (Figure J.2), and PS702 (Figure J.3) Express blade servers are built on the proven foundation of the IBM BladeCenter family of products—easy-to-use, integrated platforms with a high degree of deployment flexibility, energy efficiency, scalability, and manageability. They minimize complexity, improve efficiency, automate processes, reduce energy consumption, and scale easily: these are the benchmarks that matter on a smarter planet. They are the premier blades for 64-bit applications.

The POWER7 processor-based PS blades automatically optimize performance and capacity at either a system or virtual machine level and benefit from the new POWER7 processor, which contains innovative technologies that help maximize performance and optimize energy efficiency. They represent one of the most flexible and cost-efficient solutions for UNIX, i, and Linux deployments available on the market. Further enhanced by its ability to be installed in the same chassis with other IBM BladeCenter blade servers, the PS blades can deliver the rapid return on investment that clients and businesses demand.

Delivering on the promise for a highly dynamic infrastructure, the BladeCenter PS blades help in delivering superior business and IT services with agility and speed—all in a simple to manage highly efficient way. The PS700, PS701, and

PS702 PS700 PS701

Specifications

Form factor	Single-wide blade server for BladeCenter E, BladeCenter T, BladeCenter S, BladeCenter H, or BladeCenter HT chassis
Processor cores	Four 64-bit 3.0 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration
Level 2 (L2) cache	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core
Memory (std/max)	Base offering: 8 GB (2 x 4 GB); Express offering: 16 GB (4 x 4 GB), up to 64 GB maximum per blade, eight DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz (4 GB DIMMs) 800 MHz (8 GB DIMMs)
Internal disk storage	Two 300 or 600 GB 2.5" Serial Attached SCSI (SAS) 10K rpm non-hot-swappable disk drive; No disk drive required on base offering.
Networking	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual-gigabit Ethernet
I/O upgrade	One PCI-E CIOv Expansion Card & one PCI-E CFFh High Speed Expansion Card
Optional connectivity	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
PowerVM	PowerVM Express Edition: Includes Virtual I/O Server (VIOS) with Integrated Virtualization Manager and PowerVM Lx86; PowerVM Standard Edition: Adds shared processor pools and micropartitioning; PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
Systems management	Integrated systems management processor, IBM Systems Director Active Energy Manager, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI compliant
Operating systems	AIX V5.3 or later, AIX V6.1 or later, IBM i 6.1 or later, SUSE Linux Enterprise Server 10 for POWER (SLES10 SP3) or later, SLES11 SP1 or later, Red Hat Enterprise Linux 5.5 for POWER (RHEL5.5) or later, RHEL5.1 or later
High availability	IBM PowerHA family

- PS700 Express details on PartnerWorld
- PS700 Express details on IBM.com
- PS700 Express competitive info on COMP
- PS700 blog search
- PS700 Twitter search

▶ Play video
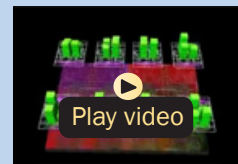
POWER7 Chip animation

Figure J.1.   IBM BladeCenter PS700 Express at a glance (and links to more detail).

Specifications

Form factor	Single-wide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
Processor cores	Eight 64-bit 3.0 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration
Level 2 (L2) cache	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core
Memory (std/max)	Base offering: 16 GB (4 x 4 GB); Express offering: 32 GB (4 x 8 GB), up to 128 GB maximum per blade, sixteen DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz (4 GB DIMMs) 800 MHz (8 GB DIMMs)
Internal disk storage	One 300 or 600 GB 2.5" Serial Attached SCSI (SAS) 10K rpm non-hot-swappable disk drive; No disk drive required on base offering.
Networking	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual-gigabit Ethernet
I/O upgrade	One PCI-E CIOv Expansion Card and one PCI-E CFFh High Speed Expansion Card
Optional connectivity	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
PowerVM	PowerVM Express Edition: Includes Virtual I/O Server (VIOS) with Integrated Virtualization Manager and PowerVM Lx86; PowerVM Standard Edition: Adds shared processor pools and micropartitioning; PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
Systems management	Integrated systems management processor, IBM Systems Director Active Energy Manager, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI compliant
Operating systems	AIX V5.3 or later, AIX V6.1 or later; IBM i 6.1 or later SUSE Linux Enterprise Server 10 for POWER (SLES10 SP3) or later; SLES11 SP1 or later; Red Hat Enterprise Linux 5.5 for POWER (RHEL5.5) or later; RHEL6.1 or later
High availability	IBM PowerHA family

- PS701 Express details on PartnerWorld
- PS701 Express details on IBM.com
- PS701 Express competitive info on COMP
- PS701 blog search
- PS701 Twitter search

✓ Minimize complexity
✓ Improve efficiency
✓ Scale easily

Play video

POWER7 Innovation

Figure J.2.   IBM BladeCenter PS701 Express at a glance (and links to more detail).

PS702 Specifications

Form factor	Double-wide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
Processor cores	Sixteen 64-bit 3.0 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration
Level 2 (L2) cache	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core
Memory (std/max)	Base offering: 32 GB (8 x 4 GB); Express offering: 64 GB (16 x 4 GB), up to 128 GB maximum per blade, sixteen DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz (4 GB DIMMs) 800 MHz (8 GB DIMMs)
Internal disk storage	Two 300 or 600 GB 2.5" Serial Attached SCSI (SAS) 10 K rpm non-hot-swappable disk drive; No disk drive required on base offering.
Networking	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual-gigabit Ethernet
I/O upgrade	Two PCI-E CIOv Expansion Card & two PCI-E CFFh High Speed Expansion Card
Optional connectivity	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
PowerVM	PowerVM Express Edition: Includes Virtual I/O Server (VIOS) with Integrated Virtualization Manager and PowerVM Lx86; PowerVM Standard Edition: Adds shared processor pools and micropartitioning; PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
Systems management	Integrated systems management processor, IBM Systems Director Active Energy Manager, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI compliant
Operating systems	AIX V5.3 or later, AIX V6.1 or later, IBM i 6.1 or later, SUSE Linux Enterprise Server 10 for POWER (SLES10 SP3) or later, SLES11 SP1 or later, Red Hat Enterprise Linux 5.5 for POWER (RHEL5.5) or later, RHEL5.1 or later
High availability	IBM PowerHA family

- PS702 Express details on PartnerWorld
- PS702 Express details on IBM.com
- PS702 Express competitive info on COMP
- PS702 blog search
- PS702 Twitter search

Play video

POWER7 overview (German)

Figure J.3. IBM BladeCenter PS702 Express at a glance (and links to more detail).

PS702 Express blades have been preconfigured and tested by IBM and are based on proven technology. Utilizing a 3.0 GHz 64-bit POWER7 processor and available in a four-core, eight-core, or sixteen-core configuration, they are optimized to achieve maximum performance for both the system and its virtual machines. Couple that performance with PowerVM and you are now enabled for massive workload consolidation to drive maximum system utilization, predictable performance, and cost efficiency.Here are some quick PS700/701/702 facts:

- Consolidate on IBM BladeCenter Power Blades and virtualize applications to better utilize resources and amplify the already-significant advantages of BladeCenter efficiencies

- Simplifies your deployment with flexible configurations that make it easy to implement the right system and the ability to run AIX, IBM i, and Linux operating systems simultaneously

- Elegantly simple scalability, allows easy expansion and pay-as-you-grow flexibility for the utmost in investment protection, performance growth, and time to value

- A secure, resilient infrastructure solution that helps drive down costs, reduce risk, improve energy efficiency, and enhance flexibility

JS12 Express

The IBM BladeCenter JS12 Express blade server (Figure J.4) is the perfect alternative to a traditional AIX, IBM i, or Linux rack-mount or tower server. The JS12 Express blade server, combined with a BladeCenter S chassis, provides exceptional

Specifications

Form factor	Single-wide blade server for BladeCenter E, BladeCenter S, BladeCenter H, BladeCenter HT, or BladeCenter T chassis
Processor cores	Two 64-bit 3.8 GHz POWER6 with AltiVec SIMD and hardware decimal floating-point acceleration
Level 2 (L2) cache	4 MB per processor core; 4-way set associative
Memory (std/max)	xBase/Express offering: 4 GB (2 x 2 GB); up to 64 GB maximum per blade, 8 DIMM slots, ECC Chipkill DDR2 SDRAM running at 667 MHz (2, 4 GB DIMMs) 400 MHz (8 GB DIMMs)
Internal disk storage	Zero to two 73, 146, 300, or 600 GB 2.5" serial attached SCSI (SAS) 10 K rpm disk drives; integrated RAID-0 or -1 standard on blade server with support for disk mirroring
Networking	Integrated Virtual Ethernet adapter (IVE) dual gigabit and support for optional dual gigabit Ethernet daughter card
I/O upgrade	Integrated PCI Express connector for high-speed expansion cards, integrated connector for legacy expansion cards
Optional connectivity	1 Gbps Ethernet Expansion Card, 4 Gbps Fibre Channel, 4X InfiniBand, iSCSI Expansion Card, SAS Expansion Card
PowerVM Standard Edition	Virtual LAN, POWER Hypervisor, Micro-Partitioning, Virtual I/O (built-in) Server with Integrated Virtualization Manager, shared dedicated capacity, shared processor pool, PowerVM Lx86
PowerVM Enterprise Edition (optional)	All the features of PowerVM Standard Edition plus Live Partition Mobility and Active Memory Sharing
Operating systems	AIX V5.3 or later; IBM i V6.1 or later; SUSE Linux Enterprise Server 10 for POWER (SLES10 SP2) or later; Red Hat Enterprise Linux 4.6 for POWER (RHEL4.6) or later; RHEL5.1 or later
High availability	IBM PowerHA family

- JS12 Express details on PartnerWorld
- JS12 Express details on IBM.com
- JS12 Express competitive info on COMP
- JS12 blog search
- JS12 Twitter search

JS12 overview

Figure J.4.   IBM BladeCenter JS12 Express at a glance (and links to more detail).

value and expandability in an attractively packaged and highly efficient design. And, specifically for an office environment, this combination can reside in your office quietly, securely, and looking like it belongs with an acoustic treatment for quiet operation, a set of security doors to protect vital data and servers, and optional dust filtering to expand IT into virtually any environment. For small database and application serving, the BladeCenter JS12 Express blade server delivers great performance, expandability, and capacity to satisfy the needs of clients looking for an easy-to-use, integrated platform with a high degree of deployment flexibility, scalability, and manageability.

Here are some quick JS12 facts:

- For replacing traditional UNIX, IBM i (formerly known as i5/OS), and Linux servers

- For small database and application serving

- For a complete business system with an integrated database and application server.

JS22 Express

The BladeCenter JS22 Express (<u>Figure J.5</u>) is a premier SMB (small and mid-size business) blade for 64-bit applications. It represents one of the most cost-efficient solutions for UNIX, IBM i, and Linux deployments available on the market. Further enhanced by its ability to be installed in the same chassis with other BladeCenter LS, HS, and JS blade servers, the JS22 Express can deliver the rapid return on investment that small businesses demand.

Specifications

Form factor	Single-wide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
Processor cores	Four 64-bit 4.0 GHz POWER6 with AltiVec SIMD and hardware decimal floating-point acceleration
Level 2 (L2) cache	4 MB per processor core; 4-way set associative
Memory (std/max)	Base/Express offering: 4 GB (2 x 2 GB), up to 32 GB maximum per blade, four DIMM slots, ECC Chipkill DDR2 SDRAM running at 667 MHz (1, 2, 4 GB DIMMs) 533 MHz (8 GB DIMMs)
Internal disk storage	One 73, 146 or 300 GB 2.5" Serial Attached SCSI (SAS) 10 K rpm non-hot-swappable disk drive standard on Express offering; No disk drive required on base offering
Network interface	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual gigabit Ethernet daughter card
I/O upgrade	Integrated PCI Express connector for high-speed daughter cards, integrated connector for legacy daughter cards
Optional connectivity	1 Gbps Ethernet Expansion Card, 4 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion Card
PowerVM Standard Edition (built-in)	Virtual LAN, POWER Hypervisor, micro-partitioning, virtual I/O server with integrated virtualization manager, shared dedicated capacity, PowerVM Lx86 (formerly known as System p Application Virtual Environment)
PowerVM Enterprise Edition (optional)	All the features of PowerVM Standard Edition plus Live Partition Mobility and Active Memory Sharing
Systems management	Integrated systems management processor, IBM Systems Director Active Energy Manager, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI-compliant

- JS22 Express details on PartnerWorld
- JS22 Express details on IBM.com
- JS22 Express competitive info on COMP
- JS22 Express blog search
- JS22 Express Twitter search

Play video

Winn-Dixie—IBM Power Systems Client (4:58)

Figure J.5.   IBM BladeCenter JS22 Express at a glance (and links to more detail).

The JS22 Express blade has been preconfigured and tested by IBM and is based on proven technology. Utilizing a 4.0 GHz 64-bit POWER6 processor core and available in a four-core configuration, it is designed to deliver outstanding performance at compelling prices.

Here are some quick JS22 facts:

- For consolidating UNIX, IBM i, or Linux servers into a centralized BladeCenter infrastructure

- For business-performance applications like smaller database, OLTP, and business intelligence

- For HPC workloads such as weather forecasting, seismic processing, molecular dynamics, and computational fluid dynamics.

JS23 and JS43 Express

Built on the promise of the IBM BladeCenter family of products—easy-to-use, integrated platforms with a high degree of deployment flexibility, energy efficiency, scalability, and manageability—the BladeCenter JS23 and JS43 Express are the premier blades for 64-bit applications (Figures J.6 and J.7). They represent one of the most flexible and cost-efficient solutions for UNIX, i, and Linux deployments available on the market. Further enhanced by its ability to be installed in the same chassis with other IBM BladeCenter blade servers, the JS23 and JS43 can deliver the rapid return on investment that clients and businesses demand. Delivering on the promise of a truly Dynamic Infrastructure, the BladeCenter JS23 and JS43 help in delivering superior business and IT services

Specifications

Form factor	Single-wide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
Processor cores	Four 64-bit 4.2 GHz POWER6 with AltiVec SIMD and hardware decimal floating-point acceleration
Level 2 (L2) cache	4 MB per processor core; 4-way set associative
Level 3 (L3) cache	32 MB per processor socket
Memory (std/max)	Base offering: 4 GB (2 x 2 GB); Express offering:4 GB (2 x 2 GB), up to 64 GB maximum per blade, eight DIMM slots, ECC IBM Chipkill DDR2 SDRAM running at 667 MHz (2 and 4 GB DIMMs) 400 MHz (8 GB DIMMs)
Internal disk storage	One 73, 146, or 300 GB 2.5" Serial Attached SCSI (SAS) 10 K rpm non-hot-swappable disk drive or 69 GB solid state disk; no disk drive required on base offering
Networking	Integrated Virtual Ethernet adapter (IVE) dual gigabit and support for optional dual gigabit Ethernet daughter card expansion card
Optional connectivity	1 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
PowerVM Standard Edition (built-in)	Virtual LAN, POWER Hypervisor, Micro-Partitioning, Virtual I/O Server with Integrated Virtualization Manager, shared dedicated capacity, PowerVM Lx86
PowerVM Enterprise Edition (optional)	All the features of PowerVM Standard Edition plus Live Partition Mobility and Active Memory Sharing
Operating systems	AIX V5.3 or later, AIX V6.1 or later, IBM i 6.1 or later, SUSE Linux Enterprise Server 10 for POWER (SLES10 SP2) or later; Red Hat Enterprise Linux 4.6 for POWER (RHEL4.6) or later; RHEL5.1 or later
High availability	IBM PowerHA family

- JS23 info on PartnerWorld
- JS23/JS43 info on IBM.com
- JS23 competitive info on COMP
- JS23 blog search
- JS23 Twitter search

Figure J.6.   IBM System JS23 at a glance (and links to more detail).

Specifications

Form factor	Double-wide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
Processor cores	Eight 64-bit 4.2 GHz POWER6 with AltiVec SIMD and hardware decimal floating-point acceleration
Level 2 (L2) cache	4 MB per processor core; 4-way set associative
Level 3 (L3) cache	32 MB per processor socket
Memory (std/max)	Base offering: 8 GB (2 x 4 GB); Express offering: 8 GB (2 x 4 GB), up to 128 GB maximum per blade, 16 DIMM slots, ECC Chipkill DDR2 SDRAM running at 667 MHz (2 and 4 GB DIMMs), 400 MHz (8 GB DIMMs)
Internal disk storage	One or two 73, 146, 300, or 600 GB 2.5" Serial Attached SCSI (SAS) 10 K rpm non-hot-swappable disk drive or 69 GB solid state disk; no disk drive required on base offering
Networking	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual gigabit Ethernet daughter card
PowerVM Standard Edition (built-in)	Virtual LAN, POWER Hypervisor, micro-partitioning, virtual I/O server with integrated virtualization manager, shared dedicated capacity, PowerVM Lx86
PowerVM Enterprise Edition (optional)	All the features of PowerVM Standard Edition plus live partition mobility and active memory sharing
Operating systems	AIX V5.3 or later, AIX V6.1 or later IBM i 6.1 or later, SUSE Linux Enterprise Server 10 for POWER (SLES10 SP2) or later; Red Hat Enterprise Linux 4.6 for POWER (RHEL4.6) or later; RHEL5.1 or later
High availability	IBM PowerHA family

- JS43 info on PartnerWorld

- JS23/JS43 info on IBM.com

- JS43 competitive info on COMP

- JS43 blog search

- JS43 Twitter search

Figure J.7.   IBM System JS43 at a glance (and links to more detail).

with agility and speed—all in a simple-to-manage, highly ef-
ficient way.

Here are some quick JS23 and JS43 facts:

- Ideal for infrastructure consolidation, virtualization, and de-
manding applications that require scalable performance and
high memory capacity

- IBM POWER6 processor technology and the ability to run AIX,
IBM i, and Linux operating systems simultaneously

- Elegantly simple scalability, allowing easy expansion and pay-
as-you-grow flexibility for the utmost in investment protection
and performance growth

- A secure, resilient, and dynamic infrastructure solution that
helps drive down costs, reduce risk, improve energy effi-
ciency, and enhance flexibility.

Cell/B.E. Blades

For many years, organizations have relied on performance
gains from increasing clock speeds of "traditional" micropro-
cessor architectures. However, in recent years this approach
has been challenged by the physical limitations of semicon-
ductors and by traditional processor architecture implemen-
tations. Issues with power consumption, heat dissipation,
and memory latencies have led to diminishing returns on
performance. High-performance computing (HPC) cluster
applications such as digital content creation, digital video
surveillance, electronic design automation, image and signal
processing, financial algorithms, scientific research, and seis-

mic processing may need a fundamentally new technology and approach to the system-level architecture to achieve the desired level of performance.

In this section we examine blade servers based on the Cell/B.E. processor designed to meet these needs by complementing systems based on traditional processors to accelerate parallel processing and streaming applications.

QS22

The IBM BladeCenter QS22 (Figure Q.1) is based on the innovative multi-core IBM PowerXCell 8i processor, a new-generation processor based on the Cell Broadband Engine (Cell/B.E.) Architecture. Offering extraordinary double-precision floating-point processing power, the QS22 can yield application results faster and with more fidelity. This can enable organizations to get information faster to facilitate important business decisions.

Part of the BladeCenter family of products, the QS22 is a high-performance blade that extends and deepens the IBM HPC solution portfolio by providing a new level of parallelism and performance to targeted workloads. The PowerXCell 8i multi-core processor architecture helps the QS22 accelerate key algorithms such as 3D rendering, compression, and encryption and enables companies to create and run highly visual, immersive, real-time applications. This performance offers significant potential benefit for even the most demanding applications used in aerospace and defense, health care, life sciences, petroleum exploration, financial markets, digital media, electronics, government, education, and other industries.

Specifications

Form factor	Single-wide blade server for BladeCenter
BladeCenter compatibility	BladeCenter H, HT, and S
Processors	3.2 GHz IBM PowerXCell 8i Processors
Number of processors	Two standard, each with one PPE core and eight enhanced double precision (eDP) SPE cores
L2 cache	512 KB per IBM PowerXCell 8i Processor, plus 256 KB of local store memory for each eDP SPE
Memory	Up to 32 GB (16 GB per processor)
Internal disk storage	Optional 8 GB flash drive
Optional external storage	BladeCenter boot disk system (1726-22B)
Networking	Dual Gigabit Ethernet
I/O upgrade	Serial attached SCSI (SAS) daughter card connected via PCI-X (CFFv) BladeCenter PCIe expansion unit (43W4391)
Optional connectivity	Dual-port DDR InfiniBand 4x HCA connected via PCI-Express (43W4423)
Operating systems	Red Hat Enterprise Linux
Warranty	3-year

- QS22 details on PartnerWorld
- QS22 details on IBM.com
- QS22 competitive info on COMP
- QS22 blog search
- QS22 Twitter search

Play video
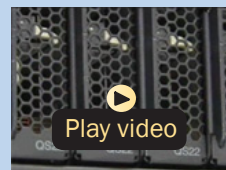
QS22 commercial supercomputing (1:45)

Figure Q.1.   IBM BladeCenter QS22 at a glance (and links to more detail).

Here are some quick QS22 facts:

- Third-generation blade system based on an enhanced version of the Cell Broadband Engine Architecture

- IBM PowerXCell 8i processor, offering five times the double-precision performance of the previous Cell/B.E. processor

- High-performance blade solution for selected workloads

- Significant performance acceleration of target workloads such as rendering and medical imaging

- Up to 32 GB of processor memory.

BladeCenter Open Fabric (I/O)

In this section, we examine some options collectively called the BladeCenter Open Fabric. This is a portfolio of integrated server I/O that offers an open, high-performance, and com-prehensive set of interconnects and smart-management tools to help run your

MORE ON THE WEB

- BladeCenter Open Fabric info on IBM.com

business. Integrated across all blades, switches, and chassis, BladeCenter Open Fabric supports open standards and in-dustry interoperability across five I/O fabrics, including Fibre Channel, InfiniBand, Ethernet, iSCSI, and serial attached SCSI (SAS), helping to simplify blade I/O management and deployment so you can concentrate on realizing innovation in your business.
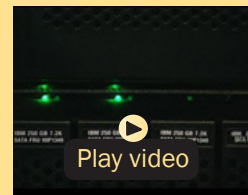
BladeCenter Open Fabric Manager

IBM BladeCenter Open Fabric Manager is designed to help you manage growth and complexity by making it easy to manage I/O and network interconnects for up to 100 BladeCenter chassis—up to 1,400 blade servers. BladeCenter Open Fabric Manager helps make blade deployment EASY: Once installed, the utility is resident in the Advanced Management Module (AMM) so you can preconfigure LAN and SAN connections. Thus, I/O connections are made automatically when you plug in a blade. And no special tools or training are required; just manage with the easy-to-use GUI. Clients can also purchase the optional Advanced version which enables automatic failover to a predefined spare blade pool, thereby maintaining a high-availability environment for mission-critical applications.

In contrast to typical competitive tools that support only a small number of proprietary blades and switches, BladeCenter Open Fabric Manager is OPEN and allows you to manage a wide range of industry Ethernet and Fibre Channel switches—Cisco, Nortel, Brocade, QLogic.

MORE ON THE WEB

- BladeCenter Open Fabric Manager info on IBM
- BladeCenter Open Fabric Manager competitive info on COMP
- BladeCenter Open Fabric Manager blog search
- BladeCenter Open Fabric Manager Twitter search
- BladeCenter Open Fabric Manager on YouTube (multiple videos)

Play video

IBM BladeCenter Open Fabric Manager (Alex Yost) (4:50)

BladeCenter Open Fabric Manager is the right choice now and into the future. The software can even be deployed on existing hardware through a firmware upgrade, helping you protect your current BladeCenter investments and giving you the flexibility to deploy precisely the solution you need to help your business realize innovation.

Virtual Fabric

The next-generation IBM BladeCenter servers offer balanced processing and memory capabilities. This enables more virtual machines per server, but I/O can quickly become a bottleneck. Three key issues that often surface from an I/O perspective include:

1. The need for more than two ports per server. Six to eight are often needed for virtualized environments, but this leaves no room for future expandability.

2. The need for more than 1 Gb, yet today most clients do not need full 10 Gb bandwidth per port.

3. Clients are planning and preparing for network convergence as they deploy new technologies.

IBM BladeCenter Virtual Fabric helps address these issues and can also extend its value to nonvirtualized environments. This solution, designed in partnership with BLADE Network Technologies and Emulex, can significantly reduce complexity and TCO by reducing switch costs up to 75 percent, reducing cable and adapter costs up to 50 percent, and achieving better energy efficiency. At the same time, it provides clients

the ability to allocate and adjust bandwidth based on actual requirements, while maintaining investment protection for the future with 10 Gb or converged Ethernet infrastructures.

Here are some overall virtual fabric highlights to keep in mind as you explore the specific product offerings covered next:

- Provides the ability to reduce hardware costs 50–75 percent

- Reduces complexity of your virtualized environment

- Provides the ability to tailor bandwidth as required

- Offers investment protection for the future (CEE) and shared I/O.

Now let's look at some specific virtual fabric offerings for IBM BladeCenter.

BNT Virtual Fabric 10 Gb Switch Module

The BNT Virtual Fabric 10 Gb Switch Module for IBM BladeCenter offers the most bandwidth of any blade switch and represents the perfect migration platform for clients who are still at 1 Gb outside the chassis by seamlessly integrating in the existing 1 Gb infrastructure. This is the first 10 Gb switch for IBM BladeCenter that is convergence ready—

MORE ON THE WEB

- BNT Virtual Fabric 10 Gb Switch Module Redbook info
- BNT Virtual Fabric 10 Gb Switch Module info on PartnerWorld
- Virtual fabric info on IBM.com
- Ready to buy

able to transmit Converged Enhanced Ethernet (CEE) to a Fibre Channel over Ethernet (FCoE) capable top-of-rack switch. This feature will be available through a future firmware upgrade at no additional cost.

This offering will also work with BladeCenter Open Fabric Manager, providing all the benefits of I/O Virtualization at 10 Gb speeds.

Here are some quick BNT Virtual Fabric 10 Gb Switch Module facts:

- Single-wide high-speed switch module

- Fourteen internal auto-negotiating ports: 1 Gb or 10 Gb to the server blades

- Two internal full-duplex 100 Mbps ports connected to the management module

- Up to ten 10 Gb SFP+ ports (also designed to support 1 Gb SFP if required, flexibility of mixing 1 Gb/10 Gb)

- One 10/100/1000 Mb copper RJ-45 used for management or data

- Supports IBM Virtual Fabric for IBM BladeCenter.

Emulex Virtual Fabric Adapter

This solution enables clients to get up to eight virtual ports that can be tailored to meet the bandwidth requirements of the application. The key components for this offering include the two-port 10 Gb Virtual Fabric Adapter by Emulex and the Virtual Fabric 10 Gb Switch Module from BNT.

This solution makes use of Converged Enhanced Ethernet (CEE) and can significantly help reduce complex-

MORE ON THE WEB

- Emulex Virtual Fabric Adapter Redbook info
- Emulex Virtual Fabric Adapter info on PartnerWorld
- Virtual fabric info on IBM.com
- Ready to buy

ity and cost in virtualized environments by reducing switch costs up to 75 percent, reducing cable and adapter costs up to 50 percent, and achieving better energy efficiency. At the same time, the virtual fabric solution gives clients the opportunity to allocate and adjust bandwidth based on actual requirements and have investment protection for next-generation technology like I/O convergence.

QLogic Virtual Fabric Extension Module

IBM was among the first to deliver Fibre Channel over Ethernet across System x and BladeCenter, and this new module takes this a step further by offering clients I/O convergence inside the chassis. Clients using the BNT 10-port 10

MORE ON THE WEB

- QLogic Virtual Fabric Extension Module Redbook info
- QLogic Virtual Fabric Extension Module info on PartnerWorld
- Virtual fabric info on IBM.com
- Ready to buy

Gb Ethernet Switch Module for their LAN traffic can now combine it with this module and a Converged Network Adapter such as the QLogic 2-port 10 Gb CNA to converge their LAN and SAN on a single network.

Ethernet Switch Modules

Here we look at the switch modules that allow BladeCenter to participate in an Ethernet network.

10 Gb Ethernet Pass-Thru Module

The 10 Gb Ethernet Pass-Thru Module for IBM BladeCenter is ideal for clients looking to enable end-to-end nonblocking 10 Gb setup within the chassis. This device supports both Ethernet and Converged Enhanced Ethernet (CEE) packets, which allows clients to connect a BladeCenter Chassis to an FCoE-capable top-of-rack switch.

> **MORE ON THE WEB**
>
> • 10 Gb Ethernet Pass-Thru Module Redbook
>
> • 10 Gb Ethernet Pass-Thru Module info on PartnerWorld
>
> • Ethernet I/O info on IBM.com

The fourteen 10 Gb Uplink ports are based on optical SFP+ technology to offer the highest performance while maintaining industry-standard connectivity. This offering will also work with BladeCenter Open Fabric Manager, providing all the benefits of I/O Virtualization at 10 Gb speeds.

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

• Single-wide high-speed switch module

• Fourteen internal 10 Gb ports to the server blades (no auto-negotiation)

• Up to fourteen 10 Gb SFP+ uplink ports (SFP+ modules not included)

- Support for SR, LR, and DAC copper cables

- Direct one-to-one mappings of external and internal ports (no configuration required).

BNT Layer 2/3 Copper and Fiber Gigabit Ethernet Switch Module

The BNT Layer 2/3 Switch offers all the switching features in a BladeCenter chassis at a competitive price. This switch is offered in two versions: Copper and Fiber. These versions provide reliability and flexibility and meet all the stringent requirements of both enterprise and telecom environments.

Here are some quick BNT Layer 2/3 Copper and Fiber Gigabit Ethernet Switch Module facts:

- Fourteen internal full-duplex Gigabit ports

- Two internal full-duplex 10/100 Mbps ports

- Copper switch: Six 1000BASE-T copper RJ-45 connections

- Fiber switch: Six 1000BASE-SX SFP transceiver-based LC fiber connections

- Autosensing 10/1000/1000 Mbps external Ethernet ports for bandwidth optimization

- Nonblocking architecture with wire-speed forwarding of traffic.

MORE ON THE WEB

- BNT Layer 2/3 Copper/Fiber Gigabit Ethernet Switch Module Redbook info
- BNT Layer 2/3 Copper/Fiber Gigabit Ethernet Switch Module info on PartnerWorld
- Ethernet I/O info on IBM.com

BNT Layer 2-7 Gigabit Ethernet Switch Module

BLADE Network Technologies (BNT) offers a Layer 2-7 Gigabit Ethernet Switch Module, which enables you to consolidate full Layer 2-7 LAN switching capabilities into IBM BladeCenter. Consolidation flattens the topology of the data center infrastructure and reduces the number of discrete devices, management consoles, and manufacturers that you have to deal with. And the L2-7 Switch Module includes advanced security, high availability, and performance features, further reducing the need for discrete function-specific appliances. The result is dramatic simplification of the data center infrastructure, which translates into faster performance, higher availability, greater scalability, stronger security, simplified management, and lower TCO.

Here are some quick BNT Layer 2-7 facts:

- Improved application availability and boosted application performance

- Increased application and server scalability

- Enhanced application and server security

- Simplified server deployment and management

- Reduced data center total cost of ownership (TCO).

MORE ON THE WEBV

- BNT Layer 2-7 Gigabit Ethernet Switch Module info on PartnerWorld
- Ethernet I/O info on IBM.com

Cisco Catalyst Switch Module 3012

The Cisco Catalyst Switch Module 3012 for IBM BladeCenter represents the next-generation networking solution for blade server environments. Built on the market-leading Cisco hardware

MORE ON THE WEB
• Cisco Catalyst Switch Module 3012 info on PartnerWorld
• Cisco Catalyst Switch Module 3012 info on IBM.com
• Ethernet I/O info on IBM.com

and Cisco IOS Software, the Cisco Catalyst Switch Module 3012 is engineered with unique technologies specifically designed to meet the rigors of blade server-based application infrastructure for the small or mid-size enterprise.

Here are some quick 3012 facts:

- Cisco Catalyst Switch Module 3012 provides four external 1 Gb ports and 14 internal 1 Gb ports

- Operates in a standard I/O module bay across all chassis types

- Cisco Catalyst Switch Module 3012 is fully compatible with Open Fabric Manager—enabled for I/O virtualization with no changes required in switch module during installation or after blade replacement or failover

- Layer 2 and basic Layer 3 switching (static routing and RIP) is supported

- Cisco Catalyst Switch Module 3012 offers common management with external Cisco switches via IOS Command Line Interface and CiscoWorks LAN Management Solution.

Cisco Catalyst Switch Modules 3110G and 3110X

The Cisco Catalyst Switch Modules 3110G and 3110X represent the next-generation networking solution for blade server environments. Built on the market-leading Cisco hardware and Cisco IOS Software, the Cisco Catalyst Switch Module 3110 is engineered with unique technologies specifically designed to meet the rigors of blade server-based application infrastructure. Specifically, the switch is designed to deliver scaleable, high-performance, highly resilient connectivity while supporting ongoing IT initiatives to reduce server infrastructure complexity and total cost of ownership (TCO).

Here are some quick 3110G and 3110X facts:

- Cisco Catalyst Switch Module 3110G provides four external 1 Gb ports and 14 internal 1 Gb ports

- Cisco Catalyst Switch Module 3110X provides one external 10 Gb uplink port and 14 internal 1 Gb ports

- Both are perfect for large enterprises where Cisco's VBS technology enables rack-level link consolidation and switch management

MORE ON THE WEB

- Cisco Catalyst Switch Modules 3110G/3110X info on PartnerWorld
- Cisco Catalyst Switch Module 3110G info on IBM.com
- Cisco Catalyst Switch Module 3110X info on IBM.com
- Ethernet I/O info on IBM.com

- Both are fully compatible with Open Fabric Manager—enabled for I/O virtualization with no changes required in switch module during installation or after server blade replacement or failover

- The base switch supports Layer 2 and basic Layer 3 switching; IP Services S/W upgrade enables OSPF and BGP routing; Advanced I/P Services S/W upgrade enables IPv6n

- Cisco Catalyst Switch Module 3110G and Module 3110X operate in standard I/O module bay across BladeCenter E, H, T, and HT chassis types

- Separately available are two optional S/W keys for the Cisco Catalyst 3110 switch modules.

Intelligent Copper Pass-Thru Module

The Intelligent Copper Pass-Thru Module (ICPM) is designed for those IT organizations that wish to deploy their IBM BladeCenter servers directly into their existing networking infrastructure and that require line rate performance. The ICPM provides many additional

> **MORE ON THE WEB**
> - Copper Pass-Thru info on PartnerWorld
> - Copper Pass-Thru info on IBM.com
> - Ethernet I/O info on IBM.com

functions not available on the older IBM Copper Pass-Thru Module (CPM) and is supported in all BladeCenter chassis and the Multi-Switch Interconnect Module (MSIM). The ICPM is designed to exploit management capabilities of the management modules or advanced management modules (MM/AMM).

The moment a cable is plugged into the uplink ports of the ICPM and the upstream switch, the ICPM automatically negotiates the best connection to the upstream switch with no further action required. Unlike the older IBM CPM, which used fan-out cables that were limited 3-meter lengths, the ICPM is designed to use standard Ethernet cables with lengths up to 100 meters to connect to upstream networking equipment. And instead of using three fan-out cables, the ICPM's uplink ports use 14 separate Ethernet cables, which reduces the impact of any single cable failure.

Here are some quick Intelligent Copper Pass-Thru Module facts:

- Ideal for clients whose applications require 100 percent line rate performance

- Easy to install and does not require any networking knowledge

- Compatible with Serial over LAN (SoL) and secure Concurrent KVM

- Fully compatible with BladeCenter Open Fabric Manager.

BNT 1/10 Gb Uplink Ethernet Switch Module

The BladeCenter Network Technology (BNT) 1/10 Gb Uplink Ethernet Switch Module for IBM BladeCenter is an innovative switch designed to meet the growing bandwidth needs of our clients. Today, while our clients look to implement solutions to meet their current 1 Gb requirements, they also need a way to migrate easily to 10 Gb. This switch provides investment

protection and future proofing since it supports

both 1 Gb and 10 Gb ports concurrently.

Here are some quick BNT 1/10 Gb Uplink Ethernet Switch Module facts:

- Includes six 1 Gb and three 10 Gb Ethernet Uplinks for un-matched upstream bandwidth

- Supported in all five IBM BladeCenter chassis in addition to Multi-Switch Interconnect Module (MSIM) for IBM BladeCenter and IBM BladeCenter HT

- Designed for extreme lower-power consumption

- Full Ethernet Layer 2/3 functionality comes standard.

Server Connectivity Module for IBM BladeCenter

As small and mid-size businesses try to squeeze more value from their IT systems and onsite networking skills, the Server Connectivity Module for IBM BladeCenter delivers a range of capabilities in scalable, flexible configurations. An intuitive graphical user interface (GUI) and integrated management software make this module affordable and simple for IT administrators to deploy, manage, and maintain—delivering more value with fewer resources. And the networking features of the Server Connectivity Module have been designed to prevent an improperly configured device from disrupting

the network infrastructure, helping enable critical system up-time and uninterrupted operation.

Here are some quick facts about this module:

- Serves the needs of small and mid-size business customers

- Easy to install, configure, and manage through an easy-to-use browser-based interface

- Ideal for environments where a separation between the server and networking domains is preferred.

Cisco Nexus 4001I Switch Module for IBM BladeCenter

The Cisco Nexus 4001I Switch Module for IBM BladeCenter is an end-to-end 10 Gb switch that offers a high-performance, low-latency solution that seamlessly integrates with other Cisco Nexus family products. An optional upgrade license key enables easy transition to FCoE. Clients considering Fibre Channel over Ethernet as a fabric-consolidation solution can implement a 10 Gb Ethernet infrastructure as the basis of the solution. The solution uses FCoE between the converged network adapter (CNA) in each server and a top-of-rack (TOR) switch such as the Cisco Nexus 5000 Series, with the Cisco Nexus 4001I blade switch at the access layer between

them. With this solution, clients gain most of the cost savings from the use of fewer adapters, cables, and switch ports. The FCoE connection between the CNA and the 4001I and

5000 Series switches will carry both Fibre Channel and Ethernet traffic on a single link. The Cisco Nexus 5000 Series switch will

then separate LAN and Ethernet traffic to the Cisco Nexus 7000 Series switch upstream and SAN traffic to the Cisco MDS 9000 Family switch upstream. Here are some quick facts about this module:

- Twenty ports of 10 Gb (14 internal and 6 external) bandwidth

- Supported on High Speed Chassis (H/HT)

- Common Nexus CLI and Web-based management tool.

Fibre Channel Switch Modules

This section covers switch modules that allow for the attachment of BladeCenter to fibre storage area networks.

Cisco 4 Gb 10- and 20-port Fibre Channel

These latest Fibre Channel switching options integrate an enterprise fabric into the BladeCenter architecture, providing high-bandwidth connectivity. They offer high-performance, highly available storage area networks (SANs) at a competitive price, and are easy to set up and integrate into core or edge SAN configurations.

Here are some quick Cisco 4 Gb 10- and 20-port Fibre Channel Switch facts:

- Enables high-performance end-to-end 1, 2, and 4 Gigabits-per-second SAN solutions for the data center

- Affordable 10-port and 20-port offerings available for small, medium, and large enterprise business needs

- Exciting addition to the Cisco Ethernet and MDS family of products

- Includes Tivoli SAN manager enhancements to better manage MDS9000 with integrated IBM SAN Volume Controller

- Ten-port upgrade available for on-demand scaling to a 20-port switch

- Cisco SFPs are required:
  - Long-wave 41Y8600
  - Short-wave 41Y8598
  - Short-wave 4-pack 41Y8596.

Brocade 10- and 20-port 4 Gbps SAN Switch Modules

IBM adds more value to BladeCenter with integrated Brocade storage area network (SAN) switch modules with 4 Gbps per-

formance. Compatibility and full interoperability with existing Brocade fabrics and IBM System Storage SAN switches enhance scalability. Additional features help improve system SAN security and performance. And by providing full integration of Brocade enterprise fabric into the

> ### MORE ON THE WEB
>
> * Brocade SAN Switch info on PartnerWorld
> * Brocade SAN Switch info on IBM.com

BladeCenter architecture, the Brocade SAN switch helps improve system manageability and simplifies the infrastructure.

Here are some quick Brocade 4 Gbps SAN Switch facts:

* High-performance end-to-end 1, 2, and 4 Gigabits-per-second SAN solutions are enabled for the data center

* Affordable 10-port and 20-port offerings are available for small, medium, and large enterprise business needs

* Easy-to-use nondisruptive upgrade doubles the 10-port switch connectivity to 20 ports when your business needs change

* The Brocade SAN fabric is integrated to simplify deployment/management and reduce infrastructure complexity and total cost of ownership

* Brocade's proven Silkworm technology is utilized and is fully backward-compatible and interoperable with Silkworm and IBM TotalStorage b-type SAN switches.

Brocade 10- and 20-port 8 Gbps SAN Switch Modules

The Brocade Enterprise 10-port and 20-port 8 Gbps SAN Switch Modules for IBM BladeCenter deliver embedded Fibre

Channel switching with the industry's fastest Fibre Channel throughput performance (8 Gb). These two switches have almost the same features and functions except for the number of activated ports: the 10-port switch has 10 activated ports, and the 20-port switch has 20 activated ports.

Here are some quick Brocade 8 Gbps SAN Switch facts:

- Six external auto-sensing Fibre Channel ports (2 Gbps, 4 Gbps, or 8 Gbps for 8 Gb SFP+ transceivers) operate at a maximum speed of 8 Gbps

- Fourteen internal Fibre Channel ports operate as F_ports (fabric ports) at 2 Gbps, 4 Gbps, or 8 Gbps, depending on FC expansion cards installed into blades

- Ten-port model with 10 Dynamic Ports-on-Demand (DPODs) can be activated in any combination of internal and external ports

- High-availability features include hot-pluggable design, non-disruptive software upgrades, automatic path failover, and power-on self-test diagnostics and status reporting

- Aggregate Fibre Channel I/O bandwidth: 48 Gbps (six external ports at 8 Gbps line rate)

MORE ON THE WEB

- Brocade 10 and 20-port 8 Gbps SAN Switch info on PartnerWorld
- Brocade 10 and 20-port 8 Gbps SAN Switch info on IBM.com
- Brocade 10 and 20-port 8 Gbps SAN Switch Redbook

- External ports can operate as F_ports (fabric ports), FL_ports (fabric loop ports), or E_ports (expansion ports) when in full FC switch mode; when in Brocade Access Gateway mode, the external ports operate as NPIV-enabled N_Ports

- Fabric latency of 0.74 µsec ensures the fastest response and access time to data for critical applications and servers

- Full 8 Gbps operations are supported at distances up to 129 km and up to 1036 km at 1 Gbps.

QLogic 4 Gb Pass-Thru Fibre Channel

The QLogic Intelligent 4 Gb Pass-Thru Fibre Channel Module provides seamless interoperability to an external SAN fabric, primarily those utilizing the extended features from their SAN infrastructure provider. This product is ideal for clients with existing SANs that want to integrate BladeCenter cost effectively and without disruption to their existing SAN.

> **MORE ON THE WEB**
>
> - QLogic 4 Gb Pass-Thru Fibre Channel info on PartnerWorld
> - QLogic 4 Gb Pass-Thru Fibre Channel info on IBM.com

This product provides additional functionality via a software upgrade option to open-standard full-fabric functionality utilizing the full-fabric mode.

Here are some quick QLogic 4 Gb Pass-Thru Module facts:

- Affordable 4 Gb solution that delivers an alternative to traditional optical pass-thru module

- Six external 4 Gb ports

- Supported across all BladeCenter chassis and multi-switch interconnect modules

- Provides open, standards-based NPIV interface simplifying SAN interoperability and scalability.

QLogic Intelligent 8 Gb Pass-Thru Fibre Channel Module

The QLogic Intelligent 8 Gb Pass-Thru Fibre Channel Module for IBM BladeCenter provides double the throughput of the 4 Gb module described above. It provides an alternative to the traditional optical pass-thru module with six external 8 Gb ports. It is supported across all BladeCenter chassis and multi-switch interconnect modules.

MORE ON THE WEB

- QLogic Intelligent 8 Gb Pass-Thru Fibre Channel Module info on PartnerWorld
- Fibre Channel Switch info on IBM.com

QLogic 10- and 20-port 4 Gb Fibre Channel

The QLogic 10- and 20-port 4 Gb Fibre Channel Switch Modules and 4 Gb expansion card for IBM BladeCenter enable an end-to-end 4 Gb SAN solution for blade servers. Both 10- and 20-port modules offer easy-to-use wizards, storage area network (SAN) management flexibility, and interoperability with other major

MORE ON THE WEB

- QLogic Fibre Channel Switch info on PartnerWorld
- Fibre Channel Switch info on IBM.com

manufacturers' FCSW2- and FCSW3-compliant storage networking products.

Here are some quick QLogic Fibre Channel Switch facts:

- High-performance end-to-end 1, 2, and 4 gigabits-per-second SAN solutions are enabled

- Interoperability is provided in open mode leveraging standards-compliant (FCSW2 & FCSW3) SANs

- Affordable 10-port and 20-port offerings are available—ideal for small, medium, and large enterprise business needs

- Easy-to-use software upgrade doubles your 10-port switch connectivity to 20 ports for on-demand scalability

- Included with every switch, QLogic's SANsurfer Management Suite eases installation, configuration, and management of your SAN infrastructure—all from one GUI.

QLogic 20-port 8 Gb SAN Switch Module

The QLogic 20-port 8 Gb SAN Switch Module for IBM BladeCenter offers double the throughput of the 4 Gb version described above. It enables high-performance

MORE ON THE WEB

- QLogic 20-port 8 Gb SAN Switch Module info on PartnerWorld
- Fibre Channel Switch info on IBM.com

2, 4, and 8 gigabits-per-second SAN solutions and provides interoperability in open mode leveraging standards-compliant (FC-SW2 & FC-SW3) SANs. This 20-port switch module is

supported on BladeCenter E, H, T, and HT chassis and multi-switch interconnect modules.

InfiniBand Switch Modules

InfiniBand is recognized as an industry-standard fabric for creating clusters that address high-performance computing (HPC) requirements such as those found in scientific, technical, and financial applications. The InfiniBand high-bandwidth fabric permits high-speed interconnection between cluster servers to enable fast performance. In this section, we cover a module that allows BladeCenter to participate with Infiniband.

Voltaire 40 Gb InfiniBand Switch Module

The Voltaire 40 Gb InfiniBand Switch Module for BladeCenter provides InfiniBand QDR connectivity between the server platform's high-performance blade servers and external In-

> **MORE ON THE WEB**
>
> - Voltaire 40 Gb InfiniBand Switch Redbook Technote
> - Voltaire 40 Gb InfiniBand Switch info on PartnerWorld

finiBand fabrics in nonblocking designs, all on a single device. Voltaire's high-speed module also accommodates performance-optimized fabric designs utilizing a single BladeCenter chassis or stacking multiple BladeCenter chassis without requiring an external InfiniBand switch.

The InfiniBand Switch Module offers 14 Gb ports, one to each server, and 16 ports out of the chassis per switch. This solution offers a no-compromise, congestion-free solution to meet even the most performance-hungry applications.

Here are some quick Voltaire 40 Gb InfiniBand Switch facts:

- Full QDR rate InfiniBand switching

- Based on the Infiniscale-IV device

- Up to 40 Gbps performance for clusters and grids (bidirectional)

- Hot-swap support, with soft start and current limiting

- Bay address and presence support.

SAS I/O

In this section, we look at the SAS (serial attached SCSI) I/O family of switches that enable BladeCenter to leverage storage that provides unprecedented performance and ease of use.

MORE ON THE WEB

- BladeCenter S SAS RAID Controller Module info on PartnerWorld
- BladeCenter S SAS RAID Controller Module info on IBM.com

BladeCenter S SAS RAID Controller Module

IBM BladeCenter is the industry's premier server portfolio, and it has been helping clients simplify IT, making it easier to deploy, own, and manage servers, storage, and IO. IBM is extending that promise by making available the IBM BladeCenter S SAS RAID Controller Module. Quite simply, the SAS RAID Controller Module can enable the benefits of a SAN right inside the BladeCenter S chassis.

The IBM BladeCenter S SAS RAID Controller Module is an innovative approach to efficient IT. Rather than manage RAID at several adapters, the SAS RAID Controller consolidates this function at the switch level, simplifying management and minimizing costs. Combine this with the ability to deliver RAID 0, 1, 0+1, and 5 while also allowing shared storage for up to six blade servers, the SAS RAID Controller Module is the only slide-in way to get your SAN up and running in no time.

Here are some quick SAS RAID Controller Module facts:

- Enhanced domain knowledge and function in Microsoft application monitors

- Improved problem determination by combining data from multiple Microsoft application monitors

- Automated Microsoft business practices

- Integration of data and events with other Tivoli Enterprise Portal (TEP)-based solutions from IBM Tivoli Composite Application Manager (ITCAM), ITM, and OMEGAMON, which allows comprehensive management of your business applications.

SAS Connectivity Module

The IBM BladeCenter SAS Connectivity Module is a high-performance
3 Gbps SAS based pass-thru module that enables broad storage functionality for all BladeCenter chassis.

Here are some quick SAS Connectivity Module facts:

- Enables up to twelve 3.5-inch SAS or SATA disks in BladeCenter S using the Disk Storage Module (DSM)

- Enables use of entry storage products such as IBM System Storage DS3200 with BladeCenter chassis

- Two switches to enable fully redundant capability in BladeCenter chassis

- High-performance, fully duplex, 3 Gbps speeds.

MORE ON THE WEB

- SAS Connectivity Module info on PartnerWorld
- SAS Connectivity Module info on IBM.com

About the Editor

Jim Hoskins is the founder of Maximum Press, a premier publisher of books, ebooks, and rich media that help businesses apply technology profitably. Jim has been involved with computer technology design, implementation, and education for over 30 years. He is the author of many articles and books covering a wide range of technology and Internet business topics. Jim spent a decade with IBM designing computer systems and directly helping businesses of all sizes design and implement real-world solutions. He is the author/editor of the popular *Exploring IBM* series, which has sold over 350,000 copies in 12 languages. Jim has a degree in electrical engineering from the University of Florida and resides in Gulf Breeze, Florida, with his wife and five children. You can reach Jim via email at jimh@maxpress.com.