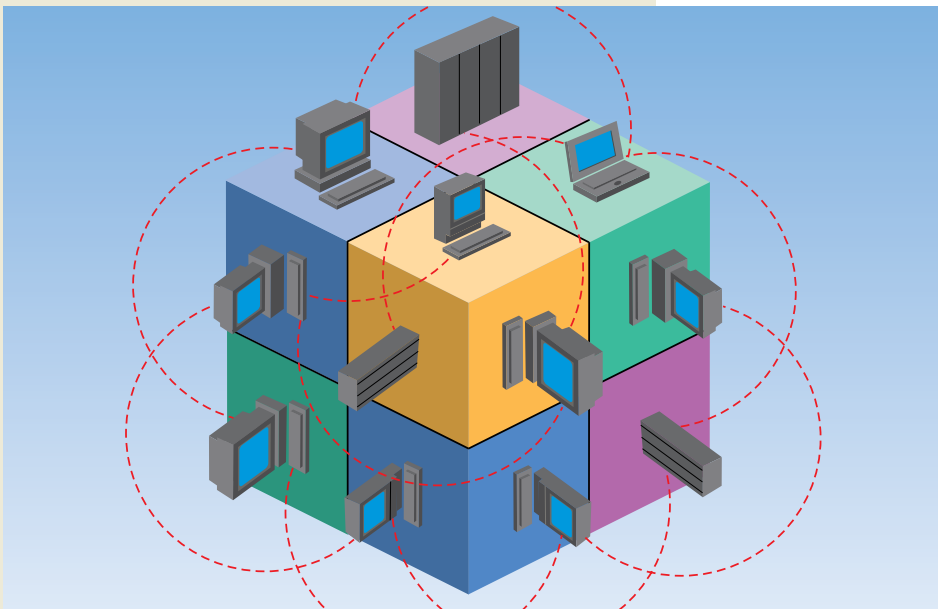


# IBM System x and BladeCenter Business Partner Guidebook

Your Roadmap to  
Success with IBM  
System x and  
BladeCenter



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# **IBM System x and BladeCenter Business Partner Guidebook**

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# IBM System x and BladeCenter Business Partner Guidebook

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Sixteenth Edition

*Your Roadmap to Success with IBM  
System x and BladeCenter*

Edited by Jim Hoskins

(version 16.0e)



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# What's New in This Edition?

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

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

[x3400 M3](#)

[x3500 M3](#)

[x3550 M3](#)

[x3650 M3](#)

[x3850 X5](#)

[dx360 M3](#)

[HS22](#)

[HS22V](#)

[HX5](#)

[Virtual Fabric for IBM BladeCenter](#)

# 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 will automatically check to see if you have the most current edition. If you don’t, you will be able to download the latest edition immediately.

### MORE ON THE WEB

- [Check for updated editions of this guidebook](#)

## 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

#### MORE ON THE WEB

- [Get plugged in to IBM product and program communications](#)

will find new product announcements, letters to Business Partners, customer success stories, educational opportunities, and more.

### 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

#### MORE ON THE WEB

- [Systems Connect eXpert](#)

education roadmap of choice; sales or technical. Then, start progressing through the education.

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

### MORE ON THE WEB

- [IBM Express Advantage portfolio](#)

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

### MORE ON THE WEB

- [Express Seller Toolkit](#)

## 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),

**MORE ON THE WEB**

- [Find detailed IBM product information quickly](#)

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

**MORE ON THE WEB**

- [Find competitive info](#)

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.

**MORE ON THE WEB**

- [“Know Your IBM” training modules](#)

The roadmaps 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.

### MORE ON THE WEB

- [Explore training and certification opportunities](#)

# Introduction

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## 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.

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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

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- 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” links to go directly to that part of the guidebook
- Search for keywords in the document using the Acrobat Reader “Find” function (the binoculars icon on the toolbar).

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

### MORE ON THE WEB

- [About IBM's patent portfolio](#)

## A Smarter Planet

The smarter planet leadership agenda was born out of a need for change coupled with the unique opportunities now emerging for leaders of businesses and institutions worldwide. We find ourselves at this moment because the crisis in our financial 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 twenty-first century has been a series of wakeup 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 identity theft to terrorism—all issues of a hyperconnected world—have

### MORE ON THE WEB

- [IBM CEO Sam Palmisano on A Smarter Planet](#)
- [A Smarter Planet info on IBM.com](#)



*Smart planet.  
Smart IT solutions*

surfaced 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 costs, 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



**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.

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, extraordinary 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 sim-

plify 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 environments. 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.

### MORE ON THE WEB

- [Blade Open Specification](#)
- [Blade.org](#)
- [Article on racks vs. blades in NetworkWorld Magazine](#)



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.

*“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 uti-

lize 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.

## System x Naming Structure

The naming structure used with System x products assigns a meaning to each of the numbers. In general, the following naming policy applies. The first number position indicates

the type of server. For example, in the name “IBM System x3800” (or x3800 for short), the “3” in “x3800” tells you it’s an x86 server. The second number (an “8” in this case) is an indication of functionality. Typically, higher numbers are applied to servers with two or more processor sockets and lower numbers refer to servers with either one or two processor sockets. The third number tells you the type of mechanical packaging—“0” for tower or “5” or higher for rack-mount—so you know the x3800 is packaged as a tower. The fourth number position tells you whether the server uses Intel processors “0” or AMD processors “5,” so you know the x3800 uses Intel processors.

## What Are IBM Express Offerings?

While the needs of small and medium 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 medium customers and the IBM Business Partners that help service them. Express offerings retain the functions and features sought most by medium businesses and drop the more-complex functions needed by larger enterprises. Yet, they still provide a nondisruptive 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

# 2

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## 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 offers 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 PartnerWorld 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.)

### MORE ON THE WEB

- [IBM PartnerWorld Web site home page](#)
- [IBM PartnerWorld news and newsletters](#)
- [PartnerWorld membership levels](#)
- [Help with your user ID and password](#)

## 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

## MORE ON THE WEB

- [IBM Systems College](#)
- [System x Sales](#)
- [System x Technical](#)

the most current education as well as roadmaps, 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.

## 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 roadmaps 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 roadmaps. 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 specific certification track but are critical to help drive your business forward.

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



Systems Connect 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

- [Systems Connect eXpert Program](#)

## 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 annually 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

#### MORE ON THE WEB

- [IBM Professional Certification info](#)
- [System x & BladeCenter Specialist Certification Guide](#)

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

#### MORE ON THE WEB

- [System x training listed on PartnerWorld](#)
- [BladeCenter training listed on PartnerWorld](#)

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 \(has an IBM Business Partner Group\)](#)

## 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

### MORE ON THE WEB

- [System x performance benchmarks](#)
- [BladeCenter performance benchmarks](#)

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.

## 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 stories, complete with company profiles, identified needs, solutions, and resulting benefits. IBM Business Partners can use

### MORE ON THE WEB

- [System x and BladeCenter success stories](#)



*Customer Testimonials (multiple videos)*

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 recommends specific solutions to address them. To offer your clients more complete solutions, make

### MORE ON THE WEB

- [Playbook for System x and BladeCenter](#)
- [Speed sheets](#)

your deals more profitable, and increase your win odds, you'll also want to check out the sections on financing, services, and storage.

## Web Content Syndication (for Your Web site)

IBM Business Partners who market and sell IBM servers, storage, workstations, services, and software can improve their Web presence for FREE by leveraging syndicated Web content from ibm.com to their own Web sites. IBM has teamed with WebCollage, Inc., to provide the capability for Premier,

### MORE ON THE WEB

- [Web content syndication](#)

Advanced, and Member level PartnerWorld participants to receive Web content dynamically 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 order. There are tools (wizards, PDF files, spreadsheets, etc.) that help you configure System x servers, BladeCenter servers, racks of servers, and even cluster solutions. You can

### MORE ON THE WEB

- [Configurator tools](#)

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, networking 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 BladeCenter 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. 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 medium business environments. (See “What Are ‘IBM Express’ Offerings?” in Chapter 1.)

### MORE ON THE WEB

- [Storage products for System x and BladeCenter servers on IBM.com](#)

## 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

#### MORE ON THE WEB

- [Service offering info on PartnerWorld](#)

IBM Global Technology Services. Our offerings can provide powerful supplements to their internal resources, opportuni-

ties 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.

## 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.

#### MORE ON THE WEB

- [Cross Brand Selling Advisor](#)

## 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 solutions. 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.

#### MORE ON THE WEB

- [System x turn-key solutions](#)

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 medium 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

### MORE ON THE WEB

- [IBM solutions for VMware ESXi](#)

Infrastructure 3 Foundation, Standard, or Enterprise edition licenses. IBM offers System x and BladeCenter servers pre-

tested 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.

## SAP Solutions for Small and Medium 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 medium 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.

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.

## MORE ON THE WEB

- [SAP applications for System x and BladeCenter info on IBM.com](#)
- [SAP on System x standard offerings \(zip file\)](#)
- [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 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 rela-

## MORE ON THE WEB

- [IBM Global Financing](#)

tionship management, data mining, and e-business, require a substantial investment. IGF financing enables customers to pay for their new technology in affordable monthly payments during the life of the project. Our customers run the gamut from the smallest, family-owned business purchasing a single server and software to the largest, multinational corporation, acquiring tens of thousands of PCs for offices on several continents. In addition to working directly with customers, we work with IBM Business Partners to provide financing for their clients and to help them build their own businesses.

## 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 solu-

### MORE ON THE WEB

- [Contact Techline](#)
- [Technical Sales Library](#)
- [PartnerWorld technical resources and support](#)

tions 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.



# 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.

### MORE ON THE WEB

- [Overview of all System x "tower" servers](#)

### 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 M2

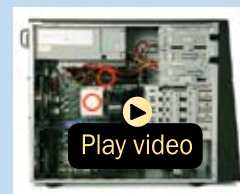
The IBM System x3200 M2 ([Figure T.1](#)) is a single-socket tower server that offers more performance, configuration flexibility, and availability features than many servers in its



## Specifications

Form factor	Tower/5U (rack mountable)
Processor (CPU GHz/ L2 cache/front-side bus MHz max)	Intel Xeon quad-core up to 3.16 GHz/12 MB/1333 MHz or Intel Xeon dual-core up to 3.0 GHz/6 MB/1333 MHz
Number of processors (std/max)	1/1
Memory (std/max)	512 MB up to 2 GB/up to 8 GB DDR II 667 or 800 MHz
Expansion slots	Two PCI (32-bit/33 MHz), 2 PCI-Express (x8, x1), optional PCI-X, or hardware RAID-0, -1, Remote Supervisor Adapter II SlimLine slot
Disk bays (total/ hot-swap)	Four 3.5" simple-swap or hot-swap SATA, four 2.5"/3.5" hot-swap SAS or eight 2.5" hot-swap SAS hard disk drives through configuration order
Maximum internal storage	Up to 1.17 TB SAS or up to 4.0 TB SATA HDDs
Network interface	Integrated Gigabit Ethernet
Power supply (std/max)	400W 1/1 or 430W hot-swap redundant 2/2
RAID support	Integrated RAID-0/-1 standard for hot-swap models, optional for simple-swap models, RAID-5 is optional for all models
Ports	Six USB; Ethernet, two serial, parallel, and video
Systems management	IPMI 2.0-compliant mini-BMC2, IBM Systems Director, Alert Standard Format 2.0, IBM ServerGuide, optional RSA II SlimLine, and Remote Deployment Manager
Operating systems	Microsoft Windows Server, Windows Small Business Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, Novell NetWare 6.5
Limited warranty	1-year or 3-year customer-replaceable unit and onsite limited warranty

- [x3200 M2 details on PartnerWorld](#)
- [x3200 M2 details on IBM.com](#)
- [x3200 M2 competitive info on COMP](#)
- [x3200 M2 blog search](#)
- [x3200 M2 Twitter search](#)



**Figure T.1.** IBM System x3200 M2 at a glance (and links to more detail).

class. It is designed to meet a wide range of business needs—and help you adapt to changing business requirements.

The x3200 M2 offers the latest quad-core or dual-core processors. Providing up to 4.0 TB of disk storage, you can configure up to eight 2.5-inch hot-swap SAS drives for added flexibility and performance. Integrated slotless hardware RAID and internal tape backup support help protect your valuable data.

The x3200 M2 provides integrated systems management through its mini-BMC2. Upgrade to the Remote Supervisor Adapter II SlimLine card to manage distributed systems remotely. A proven platform that delivers performance and reliability, the x3200 M2 helps minimize costs, better manage complexity, and protect system investments. Select configurations of the x3200 M2 are part of the IBM Express Advantage Portfolio, designed and priced to meet the needs of medium businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3200 M2 facts:

- Manage growth and risk with configuration flexibility, data protection, and application performance.
- Manage complexity with integrated and remote management options.
- Standard features deliver high levels of system availability—at a value price.

## x3200 M3

The IBM System x3200 M3 ([Figure T.2](#)) offers enhanced performance to help you take on the dynamic challenges of running IT with an emphasis on security, simplicity, efficiency, 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 medium 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.



**Specifications**

Form factor/height	Tower/5U (rack mountable)
Processor (CPU GHz/L2 cache/front-side bus MHz max)	Intel Xeon 3400 Series (quad-core) up to 2.93 GHz/8 MB/1333 MHz or Intel Celeron, Pentium or Core i3 (dual-core) up to 3.06 GHz/4 MB/1333 MHz
Number of processors (std/max)	1/1
Memory (max)	1, 2, and 4 GB UDIMMs; 1, 2, 4, and 8 GB RDIMMs; up to 16 GB UDIMMs via 4 slots or 32 GB RDIMM via 6 DIMMs
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 4.0 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 supported	Microsoft Windows Server, Microsoft Windows Small Business Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMWare vSphere

- [x3200 M3 details on PartnerWorld](#)
- [x3200 M3 details on IBM.com](#)
- [x3200 M3 competitive info on COMP](#)
- [x3200 M3 blog search](#)
- [x3200 M3 Twitter search](#)



**Figure T.2.** IBM System x3200 M3 at a glance (and links to more detail).

- 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 ([Figure T.3](#)) 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 medium businesses. Easy to manage, Express models and configurations vary by country.



**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 (max)	2 GB/96 GB registered DDR-3 DIMMs
Expansion slots	5 PCI-Express and 1 PCI; additional 2 PCI-X or 1 PCI-E (optional via CTO)
Disk bays (total/hot-swap)	Four 3.5" or eight 2.5" (model dependent)
Maximum internal	4.0 TB hot-swap Serial ATA hard disk drives (HDDs); 1.2 TB storage hot-swap SAS, 3.0 TB simple-swap Serial ATA, or 2.4 TB hot-swap SFF SAS
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	670 W 1/1 or 920W 1/2
Hot-swap components	Hard disk drives, power supply (model dependent)
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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere
Limited warranty	1-year or 3-year customer-replaceable unit and onsite limited warranty

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



**Figure T.3.** IBM System x3400 M2 at a glance (and links to more detail).

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.

## x3400 M3

The IBM System x3400 M3 ([Figure T.4](#)) 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 required. 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





**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 (available via configure to order only)
Disk bays (total/hot-swap)	Standard with 4 3.5" simple-swap Serial ATA (SATA) or 3.5" hot-swap SATA/Serial Attached SCSI (SAS) hard disk drives (HDDs) or 8 or 16 2.5" hot-swap SAS HDDs; Eight 3.5" hot-swap SAS/SATA HDDs (model dependent)
Maximum internal storage	3.0 TB of 3.5" simple-swap SATA HDDs; 8.0 TB of 3.5" hot-swap SATA HDDs; 4.8 TB of 3.5" hot-swap SAS HDDs; or 8.0 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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere; integrated hypervisor key
Limited warranty	3-year customer-replaceable unit and onsite limited warranty

- [x3400 M3 details on PartnerWorld](#)
- [x3400 M3 details on IBM.com](#)
- [x3400 M3 competitive info on COMP](#)
- [x3400 M3 blog search](#)
- [x3400 M3 Twitter search](#)

**Figure T.4.** IBM System x3400 M3 at a glance (and links to more detail).

the x3400 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of medium 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
- Helps reduce energy costs and eases management with efficient design.

## x3500 M2

The IBM System x3500 M2 ([Figure T.5](#)) 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 manage-



**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	6 PCI-Express, 1 PCI, 2 PCI-X (optional—requires removal of 1 PCI-Express)
Disk bays (total/hot-swap)	16/16 (SFF) (8 standard with additional 8 available via CTO)
Maximum internal storage	2.4 TB hot-swap 2.5" Serial Attached SCSI (SAS) standard; 4.8 TB hot-swap 2.5" Serial Attached SCSI (SAS) via CTO
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-02 of this , -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; remote presence (standard); IBM Systems Director and IBM Systems Director Active Energy Manager
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere
Limited warranty	3-year customer-replaceable unit and onsite limited warranty

- [x3500 M2 details on PartnerWorld](#)
- [x3500 M2 details on IBM.com](#)
- [x3500 M2 competitive info on COMP](#)
- [x3500 M2 blog search](#)
- [x3500 M2 Twitter search](#)



**Figure T.5.** IBM System x3500 M2 at a glance (and links to more detail).

ment. 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 medium businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3500 M2 facts:

- 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 ([Figure T.6](#)) 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-manage-



**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 X5677 3.46 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 RDIMMs1 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	8 TB of 2.5" hot swap SAS/SATA standard; 12 TB of 2.5" hot-swap SAS/SATA (model dependent)
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 Analysis on 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, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere
Limited warranty	3-year customer-replaceable unit and onsite limited warranty

- [x3500 M3 details on PartnerWorld](#)
- [x3500 M3 details on IBM.com](#)
- [x3500 M3 competitive info on COMP](#)
- [x3500 M3 blog search](#)
- [x3500 M3 Twitter search](#)



**Figure T.6.** IBM System x3500 M3 at a glance (and links to more detail).

ment 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.

Select configurations of the x3500 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of medium businesses. Easy to manage, Express models/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.

Designed for infrastructure applications, the x3250 M2 leverages the latest dual-core and quad-core processor technology. 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 which 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 medium 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.



## Specifications

Form factor/height	Rack/1U
Processor (CPU GHz/L2)	Intel Xeon 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 2.80 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 1.2 TB 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 optional 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, Microsoft Windows Small Business Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, Novell NetWare 6.5
Limited warranty	1-year or 3-year customer-replaceable unit and onsite 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](#)



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



## x3250 M3

The IBM System x3250 M3 ([Figure R.2](#)) is a single-socket server that offers new levels of performance and flexibility to help you respond quickly to changing business demands. Cost-effective and compact, it is well-suited for small to medium 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 footprint. 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 protect your IT investments and lower your operating costs. Select configurations of the x3250 M3 are part of the IBM Express Advantage Portfolio, designed to meet the needs of medium businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3250 M3 facts:

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



## Specifications

Form factor/height	Rack/1U
Processor (CPU GHz/ L3 cache/front-side bus MHz max)	Intel Xeon 3400 Series (quad-core) up to 2.93 GHz/8 MB/1333 MHz or Intel Celeron, Pentium, or Core i3 (dual-core) up to 3.06 GHz/4 MB/1333 MHz
Number of processors (std/max)	1/1
Cache (max)	8 MB L3
Memory (max)	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 (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
Maximum internal storage	2.0 TB SATA or SAS
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	351 W 1/1
RAID support	Hot-swap hardware RAID-0, -1 (standard), simple-swap 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, Microsoft Windows Small Business Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere
Limited warranty	1-year or 3-year customer-replaceable unit and onsite limited warranty

- [x3250 M3 details on PartnerWorld](#)
- [x3250 M3 details on IBM.com](#)
- [x3250 M3 competitive info on COMP](#)
- [x3250 M3 blog search](#)
- [x3250 M3 Twitter search](#)



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

- Achieve energy savings with built-in power-management tools.
- Minimize risks with easy serviceability and maintenance.

## x3350

The IBM System x3350 ([Figure R.3](#)) is a single-socket commercial application server that provides outstanding reliability, availability and serviceability features, management control, and levels of performance previously available only with dual-processor systems. The x3350 affords lower costs, with leaner power and cooling consumption than competitive 1U, two-processor servers.

Designed for single-application hosting in a non-blade environment, the x3350 provides uncompromised availability features. The x3350 is ideal for deployments that require a dedicated server, where the application vendor doesn't support virtualization, or where the application doesn't scale to take advantage of multiple sockets.

Select configurations of the x3350 are part of the IBM Express Advantage Portfolio, designed and priced to meet the needs of medium businesses.

Here are some quick x3350 facts:

- Go green and save with affordable, energy-efficient, high-performance quad-core computing.
- Manage growth and risk with scalability, flexibility, and security to respond to business change.



### Specifications

Form factor/height	Rack/1U
Processor (CPU GHz/ L2 MHz max)	Intel Xeon (dual-core) (up to 3.16 GHz/6 MB/1333 MHz) or Intel Xeon (quad-core) (up to 3.0 GHz/12 MB/1333 MHz)
Number of processors (std/max)	1/1
Memory (std/max) slots	1 GB or 2 GB/8 GB PC2-6400 DDR II 800 MHz via 4 DIMM slots
Expansion slots	2 PCI-Express x8
Disk bays (total/ hot-swap)	Up to four 2.5" simple-swap or hot-swap SATA or SAS HDDs
Maximum internal storage	Up to 2.0 TB SATA or 600 GB SAS
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	450 W 1/2
Hot-swap components	Power supply, fans, hard disk drives
RAID support	Integrated hardware RAID-0, -1 standard; RAID-5 optional
Systems management	IPMI 2.0-compliant full Base Management Controller (BMC), Automatic Server Restart, IBM Director, IBM ServerGuide™, Remote Deployment Manager, IBM Wake on LAN
Operating systems	Microsoft Windows Server, Microsoft Windows Small Business Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, Novell NetWare 6.5, VMware vSphere
Limited warranty	1-year or 3-year customer-replaceable unit and onsite limited warranty

- [x3350 details on PartnerWorld](#)
- [x3350 details on IBM.com](#)
- [x3350 competitive info on COMP](#)
- [x3350 blog search](#)
- [x3350 Twitter search](#)



**Figure R.3.** IBM System x3350 at a glance (and links to more detail).

- Manage complexity with integrated systems-management tools.

## x3550 M2

The IBM System x3550 M2 ([Figure R.4](#)) 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.

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 medium businesses.



## Specifications

Form factor/height	1U rack
Processor (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 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 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 SAS/SATA or solid-state drives (SSD)
Maximum internal storage	Up to 3.0 TB hot-swap serial attached SCSI (SAS) or up to 3.0 TB hot-swap Serial ATA (SATA) or up to 300 GB hot-swap SSD local storage
Network interface	Gigabit Ethernet (2 ports standard, plus 2 ports optional)
Hot-swap components	Power supplies, fans, HDDs
RAID support	Hardware RAID-0, -1, optional RAID-5
Systems management	IBM IMM with Virtual Media Key, Predictive Failure Analysis, Integrated Service Processor, Diagnostic LEDs, light path diagnostics, Automatic Server Restart, IBM Systems Director Active Energy Manager, IBM ServerGuide
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Server, SUSE Linux Enterprise, VMware vSphere, Sun Solaris 10

- [x3550 M2 info on PartnerWorld](#)
- [x3550 M2 info on IBM.com](#)
- [x3550 M2 competitive info on COMP](#)
- [x3550 M2 blog search](#)
- [x3550 M2 Twitter search](#)



**Figure R.4.** IBM System x3550 M2 at a glance (and links to more detail).

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.5](#)) 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.



### Specifications

Form factor/height	Rack/1U
Processor (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
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	2
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
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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server and VMware vSphere

- [x3550 M3 info on PartnerWorld](#)
- [x3550 M3 info on IBM.com](#)
- [x3550 M3 competitive info on COMP](#)
- [x3550 M3 blog search](#)
- [x3550 M3 Twitter search](#)

**Figure R.5.** IBM System x3550 M3 at a glance (and links to more detail).



Select configurations of the x3550 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of medium 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.
- Simplify management and serviceability with flexible design.
- Maintain availability and lower risk through a resilient architecture.

## x3650 M2

The IBM System x3650 M2 ([Figure R.6](#)) 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



## 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 (I/O)	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 12 (2.5") hot-swap SAS/SATA or solid-state HDDs
Maximum internal storage	Up to 6.0 TB hot-swap Serial Attached SCSI (SAS) or up to 6.0 TB hot-swap Serial ATA (SATA) or up to 600 GB hot-swap solid state (SSD) local storage
Network interface	Gigabit Ethernet (2 ports standard, plus 2 ports optional)
Hot-swap components	Power supplies, fans, HDDs
RAID support	Hardware RAID-0, -1, optional RAID-5
Systems management	IBM IMM with virtual media key, predictive failure analysis, integrated Service Processor, Diagnostic LEDs, light path diagnostics, Automatic Server Restart, IBM Systems Director Active Energy Manager, IBM ServerGuide
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Server, SUSE Linux Enterprise, VMware vSphere, Sun Solaris 10

- [x3650 M2 details on PartnerWorld](#)
- [x3650 M2 details on IBM.com](#)
- [x3650 M2 competitive info on COMP](#)
- [x3650 M2 blog search](#)
- [x3650 M2 Twitter search](#)



**Figure R.6.** IBM System x3650 M2 at a glance (and links to more detail).

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 medium businesses.

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.7](#)) 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.



## Specifications

Form factor/height	Rack/2U
Processor (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)	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 (I/O)	4
Disk bays (total/hot-swap)	Up to 16 2.5" hot-swap Serial Attached SCSI (SAS)/Serial ATA (SATA) HDDs or solid-state drives (SSDs)
Maximum internal storage	Up to 8.0 TB hot-swap SAS or up to 8.0 TB hot-swap SATA or up to 800 GB hot-swap SSD storage
Network interface	Integrated 2 ports, plus 2 ports optional Gigabit Ethernet
Hot-swap components	Power supplies, fan modules, disks
RAID support	Hardware RAID-0, -1, -1E or RAID-0, -1, -10 (additional option -5 with Self Encrypting Disk (SED) function) or RAID 0, -1, -10, -5, -50 with 256 MB or 512 MB cache (additional option -6,-60 with SED function and additional option battery backup), model dependent
Systems management	IBM Integrated Management Module (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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server and VMware vSphere, Sun Solaris 10

- [x3650 M3 details on PartnerWorld](#)
- [x3650 M3 details on IBM.com](#)
- [x3650 M3 competitive info on COMP](#)
- [x3650 M3 blog search](#)
- [x3650 M3 Twitter search](#)

**Figure R.7.** IBM System x3650 M3 at a glance (and links to more detail).

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.

Select configurations of the x3650 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of medium 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.8](#)) 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 avail-



### 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	6 maximum
Disk bays (total)	2
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 supported	Microsoft Windows Server, Red Hat Enterprise Server, SUSE Linux Enterprise

- [x3650 T details on PartnerWorld](#)
- [x3650 T details on IBM.com](#)
- [x3650 T competitive info on COMP](#)
- [x3650 T blog search](#)
- [x3650 T Twitter search](#)

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

ability, 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.
- 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](#)

## x3755

The IBM System x3755 ([Figure E.1](#)) provides unmatched price, performance, and energy efficiency with two, three, or



### Specifications

Form factor/height	4U
Processor (max)	Six-core AMD Opteron Models 8385 and 8435 (up to 2.6 GHz)
Number of processors (std/max)	2/4
Cache (max)	6 MB L3
Memory (max)	128 GB DDR II 667 MHz
Expansion slots	7 total: 4 PCI-Express (1) x16; (2) x8; (1) x4 and 2 PCI-X (133 MHz/100 MHz); 1 HTx
Disk bays (total/hot-swap)	4/4
Maximum internal storage	1.2 TB (4 x 300 GB)
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	1500W (1/2)
Hot-swap components	Power supply, HDDs, cooling fans
RAID support	Integrated RAID-0, -1, -10, RAID-5 optional
Systems management	Baseboard Management Controller IPMI 2.0 standard, optional RSA II SlimLine
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere, Sun Solaris
Limited warranty	3-year customer-replaceable unit and onsite limited warranty

- [x3755 details on PartnerWorld](#)
- [x3755 details on IBM.com](#)
- [x3755 competitive info on COMP](#)
- [x3755 blog search](#)
- [x3755 Twitter search](#)



**Figure E.1.** IBM System x3755 at a glance (and links to more detail).



four six-core AMD Opteron processors and IBM's exclusive CPU Pass Thru card. This innovative card delivers near-linear performance and flexible configurations with headroom to grow in one-CPU increments providing real savings while increasing performance.

The x3755, using IBM's exclusive Xcelerated Memory Technology, is the only AMD Opteron processor-based four-socket server capable of running fully populated memory at the maximum 667 MHz. Competitive systems are forced to clock memory speed back to 533 MHz with fully populated DIMMs. The x3755 provides outstanding memory, price, and performance for general-purpose computing environments, mission-critical business applications, and virtualized environments.

Features such as the pull-down light path diagnostics panel and IBM predictive failure analysis allow quick and easy identification of component failures, helping to maximize uptime. Offering light path diagnostics for major components such as hard disk drives, memory, and CPU, along with fans, voltage regulator modules, and power supplies, the x3755 delivers a full set of alerts to help keep your system running at maximum efficiency.

Here are some quick x3755 facts:

- The industry's only AMD Opteron processor-based system capable of a three processor configuration, delivering outstanding performance at a lower cost
- Outstanding leadership with IBM Xcelerated Memory Technology

- Deliver superb performance per watt with this cost-effective solution.

## x3850 M2

Built on the fourth generation of IBM X-Architecture servers, the IBM System x3850 M2 ([Figure E.2](#)) takes performance, efficiency, and reliability to the next level. Featuring an unmatched combination of x86 performance and scalability with a balanced design, the x3850 M2 delivers unrivaled reliability, providing confidence in your IT solution deployments. An easy upgrade path provides the necessary flexibility to deliver an optimized solution for scale-up database, enterprise applications, and server consolidation through virtualization services.

The x3850 M2 is a traditional four-socket server that provides organizations an uncomplicated, cost-effective option—yet easily accommodates growing businesses that require increased application performance. The ScaleXpander Option kit delivers the ability to scale from four sockets to eight sockets and up to 16 sockets with the flexible XpandOnDemand design; it's a pay-as-you-grow offering that provides more flexibility than the previous x3850, so organizations have even more control over IT costs. And the system's balanced design enables organizations to operate efficiently and save money on initial server configurations without having to make up-front decisions about scalability and long-term protection of their IT investments. When clients add a second chassis, the x3850 M2 doubles the memory availability and I/O capability and nearly doubles processing power.

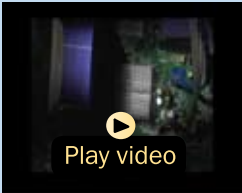
Here are some quick x3850 M2 facts:



**Specifications**

Form factor/height	Rack/4U per chassis
Processor (max)	Intel Xeon Series 7400 up to 2.66 GHz (6 core)/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	7 total PCI-Express half length, (2 hot-plug)
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 w/TCP-IP off-load engine
Power supply (std/max)	1440W 220V 2/2
Hot-swap components	Power supplies, fans, memory, hard disk drives, and PCI-Express adapters
RAID support	Integrated RAID-0, -1, optional RAID-5
Systems management	Alert on LAN 2, Automatic Server Restart, IBM Director, IBM ServerGuide, 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 (DSA)
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere, Sun Solaris
Limited warranty	3-year customer-replaceable unit and onsite limited warranty

- [x3850 M2 details on PartnerWorld](#)
- [x3850 M2 details on IBM.com](#)
- [x3850 M2 competitive info on COMP](#)
- [x3850 M2 blog search](#)
- [x3850 M2 Twitter search](#)



**Figure E.2.** IBM System x3850 M2 at a glance (and links to more detail).

- Outstanding commercial application serving and database performance
- Balanced system design supports more applications and helps clients manage expanding business needs
- Mission-critical availability helps prevent interruptions in day-to-day enterprise operations
- High-bandwidth, low-latency memory subsystem is built on DDR II-registered DIMM technology
- Go green and save through server memory technology using less power and new, high-efficiency power supplies.

## x3850 X5

The new IBM System x3850 X5 ([Figure E.3](#)) is built on the fifth generation of enterprise IBM X-Architecture technology and next-generation Intel Xeon processors, offering 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 and node-partitioning capabilities. A modular building-block design lets you customize your system for current needs while providing the ability to react to changing workloads. Expand your four-socket, 64-DIMM x3850 X5 to four sockets and 96 DIMMs or up to eight sockets and 192 DIMMs. Reallocate resources and repartition systems as your environment changes. The x3850 X5 meets your needs today, while providing an



**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 (optional 2)
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 DASH
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, memory, hard disk drives, solid-state-drives and PCIe adapters
RAID support	Integrated RAID-0, -1, -1E; optional RAID-5
Systems management	Alert on LAN 2, Automatic Server Restart, IBM Systems Director, IBM ServerGuide, Integrated Management Module (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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere
Limited warranty	3-year customer-replaceable unit and onsite limited warranty

- [x3850 X5 details on PartnerWorld](#)
- [x3850 X5 details on IBM.com](#)
- [x3850 X5 competitive info on COMP](#)
- [x3850 X5 blog search](#)
- [x3850 X5 Twitter search](#)

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

easy, cost-effective upgrade path to change your environment when you're ready.

Here are some quick x3850 X5 facts:

- Unmatched flexibility to meet changing workload demands
- Optimized systems with customizable configurations for target workloads
- Greater performance and utilization at a lower total cost
- Consolidated workloads kept 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 ([Figure E.4](#)) 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.

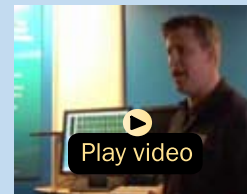
The x3950 M2 provides an uncomplicated, cost-effective, and highly flexible solution. With the ability to scale up to a



**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	7 total PCI-Express half-length, (2 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)	1440W 220V 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 LAN 2, Automatic Server Restart, IBM Director, IBM ServerGuide, 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 (DSA)
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere, Solaris
Limited Warranty	3-year customer-replaceable unit and onsite 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](#)



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

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.

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.

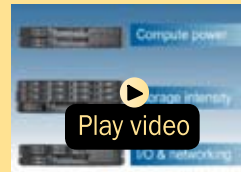
### **iDataPlex**

For large-scale computing, iDataPlex Intel Xeon processor-based servers help pack more processors into the same



## MORE ON THE WEB

- [Overview of iDataPlex servers](#)
- [Linux Magazine article on iDataPlex](#)



*iDataPlex Overview (2:30)*

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 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



### 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)	2
Cache (max)	4 MB to 8 MB
Memory (max)	Up to 128 GB DDR-3 1333 MHz via 16 DIMM slots
Expansion slots	1 slot PCI-Express x16 electrical/x16 mech (Gen 2), 2 x 8 PCI-Express
Disk bays (total/hot-swap)	Up to five 3.5" (2U) or 123.5" (3U storage density)
Maximum internal storage	12.0 TB (3U storage chassis)
Interconnect Fabric adapters (std)	Ethernet <ul style="list-style-type: none"> <li>• Integrated 1 Gb dual-port Ethernet</li> <li>• Integrated 1 Gb configurable management port</li> </ul>
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 supported	Red Hat Enterprise Linux, SUSE Linux Enterprise, Microsoft Windows Server, VMware Infrastructure 3.5 and VMware vSphere 4
Limited warranty	3-year customer-replaceable unit and onsite 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](#)



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

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.

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*

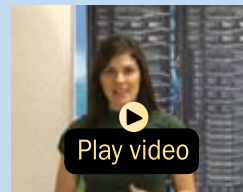
The IBM System x iDataPlex dx360 M3 ([Figure I.2](#)) is designed for data centers that require high performance, yet are constrained on floor space, power, and cooling infrastructure. The dx360 M3 provides an innovative, half-depth solution optimized for maximum density and incredible efficiency. Fea-



## Specifications

Form factor/height	Half-depth, 2U flex chassis or 3U storage chassis
Processor (max)	Intel Xeon 5600 series up to 3.06 GHz
Number of processors (max)	2
Cache (max)	4 MB to 12 MB
Memory (max)	Up to 128 GB DDR-3 1333 MHz via 16 DIMM slots
Expansion slots	1 slot PCIe x16 electrical/x16 mech (Gen 2), 2 x 8 PCIe
Disk bays (total/hot-swap)	Up to five 3.5" (2U) or 12 3.5" (3U storage density)
Maximum internal storage	24.0 TB (3U storage chassis)
Interconnect Fabric Adapters (std)	Ethernet <ul style="list-style-type: none"> <li>• Integrated 1 Gb dual-port Ethernet</li> <li>• Integrated 10/100 configurable management port</li> <li>• 10 Gb single- or dual-port Ethernet (optional) Fibre Channel</li> <li>• 8 GB dual-port HBA (optional) InfiniBand</li> <li>• DDR single- or dual-port HCA (optional)</li> <li>• QDR single- or dual-port HCA (optional) solid-state drives (SSDs)</li> <li>• IBM 160 GB High IOPS SSD PCIe (optional)</li> <li>• IBM 320 GB High IOPS SSD PCIe (optional)</li> </ul>
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
Operating systems supported	Red Hat Enterprise Linux, SUSE Linux Enterprise, Microsoft Windows Server, VMware Infrastructure 3.5, and VMware vSphere 4

- [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](#)



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

turing the latest Intel Xeon Processor 5600 series and DDR-3 memory, 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.

New features in the dx360 M3 include the latest Intel processors, with up to six cores for increased processing and high-performance computing. Expanded power options include 2U chassis power redundancy for line feed and chassis protection and enhanced storage performance, capacity, and flexibility. Customers who need next-generation converged networking can use the FCoE with 10G converged network adapters.

For high-performance computing, the dx360 M3 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 M3 enables the right compute, storage, or I/O capabilities required in your data center.

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 and better optimized fans in the 2U chassis, and power-management capabilities provide further efficiencies to minimize the dx360 M3's power requirements.

The dx360 M3 is simple to manage on a server level or at a rack level as part of an iDataPlex rack. IBM ToolsCenter provides common management across all System x servers, making the dx360 M3 easy to incorporate into your data center.

Here are some quick dx360 M3 facts:

- New high-performance computing capability with the latest Intel 5600 Series using six-core processors
- Enhanced power options for redundant 2U chassis power design for line feed and chassis protection
- New storage performance capability and flexibility
- 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.

## System Cluster

IBM's System x clusters ([Figure I.3](#)) span the broad portfolio of highly innovative IBM System x servers (System x rack servers, BladeCenter Blade Servers, and iDataPlex servers) with industry-leading OEM interconnects, IBM storage, and cluster software. IBM can deliver a customized high-performance computing solution that is preintegrated and tested, with a single point of contact for service and support.

Our HPC clusters can be deployed on either Linux or Microsoft Windows network operating systems and are designed to optimize performance supporting a broad range of application environments, including industrial design and manufacturing, financial services, life sciences, government, and education.



**Specifications**

System Blade Servers	HS22, LS22, LS42, JS23, JS43
Rack servers	x3550 M2, x3650 M2, x3755
iDataPlex servers	dx360 M2
Interconnects	BLADE Network Technologies (BNT), Cisco, Force10, SMC
Ethernet switches	
Ethernet Adapters	Chelsio, Mellanox
InfiniBand	Voltaire, QLogic, Mellanox
Fibre Channel	Brocade, QLogic, Emulex
Storage servers	System Storage DS5020, DS5100, DS5300, DS4800, DS4700, DS4200, DS3400, DS3200, EXP3000
Storage expansion	EXP5000 Storage Expansion Unit, EXP810 Storage Expansion Unit, EXP420 Storage Expansion Unit, EXP3000SAS JBOD, Single ESM
SAN switches	IBM System Storage SAN24B-4 Express, IBM System Storage SAN40B-4
Operating system	Red Hat Enterprise Linux, SUSE Linux Enterprise, Microsoft Windows HPC Server 2008

- [1350 Cluster details on PartnerWorld](#)
- [1350 Cluster details on IBM.com](#)
- [1350 Cluster competitive info on COMP](#)
- [HPC Clustering Sales Kit](#)
- [1350 Cluster blog search](#)
- [1350 Twitter search](#)



**Figure I.3.** IBM System Cluster 1350 at a glance (and links to more detail).

IBM has extensive experience and is a world leader with HPC clusters, as demonstrated by our continued leadership in the Top 500 Supercomputers list published twice per year. Our HPC clusters are thoroughly tested in IBM engineering and test laboratories for integrated cluster functionality. Our clients benefit by realizing minimized risk and complexity.



# 4

## BladeCenter Product Quick Reference

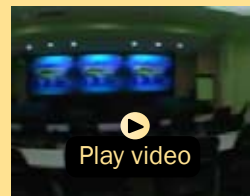
In this chapter, we explore the IBM BladeCenter products and guide you to resources that will help you succeed.

### 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 mid-planes (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,

#### MORE ON THE WEB

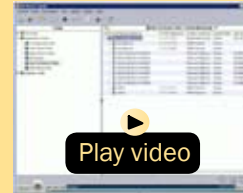
- [Overview of BladeCenter servers](#)
- [Info on Blade.org](#)



*IBM BladeCenter:  
The right choice (6:55)*

**MORE ON THE WEB**

*IBM BladeCenter  
Video Library*



*IBM BladeCenter  
Configuration Manager  
Demo (4:46)*

reprovisioning, updating, troubleshooting, 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 employ techniques that enable using more powerful microprocessors. You can quickly respond to changing workloads by repurposing 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 medium 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 medium 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 medium 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.

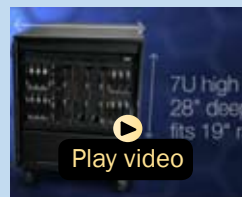
Here are some quick BladeCenter S chassis facts:



### Specifications

Form factor	Rack/7U incorporates blade server bays and hot-swap storage high-availability midplane
Blade bays	Up to 6
Disk bays	Up to 2 disk storage modules that can incorporate six 3.5" SAS or SATA disks each
Standard media	CD-RW/DVD-ROM combo accessible from each blade server
Switch modules	4 switch module bays
Power supply module	Up to 4 (hot-swap and redundant 950W/1450W with load balancing, auto-sensing, and failover capabilities)
Cooling modules	4 hot-swap and redundant blowers standard
Systems management I/O ports	1 management module standard hardware
Systems management	Open and easy systems-management and deployment tools software
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 that can be either individually zoned or shared across all blades
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 onsite limited warranty

- [BladeCenter S chassis details on PartnerWorld](#)
- [BladeCenter S chassis details on IBM.com](#)
- [BladeCenter S chassis competitive info on COMP](#)
- [BladeCenter S blog search](#)
- [BladeCenter S Twitter search](#)



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

- 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.

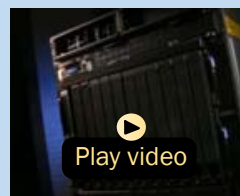
With its best-in-class energy-efficient design, BladeCenter E enables organizations to reduce power consumption without compromising processing performance. In fact, the system is up to 11 percent more efficient in power and cooling compared to the HP c-Class chassis to run the same configuration in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



**Specifications**

Form factor/height	Rack-mount chassis/7U
Blade bays	Up to 14
Switch modules	4 switch module bays
Power supply module	Up to 4 2000 W or 2320 W (hot-swap and redundant with load-balancing and failover capabilities)
Cooling modules	2 hot-swap and redundant blowers standard
Standard media	DVD multi-burner (also available as a CTO option)
Systems-management hardware	1 Advanced Management Module standard; add an optional module for redundancy
I/O ports	Keyboard, video, mouse, Ethernet, USB
Systems management	Open and easy systems-management and trial deployment tools software
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 onsite 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](#)



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

an organization 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. With IBM BladeCenter Open Fabric Manager, BladeCenter H can help organizations run applications even more efficiently by delivering a flexible, open, and connected infrastructure.

IBM continues to build on its reputation for helping customers find innovative IT solutions with BladeCenter H, 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.

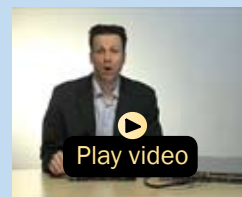




**Specifications**

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 bays
Power supply module	Up to 4 hot-swap and redundant 2900 W AC with load balancing and failover capabilities; operating at 200–240V
Cooling modules	2 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 software
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
Limited warranty	3-year customer-replaceable unit and onsite limited warranty
External storage	Support for IBM System Storage solutions (including DS and NAS family of products) and many widely adopted non-IBM storage offerings

- [BladeCenter H chassis details on PartnerWorld](#)
- [BladeCenter H chassis details on IBM.com](#)
- [BladeCenter H chassis competitive info on COMP](#)
- [BladeCenter H blog search](#)
- [BladeCenter H Twitter search](#)



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

BladeCenter H also drives innovation through its open architecture, supporting industry-standard I/O switches from Cisco, Brocade, and others, so organizations have more choice and flexibility when it comes to their IT environment. Likewise, IBM's affiliation with blade.org helps open the architecture even more by supporting an online, collaborative environment to promote advances in technology solutions.

Here are some fast BladeCenter H facts:

- Delivers high performance to run the most demanding applications and simulations at blazing-fast speeds
- 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.

## 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 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.



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

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

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

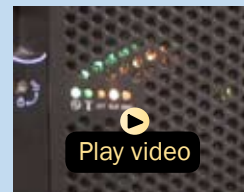
- Integration of servers, I/O, storage, operating systems, and applications into a single, compact network platform that is ideal for deploying autonomic capabilities, enabling an on-demand operating environment.

## 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



- [BladeCenter HT chassis details on PartnerWorld](#)
- [BladeCenter HT chassis details on IBM.com](#)
- [BladeCenter HT chassis competitive info on COMP](#)
- [BladeCenter HT blog search](#)
- [BladeCenter HT Twitter search](#)



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

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, networking, 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.

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

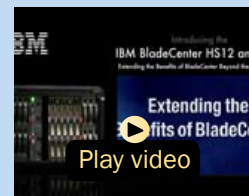
The IBM BladeCenter HS22 ([Figure H.2](#)) offers flexible options to support a broad range of workloads, including virtualization and enterprise applications. Along with intuitive UEFI-based tools, the HS22 can be customized and deployed quickly while best-in-class reliability features help keep you up and run-



### 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 supported	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 onsite limited warranty

- [HS12 details on PartnerWorld](#)
- [HS12 details on IBM.com](#)
- [HS12 competitive info on COMP](#)
- [HS12 blog search](#)
- [HS12 Twitter search](#)



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





**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)	12 DDR-3 VLP DIMM slots (up to 96 GB of total memory capacity and memory speeds up to 1333 MHz)
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
Disk bays (total/hot-swap)	2 hot-swap bays supporting SAS HDDs or solid-state drives
Maximum internal storage	Up to 1.0 TB total internal storage
Network interface	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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, Sun Solaris, and VMware

- [HS22 details on PartnerWorld](#)
- [HS22 details on IBM.com](#)
- [HS22 competitive info on COMP](#)
- [HS22 blog search](#)
- [HS22 Twitter search](#)

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

ning. Mix and match the HS22 with the industry's most diverse set of chassis and blades 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.

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.

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 144 GB of DDR3 memory, the HS22V allows you to fit more and larger virtual machines per blade.



**Specifications**

Form factor/height	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 8 MB L3 cache (12 MB max)
Memory (max)	18 DDR-3 VLP DIMM slots (up to 144 GB of total memory capacity and memory speeds up to 1333 MHz)
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	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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, Sun Solaris, and VMware

- [HS22V details on PartnerWorld](#)
- [HS22V details on IBM.com](#)
- [HS22V competitive info on COMP](#)
- [HS22V blog search](#)
- [HS22V Twitter search](#)



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

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 BladeCenter for a flexible, easy, fast, and reliable I/O solution that helps reduce costs 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 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
- Improved service with unparalleled RAS features and innovative management
- Managed growth and reduced risk on a BladeCenter platform with proven stability.

## HX5

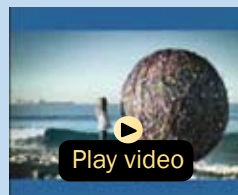
The IBM BladeCenter HX5 ([Figure H.4](#)) goes beyond the industry standards with unique innovations from fifth-genera-



**Specifications**

Form factor	Singlewide (30 mm), quadwide (120 mm)
Processor (max)	Intel Xeon 7500 and 6500 processors; 4/6/8 cores, up to 2.66 GHz; Up to 2 processors per single-wide HX5; scalable to 4 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	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; scalable up to 16 ports of I/O in 4-socket, double-wide form factor
Disk bays (total/hot-swap)	2 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
Network interface	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE
RAID support	Optional RAID-0, -1, -1E optional RAID-5
Systems management	Integrated systems-management processor
Operating systems supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere, Sun Solaris

- [HX5 details on PartnerWorld](#)
- [HX5 details on IBM.com](#)
- [HX5 competitive info on COMP](#)
- [HX5 blog search](#)
- [HX5 Twitter search](#)



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

tion IBM X-Architecture technology (eX5). The HX5 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.

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.

Here are some quick HX5 facts:

- Provide optimal performance for your virtualization and database applications.
- Get faster time to value with flexible two- to four-socket processing on a single, scalable platform.
- Protect your IT investments with simplified systems management and an easy upgrade path.

## LS22

The IBM BladeCenter LS22 blade server ([Figure L.1](#)) 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 medium 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 ([Figure L.2](#)) 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.

Supporting high-memory-capacity 16 DIMM slots and memory speeds up to 800 MHz, the LS42 can help drive your



### 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 3 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	2 integrated Gigabit Ethernet controllers
I/O upgrade	1 PCI-X expansion connector and 1 PCI-Express expansion connector
Systems-management hardware	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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere, and Sun Solaris
I/O ports (max)	8
Limited warranty	3-year customer-replaceable unit and onsite limited warranty

- [LS22 details on PartnerWorld](#)
- [LS22 details on IBM.com](#)
- [LS22 competitive info on COMP](#)
- [LS22 blog search](#)
- [LS22 Twitter search](#)

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

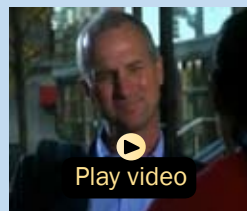




**Specifications**

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 2 SAS or solid-state HDDs installed on each blade (support for up to 3 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	2 or 4 integrated Gigabit Ethernet controllers
I/O upgrade	2 PCI-X expansion connectors and 1 PCI-Express expansion connector
Systems-management hardware	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 supported	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere, and Sun Solaris
I/O ports (max)	8 or 12
Limited warranty	3-year customer-replaceable unit and onsite limited warranty

- [LS42 details on PartnerWorld](#)
- [LS42 details on IBM.com](#)
- [LS42 competitive info on COMP](#)
- [LS42 blog search](#)
- [LS42 Twitter search](#)



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

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.

## *JS12 Express*

The IBM BladeCenter JS12 Express blade server ([Figure J.1](#)), combined with a BladeCenter S chassis, provides exceptional value and expandability in an attractively packaged and highly efficient design. Specifically designed 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*

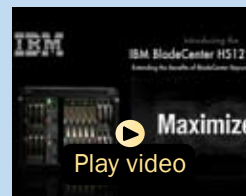
The BladeCenter JS22 Express ([Figure J.2](#)) is a premier SMB (small and medium business) blade for 64-bit applications. It represents one of the most cost-efficient solutions for UNIX, IBM i, and Linux deployments available on the market. Further enhanced by its ability to be installed in the same chassis



## 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, or 300 GB 2.5" serial attached SCSI (SAS) 10K 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 Infini-Band, 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 supported	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](#)



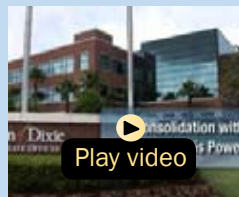
**Figure J.1.** IBM BladeCenter JS12 Express at a glance (and links to more detail).



### Specifications

Form factor	Single-wide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
Processor cores	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 offering: 2 GB (2 x 1 GB); Express offering: 4 GB (2 x 2 GB), up to 32 GB maximum per blade, 4 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 or 146 GB 2.5" serial attached SCSI (SAS) 10K 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
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](#)



**Figure J.2.** IBM BladeCenter JS22 Express at a glance (and links to more detail).

with other BladeCenter LS, HS, and JS bladeservers, the JS22 Express can deliver the rapid return on investment that small businesses demand.

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***

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.3](#) and [J.4](#)). They represent two of the most flexible and cost-efficient solutions for UNIX, IBM i, and Linux deployments available in the market. Further enhanced by their ability to be installed in the same chassis with other IBM BladeCenter blade servers, the JS23 and JS43 can deliver the rapid return on invest-



**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, 8 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) 10K 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 supported	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.3.** 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, or 300 GB 2.5" Serial Attached SCSI (SAS) 10K 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 supported	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.4.** IBM System JS43 at a glance (and links to more detail).



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

Here are some quick JS23 and JS43 facts:

- Ideal for infrastructure consolidation, virtualization, and demanding 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 efficiency, and enhance flexibility.

## Cell/B.E. Blades

For many years, organizations have relied on performance gains from increasing clock speeds of “traditional” microprocessor architectures. However, in recent years this approach has been challenged by the physical limitations of semiconductors and by traditional processor architecture implementations. 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 seismic 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.

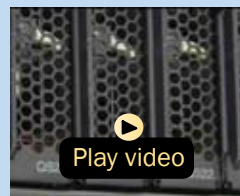
Part of the BladeCenter family of products, the QS22 is a high-performance blade that extends and deepens the IBM HPC solution portfolio by providing a new level of parallelism and performance to targeted workloads. The PowerXCell 8i multi-core processor architecture helps the QS22 accelerate key algorithms 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 de-



**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	2 standard, each with 1 PPE core and 8 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 supported	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](#)



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

manding applications used in aerospace and defense, health care, life sciences, petroleum exploration, financial markets, digital media, electronics, government, education, and other industries.

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 comprehensive set of interconnects and smart-management tools to help run your business. Integrated across all blades, switches, and chassis, BladeCenter Open Fabric supports open standards and industry 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

### MORE ON THE WEB

- [BladeCenter Open Fabric info on IBM.com](#)

deployment so you can concentrate on realizing innovation in your business.

## BladeCenter Open Fabric Manager

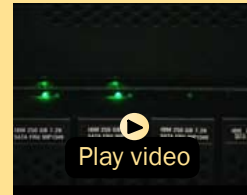
IBM BladeCenter Open Fabric Manager is designed to help you manage growth and complexity by making it easy to manage I/O and network interconnects for up to 100 BladeCenter chassis—up to 1400 blade servers. BladeCenter Open Fabric Manager helps make blade deployment EASY: Once installed, the utility 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.

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.

## 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 \(multiple videos\)](#)



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

## 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:

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

cent, 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—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 ad-

## 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](#)

ditional 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*

The IBM BladeCenter Virtual Fabric offering addresses these issues and extends these value propositions to non-virtualized environments. This solution enables clients to get up to eight virtual ports that can be tailored to meet the bandwidth re-



quirements 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 complexity 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.

#### 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](#)

### *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 Gb Ethernet Switch Mod-

#### 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](#)

ule for their LAN traffic can now combine it with this module and a converged network adapter such as the QLogic two-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 non-blocking 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.

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 switchmodule

#### 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](#)

- 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

#### **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](#)

- Autosensing 10/1000/1000 Mbps external Ethernet ports for bandwidth optimization
- Non-blocking architecture with wire-speed forwarding of traffic.

### ***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

#### **MORE ON THE WEB**

- [BNT Layer 2-7 Gigabit Ethernet Switch Module info on PartnerWorld](#)

- Enhanced application and server security
- Simplified server deployment and management
- Reduced data center total cost of ownership (TCO).

## *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 and Cisco IOS

Software, the Cisco Catalyst Switch Mod-

### **MORE ON THE WEB**

- [Cisco Catalyst Switch Module 3012 info on PartnerWorld](#)
- [Cisco Catalyst Switch Module 3012 info on IBM.com](#)

ule 3012 is engineered with unique technologies specifically designed to meet the rigors of blade server-based application infrastructure for the small or medium enterprise.

Here are some quick 3012 facts:

- Cisco Catalyst Switch Module 3012 provides four external 1 Gb ports and 14 internal 1 Gb ports.
- It 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.
- Both are fully compatible with Open Fabric Manager—enabled for I/O virtualization with no changes required in switch mod-

## 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](#)

ule 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 functions not available on the older IBM Copper Pass-Thru Module (CPM) and is supported in all BladeCenter chassis and the Multi-Switch In-

## MORE ON THE WEB

- [Copper Pass-Thru info on PartnerWorld](#)
- [Copper Pass-Thru info on IBM.com](#)

terconnect 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. To-day, 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 unmatched 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.

### ***BNT 6-port 10 Gb Ethernet Switch Module***

The BNT 6-port 10 Gb Ethernet Switch Module for IBM BladeCenter is ideal for VoIP and IPTV applications requiring high-bandwidth and time-sensitive switching support. It is supported on BladeCenter H and HT chassis and multi-switch

#### **MORE ON THE WEB**

- [Nortel BNT 1/10 Gb Ethernet Switch info on PartnerWorld](#)
- [Ethernet I/O info on IBM.com](#)

#### **MORE ON THE WEB**

- [6-port 10 Gb Ethernet Switch Module info on PartnerWorld](#)
- [Ethernet I/O info on IBM.com](#)

interconnect modules, and is compatible with BladeCenter Open Fabric Manager.

### *Server Connectivity Module for IBM BladeCenter*

As small and medium 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 uptime and uninterrupted operation.

Here are some quick facts about this module:

- Serves the needs of small and medium 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.

#### **MORE ON THE WEB**

- [Server Connectivity Module for IBM BladeCenter info on PartnerWorld](#)
- [Server Connectivity Module for IBM BladeCenter info on IBM.com](#)

## 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

### MORE ON THE WEB

- [Cisco Nexus 4001I info on PartnerWorld](#)
- [Cisco Nexus 4001I info on IBM.com](#)
- [Cisco Nexus 4001I Redbook](#)

- Supported on High Speed Chassis (H/HT), all multi-switch interconnect modules and compatible with BladeCenter Open Fabric Manager
- 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

#### **MORE ON THE WEB**

- [Cisco 4 Gb 10 and 20-port Fibre Channel Switch info on PartnerWorld](#)
- [Cisco 4 Gb 10 and 20-port Fibre Channel Switch info on IBM.com](#)

- 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 for IBM BladeCenter***

IBM adds more value to BladeCenter with integrated Brocade storage area network (SAN) switch modules with 4 Gbps performance. 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 BladeCenter architecture, the Brocade SAN switch helps improve system manageability and simplifies the infrastructure.

#### **MORE ON THE WEB**

- [Brocade SAN Switch info on PartnerWorld](#)
- [Brocade SAN Switch info on IBM.com](#)

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 non-disruptive 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 for IBM BladeCenter***

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

#### **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](#)

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 (6 external ports at 8 Gbps line rate).
- 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  $\mu$ sec 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. This product provides additional functionality via a software upgrade option to open-standard full-fabric functionality utilizing the full-fabric mode.

#### **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](#)

tively and without disruption to their existing SAN. 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 manufacturers' FCSW2- and FCSW3-compliant storage networking products.

### **MORE ON THE WEB**

- [QLogic Fibre Channel Switch info on PartnerWorld](#)
- [Fibre Channel Switch info on IBM.com](#)

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 2, 4, and 8 gigabits-per-second SAN solutions and provides interoper-

#### **MORE ON THE WEB**

- [QLogic 20-port 8 Gb SAN Switch Module info on PartnerWorld](#)
- [Fibre Channel Switch info on IBM.com](#)

ability 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, techni-

cal, 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.

## 4x InfiniBand Pass-Thru

The 4x InfiniBand Pass-Thru Module delivers the highest chassis throughput and performance in the industry. Especially important in high-performance computing environments, this module enables BladeCenter server systems to form high-performance clusters and grids that deliver the performance required to realize the full potential of next-generation applications and systems.

### MORE ON THE WEB

- [4x InfiniBand Pass-Thru info on PartnerWorld](#)
- [4x InfiniBand Pass-Thru info on IBM.com](#)

Here are some quick facts about this module:

- It delivers the highest chassis throughput and performance in the industry.
- Combined with DDR HCAs, this module provides 14 4x DDR ports of connectivity to blades and 14 4x DDR external ports from the BladeCenter H chassis.
- It supports Message Passing Interface (MPI), IP over InfiniBand (IPoIB), and Sockets Direct Protocol (SDP), which use InfiniBand Remote Direct Memory Access (RDMA) to support the most demanding high-performance computing applications and high-performance database clusters.

## 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 InfiniBand fabrics in non-blocking 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.

### MORE ON THE WEB

- [Voltaire 40 Gb InfiniBand Switch Redbook Technote](#)
- [Voltaire 40 Gb InfiniBand Switch info on PartnerWorld](#)

performance-optimized fabric designs utilizing a single BladeCenter chassis or stacking multiple

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.

### *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 abil-

ity 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

#### **MORE ON THE WEB**

- [BladeCenter S SAS RAID Controller Module info on PartnerWorld](#)
- [BladeCenter S SAS RAID Controller Module info on IBM.com](#)

- 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-

#### **MORE ON THE WEB**

- [SAS Connectivity Module info on PartnerWorld](#)
- [SAS Connectivity Module info on IBM.com](#)

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 12 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.

# About the Editor

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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 25 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](mailto:jimh@maxpress.com).

