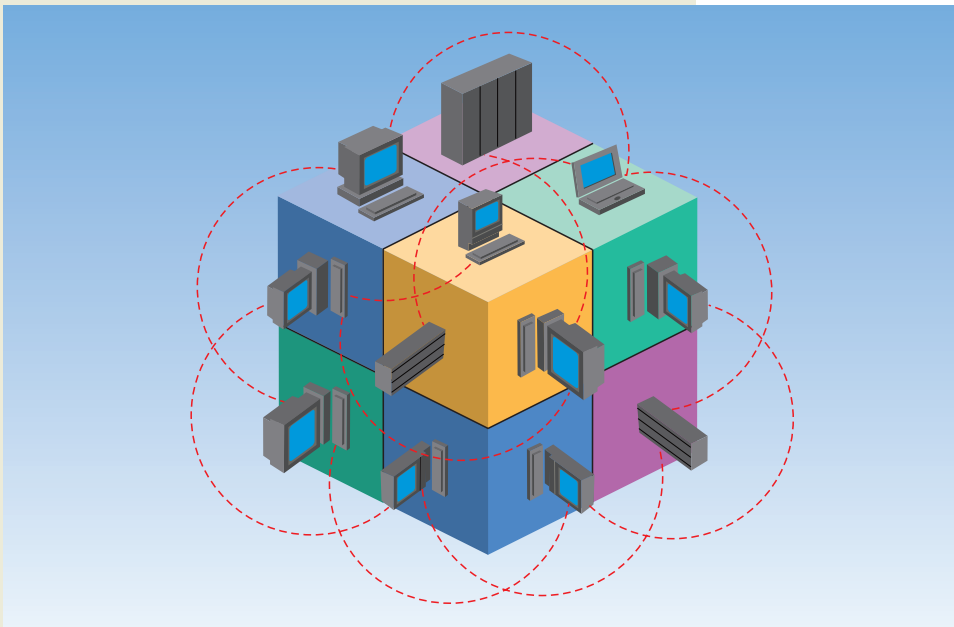


IBM System x and BladeCenter Business Partner Guidebook

Your Roadmap to
Success with IBM
System x and
BladeCenter



Edited by Jim Hoskins

Over
100,000 copies
downloaded!

IBM System x and BladeCenter Business Partner Guidebook

Titles of Interest

Other IBM eBooks of Interest

- [*IBM PureSystems Business Partner Guidebook*](#)
- [*IBM Power Systems Business Partner Guidebook*](#)
- [*IBM Storage Business Partner Guidebook*](#)
- [*SmartCloud Foundation Business Partner Guidebook*](#)
- [*IBM Collaboration Solutions Guidebook*](#)
- [*Real World IBM SOA Stories*](#)
- [*IBM System z Demos and White Papers*](#)

For more information email us at info@maxpress.com.

IBM System x and BladeCenter Business Partner Guidebook

Twenty-Fourth Edition

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

Edited by Jim Hoskins

(version 24.0e)



Clear Horizon

605 Silverthorn Road
Gulf Breeze, FL 32561
maxpress.com

Notices

Production Manager: Jacquie Wallace

Cover Designer: Lauren Smith

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold with the understanding that the publisher is not engaged in rendering professional services. If legal, accounting, medical, psychological, or any other expert assistance is required, the services of a competent professional person should be sought. ADAPTED FROM A DECLARATION OF PRINCIPLES OF A JOINT COMMITTEE OF THE AMERICAN BAR ASSOCIATION AND PUBLISHERS.

Copyright 2012 by Maximum Press.

All rights reserved. Published simultaneously in Canada.

Reproduction or translation of any part of this work beyond that permitted by Section 107 or 108 of the 1976 United States Copyright Act without the permission of the copyright owner is unlawful. Requests for permission or further information should be addressed to the Permissions Department, Maximum Press.

This ebook was sponsored by IBM. This ebook utilized information provided by IBM and other companies including publicly available data. This report represents Maximum Press's viewpoint and does not necessarily represent IBM's position on these issues.

Acknowledgments

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

Disclaimer

The purchase of computer software or hardware is an important and costly business decision. While the author and publisher of this guidebook have made reasonable efforts to ensure the accuracy and timeliness of the information contained herein, the author and publisher assume no liability with respect to loss or damage caused or alleged to be caused by reliance on any information contained herein and disclaim any and all warranties, expressed or implied, as to the accuracy or reliability of said information.

This guidebook is not intended to replace the manufacturer's product documentation or personnel in determining the specifications and capabilities of the products mentioned in this guidebook. The manufacturer's product documentation should always be consulted, as the specifications and capabilities of computer hardware and software products are subject to frequent modification. The reader is solely responsible for the choice of computer hardware and software. All configurations and applications of computer hardware and software should be reviewed with the manufacturer's representatives prior to choosing or using any computer hardware and software.

Trademarks

The words contained in this text which are believed to be trademarked, service marked, or otherwise to hold proprietary rights have been designated as such by use of initial capitalization. No attempt has been made to designate as trademarked or service marked any words or terms in which proprietary rights might exist. Inclusion, exclusion, or definition of a word or term is not intended to affect, or to express judgment upon, the validity or legal status of any proprietary right which may be claimed for a specific word or term.

Table of Contents

Your 10-Step Quick Start	13
1. Check for Updated Editions of This eBook.....	13
2. Apply for Your IBM PartnerWorld Membership	13
3. Plug in to IBM Business Partner News.....	14
4. Enroll in the Systems Connect eXpert Program	14
5. Review the System x Express Portfolio	15
6. Understand the Express Seller Program.....	15
7. Learn to Quickly Find IBM Product Information.....	15
8. Learn to Find Competitive Information	16
9. Try Out “Know Your IBM”	16
10. Make Your Training and Certification Plan	17
Introduction	18
About This Guidebook.....	18
Products May Vary from Country to Country.....	18
How to Use This MaxFacts™ Interactive Guidebook.....	18
Reader Feedback	20
Chapter 1:	
Welcome to the Team	21
Why Team with IBM?	21
Innovation That Matters	21
A Smarter Planet	22
Smarter Computing.....	23
Why IBM System x and BladeCenter?	24
Realize Innovation.....	24
IBM eX5 Servers.....	24

IBM System x Rack and Tower Servers	25
IBM BladeCenter Blade Servers.....	26
IBM System x iDataPlex Servers.....	26
Reduce Sprawling IT	27
Inflexible IT	27
IT Resiliency	28
IBM System x Rack and Tower Server Basics	29
IBM BladeCenter Server Basics	29
Virtualizing on System x and BladeCenter	30
Save with IBM Energy Efficiency	31
Systems Management Made Easy	31
What Are IBM Express Offerings?	32

Chapter 2:

General System x and BladeCenter Resources 34

The IBM PartnerWorld Web Site	34
System x Specialty/Business Partner Technical Vitality (BPTV) Skills Dashboard	35
IBM System x and BladeCenter Education	37
IBM Systems College	37
Systems Connect eXpert Education Offering.....	37
IBM Professional Certifications.....	38
Other Education Listed on PartnerWorld.....	40
Know Your IBM (KYI).....	40
Social Media Resources for IBM Business Partners	40
Performance Benchmarks	41
Success Stories, References, Case Studies.....	42
Sources for Competitive Marketing Information	42
Playbook/Sales Kits for System x and BladeCenter	43
Web Content Syndication (for Your Web site)	44
Pre Sales Information at Your Fingertips (PSAT)	44
Configuration Tools for Specifying Servers	44

System x and BladeCenter Workload Solutions	
eGuide for BPs	45
Attaching Accessories and Upgrades to Your Proposals .	45
Attaching Operating Systems to Your Proposals	46
Attaching Storage to Your Proposals	46
Attaching Services to Your Proposal	48
System x Solutions	49
Virtual Desktop for Smart Business	49
SmartCloud Entry	51
BladeCenter Foundation for Cloud	52
x86 Solutions for VMware.....	54
x86 Solutions for SAP Environments	55
<i>SAP HANA</i>	56
<i>Business Warehouse Accelerator</i>	57
<i>SAP Discovery System</i>	59
Reference Architecture Solutions for Big Data.....	60
Reference Architecture for Hadoop: Cloudera.....	62
IBM Systems Director	63
IBM Global Financing	66
Technical Support for Business Partners	66

Chapter 3:

System x Product Quick Reference **68**

Tower Servers	68
x3100 M4	68
x3200 M3	71
x3300 M4	73
x3400 M3	75
x3500 M4	77
Rack-Mount Servers	80
x3250 M3	80
x3250 M4	82

x3530 M4	84
x3550 M4	86
x3620 M3	89
x3630 M3	91
x3630 M4	93
x3650 M4	95
x3750 M4	98
x3755 M3	100
Enterprise Servers.....	102
x3690 X5.....	102
x3850 X5/x3950 X5	104
iDataPlex/Cluster Servers	107
iDataPlex	107
<i>iDataPlex dx360 M4</i>	108
Intelligent Cluster.....	110

Chapter 4: PureFlex System and Flex System Elements 112

IBM PureFlex System and IBM Flex System	112
--	------------

Chapter 5: BladeCenter Product Quick Reference 114

What Is a BladeCenter Server?	114
Chassis	117
<i>BladeCenter S Chassis.....</i>	<i>117</i>
<i>BladeCenter E Chassis.....</i>	<i>119</i>
<i>BladeCenter H Chassis</i>	<i>121</i>
<i>BladeCenter HT Chassis</i>	<i>123</i>
Blade Servers.....	126
x86 Blades	126
<i>HS12.....</i>	<i>126</i>
<i>HS22.....</i>	<i>128</i>
<i>HS22V.....</i>	<i>130</i>

HS23.....	132
HS23E.....	135
HX5	137
Power Blades	139
PS700, PS701, and PS702 Express.....	139
PS703 and PS704 Express.....	144
BladeCenter Open Fabric (I/O).....	147
BladeCenter Open Fabric Manager	148
Virtual Fabric.....	149
IBM BladeCenter Virtual Fabric 10 Gb Switch Module	150
QLogic Virtual Fabric Extension Module.....	152
Emulex 10 GbE Virtual Fabric Adapter II/Advanced II	152
Emulex 10 GbE Virtual Fabric Adapter II/Advanced II for	
HS23.....	153
Emulex 10 GbE Virtual Fabric Adapter/Advanced.....	154
Brocade Converged 10 GbE Switch Module	155
Broadcom 2-port 10 Gb Virtual Fabric Adapter	156
Broadcom 10 Gb (Gen 2) 2-port and 4-port Ethernet	
Expansion Cards	157
Ethernet Switch Modules	157
10 Gb Ethernet Pass-Thru Module	157
IBM iFlow Director	158
IBM BladeCenter Layer 2/3 Copper and Fiber Gigabit	
Ethernet Switch Module	160
IBM BladeCenter Layer 2-7 Gigabit Ethernet Switch Module	160
Cisco Catalyst Switch Module 3012	161
Cisco Catalyst Switch Modules 3110G and 3110X.....	162
Intelligent Copper Pass-Thru Module.....	163
IBM BladeCenter 1/10 Gb Uplink Ethernet Switch Module ..	163
Server Connectivity Module for IBM BladeCenter	165
Cisco Nexus 4001I Switch Module for IBM BladeCenter.....	165
Fibre Channel Switch Modules.....	165
Cisco 4 Gb 10- and 20-port Fibre Channel	166
Brocade 10- and 20-port 8 Gbps SAN Switch Modules	166
QLogic Intelligent 8 Gb Pass-Thru Fibre Channel Module	167
QLogic 20-port 8 Gb SAN Switch Module.....	167

InfiniBand Switch Modules168
 Voltaire 40 Gb InfiniBand Switch Module 168
SAS I/O169
 BladeCenter S SAS RAID Controller Module..... 169
 SAS Connectivity Module.....170

Chapter 6: IBM System Networking 171

System Networking Basics171
IBM System Networking Product Quick Reference175
IBM System Networking Switches.....175
 IBM VMready176
 IBM Distributed Virtual Switch 5000V.....176
 IBM Programmable Network Controller.....177
 IBM RackSwitch Portfolio178
 IBM RackSwitch G8000 179
 IBM RackSwitch G8052181
 IBM RackSwitch G8124E182
 IBM RackSwitch G8264184
 IBM RackSwitch G8264T185
 IBM System Networking RackSwitch G8316186
 Converged Switch B32188
 Brocade VDX 6730 Converged Switch189
 Juniper Ethernet Switches..... 190
 Ethernet Switch J48E190
 Juniper Networks EX2200 Ethernet Switch.....192

About the Editor 194

Your 10-Step Quick Start

Take these 10 steps to “hit the ground running” if you are 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

MORE ON THE WEB

- [Explore PartnerWorld](#)
- [PartnerWorld contact phone numbers by country](#)
- [Get your PartnerWorld user ID](#)





ID and a password to gain access to some areas of the site. If you have any questions, call PartnerWorld for help (follow the link in the “More on the Web” box to get the right phone number for your country).

3. Plug in to IBM Business Partner News

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

MORE ON THE WEB

- [Get news for IBM Business Partners](#)

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.

MORE ON THE WEB

- [Systems Connect eXpert](#)

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



5. Review the System x Express Portfolio

The IBM midmarket portfolio is a set of IBM products and services (e.g., servers, storage, services, etc.) specially configured and priced for the small and mid-size 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's midmarket portfolio of offerings and you will have solutions for your customers that you can deploy quickly and grow as needed.

MORE ON THE WEB

- [IBM Express Advantage](#)

6. Understand the Express Seller Program

Express Seller is designed to help IBM Business Partners accelerate sales of select IBM products and services to small and mid-size businesses. These offerings are supported by IBM investments in incentive programs, education, and demand generation support 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), the IBM Sales Manual (a comprehensive collection of de-



tailed 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.

MORE ON THE WEB

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

8. Learn to Find Competitive Information

IBM consistently updates information about the competitors you will encounter and their products. Explore this valuable tool so you will be ready when you need it. You will need your user ID and password.

MORE ON THE WEB

- [Find competitive info](#)

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.

MORE ON THE WEB

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

KYI is more general training that will give you a “high-level” view of IBM offerings. 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

About This Guidebook

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

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

Products May Vary from Country to Country

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

How to Use This MaxFacts™ Interactive Guidebook

This guidebook has been specially designed to be read on your computer screen using the free Adobe Acrobat Reader





software or a supporting Web browser. Alternately, you can print this guidebook on almost any printer and read the material anywhere.

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

Links provided throughout this guidebook (anywhere you see a “More on the Web” box or embedded within some figures) will lead you to additional information related to the topic at hand resident on the Web. In this way, this guidebook is a “three-dimensional guide” providing you with information about the topics at the level of detail you choose. To follow a link, simply click on it and a Web browser window will appear on your screen with the requested information. If the link brings you to a password-protected area (e.g., on the IBM PartnerWorld or COMP Web sites), you will be prompted to enter your IBM-issued user ID and password before you are presented with information.

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



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

To navigate around within this guidebook, you can:

- Step forward or backward a page at a time using the standard Acrobat Reader navigation toolbar shown along the bottom of your screen
- Click on the “Bookmark” links shown on the left side of your screen to go directly to that part of the guidebook
- Click on the “Table of Contents” section and click on the links to go directly to that part of the guidebook
- Search for keywords in the document using the Acrobat Reader “Find” function (found on the toolbar).

Reader Feedback

We welcome your feedback on any aspect of this guidebook, so please email your comments or suggestions to info@maxpress.com.

To see our full line of IBM titles, we invite you to visit our Web site, maxpress.com. From all of us at Maximum Press, thank you for your interest.

MORE ON THE WEB

- [email us \(info@maxpress.com\)](mailto:info@maxpress.com)
- Maximum Press Web site

1

Welcome to the Team

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

Why Team with IBM?

If you are seeking to truly differentiate yourself in the marketplace by extending your market reach with more profitable end-to-end solution offerings, IBM is uniquely positioned to help you make this happen. IBM provides you with an integrated portfolio of tower, rack-mount, blade, and high density HPC 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

By *smarter*, we mean that intelligence is being infused into the systems and processes that make the world work—into things no one would recognize as computers: cars, appliances, roadways, power grids, even clothes. We find ourselves in a world becoming smaller, flatter, and smarter.

MORE ON THE WEB

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

Data is being captured today as never before. It's revealing everything from large and systemic patterns—of global markets, workflows, national infrastructures, and natural systems—to the location, temperature, security, and condition of every item in a global supply chain. And then there's the growing torrent of information from billions of individuals using social media. They are customers, citizens, students, and patients. They are telling us what they think, what they like and want, and what they're witnessing. As important, all this data is far more real-time than ever before.

On a smarter planet, change is the only constant. The most responsive and agile firms—supported with innovative business models and processes—will be positioned to lead their industries and surpass their competition.



Smarter Computing

On a smarter planet, IT leaders are seizing the opportunity to deliver innovation that matters for customers, employees, and partners. Smarter Computing is a new and evolutionary model of the IT infrastructure that enables a smarter planet. It helps organizations rethink their IT infrastructure so they can unleash innovation through the cloud, unlock the power of Big Data, and secure critical information and business processes. The

MORE ON THE WEB

- [The IT infrastructure that enables a smarter planet](#)
- [PartnerWorld Smarter Computing portal](#)

Smarter Computing approach is supported by a comprehensive portfolio of systems, software, and services, and is delivered through flexible deployment models. Smarter Computing helps organizations make the right decisions today, ensuring a smarter tomorrow.

A tomorrow ready IT infrastructure which excels in three key domains provides the flexibility, efficiency, and agility to master this transition. A tomorrow ready IT infrastructure must be:

- Cloud ready—to virtualize and rationalize data centers and optimize traditional infrastructures.
- Data ready—to leverage advanced analytics to build an infrastructure that turns information into insights.
- Security ready—to manage risks, security, and compliance insight and outside of the data center.



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 and realize ROI. 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 X-Architecture to support the demanding enterprise-class workloads that clients increasingly deploy on x86 systems. Today, IBM continues its tradition of x86 leadership with unique capabilities for breaking through IT bottlenecks with



balanced systems design—focusing on three major engineering goals:

- Unleashing memory
- Delivering unmatched I/O performance
- Providing flexible systems for affordable scalability and simplified deployment.

The IBM System x eX5 servers are designed for a business's 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 and Tower Servers

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 like eXFlash



high IOPS SSD technology and 10 GbE Virtual Fabric to create something more practical: outstanding performance, high availability, scalability, power efficiency, and proactive manageability.

IBM BladeCenter Blade Servers

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 data centers that require high performance, yet are constrained on floor space, power, and cooling infrastructure, the IBM System x iDataPlex provides an innovative solution optimized for maximum density and incredible efficiency.

The half-depth, energy-efficient design of the iDataPlex servers and chassis can significantly reduce power and cooling requirements vs. standard 1U servers. 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 Sprawling IT

One of the challenges facing today's businesses is IT sprawl. We've seen server volumes grow by six fold and storage by almost 70 fold over the last two decades. What you're seeing is IT departments that have to make investments which lead to more sprawl, which drives up costs. It's a challenge that needs to be addressed and requires not just incremental improvements in savings or cost reductions, but dramatic improvements in total cost of ownership as well. These improvements are brought about by leveraging energy efficiency, virtualization, and consolidation with optimized systems and networks across all resources in the data center, alternative service delivery models, and standardization. With IBM System x and BladeCenter, organizations can help simplify the management of the IT infrastructure, improve utilization, and reduce costs.

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

Inflexible IT

Over time, as new infrastructure is added, IT resources can become cumbersome and inflexible. As IT departments are asked to deploy new services, they can't work across all the different silos of IT to quickly deliver these new services.



Given the dynamic nature of today's demands, a business needs to be supported by an IT infrastructure that can adapt to changing needs. IBM System x and BladeCenter provide organizations the flexibility they need to proactively adjust to change and get the most out of their existing assets.

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.

IT Resiliency

The complexity and growth of today's data center has also exacerbated the need for resiliency. Systems must be able to identify issues before they happen, react to avoid disruption, and if failure occurs, recover quickly. As a result, resiliency must evolve from the physical hardware to the workload. 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. The IBM BladeCenter S is designed with everything a small office with limited IT skills needs.

MORE ON THE WEB

- [Blade Open Specification](#)

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.

Virtualizing on System x and BladeCenter

Utilization and efficiency can be increased by consolidating and virtualizing server workloads and applications. Your customers can simplify virtual-server deployments—especially when application requirements are growing or unpredictable—using System x enterprise servers with extra processor, memory, and I/O capacity that the competition can't match. If power consumption is your primary concern, consolidate onto BladeCenter servers and virtualize applications to better utilize resources and amplify the already-significant advantages of BladeCenter efficiencies. Virtualizing with BladeCenter also allows customers to choose from a broad range of reliable networking and storage with BladeCenter Open Fabric. When it comes to business-



critical applications, IBM System x and BladeCenter offer the performance, availability, and resiliency your customers need. If your need for virtual machines continues to grow in an accelerated number and the cost of power or hardware begins to add up, iDataPlex can also be a viable virtualization platform that will save the cost of hardware redundancy for virtualized applications that are parallel and non-mission-critical.

Save with IBM Energy Efficiency

The IBM X-Architecture platform equips System x and BladeCenter servers with technology to help your customers realize the innovation to become more efficient so they can go green and start saving. Innovations include Calibrated Vector Cooling design to maximize air flow, Active Energy Manager to control power usage, IBM Rear Door Heat eXchanger that 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. IBM servers come with a comprehensive management software portfolio that allows the servers to be managed either locally or



remotely. Systems Director offers comprehensive management of both the physical and virtual system, allows for an automated, fast deployment, provides a single interface for the entire data center, and seamlessly plugs into many existing enterprise management solutions such as Tivoli and other non-IBM solutions. Products like Systems Director VMControl help you move beyond managing virtualization to using virtualization to better manage your IT infrastructure, and products like IBM Systems Director Network Control provide integration of server, storage, and network management for virtualization environments across multiple platforms. With additional tools like Active Energy Manager and BladeCenter Open Fabric Manager, System x and BladeCenter reduce the complexity of managing your data center.

What Are IBM Express Offerings?

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



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

2

General System x and BladeCenter Resources

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

The IBM PartnerWorld Web Site

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

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





In this guidebook, we have summarized and provided direct links to a great deal of 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](#)

System x Specialty/Business Partner Technical Vitality (BPTV) Skills Dashboard

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

The criteria for the System x Specialty and Specialty Elite is available immediately and business partners are encour-



MORE ON THE WEB

- [System x Specialty info on PartnerWorld](#)
- [Business Partner Technical Vitality \(BPTV\) Skills Dashboard tool](#) (sign-in required)

aged to begin preparing to meet these criteria and initiate the application process now.

IBM has enhanced the Business Partner Technical Vitality (BPTV) program with the BPTV skills dashboard to help you track your skills progress with System x Specialty. This Web-based application will offer you guidance on the skill requirements and certification options needed to become a System x Specialty partner.

BPTV Skills Dashboard provides:

- A customized GAP analysis showing point-in-time skill achievements mapped to the published IBM Specialty criteria.
- Easy-to-read color coded results highlighting achievements met and criteria still needing completion (GAPs in skill criteria)
- A single consolidated report across all IBM brand and solution specialties, which can easily be shared with colleagues for longer term skill expansion and education planning.

BPTV Access: Your Authorized Program Administrator (APA) will have immediate access to BPTV. Your APA may allow additional employees to view the scorecard and dashboard by assigning them the “BPTV General” role in PPS. For additional information and assistance, contact [PartnerWorld](#) for guidance.



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 section, we discuss options for you to obtain the System x–related education you need.

IBM Systems College

IBM Systems College is your one-stop education resource for all STG brands including System z, Power, Storage, System x, BladeCenter, and Retail Store Solutions. Find the most current education as well as 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. IBM Systems College also provides information on IBM skills mastery, mastery tests, and certifications.

MORE ON THE WEB

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

Systems Connect eXpert Education Offering

The IBM Systems Connect eXpert offering is specific to System x and BladeCenter. eXpert delivers System x and BladeCenter education in the form of easy-to-follow, flexible 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.

MORE ON THE WEB

- [Systems Connect eXpert Program](#)

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

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

MORE ON THE WEB

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

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 industry-recognized IBM Certification.



Other Education Listed on PartnerWorld

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

MORE ON THE WEB

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

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 your sales 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



MORE ON THE WEB

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

or just getting interested, the “More on the Web” box provides some links that will be of interest to you.

Performance Benchmarks

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

MORE ON THE WEB

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



MORE ON THE WEB

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



Customer testimonials (multiple videos)

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 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.

Additionally, we invite you to nominate clients you have helped succeed by leveraging IBM System x and BladeCenter. We would like the opportunity to create a case study or success story video with you and your client. To learn about this program, visit the link 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 solu-

tions to address them. To offer your clients more complete solutions, make your deals more profitable, and increase your win odds, you’ll also want to check out the sections on financing, services, and storage.

MORE ON THE WEB

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



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, Advanced, and Member level PartnerWorld participants to receive Web content dynamically delivered into their Web sites.

MORE ON THE WEB

- [Web content syndication](#)

Pre Sales Information at Your Fingertips (PSAT)

IBM Business Partners needing access to pre sales information for IBM System x Servers and IBM BladeCenter can find quick access to IBM information using the Pre-Sales Advisor Tool (PSAT).

Access supply availability, promotions, COG, competitive information, and our online configurator or link to the download configurator SSCT.

MORE ON THE WEB

- [Pre-Sales Advisor Tool \(configs, tools, resources\)](#)

Configuration 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

MORE ON THE WEB

- [Configuration tools](#)



servers, racks of servers, and even cluster solutions. You can explore these tools by following the link provided in the “More on the Web” box.

System x and BladeCenter Workload Solutions eGuide for BPs

The Workload Solutions eGuide for Business Partners is a repository that provides sales assets for mission critical customer solutions in a simple, easy-to-use package.

MORE ON THE WEB

- [System x and BladeCenter Workload Solutions eGuide for BPs](#)

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, SUSE, Red Hat, 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

MORE ON THE WEB

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



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 mid-size business environment. (See “What Are ‘IBM Express’ Offerings?” in Chapter 1.)

Attaching Services to Your Proposal

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

CIOs, IT directors, and business leaders in client organizations of all sizes across all industries see tremendous value in IBM Global Technology Services. Our offerings can provide powerful supplements to their internal resources, opportunities to save money, and programs to enhance the effectiveness of their technology investments. And IBM gives you a way to complement your resources and

MORE ON THE WEB

- [Service offering info on PartnerWorld](#)



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.

System x Solutions

Whether your business requires a “quick start” solution or you do your own integration, IBM System x and BladeCenter systems provide highly reliable and flexible platforms that can scale quickly, easily, and inexpensively, so you can stretch your IT budget and confidently execute your business objectives—even as conditions change.

MORE ON THE WEB

- [System x solutions](#)

To gain further insight into these solutions, this section will look at a few examples.

Virtual Desktop for Smart Business

IBM Virtual Desktop for Smart Business 6.0 is designed to enhance the overall quality and reliability of virtual desktops, with options that cover a range of end-user audiences: task workers, knowledge workers, mobile users and temporary workers. Unlike first generation virtual desktop infrastructure (VDI) solutions, the latest offering from IBM can transform end user computing by optimizing both IT efficiency and user



MORE ON THE WEB

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



Overview of IBM Virtual Desktop for Smart Business (2:24)

flexibility. It is designed to give users constant, consistent, high quality access to virtual desktops from a variety of end point devices with enhanced management, integration, disaster recovery and mobility capabilities.

Here are some quick Virtual Desktop facts:

- Reduce the total cost of ownership for employee desktops by spending less time and money building, managing, patching, upgrading and supporting PCs
- Reduce the resources spent on deploying and upgrading operating systems and desktop software
- Provide secure remote access to user desktops and applications while keeping your confidential data safe and backed up
- Deliver a high quality user experience quickly and easily, regardless of time, location, connection, or device.



SmartCloud Entry

IBM SmartCloud Entry is robust software that simplifies management of your virtualized environment. Users can request and provision an environment quickly through an easy-to-use web-based interface. IT managers can monitor and manage this environment for improved efficiency and utilization of the data center. IBM SmartCloud Entry v2.4 release includes heterogeneous server architecture support from a single Smart-

MORE ON THE WEB

- [SmartCloud Entry details on PartnerWorld](#)
- [SmartCloud Entry Sales Kit](#)
- [SmartCloud Entry details on IBM.com](#)
- [SmartCloud competitive info on COMP](#)
- [SmartCloud blog search](#)
- [SmartCloud Entry Twitter search](#)

Cloud Entry user interface. This enables greater flexibility as customers can manage across System x, BladeCenter, IBM Flex System, and PureFlex platforms with a single, consolidated image of SmartCloud Entry software. IBM intends to update the IBM SmartCloud Entry offerings to support Hyper-V and KVM virtualized workloads to provide more options and greater flexibility for cloud infrastructures.

Powerful new features include multi-cloud support, e.g., across geographies and groups of tiered hardware and project level customization, with new automation, e.g., that can give one team's project sandbox test hardware, whereas another team project is getting full production ready hardware; with expirations and approvals at the project level.

Here are some quick Starter Kit for Cloud facts:

- Improves data center efficiency and time to value



- Manages System x, IBM BladeCenter, IBM PureFlex System and IBM Flex System
- Multi-hypervisor support gives implementation choices
- Simple-to-deploy, easy-to-use, works with new or existing infrastructure
- Optimized with automation, security and resource sharing, and built-in metering and reporting.

BladeCenter Foundation for Cloud

Reduce complexity and risk with IBM BladeCenter Foundation for Cloud ([Figure S.1](#)). It provides the flexibility needed to make this easy with preintegrated systems and a pre-loaded management system. Comprehensively designed with everything needed to deploy a high-performance, reliable, and scalable fully virtualized data center, it comes with converged networking, virtualized servers, storage, and available start-up services to help you take the guesswork out of establishing a virtualized data center environment. BladeCenter Foundation for Cloud can help you get up and running in days, not weeks. This solution is built by combining the strength of the IBM System x platform and the advantages of the latest BladeCenter capabilities in the virtualized environment—including great performance, unmatched reliability, rapid scaling, high resiliency, and leading network bandwidth capacity as well as industry-leading virtualization technology from VMware. BladeCenter Foundation for Cloud is available in multiple configuration sizes to meet your organization's specific needs.



- [BladeCenter Foundation for Cloud details on PartnerWorld](#)
- [BladeCenter Foundation for Cloud details on IBM.com](#)
- [BladeCenter Foundation for Cloud competitive info on COMP](#)
- [BladeCenter Foundation for Cloud blog search](#)
- [BladeCenter Foundation for Cloud Twitter search](#)

Figure S.1. IBM BladeCenter Foundation for Cloud (and links to more detail).

Virtualized data centers built upon the BladeCenter Foundation for Cloud can help drive down your total cost of ownership by enabling you to more effectively manage and leverage your capital investments in IT assets. Based on BladeCenter systems, it provides a large network bandwidth capacity that exceeds competitor offerings and enables the rapid movement of virtual machine images, combined with a reduced cost of connectivity by up to 44 percent compared to traditional rack servers. Energy-smart design and integrated



power management capabilities help drive optimal utilization of valuable power and cooling resources. With greater visibility into key energy metrics across your IT assets, you can identify areas where energy consumption can be reduced. Built-in virtualization helps create a simplified, flexible IT environment that can save up to half of your valuable data center space while allowing you to more effectively use fewer resources. Storage virtualization is supported via the optional addition of IBM System Storage SAN Volume Controller, which also helps to increase management efficiency and resource utilization of heterogeneous storage assets.

Here are some quick BladeCenter Foundation for Cloud facts:

- Comprehensive virtualization platform with converged networking, servers, storage, and management
- High return on investment platform, large virtual machine capacity in a simple-to-manage package
- Fast and easy to order and deploy with tested configurations
- Reduce complexity and risk with best practices high availability designed in
- Energizes new performance and technology into existing data centers and opens easy pathway to cloud.

x86 Solutions for VMware

IBM and VMware can help you implement a reliable infrastructure with hardware and software designed for virtualization. As the first authorized reseller of VMware products, IBM offers the broadest portfolio of industry-standard x86 servers



with the System x and BladeCenter servers that can help you lower IT costs with unparalleled performance, extraordinary energy efficiency, and rock-solid reliability. Whether your business needs a virtual desktop solution or an enterprise-class server virtualization solution, IBM has you covered with innovative technology and exceptional services and support.

MORE ON THE WEB

- [x86 VMware solution info on PartnerWorld](#)
- [IBM VMware solution info on IBM.com](#)

x86 Solutions for SAP Environments

For 40 years, IBM and SAP have worked together to create powerful business solutions, delivering differentiating advantages that can help you align and integrate your processes, communicate with employees, partners, suppliers, and customers in new ways, improve efficiency, and fully utilize your IT investment to increase the value of your business. Whether your business supports a high-performance data center or a small office with limited IT skills, IBM offers a large portfolio of System x and BladeCenter servers for your diverse SAP workloads.

MORE ON THE WEB

- [SAP on System x info on PartnerWorld](#)
- [SAP applications for System x and BladeCenter info on IBM.com](#)
- [The benefits of running SAP solutions on System x and BladeCenter Redbook](#)
- [SAP solutions for SMB info on SAP.com](#)
- [IBM and SAP Alliance](#)



In this section, we will take a quick look at some IBM's x86 solutions for SAP environments.

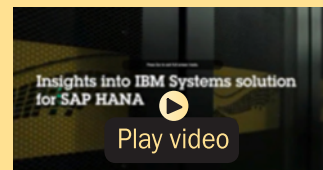
SAP HANA

SAP HANA, delivered on IBM eX5 enterprise servers with fifth-generation IBM Enterprise X-Architecture technology (eX5), helps transform the enterprise by addressing current needs while delivering the robust scalability and performance needed to accommodate growth. SAP HANA running on powerful IBM eX5 enterprise servers with Intel Xeon processor E7 family combines the speed and efficiency of in-memory processing with the ability to analyze massive amounts of business data—enabling companies to eliminate barriers between real-time events and real-time business decisions.

To support today's information-critical business environment, SAP HANA gives companies the ability to process huge amounts of data faster than ever before. The appliance lets business users instantly access, model, and analyze all of a company's transactional and analytical data from virtually any

MORE ON THE WEB

- [SAP HANA info on PartnerWorld](#)
- [SAP HANA info on IBM.com](#)
- [SAP HANA competitive info on COMP](#)
- [SAP HANA blog search](#)
- [SAP HANA Twitter search](#)
- [SAP HANA RedPaper](#)



SAP HANA overview (7:25)



data source in real time, in a single environment, without impacting existing applications or systems.

The result is accelerated business intelligence (BI), reporting and analysis capabilities with direct access to the in-memory data models residing in SAP In-Memory Database software. Advanced analytical workflows and planning functionality directly access operational data from SAP ERP or other sources. SAP HANA provides a high-speed data warehouse environment, with SAP In-Memory Database serving as a next-generation, in-memory acceleration engine.

Here are some quick SAP HANA facts:

- SAP HANA running on IBM eX5 enterprise servers enables faster access to SAP operational data and information with near real-time visibility into business operations
- Powerful and scalable IBM eX5 enterprise servers powered by the Intel Xeon processor E7 family speed in-memory processing, enabling the analysis of massive amounts of business and operational data
- Workload Optimized Solutions for SAP HANA simplify ordering and deliver leading performance and scaling with faster deployment
- Simple, seamless scalability with the IBM General Parallel File System (GPFS) eliminates the need for external storage and enables high availability and disaster recovery.

Business Warehouse Accelerator

IBM and SAP offer an integrated solution that enables customers to deploy SAP NetWeaver Business Warehouse Ac-



MORE ON THE WEB

- [Business Warehouse Accelerator details on PartnerWorld](#)
- [IBM SAP Alliance overview on PartnerWorld](#)
- [Business Warehouse Accelerator details on IBM.com](#)
- [Business Warehouse Accelerator competitive info on COMP](#)
- [Business Warehouse Accelerator blog search](#)
- [Business Warehouse Accelerator Twitter search](#)



Overview of IBM Business Warehouse Accelerator (5:27)

celerator (SAP NetWeaver BW Accelerator) in an easy, cost-effective way as a snap-in solution to an existing SAP NetWeaver BW landscape. Shipped with Intel Xeon processor-based servers, the IBM Systems solution for SAP NetWeaver Business Warehouse Accelerator offers users near real-time analytics when using SAP NetWeaver BW.

The IBM Systems solution for SAP NetWeaver BW Accelerator crunches through terabytes of SAP NetWeaver BW data in a matter of seconds, without the need for dedicated database administrators building and maintaining pre-defined aggregates or spending valuable time on query performance-tuning. IBM's automated High Availability solution for SAP NetWeaver BW Accelerator allows customers to implement SAP NetWeaver BW Accelerator as a mission-critical system, at minimal effort using standard functionality.

Here are some Business Warehouse Accelerator facts:

- Query processing up to 200 times faster than traditional approaches



- Smart data compression combined with in-memory processing and search engine-based parallel processing delivered with unmatched scalability, offering increased speed, flexibility, and business insights
- Turbo-charged insights and decision support that empowers SAP NetWeaver BW users.

SAP Discovery System

The IBM Systems solution with SAP Discovery system can help businesses speed development and deployment of new SAP applications, including SAP HANA. The IBM Systems solution with SAP Discovery system combines robust IBM hardware built on the Intel Xeon processor E5 family, a wide range of preinstalled SAP software, and a variety of demonstrations, examples, and hands-on exercises. The IBM Systems solution with SAP Discovery system offers a fast, easy, and cost-effective way to explore, evaluate, and train on SAP products before deploying new software on your infrastructure.

MORE ON THE WEB

- [SAP Discovery System info on IBM.com](#)
- [SAP Discovery System info on PartnerWorld](#)

The IBM Systems solution with SAP Discovery system uses the IBM System x3650 M4 server to provide a robust, compact, and cost-effective hardware platform for evaluating SAP software in a virtual environment using VMware ESXi software with Microsoft Windows and SUSE Linux operating systems. IBM System x3650 M4 servers offer an energy-smart, affordable, and easy-to-use rack solution for data center environ-



ments looking to significantly lower operational and solution costs. Built on the latest eight-core Intel Xeon processor E5 family, x3650 M4 two-socket servers offer a highly available, growth-flexible, and virtualization-capable hardware platform that can support the demanding workloads of a SAP implementation, even in a constrained data center. The x3650 M4 can be equipped with up to 18 memory modules, providing enhanced memory bandwidth and intelligent processing that deliver up to 54 percent better SAP application performance than the previous-generation server.

Here are some quick SAP Discovery System facts:

- Get quick access to a complete SAP environment for development, training, and proof-of-concept exploration activities
- Integrates a full range of preinstalled SAP software, development tools, and IBM DB2 to minimize risk, reduce costs, and accelerate implementation
- Built on the high-performance, energy-efficient, and cost-effective IBM System x3650 M4 server, powered by the Intel Xeon processor E5 family
- Designed to help users of SAP software evaluate, upgrade, prototype, and train in a risk-free environment.

Reference Architecture Solutions for Big Data

Reference architecture solutions for big data analytics from IBM are easy to order, easy to implement solutions. They include IBM hardware, software, and services, along with a standardized blueprint created from IBM enterprise experi-



ence and expertise. You can quickly deploy these cost-effective remedies to analyze data at rest, which is stored data such as databases, or data in motion, like streaming data, or both. The solutions are built around powerful, affordable, scalable IBM System x servers and IBM System Networking solutions combined with IBM InfoSphere BigInsights and InfoSphere Streams software, so you can deploy proven solutions quickly.

MORE ON THE WEB

- [Big data solutions info on IBM.com](#)
- [Hadoop InfoSphere BigInsights info on PartnerWorld](#)
- [InfoSphere Streams info on PartnerWorld](#)

Reference architectures for big data analytics provide technical blueprints that include a well-defined scope, a complete listing of requirements, and architectural decisions proven in the field including IBM Intelligent Cluster that helps make complex solutions simple. A reference architecture provides the value of synergy amongst each of the solution building blocks, with the flexibility needed to meet your requirements.

InfoSphere BigInsights takes open source Apache Hadoop and adds the enterprise-class functionality and integration necessary to help meet your critical business requirements. It provides a thoroughly tested and integrated solution that combines the benefits of leading-edge technologies with mature, enterprise-ready features. Organizations can run large-scale, distributed analytics jobs on clusters of cost-effective server hardware. This infrastructure leverages Hadoop's Map-Reduce framework to tackle very large data sets by breaking up the data across many nodes and coordinating data processing across a massively parallel environment.



Here are some quick big data reference architecture facts:

- Accelerates time-to-value with scalable, factory-integrated solutions
- Performs low-latency analysis on large volumes of stored or streaming data
- Analyzes data in its native format using IBM InfoSphere software
- Uses deep architectural services for rapid deployment and tuning.

Reference Architecture for Hadoop: Cloudera

IBM System x provides Cloudera-certified reference architectures for Apache Hadoop environments based on CDH, Cloudera's Hadoop distribution. The Cloudera-certified reference architecture solution from IBM for Hadoop big data analytics is an easy to order, easy to implement solution. It includes IBM System x hardware certified with Cloudera software and services along with a standardized blueprint based on IBM enterprise experience and expertise. You can quickly deploy this cost-effective business analytics solution to analyze data at rest, which is commonly stored in databases. This reference architecture is built around powerful, affordable, scalable IBM System x servers and IBM System Networking solutions so you can deploy your Cloudera-certified solution faster.

MORE ON THE WEB

- [Hadoop/Cloudera info on IBM.com](#)
- [Hadoop/Cloudera info on PartnerWorld](#)



Reference architectures certified for Cloudera-based big data analytics provide technical blueprints that include a well defined scope, a complete listing of requirements, and architectural decisions proven in the field. For further customer benefit, IBM has the ability to deliver reference architectures in preconfigured hardware platforms. These reference architectures provide the value of synergy across each of the solution building blocks, with the flexibility needed to meet your requirements.

Here are some quick Hadoop/Cloudera reference architecture facts:

- Accelerates time to value with faster ordering and quicker deployment
- Delivers tested configurations for Cloudera distribution of Apache Hadoop environments
- Performs low-latency analysis on large volumes of data
- Cost-effectively deploys on easy-to-use, scalable IBM System x servers
- Offers a preconfigured hardware platform from IBM
- Includes deep architectural services for rapid deployment and tuning.

IBM Systems Director

IBM Systems Director ([Figure S.2](#)) is an easy-to-use point-and-click platform management tool that is authorized for use with IBM systems. It streamlines the way physical and virtual



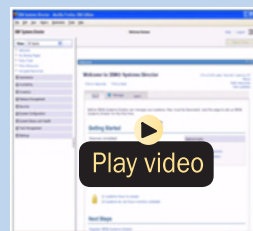
Express Edition provides an affordable foundation for systems management. It provides the integrated tools needed to efficiently visualize and communicate the relationships of physical and virtual systems that are discovered, monitor their health, define and receive threshold alerts, and update system firmware and operating environments.

Standard Edition includes all of the capabilities of the Express Edition, and adds advanced deployment, monitoring, and management features under the same console. With Systems Director Standard Edition, you can create and deploy virtual images that encapsulate an operating environment as well as any middle-ware and applications, while automatically configuring the storage attached network.

Enterprise Edition includes all of the capabilities of the Express and Standard editions plus adds tools for more comprehensive availability and performance management. It also provides more options for rapidly deploying and maintaining virtual server environments. With the Enterprise Edition, clients have the flexibility to deploy workloads in virtual machines as well as deployment into a pool of virtual system resources across multiple physical servers (called “system pools”).

VMControl helps you gain more from infrastructure wide virtualization, with cloud-ready management. The combination of IBM Systems Director and VMControl allows you to reduce the total cost of ownership of your virtualized environment—servers, storage, and networks—by decreasing management costs, increasing asset utilization, and linking infrastructure performance to business goals.

- [Systems Director info on PartnerWorld](#)
- [Systems Director info on COMP](#)
- [Systems Director info on IBM.com](#)
- [Systems Director VMControl info on IBM.com](#)
- [Systems Director detailed info on Infocenter](#)
- [Systems Director Wiki](#)
- [Systems Director Redbooks](#)
- [Systems Director on Facebook](#)



*IBM Systems Director
YouTube Channel*

Figure S.2. IBM Systems Director editions (and links to more detail).

systems are managed across multiple operating systems and virtualization technologies across IBM and non-IBM platforms.

IBM Systems Director helps administrators automate data center operations. Built-in automation capabilities enable IT administrators to schedule updates and configuration changes



to proactively avoid problems, and reduce the administrative burden of routine maintenance. Featuring simplified discovery and automated configuration, compute resources can be quickly added for management. Powerful grouping capabilities with nesting of resources help organize resources for efficient operation. A simplified interface is used to create action plans for events that can trigger automatic responses such as email notification or task execution.

To help drive system compliance and consistency, the update management feature can automatically notify users of out-of-date systems and provide simplified tasks to download and install updates.

Here are some quick Systems Director facts:

- Unifies the essential management of IBM servers, storage, and network devices, delivering a consistent look and feel for common management tasks that reduces operational complexity
- Integrates IBM's best-of-breed virtualization capabilities to provide new ways to simplify the management of physical and virtual platform resources
- Reduces energy costs and usage by monitoring and managing the energy and cooling needs of servers and storage
- Easy integration with enterprise service management tools from Tivoli as well as other third-party providers
- IBM Systems Director Editions provide options to select the level of leading management solutions based on your needs.



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.

MORE ON THE WEB

- [IBM Global Financing](#)

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

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

MORE ON THE WEB

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

entitled through the PartnerWorld program have access to IBM System x and IBM System Storage solutions and selected major competitive platform support, including:

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

Follow the links in the “More on the Web” box to access Technical Sales Support online (region selectable).

3

System x Product Quick Reference

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

Tower Servers

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

MORE ON THE WEB

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

x3100 M4

With support for next-generation Intel Xeon and Core i3 processor technology, the IBM System x3100 M4 ([Figure T.1](#))

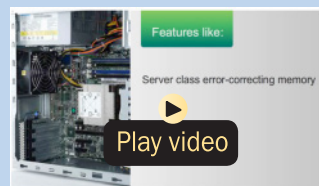




Specifications

Processor (max)	Intel Xeon E3-1200v2 series (quad-core) up to 3.6 GHz/8 MB/1600 MHz, Intel Core i3 2100 series (dual-core) up to 3.4 GHz/3 MB/1333 MHz, Pentium (dual-core) up to 3.0 GHz/3 MB/1333 MHz and low-cost Celeron
Number of processors (std/max)	1/1
Cache (max)	8 MB (processor and model dependent)
Memory (max)	1 × 4 GB standard, maximum 32 GB 1600 MHz DDR-3 UDIMMs via 4 DIMM slots
Disk bays (total)	3.5" simple swap 4 Serial ATA (SATA) or 2.5" hot-swap 8 SAS/SATA
Maximum internal storage	12 TB 3.5" simple swap SATA or 8 TB 2.5" hot-swap SAS/SATA
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	350 W fixed or 80-PLUS certified 300 W fixed (4U model with 3.5" simple-swap HDDs, model dependent)/430 W hot-swap redundant power supply (5U model with 2.5" hot-swap HDDs)
RAID support	ServeRAID-C100 for System x supports integrated RAID-0, -1; supports hardware RAID-0, -1, -10, -5, -6 for advanced data protection
Systems management	IMM2 with optional upgrade key to Remote presence
Operating systems supported	Microsoft Windows Server 2008 R2/Microsoft Windows Server 2008, SBS 2011, Red Hat Linux, SUSE Linux
Limited warranty	1-year customer replaceable unit and on-site limited warranty

- [x3100 M4 details on PartnerWorld](#)
- [x3100 M4 details on IBM.com](#)
- [x3100 M4 competitive info on COMP](#)
- [x3100 M4 configuration details](#)
- [x3100 M4 options](#)
- [x3100 M4 blog search](#)
- [x3100 M4 Twitter search](#)



x3100 M4 animated demo

Figure T.1. IBM System x3100 M4 at a glance (and links to more detail).



delivers strong performance for the price in a single-socket tower. Advanced features and functions, which come standard, include innovative integrated RAID capability, 1600 MHz dependable server-class memory, energy efficiency, low-cost tower- to-rack kit and high-capacity storage options for enhanced availability.

Extremely compact, the x3100 M4 fits easily in small spaces. Flexible, configure-to-order capabilities can provide the capacity and features you need, with multiple upgrade options to help meet future growth.

Tested and certified by IBM, the x3100 M4 delivers leadership depend-ability and systems management. The optional advanced RAID helps protect your data, while dual-networking adapters offer greater network bandwidth and redundancy. A full set of powerful integrated systems management tools makes the x3100 M4 easy to install and service.

Select configurations of the x3100 M4 are part of the IBM Express Advantage Portfolio, designed to meet the needs of small and mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick x3100 M4 facts:

- Delivers robust performance at a competitive entry-server price
- Offers flexibility in an optimized compact design
- Combines reliability and simple installation with innovative management technology.



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 mid-size businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3200 M3 facts:

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



Specifications

Processor (CPU GHz/L2 cache/front-side bus 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)	Up to 32 GB DDR-3 1066/1333 MHz ECC memory, 1, 2, and 4 GB UDIMMs; 1, 2, 4, and 8 GB RDIMMs
Expansion slots	2 PCIe x8 Gen2, 1 PCIe x4, 2 PCI (32-bit/33 MHz), 1 dedicated PCIe x4 for RAID-0, -1 controller
Disk bays (total/hot-swap)	4 3.5" simple-swap or hot-swap SATA hard disk drives (HDDs); 8 2.5" hot-swap SAS HDDs (special bid only)
Maximum internal storage	Up to 12.0 TB SAS or SATA HDDs
Network interface	Dual Gigabit Ethernet
Hot-swap components	4 3.5" SATA/SAS HDDs, 8 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	7 USB (2 front/4 rear/1 internal), 2 Ethernet, 1 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, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware ESX/ESXi
Limited warranty	1- or 3-year customer replaceable unit/on-site

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



x3200 M3 animated demo

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



- Saves on energy costs with integrated power-management tools.
- Improves manageability and security with powerful built-in features.

x3300 M4

The IBM System x3300 M4 ([Figure T.3](#)) is a scalable, easy-to-use solution for customers in need of a powerful, affordable business server that can fit under their desk. The x3300 M4 embraces the “pay as you grow” philosophy to maintain an affordable entry price while allowing you to scale and configure the server to meet your needs. This dual-socket system comes standard with a single Intel Xeon E5-2400 series processor and room to add a second as needed. The Feature on Demand option makes it easy to unlock an expanded set of capabilities with optional activation keys. Storage flexibility includes support for both 2.5-inch and 3.5-inch hard drives, offering a total capacity of up to 24 TB of hot-swappable storage.

The x3300 M4 features energy-smart Intel Xeon E5-2400 processors and high-efficiency 80 PLUS power supplies so you get improved performance over previous-generation servers and better energy efficiency, while still controlling costs. The x3300 M4 is an ideal solution for branch locations and distributed infrastructures thanks to features like remote management and optimization for unattended operation so you can maintain efficiency over distance.

Select configurations of the x3300 M4 are part of the IBM Express Portfolio designed to meet the needs of small and



Specifications

Form factor/height	Tower/4U (rack-mountable)
Processor (max)	Up to two Intel Xeon E5-2400 series processors
Number of processors (std/max)	1/2
Cache (max)	Up to 20 MB per processor
Memory (max)	Up to 192 GB, 12 slots (UDIMM/RDIMM)
Expansion slots	Up to 6 PCIe expansion slots; 5 PCIe slots standard, plus 1 additional PCIe slot when the second processor is populated; An optional PCI-X slot is available via an interposer conversion kit
Disk bays (total)	8 2.5" hot-swap or 4 3.5" hot/simple-swap bays standard, up to 16 2.5" hot-swap bays via optional upgrade kit, or 8 3.5" hot/simple-swap bays via optional upgrade kit
Maximum internal storage	16 TB of 2.5" hot-swap SAS/SATA drives (HDD upgrade options required) or 24 TB of 3.5" hot or simple-swap SAS/SATA HDDs
Network interface	Intel I350 Quad 1 Gb Ethernet Controller (2 ports std, 2 ports via FoD)
Power supply (std/max)	Fixed 460 W (1/1), redundant 550 W/750 W (1/2), 80 PLUS
Hot-swap components	Power supply and hard disk drives
RAID support	Integrated 3 Gbps software RAID-0, -1, -10 standard, optional 6 Gbps hardware RAID-0, -1, -10 or RAID-5, -50 or -6, -60
Systems management	IBM IMM2 with optional upgrade FoD for remote presence, Predictive Failure Analysis, diagnostic LEDs, IBM Systems Director and Active Energy Manager (model dependent)
Operating systems	Microsoft Windows Server 2008 R2, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware vSphere Hypervisor
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- [x3300 M4 details on PartnerWorld](#)
- [x3300 M4 details on IBM.com](#)
- [x3300 M4 competitive info on COMP](#)
- [x3300 M4 configuration details](#)
- [x3300 M4 options](#)
- [x3300 M4 blog search](#)
- [x3300 M4 Twitter search](#)



x3300 M4 animated demo

Figure T.3. IBM System x3300 M4 at a glance (and links to more detail).



mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick x3300 M4 facts:

- Meet capacity demand with a powerful, affordable server that is ready to grow
- Scale up quickly and easily with “pay as you grow” flexibility, including Feature on Demand upgrades
- Save money with low-voltage processors, high-efficiency power supplies, and remote management.

x3400 M3

The IBM System x3400 M3 ([Figure T.4](#)), with the latest Intel Xeon processors, offers flexibility, reliability, and security, as well as enhanced systems management features that make it an ideal choice for small, mid-size, and distributed businesses. This two-socket server provides a balance of performance, high availability, expansion capability, and ease of management in a stable, long-life platform. The x3400 M3 includes features designed to achieve affordable performance on a tower server, allowing you to replace your older systems as business grows.

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



Specifications

Form factor/height	Tower/5U (rack-mountable)
Processor (max)	4-core Intel Xeon E5620 2.40 GHz with 12 MB of cache per processor socket standard or six-core Intel Xeon X5675 3.06 GHz with 12 MB of cache per processor socket (configure to order only)
Number of processors (std/max)	1/2
Cache (max)	4 MB, 8 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	5 PCIe and 1 PCI standard; additional 2 PCI-X or 1 PCIe (configure to order only)
Disk bays (total)	Standard with 4 3.5" simple-swap Serial ATA (SATA) or 4 3.5" hot-swap SATA/Serial Attached SCSI (SAS) HDDs or 8 or 16 2.5" hot-swap SAS/SATA HDDs; 8 3.5" hot-swap SAS/SATA HDDs
Maximum internal storage	12 TB of 3.5" simple-swap SATA HDDs; 24 TB of 3.5" hot-swap SATA/SAS HDDs; or 16 TB of 2.5" hot-swap SAS or 16 TB of SATA HDDs
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
RAID support	Integrated 6 Gbps or 3 Gbps RAID-0, -1, -1E (model dependent), optional RAID-10, -5, -50, -6, -60
Systems management	Integrated systems-management processor
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere/ESX/ESXi
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

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

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



Now with low-voltage memory built into its already efficient design—as well as tools for managing energy components—the x3400 M3 helps you better manage power consumption and costs. Extensive systems management capabilities are also available right out of the box to help save time and money on administration.

Select configurations of the x3400 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick x3400 M3 facts:

- Provides optimum performance and processing capability at a lower cost
- Offers large storage capacity and flexible configurations to scale as needs grow
- Helps reduce energy costs and ease management with efficient design.

x3500 M4

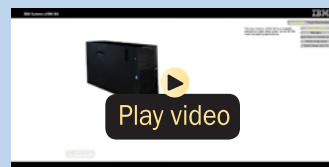
The IBM System x3500 M4 ([Figure T.5](#)) can deliver the scalability, reliable performance, and optimized efficiency for your business critical applications. Start with the basics and upgrade as your business changes without jeopardizing existing investments. Virtualizing the PC infrastructure into one server can provide access to a powerful server with abundant storage space, while significantly reducing IT costs.



Specifications

Form factor/height	Tower/5U (rack-mountable)
Processor (max)	Up to 2 Intel Xeon Processor E5-2600 product family
Number of processors (std/max)	1/2
Cache (max)	Up to 20 MB per processor
Memory (max)	Up to 768 GB 24 slots (UDIMM/RDIMM/LRDIMM)
Expansion slots	Up to 8 PCIe expansion slots; 6 PCIe slots standard, plus 2 additional PCIe slots when the second processor is populated. An optional PCI-X slot is available via an interposer conversion kit.
Disk bays (total/hot-swap)	8 2.5" hot-swap or 8 3.5" hot-swap bays standard, up to 32 2.5" hot-swap bays via optional upgrade kit, or 8 3.5" simple-swap bays via configure to order
Maximum internal storage	32 TB of 2.5" hot-swap SAS/SATA (HDD upgrade options required) or 24 TB of 3.5" hot-swap or simple-swap SAS/SATA HDDs
Network interface	Intel I350AM4 quad-port Gigabit Ethernet
RAID support	Integrated 6 Gbps hardware RAID-0, -1, -10, optional RAID-5, -6, -10, -50, -60
Systems management	IMM2 with dedicated management port
Operating systems	Microsoft Windows Server 2008 R2, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere Hypervisor
Limited warranty	3-year customer-replaceable unit and on-site limited warranty, next business day 9x5, service upgrades available

- [x3500 M4 details on PartnerWorld](#)
- [x3500 M4 details on IBM.com](#)
- [x3500 M4 competitive info on COMP](#)
- [x3500 M4 configuration details](#)
- [x3500 M4 options](#)
- [Redbook: x3500 M4 Product Guide](#)
- [x3500 M4 blog search](#)
- [x3500 M4 Twitter search](#)



x3500 M4 virtual tour

Figure T.5. IBM System x3500 M4 at a glance (and links to more detail).



The x3500 M4 supports the latest Intel microarchitecture, delivering intelligent performance enhancements that adapt to your workload environment. The x3500 M4 provides triple the storage capacity of the x3500 M3 without the cost of external devices. A flexible design and consolidated server help optimize intensive workloads and provide greater utilization, making the x3500 M4 a great choice for small and medium businesses.

The Integrated Management Module 2 (IMM2) and Unified Extensible Firmware Interface (UEFI) BIOS give the x3500 M4 a consistent system level code stack for superior setup, configuration, and ease of use. Optional remote control features provide the ability to manage, monitor, and troubleshoot from anywhere. Powerful and easy-to-use tools can help you manage both physical and virtual resources.

Select configurations of the x3500 M4 are part of the IBM Express Portfolio designed to meet the needs of small and mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick x3500 M4 facts:

- Offers flexible scalability features designed to grow with your business needs
- Provides abundant storage capacity to help safeguard data
- Enables easy installation, use, and management across long distances.



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](#)
- [Rack server comparison chart](#)

x3250 M3

The IBM System x3250 M3 ([Figure R.1](#)) 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 mid-size 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.

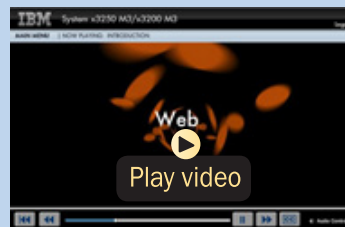
To help you stay focused on your core business, the x3250 M3 offers easy deployment, update management, and much more with its built-in IBM Tool Center. It delivers leadership reliability, management, and flexibility while helping protect your IT investments and lower your operating costs.



Specifications

Form factor/height	1U Rack
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)	2 3.5" simple-swap SATA or 3.5" hot-swap SAS/SATA, or 4 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
Hot-swap components	2 3.5" hot-swap SAS/SATA or 4 2.5" hot-swap SAS HDDs
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 mediakey, Trusted Platform Module 1.2
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere/ESX/ESXi
Limited warranty	1- or 3-year customer replaceable unit/on-site limited warranty

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



x3250 M3 animated demo

Figure R.1. IBM System x3250 M3 at a glance (and links to more detail).



Select configurations of the x3250 M3 are part of the IBM Express Advantage Portfolio, designed to meet the needs of mid-size businesses. Easy to manage, Express models/configurations vary by country.

Here are some quick x3250 M3 facts:

- Maximize performance with the latest Intel technology in a robust, flexible platform
- Achieve energy savings with built-in power management tools
- Minimize risks with easy serviceability and maintenance.

x3250 M4

The IBM System x3250 M4 server ([Figure R.2](#)) delivers the latest Intel processor technology in an ultra-small, single-socket rack server. Priced for value and built for performance, the x3250 M4 offers large capacity 1600 MHz memory, standard low-cost ServeRAID-C100 technology and dual network adapters. The x3250 M4 meets 80-PLUS certification for power supply units to enable greater energy efficiency and savings.

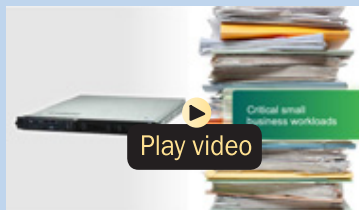
With a flexible subsystem and wide range of configuration options, a newly designed compact dual-port NIC adapter is dedicated in x4 slot, which offers another PCIe x8 slot-free. The x3250 M4 enables you to choose the level of computing power you need today and grow to meet increased application requirements. Choose hard disk drive size and storage capacity, dual- or quad-core processors, or even advanced protection RAID.



Specifications

Processor (max)	Intel Xeon E3-1200v.2 series (quad-core) up to 3.6 GHz/8 MB/1600 MHz, Intel Core i3 2100 series (dual-core) up to 3.4 GHz/3 MB/1333 MHz, Pentium (dual-core) up to 3.0 GHz/3 MB/1333 MHz
Number of processors (std/max)	1/1
Cache (max)	8 MB L3
Memory (max)	1 x 4 GB 1600 MHz DDR-3 UDIMM standard, maximum 32 GB via 4 DIMM slots
Expansion slots	1 PCIe x8, 1 PCIe x4 for hardware RAID-0, -1, compact dual-port NIC adapter (via CTO only)
Disk bays (total/hot-swap)	2 3.5" simple-swap SATA or 4 2.5" hot-swap/simple-swap SAS/SATA (simple-swap 2.5" via CTO only)
Maximum internal storage	6.0 TB, optical drive device optional
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	300 W (1/1) or redundant 460 W (1/2)
Simple-swap components	2 3.5" simple-swap SATA or 4 2.5" hot-swap/simple-swap SAS/SATA HDDs (model dependent)
RAID support	Simple-swap SATA models—ServerRAID-C100 for IBM System x; hot-swap SAS model hardware RAID-0, -1 is standard (model dependent); optional hardware RAID-5
Systems management	IMM2 with IPMI 2.0 and Serial over LAN, optional upgrade to Remote presence via Feature on Demand (FoD); IBM Systems Director, ServerGuide
Operating systems	Microsoft Windows Server 2008 R2/Microsoft Windows Server 2008, Red Hat Linux, SUSE Linux, vSphere 5.0
Limited warranty	3-year customer replaceable unit/on-site limited warranty

- [x3250 M4 details on PartnerWorld](#)
- [x3250 M4 details on IBM.com](#)
- [x3250 M4 competitive info on COMP](#)
- [x3250 M4 configuration details](#)
- [x3250 M4 options](#)
- [x3250 M4 blog search](#)
- [x3250 M4 Twitter search](#)



x3250 M4 animated demo

Figure R.2. IBM System x3250 M4 at a glance (and links to more detail).



The x3250 M4 offers standard ServeRAID-C100 for IBM System x servers, which supports RAID-0, -1, -10 functions. Powerful integrated systems management tools facilitate fast deployment and setup and can help you manage, monitor, and troubleshoot from virtually anywhere.

Select configurations of the x3250 M4 are part of the IBM Express Portfolio designed to meet the needs of small and mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick x3250 M4 facts:

- Provides next-generation performance in an innovative, compact design
- Offers a wide range of configuration options and flexibility for cost-effective growth
- Builds on IBM server tradition with integrated data protection and systems management capabilities.

x3530 M4

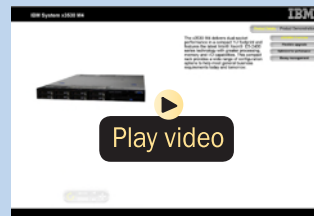
The IBM System x3530 M4 ([Figure R.3](#)) delivers dual-socket performance in a compact 1U footprint and features the latest Intel Xeon E5-2400 series technology with greater processing, memory, and I/O capabilities. Built with a focus on reduced total cost of ownership, the x3530 M4 provides 80-PLUS power supply certification to help enable energy savings. With a better balance between cost and system features, the x3530 M4 is an ideal platform for general business workloads.



Specifications

Form factor/height	1U Rack
Processor (max)	Up to 2 8-core Intel Xeon E5-2400 series processors
Cache (max)	20 MB per processor
Memory (max)	Up to 384 GB via 12 slots (UDIMM/RDIMM/LRDIMM)
Media bays	1 optional DVD bay for 2.5" model
Disk bays	8 2.5" or 4 3.5" hard disk drives (HDDs)
RAID support	Integrated 3 Gbps software RAID-0, -1, -10; optional hardware RAID-0, -1, -10 or RAID-5, -50 or -6, -60
Power supply (std/max)	1 fixed 460 W or up to 2 460 W or 675 W hot-swap redundant power supplies
Hot-swap components	Power supplies, fan modules, and hard disk drives
PCIe interface	2 PCIe slots (x16/x8) (1/0 or 0/2) + PCIe x4 for slotless RAID
Expansion slots	2 PCIe 3.0 slots
Ethernet interface	Intel Ethernet Controller I350 Dual 1 Gb on board + Intel I-350 Embedded Dual-Port GbE Activation for IBM System x (FoD)
USB ports	7 (2 x front, 4 x rear, 1x internal)
VGA ports	1 front (optional for 3.5" HDD models, model dependent)/1 back
Maximum internal storage	Up to 8 TB SAS/SATA (2.5" model) or 12 TB SAS/SATA (3.5" model)
Energy-efficiency compliance	Equivalent NEBS 1/ETSI compliance for power supply meets 80 PLUS Silver, Gold or Platinum and ENERGY STAR (model dependent)
Systems management	BM IMM2 with optional upgrade FoD to remote presence, Predictive Failure Analysis, diagnostic LEDs, standard Light path with optional advanced kit, IBM Systems Director and Active Energy Manager (model dependent)
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware vSphere
Limited warranty	3-year customer replaceable unit and onsite service, next business day 9x5, service upgrades available

- [x3530 M4 details on PartnerWorld](#)
- [x3530 M4 details on IBM.com](#)
- [x3530 M4 competitive info on COMP](#)
- [x3530 M4 configuration details](#)
- [x3530 M4 options](#)
- [x3530 M4 blog search](#)
- [x3530 M4 Twitter search](#)



x3530 M4 animated demo

Figure R.3. IBM System x3530 M4 at a glance (and links to more detail).



The x3530 M4 provides industry-leading reliability and quality. Options for advanced RAID and light path diagnostics help protect data and the system while hot-swap hard disk drives and redundant power and cooling are designed to promote uptime. For easier management, the x3530 M4 offers robust service support capabilities, including IBM Systems Director, ToolsCenter, and standard IBM Integrated Managed Module II.

Select configurations of the x3530 M4 are part of the IBM Express Portfolio designed to meet the needs of small and mid-size businesses. Easy to manage, Express models vary by country.

Here are some quick x3530 M4 facts:

- Offers more flexible configuration options and an easier upgrade path
- Balances energy-efficient performance with more affordable entry price and reduced total cost of ownership
- Helps deliver easier system management with industry-leading quality and reliability backed by IBM service and support.

x3550 M4

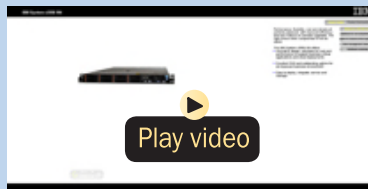
The IBM System x3550 M4 ([Figure R.4](#)) blends outstanding uptime, performance, and I/O flexibility for cost efficiency and rock-solid reliability. This compact rack server offers an energy-smart, affordable, and easy-to-use solution with a pay-as-you-grow design to help lower costs and manage risks. With more computing power per watt, support for the latest Intel



Specifications

Form factor/height	1U Rack
Processor (max)	Up to 2 8-core Intel Xeon E5-2600 series processors
Cache (max)	20 MB per processor
Memory (max)	Up to 768 GB via 24 slots (UDIMM/RDIMM/LRDIMM)
Media bays	1 optional ODD bay for 2.5" model
Disk bays	8 2.5" or 3 3.5" hard disk drives (HDDs)
RAID support	Integrated 6 Gbps hardware RAID-0, -1, -10; optional RAID-5, -50 or -6, -60
Power supply (std/max)	1/2 redundant 550 W ac, 750 W ac, or 750 W dc (model dependent)
Hot-swap components	Power supplies, fan modules, and hard disk drives
Network interface	4 x 1 GbE (std.), 2 x 10 GbE embedded adapter (slotless opt.)/Trusted Platform Module
Expansion slots	2 PCIe 3.0 slots, optional 1 PCI-X
USB ports	2 (3 for 3.5" model) front/4 back/1 internal
VGA ports	1 front/1 back
Maximum internal storage	Up to 8 TB (2.5" model) or 9 TB (3.5" model) SAS/SATA
Energy-efficiency compliance	Compliant with 80 PLUS Platinum and ENERGY STAR (model dependent)
Systems management	IBM IMM2 with optional FoD remote presence, Predictive Failure Analysis, diagnostic LEDs, light path diagnostics panel, Automatic Server Restart, IBM Systems Director and Active Energy Manager
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware vSphere
Limited warranty	3-year customer replaceable unit and on-site service, next business day 9x5, service upgrades available

- [x3550 M4 info on PartnerWorld](#)
- [x3550 M4 info on IBM.com](#)
- [x3550 M4 competitive info on COMP](#)
- [x3550 M4 configuration details](#)
- [x3550 M4 options](#)
- [Redbook: x3550 M4 Product Guide](#)
- [x3550 M4 blog search](#)
- [x3550 M4 Twitter search](#)



x3550 M4 animated demo

Figure R.4. IBM System x3550 M4 at a glance (and links to more detail).



Xeon E5-2600 series processors, and advanced memory support, the x3550 M4 offers balanced performance and density.

With redundant and hot-swap fans, disks, and power supplies, the x3550 M4 provides a resilient architecture ideal for business-critical applications. Predictive failure analysis and light path diagnostics provide advanced warning on power supplies, fans, VRMs, disks, processors, and memory. Redundant, hot-swap components make it easy to replace failures without taking your system down.

The Integrated Management Module 2 (IMM2) and Unified Extensible Firmware Interface (UEFI) give the x3550 M4 a consistent system-level code stack for superior setup, configuration, and ease of use. Optional Feature on Demand (FoD) remote presence provides the ability to manage, monitor, and troubleshoot from anywhere. Powerful tools can help you manage both physical and virtual resources.

Select configurations of the x3550 M4 are part of the IBM Express Portfolio designed to meet the needs of small and mid-size businesses. Easy to manage, Express models vary by country.

Here are some quick x3550 M4 highlights:

- Innovative design, optimized for cost and performance to support business-critical applications and cloud deployments
- Excellent RAS and outstanding uptime for an improved business environment
- Easy to deploy, integrate, service, and manage.



x3620 M3

The IBM System x3620 M3 ([Figure R.5](#)) gives growing businesses a flexible, two-socket server designed to keep costs down. Built on the latest Intel Xeon technology, the x3620 M3 helps lower costs by providing energy efficiency, integrated software RAID, and support for up to eight high capacity, low-cost 3.5-inch hard disk drives.

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

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

Select configurations of the x3620 M3 are part of the IBM Express Advantage Portfolio designed to meet the needs of mid-size businesses. Easy to manage, Express models vary by country.

Here are some quick x3620 M3 highlights:

- An ideal platform for cost-sensitive clients who require 2-socket performance and high storage capacity
- A dependable server with simplified management backed by IBM service, support, and tools



Specifications

Form factor/height	2U Rack
Processor (max)	Up to 2 3.06 GHz 6-core (3.20 GHz 4-core) Intel Xeon 5600 series processors with QuickPath Interconnect technology, up to 1333 MHz memory access speed; Also supports select Intel Xeon 5500 series processors
Number of processors (std/max)	1/2
Cache (max)	Up to 12 MB L3
Memory (max)	Up to 192 GB in 12 slots, using RDIMMs
Expansion slots	2 x8 PCIe Gen II slots and 1 x4 PCIe Gen II buried slot
Disk bays (total/hot-swap)	Up to 4 3.5" simple-swap SATA HDDs or up to 8 3.5" hot-swap SAS/SATA HDDs
Maximum internal storage	Up to 24 TB hot-swap SAS or SATA
Network interface	Integrated two ports
Power supply (std/max)	1/2; 460 W or 675 W HE each
Hot-swap components	Power supplies, HDDs
RAID support	Embedded software RAID-0, -1 or hardware RAID-0, -1, -1E or RAID-0, -1, -10 (optional -5 with SED function) or RAID-0, -1, -10, -5, -50 (optional -6, -60 with SED function and optional battery), model dependent
Systems management	IBM IMM with Virtual Media Key, Predictive Failure Analysis, Integrated Service Processor, light path diagnostics panel, automatic server restart, IBM Systems Director and Active Energy Manager, IBM ServerGuide
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware vSphere/ESX/ESXi, Oracle Solaris 10 (model dependent)

- [x3620 M3 details on PartnerWorld](#)
- [x3620 M3 details on IBM.com](#)
- [x3620 M3 competitive info on COMP](#)
- [x3620 M3 configuration details](#)
- [x3620 M3 options](#)
- [x3620 M3 blog search](#)
- [x3620 M3 Twitter search](#)



x3620 M3 animated demo

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



- Customizable design and flexible configurations for affordable growth.

x3630 M3

With support for the latest Intel Xeon processor technology, the IBM System x3630 M4 ([Figure R.6](#)) offers cost-optimized performance and memory with better energy efficiency. The x3630 M4 helps give growing businesses and branch offices a simpler, more affordable alternative to traditional enterprise offerings without sacrificing performance. For more storage-intensive workloads, the x3630 M4 can provide up to 42 TB of internal storage capacity.

The x3630 M4 offers added flexibility and an innovative design to help you more easily and cost effectively add new features as your requirements change. Depending on the model you select, these can include graphic card support, advanced RAID and light path diagnostics, hot-swap hard disk drives, rich remote-management capabilities, and a shared or dedicated port for system management. Expandable PCIe slots and NIC ports let you pay for the capabilities as you need them.

Built on IBM DNA, a simple design makes the x3630 M4 easier to manage and upgrade. Embedded RAID with optional hardware RAID, including flash and supercap RAID card support, redundant cooling fan modules, and hot-swap power supplies help enhance data protection and system availability. The x3630 M4 is backed by IBM service and support, including access to IBM Systems Director, ToolsCenter support, and IBM Integrated Managed Module capabilities.



Specifications

Form factor/height	2U Rack
Processor (max)	2-, 4-, 6-, 8-core Intel Xeon processor E5-2400 product family, up to 1600 MHz memory access speed
Number of processors (std/max)	1/2
Cache (max)	Up to 12 MB L3
Memory (max)	Up to 192 GB DDR-3 RDIMM memory via 12 DIMM slots
Expansion slots	2 - 4 x8 PCIe slots +x4 slotless RAID
Disk bays (total/hot-swap)	4, 8, x 3.5" simple-swap SATA HDDs or 8 x 3.5" hot-swap SAS/SATA HDDs +tape (value model) 12+2x 3.5" hot-swap (storage-rich model)
Maximum internal storage	Up to 24 TB disk (value model), up to 42 TB (storage-rich model)
Network interface	Intel Ethernet Controller I350 Dual 1 Gb on board + Intel I-350 Embedded Dual Port GbE Activation for IBM System x Feature on Demand (FoD)
Power supply (std/max)	Up to 2 550 W/750 W 80 PLUS certified PSU
Hot-swap components	Power supplies, hard disk drives
RAID support	Integrated 3 Gbps software RAID-0, -1, -10 for value entry model; optional hardware RAID-0, -1, -10 or RAID-5, -50 or -6, -60
Systems management	IBM Systems Director, IBM Systems Director Active Energy Manager, IMM (Integrated Management Module) with IPMI 2.0 support, UEFI (Unified Extensible Firmware Interface), IBM Tools-Center, status LEDs
Operating systems	Microsoft Windows Server, Red Hat Linux, SUSE Linux, VMware
Limited warranty	3-year customer replaceable unit and on-site limited warranty

- [x3630 M3 details on PartnerWorld](#)
- [x3630 M3 details on IBM.com](#)
- [x3630 M3 competitive info on COMP](#)
- [x3630 M3 configuration details](#)
- [x3630 M3 options](#)
- [x3630 M3 blog search](#)
- [x3630 M3 Twitter search](#)



x3630 M3 animated demo

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



Select configurations of the x3630 M4 are part of the IBM Express Portfolio designed to meet the needs of small and mid-size businesses. Easy to manage, Express models vary by country.

Here are some quick x3630 M4 facts:

- Helps reduce the cost of meeting general purpose and storage-intensive demands
- Offers more innovative design and flexible configurations for affordable growth
- Helps deliver enhanced reliability with simplified management backed by IBM service and support.

x3630 M4

With support for the latest Intel Xeon processor technology, the IBM System x3630 M4 ([Figure R.7](#)) offers cost-optimized performance and memory with better energy efficiency. The x3630 M4 helps give growing businesses and branch offices a simpler, more affordable alternative to traditional enterprise offerings without sacrificing performance. For more storage-intensive workloads, the x3630 M4 can provide up to 42 TB of internal storage capacity.

The x3630 M4 offers added flexibility and an innovative design to help you more easily and cost effectively add new features as your requirements change. Depending on the model you select, these can include graphic card support, advanced RAID and light path diagnostics, hot-swap hard disk drives, rich remote-management capabilities, and a shared



Specifications

Form factor/height	2U Rack
Processor (max)	2-, 4-, 6-, 8-core Intel Xeon processor E5-2400 product family, up to 1600 MHz memory access speed
Number of processors (std/max)	1/2
Cache (max)	Up to 20 MB L3
Memory (max)	Up to 384 GB DDR-3 RDIMM memory via 12 DIMM slots
Expansion slots	2-4 x8 PCIe slots +x4 slotless RAID
Disk bays	4, 8 x 3.5" simple-swap SATA HDDs or 8 x 3.5" hot-swap SAS/SATA HDDs +tape (value model), 12+2x 3.5" hot-swap (storage-rich model)
Maximum internal storage	Up to 24 TB disk (value model), up to 42 TB (storage-rich model)
Network interface	Intel Ethernet Controller I350 Dual 1Gb on board + Intel I-350 Embedded Dual Port GbE Activation for IBM System x Feature on Demand (FoD)
Power supply (std/max)	Up to two 550 W/750 W 80 PLUS certified PSU
Hot-swap components	Power supplies, HDDs
RAID support	Integrated 3 Gbps software RAID-0, -1, -10 for value entry model; optional hardware RAID-0, -1, -10 or RAID-5, -50 or -6, -60
Systems management	IBM Systems Director, IBM Systems Director Active Energy Manager, IMM (Integrated Management Module) with IPMI 2.0 support, UEFI (Unified Extensible Firmware Interface), IBM Tools-Center, status LEDs
Operating systems	Microsoft Windows Server, Red Hat Linux, SUSE Linux, VMware
Limited warranty	3-year customer replaceable unit and onsite limited warranty, next business day 9x5, service upgrades available

- [x3630 M4 details on PartnerWorld](#)
- [x3630 M4 details on IBM.com](#)
- [x3630 M4 competitive info on COMP](#)
- [x3630 M4 configuration details](#)
- [x3630 M4 options](#)
- [x3630 M4 blog search](#)
- [x3630 M4 Twitter search](#)



x3630 M4 animated demo

Figure R.7. IBM System x3630 M3 at a glance (and links to more detail).



or dedicated port for system management. Expandable PCIe slots and NIC ports let you pay for the capabilities as you need them.

Built on IBM DNA, a simple design makes the x3630 M4 easier to manage and upgrade. Embedded RAID with optional hardware RAID, including flash and supercap RAID card support, redundant cooling fan modules, and hot-swap power supplies help enhance data protection and system availability. The x3630 M4 is backed by IBM service and support, including access to IBM Systems Director, ToolsCenter support, and IBM Integrated Managed Module capabilities.

Select configurations of the x3630 M4 are part of the IBM Express Portfolio designed to meet the needs of small and mid-size businesses. Easy to manage, Express models vary by country.

Here are some quick x3630 M4 facts:

- Helps reduce the cost of meeting general purpose and storage-intensive demands
- Offers more innovative design and flexible configurations for affordable growth
- Helps deliver enhanced reliability with simplified management backed by IBM service and support.

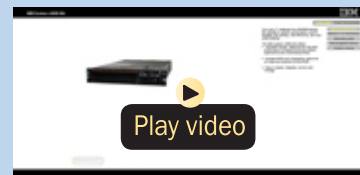
x3650 M4

The IBM System x3650 M4 ([Figure R.8](#)) blends outstanding uptime, performance, and I/O flexibility for cost efficiency and rock-solid reliability. The powerful server offers an energy-

**Specifications**

Form factor/height	2U Rack
Processor (max)	Up to 2 8-core Intel Xeon E5-2600 series processors
Cache (max)	20 MB per processor
Memory (max)	Up to 768 GB via 24 slots (UDIMM/RDIMM/LRDIMM/HCDIMM)
Media bays	Optional ODD and tape drive bay
Disk bays	16 2.5" or 6 3.5" HDDs or 32 1.8" SSDs
RAID support	IBM ServeRAID M5110e RAID on motherboard, integrated 6 Gbps hardware RAID-0, -1, -10, and optional RAID-5, -50 or -6, -60
Power supply (std/max)	1/2 redundant 550 W ac, 750 W ac, 900 W ac, or 750 W dc (model dependent)
Hot-swap components	Power supplies, fan modules, hard disk drives
Network interface	4 × 1 GbE (std.), 2 × 10 GbE embedded adapter (slotless opt.)/ Trusted Platform Module
Expansion slots	4–6 PCIe 3.0 ports, optional 4 PCI-X or 2 double-width PCIe (for GPU)
USB ports	2 front/4 back/2 internal
VGA ports	1 front/1 back
Max. internal storage	Up to 16 TB (2.5" model) or 18 TB (3.5" model) SAS/SATA
Energy-efficiency compliance	Compliant with 80 PLUS® Platinum and ENERGY STAR (model dependent)
Systems management	IBM IMM2 with optional FoD remote presence, Predictive Failure Analysis, Diagnostic LEDs, light path diagnostics panel, Automatic Server Restart, IBM Systems Director and Active Energy Manager
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware vSphere

- [x3650 M4 details on PartnerWorld](#)
- [x3650 M4 details on IBM.com](#)
- [x3650 M4 competitive info on COMP](#)
- [x3650 M4 configuration details](#)
- [x3650 M4 options](#)
- [Redbook: x3650 M4 Product Guide](#)
- [x3650 M4 blog search](#)
- [x3650 M4 Twitter search](#)

*x3650 M4 animated demo***Figure R.8.** IBM System x3650 M4 at a glance (and links to more detail).



smart, affordable, and easy-to-use rack solution with a pay-as-you-grow design to help lower costs and manage risks. With more computing power per watt and the latest Intel Xeon E5-2600 series processors, advanced memory support, and greater disk capacity for businesses requiring extreme storage, the x3650 M4 offers balanced performance and density.

With redundant hot-swap fans, disks, and power supplies, the x3650 M4 provides a resilient architecture ideal for business-critical applications. Predictive Failure Analysis and light path diagnostics provide advanced warning on power supplies, fans, VRMs, disks, processors, and memory. Redundant hot-swap components make it easy to replace failures without taking your system down.

The Integrated Management Module 2 (IMM2) and Unified Extensible Firmware Interface (UEFI) give the x3650 M4 a consistent system-level code stack for superior setup, configuration, and ease of use. Optional Feature on Demand (FoD) remote presence provides the ability to manage, monitor and troubleshoot from anywhere. Powerful and easy-to-use tools can help you manage both physical and virtual resources. Select configurations of the x3650 M4 are part of the IBM Express Portfolio designed to meet the needs of small and mid-sized businesses. Easy to manage, Express models vary by country.

Here are some quick x3650 M4 highlights:

- Innovative design, optimized for cost and performance, supports business-critical applications and cloud deployments
- Excellent RAS and outstanding uptime for an improved business environment



- Easy to deploy, integrate, service, and manage.

x3750 M4

Within a dense 2U design, the IBM System x3750 M4 ([Figure R.9](#)) provides advanced features and capabilities. These include support for up to four sockets and 48 DIMMs, mix and match internal storage, up to 16 HDDs or 32 eXFlash SSD drives, six hot-swap dual rotor fans, two power supplies, and integrated 1 Gigabit Ethernet (GbE) and 10 GbE networking with options for fiber or copper.

The x3750 M4 blends outstanding flexibility and expandability. The unique 2+2 socket design enables pay-as-you-grow processing and memory expansion to help lower cost and manage growth. The 5+3 PCIe socket design allows you to pay for I/O capabilities as needed. The x3750 M4's capabilities and performance allow clients to reduce total cost of ownership (TCO) by up to 52 percent over four years by consolidating multiple 2-socket servers into fewer 4-socket x3750 M4 servers.

The x3750 M4 excels in high performance computing (HPC), offering a balance of high computational power with high IOP local storage and fast I/O to external SAN storage. With an ultra-dense design, the x3750 M4 can help conserve floor space and lower data center power and cooling costs. Flexible eXFlash SSD storage options can deliver extreme internal storage performance to support your most demanding applications. The x3750 M4 is ideal for applications and workloads that have outgrown their 2-socket systems but do not require mission-critical RAS and availability features.



Specifications

Form factor/height	2U Rack
Processor (max)	Up to 4 4-, 6- or 8-core Intel Xeon E5-4600 series processors
Number of processors (std/max)	4
Cache (max)	Up to 20 MB per processor
Memory (max)	Up to 1.5 TB via 48 slots with 32 GB LR-DIMM
Expansion slots	5 x8 low-profile PCIe Gen3 slots; optional 3 x16 (mechanical) x8 (electrical) full-height/half-length PCIe Gen3 slots on an expansion riser
Media bays	Optional DVD drive
Disk bays (total/hot-swap)	Up to 16 2.5" HDDs or up to 32 1.8" eXFlash SSDs
Maximum internal storage	Up to 16 TB (2.5" HDD), 6.4 TB (1.8" eXFlash SSD)
Network interface	Embedded controller that supports 2 ports of 1 GbE (std.) and dual 10 GbE copper or fiber options
Power supply (std/max)	900 W or 1400 W (1 standard, 2 maximum)
Hot-swap components	Fan modules, hard disk drives, eXFlash SSD drives, power supply
RAID support	IBM ServeRAID-M5110e RAID on mother-board, integrated 6 Gbps hardware. RAID-0/-1 (std) with -5/-50 and -6/-60 upgrades
Systems management	IIBM IMMv2 with remote presence, Predictive Failure Analysis, Diagnostic LEDs, light path diagnostics panel, Automatic Server Restart, IBM Systems Director Active Energy Manager
USB ports	2 front/2 back/2 internal
VGA ports	1 front/1 back
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware vSphere
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- [x3750 M4 details on PartnerWorld](#)
- [x3750 M4 details on IBM.com](#)
- [x3750 M4 competitive info on COMP](#)
- [x3750 M4 configuration details](#)
- [x3750 M4 options](#)
- [x3750 M4 blog search](#)
- [x3750 M4 Twitter search](#)



x3750 M4 animated demo

Figure R.9. IBM System x3750 M4 at a glance (and links to more detail).



Here are some quick x3750 M4 facts:

- Incorporates outstanding features and capabilities in an ultra-dense design
- Offers advanced flexibility and expandability to meet changing business requirements
- Balances processing power, memory, and I/O bandwidth to optimize productivity and performance.

x3755 M3

The IBM System x3755 M3 ([Figure R.10](#)) is a four-socket server that provides outstanding performance and capacity in a data center-friendly 2U footprint. Based on the 8-, 12-, or 16-core AMD Opteron 6200 Series platform, the x3755 M3 helps organizations scale as workload demands increase, accommodating up to 64 processor cores and 512 GB of memory for cost-effective scaling.

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

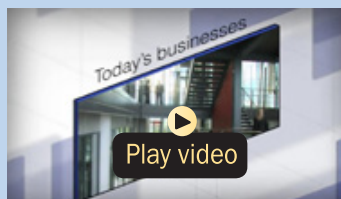
Offering flexible configuration options, the x3755 M3 is a natural choice for workloads that are outgrowing the performance and capacity available on their legacy two-processor servers. The x3755 M3 helps IT organizations bridge the gap between two-socket and four-socket systems by providing a



Specifications

Form factor/height	2U Rack
Processor (max)	Up to 3.0 GHz 8-core or 2.6 GHz 16-core AMD Opteron 6200 Series processors
Number of processors (std/max)	4/4
Cache (max)	12 MB L3
Memory (max)	Up to 512 GB DDR-3 RDIMM memory or 128 GB DDR-3 UDIMM memory via 32 DIMM slots
Expansion slots	Four PCIe slots
Disk bays (total/hot-swap)	Up to 8 hot-swap SAS/SATA, optional up to 6 simple-swap SATA
Maximum internal storage	Up to 24 TB
Network interface	Integrated quad Gigabit Ethernet ports
Power supply (std/max)	1/3 1100 W
Hot-swap components	Power supplies, fan modules, HDDs
RAID support	6 Gbps RAID-0, -1, -10 standard, upgradeable to hardware RAID-5
Systems management	IBM Systems Director, light path diagnostics panel, KVM over IP for remote management
Operating systems	Microsoft Windows Server, SUSE Linux, Red Hat Linux, VMware
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- [x3755 M3 details on PartnerWorld](#)
- [x3755 M3 details on IBM.com](#)
- [x3755 M3 competitive info on COMP](#)
- [x3755 M3 configuration details](#)
- [x3755 M3 options](#)
- [x3755 M3 blog search](#)
- [x3755 M3 Twitter search](#)



x3755 M3 overview (3:28)

Figure R.10. IBM System x3755 M3 at a glance (and links to more detail).



high-performance four-socket option in a cost-effective 2U design.

Here are some quick x3755 M3 facts:

- Meet growing workload demands with cost-effective processor and memory scaling
- Delivers value, performance, and memory for mid-size workloads
- Realize the benefits of four-socket architecture in a slim 2U server.

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.

x3690 X5

The IBM System x3690 X5 ([Figure E.1](#)) delivers four-processor performance, memory capacity, and reliability features in a slim, breakthrough two-processor system that incorporates Intel Xeon processors and fifth-generation IBM X-Architecture (eX5) technology.

By purchasing a system with two fewer processors, you can

cut your licensing costs in half while using less energy for a lower total cost of ownership. And you won't have to trade performance for a denser form factor. The x3690 X5 offers

MORE ON THE WEB

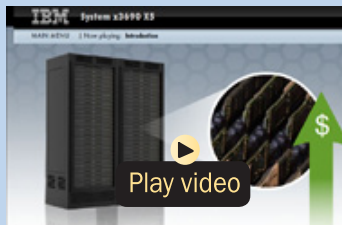
- [Overview of all System x Enterprise Servers](#)



Specifications

Form factor/height	Rack/2U per chassis
Processor (max)	Intel Xeon up to 2.4 GHz (10 core)/1066 MHz memory access
Number of processors (std/max)	1/2
Cache (max)	Up to 30 MB
Memory (std/max)	8 GB/1 TB PC3-10600 DDR3 or DDR3L, up to 2.0 TB with 32 GB DIMM and MAX5
Expansion slots	5 total PCIe Gen 2
Disk bays (total/hot-swap)	16/16 2.5" Serial Attached SCSI (SAS) or 24/24 1.8" SAS SSD internal storage
Maximum internal storage	9.6 TB SAS per chassis (supports 73.4 GB, 146.8 GB, 300 GB, 500 GB, and 600 GB hard disk drives, 50 GB and 200 GB SSD)
Network interface	Integrated dual Gigabit Ethernet with TCP-IP off-load engine, optional Emulex 10 GbE Virtual Fabric Adapter
Power supply (std/max)	675 W 220 V 1/4
Hot-swap components	Power supplies, fans, hard disk drives
RAID support	Integrated RAID-0, -1, optional RAID-5, -6
Systems management	Alert on LAN 2, automatic server restart, IBM Systems Director, IBM ServerGuide, IMM, light path diagnostics (independently powered), predictive failure analysis on hard disk drives, processors, VRMs, fans and memory, Wake on LAN, dynamic system analysis
Operating systems	Microsoft Windows Server 2008 (Standard, Enterprise and Data-center editions 64-bit), 64-bit Red Hat Enterprise Linux and SUSE Enterprise Linux, VMware vSphere Hypervisor

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



x3690 X5 animated overview

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



leadership performance, including the ability to better handle database transactions than industry-standard two-processor servers.

The x3690 X5 features greater flexibility to help you meet changing workload demands as your business grows. With MAX5, you can double the memory capacity of your two-processor system to 64 DIMM slots. Increase utilization and optimize your investments by fitting 100 percent more virtual machines per system at half the cost per virtual machine with MAX5 memory expansion. An easy upgrade path and customizable growth options offer freedom of choice. For example, you can add more memory without having to purchase unneeded processing capabilities.

Here are some quick x3690 X5 facts:

- Designed for virtualization, database, and enterprise workloads
- Achieves four-processor performance at a two-processor investment
- Grow to meet changing workload demands with unmatched memory expansion
- Own and operate your systems with less complexity and cost
- Get peace of mind with enterprise-class reliability and availability.

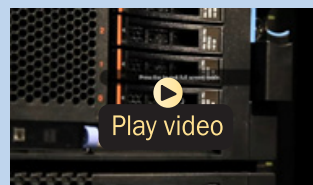
x3850 X5/x3950 X5

The new IBM System x3850 X5 and x3950 X5 ([Figure E.2](#)) offer superior performance and unbeatable reliability within

**Specifications**

Form factor/height	Rack/4U per chassis
Processor (max)	Intel Xeon up to 2.4 GHz (10-core)/1066 MHz memory access
Number of processors (std/max)	2/4 per node (optional 2-node support)
Cache (max)	Up to 30 MB
Memory (max)	32 GB/2.0 TB max PC3-10600 DDR3L, up to 3.0 TB with MAX5
Expansion slots	7 total PCIe half-length
Disk bays (total/hot-swap)	8/8 2.5" Serial Attached SCSI (SAS) or 16/16 SAS SSD
Maximum internal storage	4.8 TB per chassis (supports 8 x 73.4 GB, 146.8 GB, 300 GB, 500 GB, and 600 GB SAS hard disk drives; 8 x 160 GB and 500 GB SATA hard disk drives, or 16 x 50 GB and 200 GB solid state drives)
Network interface	10 Gbps Fibre Channel over Ethernet Dual Channel Converged Network Adapter, integrated dual Gigabit Ethernet with TCP-IP off-load engine, 10 Gbps Ethernet
Power supply (std/max)	1975 W 220 V 2/2
Hot-swap components	Power supplies, fans, hard disk drives, and solid-state drives
RAID support	Integrated RAID-0, -1; optional RAID-5, -6
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
Operating systems	Microsoft Windows Server 2008 (Standard, Enterprise and Data Center Editions 64-bit), 64-bit Red Hat Enterprise Linux, 64-bit SUSE Enterprise Linux (Server and Advanced Server), VMware vSphere Hypervisor
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- [x3850 X5/x3950 X5 details on PartnerWorld](#)
- [x3850 X5/x3950 X5 details on IBM.com](#)
- [x3850 X5/X3950 X5 competitive info on COMP](#)
- [x3850 X5/x3950 X5 configuration details](#)
- [x3850 X5/x3950 X5 options](#)
- [x3850 X5 blog search](#)
- [x3850 X5 Twitter search](#)
- [SAP HANA](#)



x3850 X5 at Acxiom (3:49)

Figure E.2. IBM System x3850 X5/x3950 X5 at a glance (and links to more detail).



an energy- and wallet-friendly design. Best of all, they offer ultimate flexibility to help you get what you need, when you need it. The x3950 X5 offers simple-to-deploy, preconfigured systems that are optimized for specific workloads. The x3950 X5 database optimized systems offer the right balance of processing power, memory, and eXFlash high-performance storage technology for your database workloads. x3950 X5 virtualization optimized systems with embedded VMware vSphere Hypervisor come standard with MAX5 for unmatched memory capacity, allowing you to increase the size and quantity of your virtual machines. The x3950 X5 SAP High Performance Analytics Appliance (HANA) helps provide super-charged analytics performance for businesses that need timely answers to vital business questions.

The x3850 X5 server allows freedom of choice with extremely flexible configurations plus memory expansion capabilities. A modular building block design lets you customize your system for current needs while providing the ability to react to changing workloads. Expand from a two-processor system up to four processors. Add a second system to create an eight-processor system. Start with two memory DIMMs and expand up to 192 with a dual-node system and two MAX5 memory expansion options. Reallocate resources as your environment changes. The x3850 X5 meets your needs today, while providing an easy, cost-effective upgrade path to change your environment when you're ready.

Here are some quick x3850 X5/x3950 X5 facts:

- Unmatched flexibility to meet changing workload demands



- Balanced systems for virtualization, database, and enterprise workloads
- Workload-optimized systems with customizable configurations for target workloads
- Achieve greater performance and utilization at a lower total cost
- Keep consolidated workloads up and running with mainframe-inspired reliability
- Easy-to-own, simplified power and systems management with an energy-smart design and remote access.

iDataPlex/Cluster Servers

Next we explore the iDataPlex and System x Clusters used for a wide variety of workloads including high performance computing, virtualization, and grid deployments.

iDataPlex

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

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

- New Direct Water Cooled dx360 M4 servers power the fastest and most energy efficient x86 supercomputer in the world
- 54 iDataPlex Systems listed in the latest Top 500 Supercomputer list (top500.org)



- 42 iDataPlex Systems listed in the latest Green 500 list (green500.org)
- iDataPlex received the 2010 HPCwire Readers' Choice Award for Best HPC Server Product or Technology.

iDataPlex dx360 M4

The IBM System x iDataPlex dx360 M4 ([Figure I.1](#)) is designed to optimize density and performance within typical data center infrastructure limits. The unique half-depth form factor is designed to help improve compute density in your space-constrained data center while also improving system cooling and energy efficiency.

With options from highly efficient low-voltage 60 W processors to high-performance 130 W processors, you can precisely balance your performance needs against energy usage. Up to two Intel Xeon Phi co-processors or NVIDIA GPUs can also be included as expansion options for those specialty workload needs. Networking choices include Ethernet and InfiniBand connectivity. Also choose from three storage configurations based on performance and capacity needs. A range of power supply selections round out flexible configuration options so you can choose the right system to support your workloads within your data center power and cooling envelope and budget limits.

Here are some quick dx360 M4 facts:

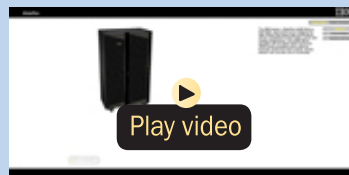
- Extraordinary performance for your most-demanding applications



Specifications

Form factor/height	Half-depth, 2U chassis with up to 2 planar trays
Processor (max)	2 8-core Intel Xeon E5-2600 Series processors
Number of processors (std/max)	2/2
Cache (max)	20 MB per processor
Memory (max)	Up to 512 GB DDR-3 via 16 DIMM slots (UDIMM/RDIMM/LRDIMM)
Expansion slots	2 PCIe Gen 3.0 slots (std.), optional 2 double width PCIe (for GPUs or co-processors)
Disk bays (total/hot-swap)	1 3.5" simple-swap SATA or 2 2.5" simple swap SAS/SATA HDDs or SSDs, or 4 1.8" simple-swap SSDs
Maximum internal storage	Up to 6 TB per 2U chassis
Network interface	2 x 1 GbE (std.), 2 InfiniBand QDR/FDR10 or FDR ports (slotless option), 2 x 10 GbE (slotless option)
Power supply (std/max)	1/2; 550 W, 750 W, or 900 W with 80 PLUS Platinum certification, redundant
Hot-swap components	Power supplies
RAID support	Integrated 6 Gbps hardware RAID-0, -1, -10, optional RAID-5, -6, -10, -50, -60
Systems management	IMM v2 with dedicated management port
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware vSphere
Limited warranty	3-year customer-replaceable unit and on-site limited warranty, next business day 9x5, service upgrades available

- [dx360 M4 details on PartnerWorld](#)
- [dx360 M4 details on IBM.com](#)
- [dx360 M4 competitive info on COMP](#)
- [Redbook: dx360 M4 Product Guide](#)
- [dx360 M4 blog search](#)
- [dx360 M4 Twitter search](#)



dx360 M4 virtual tour

Figure I.1. IBM iDataPlex dx360 M4 at a glance (and links to more detail).

- Half-depth design provides power and cooling efficiency and ultimate data center space savings
- Easy to deploy, integrate, service, and manage.

Intelligent Cluster

Intelligent Cluster solutions ([Figure I.2](#)) feature industry-leading IBM System x servers, storage, software, and third-party components that allow for a wide choice of technology within an integrated, delivered solution. IBM thoroughly tests and optimizes each solution for reliability, interoperability, and maximum performance, so clients can quickly deploy the system and get to work achieving their business goals.

Clients are expanding the use of Technical Computing and High Performance Computing to solve complex problems at a smaller scale, and smaller organizations typically lack the dedicated resources needed to deploy and manage cluster systems effectively. As an integral part of the IBM Intelligent Cluster portfolio, the IBM Platform HPC comprehensive management solution lets clients quickly put the system to work with minimal effort and skill. Platform HPC optimizes resources automatically to maximize utilization, and the easy-to-use web based tools make application deployment and ongoing management simple.

Here are some quick Intelligent Cluster facts:

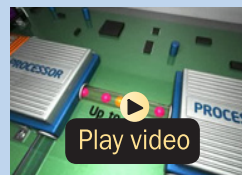
- Complex solutions made simple
- Best-of-industry technology, optimized solution design
- Increase results through automation and built-in intelligence



Specifications

Systems	Blade servers: HX5, HS23 Enterprise servers: x3850 X5, x3690 X5 iDataPlex servers: dx360 M4 Rack servers: x3550 M4, x3630 M4, x3650 M4, x3750 M4, x3755 M3
Ethernet switches	IBM System Networking, Brocade, Cisco, Juniper, LG Ericsson, Mellanox/Voltaire
Ethernet adapters	Chelsio, Mellanox, Emulex, Intel
InfiniBand switches and adapters	Mellanox, Intel
Fibre Channel	Brocade, Emulex, QLogic
Storage systems	System Storage DS5020, DS5100, DS5300, DS3950, DS3500, DS3512, DS3524
Storage expansion	EXP5000 Storage Expansion Unit; EXP 2512 Storage Expansion Unit; EXP 2524 Storage Expansion Unit; EXP 520 Storage Expansion Unit; EXP 395 Storage Expansion Unit
Storage solution	DDN SFA 10000 Fibre Channel, DDN SFA 12000 InfiniBand, NetApp DE6600
Graphic Processing Units (GPUs)	Nvidia K10, Tesla M2050, M2070, M2070-Q, M2090, M2075, and Quadro 5000
Operating systems	Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Microsoft Windows HPC Server 2008
Cluster management software	IBM Platform HPC; IBM Platform Cluster Manager; xCAT (Extreme Cloud Administration Toolkit); Moab Adaptive HPC Suite; Moab Adaptive Computing Suite; IBM General Parallel File System (GPFS) for Linux; IBM LoadLeveler; IBM Parallel Environment

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



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

Figure I.2. IBM Intelligent Cluster at a glance (and links to more detail).

4

PureFlex System and Flex System Elements

IBM PureFlex System and IBM Flex System

To meet today's complex and ever-changing business demands, you need a solid foundation of server, storage, networking, and software resources that is simple to deploy and can quickly and automatically adapt to changing conditions. You also need access to—and the ability to take advantage of—broad expertise and proven best practices in systems management, applications, hardware maintenance, and more.

For a pre-configured, pre-integrated infrastructure, IBM PureFlex System, part of the IBM PureSystems family of expert integrated systems, combines advanced IBM hardware and software along with patterns of expertise and integrates them into three optimized configurations that are simple to acquire and deploy to achieve faster time to value.

With IBM Flex System, the next evolution of blade technology is here—delivering extraordinary compute power, storage capability, and networking flexibility with the latest processors and a no-compromise design! IBM Flex System, the elements that make up IBM PureFlex System, allows you to build your own system to meet your unique IT requirements with a set



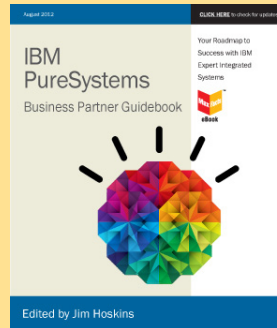


of no-compromise components including compute, storage, networking, and systems management.

Learn more about IBM PureFlex System and IBM Flex System in the IBM PureSystems Business Partner Guidebook.

MORE ON THE WEB

- [IBM PureSystems Business Partner Guidebook](#)



5

BladeCenter Product Quick Reference

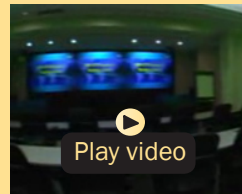
In this chapter, we explore the IBM BladeCenter products and guide you to resources that will help you succeed.

What Is a BladeCenter Server?

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

MORE ON THE WEB

- [Overview of BladeCenter servers](#)

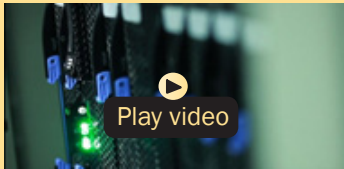


IBM BladeCenter: The right choice (6:55)

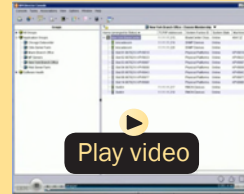




MORE ON THE WEB



*IBM BladeCenter
Video Library*



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

lower costs compared with other servers. Systems-management software helps with deployment, 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 re-purposing existing server blades or installing additional server blades in a “pay-as-you-grow” fashion.



IBM BladeCenter can help you implement new applications and functions affordably to address more and better business opportunities. With easily integrated IBM products providing a highly secure and robust platform for information sharing, you can more easily attain a collaborative working environment, keep your business up and running, and attain high levels of business resiliency.

BladeCenter servers have four elements:

- Chassis—The mechanical enclosure that holds everything else, including various optional modules that fit into bays in the chassis to provide additional function. The chassis is designed to be installed in a rack.
- Modules—Components that are installed in hot-swap module bays provided in the BladeCenter chassis. These modules provide a number of common functions needed by the installed blades, the chassis, and the other modules. Modules include things like power supplies, systems-management modules, cooling fans, and network switches. IBM has published the specifications for the BladeCenter modules and options. This should result in a greater variety of options from a wider range of vendors than before.
- Blade servers—Processors, memory, and other circuitry packaged on a card that is installed in the chassis. The server blades used in BladeCenter are of three basic types: Intel/AMD processor-based, IBM POWER microprocessor-based, or Cell Broadband Engine-based.



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

Chassis

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

BladeCenter S Chassis

The IBM BladeCenter S ([Figure C.1](#)) is the industry's first blade chassis uniquely designed for small and mid-size offices and distributed environments. Building-in simplicity and economy, BladeCenter S is designed to get big IT results from the smallest IT staffs. Small enough to sit under your desk, the new BladeCenter S chassis makes it easy and cost-effective for small and mid-size businesses to obtain IT results at levels traditionally reserved for large enterprises.

With six blade servers and a fully integrated storage area network (SAN), 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, Linux, IBM AIX, and IBM i—and integrates the hardware and software most used by mid-size businesses.

Here are some quick BladeCenter S chassis facts:

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



Specifications

Form factor	Rack/7U incorporates blade server bays and hot-swap storage high-availability midplane
Blade bays	Up to 6 1- or 2-processor, and up to three 4-processor
Disk bays	Up to 2 disk storage modules; each one can incorporate up to 6 3.5" SAS, Nearline SAS, or SATA, or an intermix of the disks
Standard media	Optional DVD multi-burner accessible from each blade server
Switch modules	4 switch module bays
Power supply module	Up to 4 (hot-swap and redundant 950 W/1450 W with load balancing, auto-sensing, and failover capabilities)
Cooling modules	4 hot-swap and redundant blowers standard
Systems management	1 management module standard
I/O ports	Keyboard, video, mouse, Ethernet, USB
Systems management	Open and easy systems management and deployment tools
Predictive failure analysis	Hard disk drives, processors, blowers, memory
Light path diagnostics	Blade server, processor, memory, power supplies, blowers, switch module, management module, hard disk drives, and expansion card
External storage	Support for IBM System Storage solutions (including DS and NAS family of products) and many widely adopted non-IBM storage offerings
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

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

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



- No special wiring needed—uses standard office power plugs with 100–240V.
- Flexible modular technology—integrates a family of IBM blade servers supporting a wide range of operating systems and applications.
- Easy to deploy, use, and manage—allows you to focus on your business, not your IT.
- Helps build greener IT infrastructures—IBM Cool Blue technology delivers a portfolio of tools that help plan, manage, and control power and cooling.

BladeCenter E Chassis

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

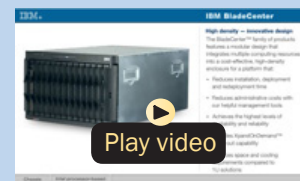
With its best-in-class energy-efficient design, BladeCenter E enables organizations to reduce power consumption without compromising processing performance. In fact, the system is up to 11 percent more efficient in power and cooling compared to the HP c-Class chassis to run the same configuration in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



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	Optional DVD multi-burner
Systems management hardware	1 Advanced Management Module standard; add an optional second module for redundancy
I/O ports	Keyboard, video, mouse, Ethernet, USB
Systems management software	Open and easy systems management and trial deployment tools
Light path diagnostics	Chassis has LEDs for power status, location, over temperature, information and status indicators on both front and back; power supplies, blade servers, management module, switch modules and blowers have light path diagnostics
External storage	Support for IBM System Storage solutions (including DS and Network Attached Storage (NAS) family of products) and many widely adopted non-IBM storage offerings
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- [BladeCenter E chassis details on PartnerWorld](#)
- [BladeCenter E chassis details on IBM.com](#)
- [BladeCenter E chassis Announcement Letter, Feb 06](#)
- [BladeCenter E chassis competitive info on COMP](#)
- [BladeCenter E configuration details](#)
- [BladeCenter E blog search](#)
- [BladeCenter E Twitter search](#)



BladeCenter E virtual tour

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



Here are some fast BladeCenter E facts:

- Maximizes productivity and minimizes power usage through energy-efficient design and innovative features
- Delivers extreme density and integration to ease data center space constraints
- Protects an organization's IT investment through IBM BladeCenter family longevity, compatibility, and innovation leadership in blades
- Supports the latest generation of IBM BladeCenter blades, providing investment protection
- Choice of 2000 W or 2320 W power supply to meet your IT infrastructure needs.

BladeCenter H Chassis

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

With IBM Open Fabric Manager, BladeCenter H can help organizations run applications even more efficiently by delivering a flexible, open, and connected infrastructure. IBM continues to build on its reputation for helping customers find innova-



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 2980 W ac high-efficiency power supplies with load-balancing and failover capabilities; Operating at 200-240 V
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	2 USB connections and an optional DVD multi-burner
Systems management software	Systems management and trial deployment tools
Predictive failure analysis	Internal storage, processors, blowers, memory
Light path diagnostics	Blade server, processor, memory, power supplies, blowers, switch module, management module, internal storage, and expansion card
External storage	Support for IBM System Storage solutions (Including DS and NAS family of products) and many widely adopted non-IBM storage offerings
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

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



BladeCenter H virtual tour

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



tive 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.

Here are some fast BladeCenter H facts:

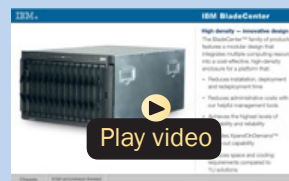
- Delivers high performance, energy efficiency, and versatility to run the most demanding applications in larger data centers
- Integrates new high-efficiency power supplies for leading energy efficiency
- Provides easy integration to promote innovation and help manage growth, complexity, and risk
- Protects your investment by being compatible with the entire IBM BladeCenter family
- Provides more than 12 percent greater performance per watt compared to the competition.

BladeCenter HT Chassis

IBM BladeCenter HT ([Figure C.4](#)) is a telecommunications-optimized version of IBM BladeCenter H. It delivers outstanding core telecom network performance and high-speed connectivity (more than 1.2 Tbps of aggregate throughput on the backplane) to the BladeCenter family. It is uniquely designed to support end-to-end, next-generation-network (NGN) applications, spanning the control, transport, and service planes for telecommunications equipment manufacturers and service providers.



- [BladeCenter HT chassis details on PartnerWorld](#)
- [BladeCenter HT chassis details on IBM.com](#)
- [BladeCenter HT chassis competitive info on COMP](#)
- [BladeCenter HT \(8740\) configurations details](#)
- [BladeCenter HT \(8750\) configuration details](#)
- [BladeCenter HT \(8740\) options](#)
- [BladeCenter HT \(8750\) options](#)
- [BladeCenter HT blog search](#)
- [BladeCenter HT Twitter search](#)



BladeCenter HT virtual tour

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

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

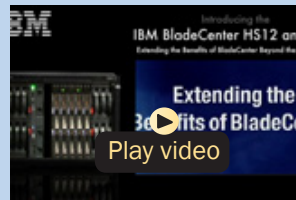
The IBM BladeCenter HS12 ([Figure H.1](#)) is a uniprocessor blade that offers the same uptime and availability features as dual-processor servers—at a lower price.



Specifications

Processor (max)	Single- or Dual-Core Intel Xeon up to 3 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 3 hot-swap SAS drives with optional storage and I/O blade)
Max. 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	Microsoft Windows Server, Windows Small Business Server, Red Hat Linux, SUSE Linux and IBM OS 4690
Limited warranty	1-year or 3-year customer-replaceable unit and on-site limited warranty

- [HS12 details on PartnerWorld](#)
- [HS12 details on IBM.com](#)
- [HS12 competitive info on COMP](#)
- [HS12 \(8028\) configuration details](#)
- [HS12 \(8028\) options](#)
- [HS12 blog search](#)
- [HS12 Twitter search](#)



HS12 overview

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



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

Here are some quick HS12 facts:

- Provides similar performance, integration, and reliability as dual-processor servers, at a more affordable price point.
- Deploys quickly and manages tasks with no loss of uptime.
- Helps reduce power and cooling costs to boost data center efficiency.

HS22

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

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

**Specifications**

Form factor	Single-wide (30 mm)
Processor (max)	Choice of 2 Intel Xeon 5600 series processors, up to 3.60 GHz
Number of processors (std/max)	1/2
Memory (max)	12 DDR-3 VLP DIMM slots (up to 192 GB of total memory capacity and memory speeds up to 1333 MHz) with memory sparing
Expansion slots	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	Virtual Fabric Adapter (10 GbE) ships integrated in some models Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE
Hot-swap components	Internal storage bays
RAID support	RAID-0, -1 and -1E (optional RAID-5 with battery-backed cache)
Systems management	Unified Extensible Firmware Interface (UEFI), IBM Integrated Management Module (IMM), Predictive Failure Analysis, optional embedded hypervisor for virtualization, IBM Systems Director Active Energy Manager, light path diagnostics, IBM Systems Director and IBM ServerGuide
Operating systems	Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware, Oracle Solaris

- [HS22 details on PartnerWorld](#)
- [HS22 details on IBM.com](#)
- [HS22 competitive info on COMP](#)
- [HS22 configuration details](#)
- [HS22 options](#)
- [GPU Expansion Blade](#)
- [HS22 blog search](#)
- [HS22 Twitter search](#)

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



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

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

Here are some quick HS22 facts:

- Improves service with unparalleled RAS features and innovative management
- Reduces costs through increased performance, utilization, and efficiency
- Manages growth and reduces risk on a BladeCenter platform with proven stability.

HS22V

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



Specifications

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

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



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

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



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

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

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

Select configurations of the HS22V are part of the IBM Express Advantage Portfolio designed to meet the needs of mid-size businesses. Easy to manage, Express models and configurations vary by country.

Here are some quick HS22V facts:

- Outstanding performance for virtualization with maximum memory capacity and CPU performance
- Improves service with unparalleled RAS features and innovative management
- Manages growth and reduces risk on a BladeCenter platform with proven stability.

HS23

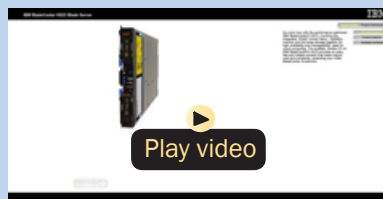
The IBM BladeCenter HS23 ([Figure H.4](#)) gives you the networking capacity you need to manage big data. The new Virtual Fabric-capable integrated 10 GbE is scalable up to four



Specifications

Form factor/height	Single-width (30 mm)
Processor (max)	Intel Xeon processor E5-2600 product family, with up to 8 cores, processing up to 16 simultaneous threads
Number of processors (std/max)	1/2
Cache (max)	20 MB
Memory (max)	256 GB at 1333 MHz (assuming 16 GB DIMMs), 16 DIMM sockets—VLP Registered ECC DDR3, at 1333 or 1600 MHz, memory mirroring and sparing supported
Expansion slots	1 CIOv slot (standard PCIe daughter cards) and 1 CFFh slot (high-speed PCIe daughter card)
Disk bays (total/hot-swap)	2 hot-swappable HDDs (SATA/SAS) or SSDs
Max. internal storage	2 TB
Network interface	Integrated Virtual Fabric for BladeCenter, Emulex BE3 Dual 10 Gb/ 1 Gb
RAID support	RAID-0, -1
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, IBM Server Guide, UpdateXpress, Dynamic System Analysis with Integrated RT Diagnostics, BladeCenter Open Fabric Manager
Operating systems	Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware
Limited warranty	3-year customer-replaceable unit and on-site limited warranty

- [HS23 details on PartnerWorld](#)
- [HS23 details on IBM.com](#)
- [HS23 competitive info on COMP](#)
- [HS23 configuration details](#)
- [HS23 options](#)
- [Redbook: HS23 Product Guide](#)
- [HS23 blog search](#)
- [HS23 Twitter search](#)



HS23 virtual tour

Figure H.4. IBM BladeCenter HS23 at a glance (and links to more detail).



ports to offer extreme speed. Sixteen DIMM slots, supporting up to 256 GB of DDR3 memory, deliver more and larger virtual machines per blade compared to previous generations. Simplify deployment of infrastructure for faster time-to-value with IBM FastSetup.

The HS23 offers outstanding performance, with support for the new 8-core Intel Xeon processor E5-2600 product family that processes up to 16 simultaneous threads. It has fast memory throughput and integrated RAID-0, -1, with optional RAID-5 with a battery-backed cache.

The HS23 provides integrated 10 GbE capability, delivering increased high-speed performance and I/O flexibility, running multiple protocols (FCoE/iSCSI), and freeing your CFFh slot to do more. Choose from a variety of adapters to suit your data center needs.

The HS23 is designed to help you be smarter about energy usage. Not only does it support low-voltage processors and memory, but it also has built-in energy monitors that help save on energy costs and consumption.

You can combine the HS23 with the BladeCenter E chassis, the most dense chassis in the industry, to optimize efficiency and minimize power consumption.

Here are some quick HS23 facts:

- Provides outstanding performance with the latest Intel Xeon processor E5-2600 product family and 1600 MHz memory
- Integrated 10 Gigabit Ethernet (GbE) to gain flexibility and easy scalability
- Backward compatible with all existing BladeCenter chassis.



HS23E

The IBM BladeCenter HS23E ([Figure H.5](#)) offers you flexible configuration options and provides you the energy efficiency and density you need. Combine the 12 DIMM slots supporting up to 192 GB of DDR3 memory at 1600 MHz with the integrated 1 Gigabit Ethernet (GbE) onboard for flexibility with value.

The HS23E offers value for performance, with support for the new 8-core Intel Xeon processor E5-2400 product family that processes up to 16 simultaneous threads and 1600 MHz memory. It is ideal for a variety of workloads such as business applications, virtualization, IT and web infrastructure, point of sale, and smart computing.

The HS23E is designed to help you be smarter about energy usage. It supports low-voltage processors and memory. The HS23E offers unbounded compatibility in all BladeCenter chassis, including BladeCenter E to provide density, optimize energy efficiency, and minimize power consumption.

The HS23E provides two ports of integrated 1 GbE and optional 4-port 10 GbE adapter for networking scalability. The option of software or hardware RAID provides flexibility to configure the HS23E to meet your business needs.

Select configurations of the HS23E are part of the IBM Express Portfolio designed to meet the needs of small and mid-size businesses. Easy to manage, Express models vary by country.

Here are some quick HS23E facts:

- An all-in-one, versatile blade that offers flexible configurations to meet your changing business needs



Specifications

Form factor/height	Single-width (30 mm)
Processor (max)	Intel Xeon processor E5-2400 product family, with up to 8 cores, processing up to 16 simultaneous threads
Number of processors (std/max)	1/2
Cache (max)	20 MB
Memory (max)	Capacity: 12 DIMM sockets at 192 GB Speed: VLP Registered ECC DDR3, at 1333 or 1600 MHz, memory mirroring and sparing supported
Expansion slots	1 CIOv slot (standard PCIe daughter cards) and 1 CFFh slot (high-speed PCIe daughter card)
Disk bays (total/hot-swap)	2 hot-swappable hard disk drives or solid state drives
Max. internal storage	2 TB (assumes 1 TB drives)
Network interface	Broadcom 5718 onboard NIC with dual Gigabit Ethernet ports with TOE
RAID support	RAID-0, -1: choice of software and hardware RAID
Systems management	Unified Extensible Firmware Interface (UEFI), IBM Integrated Management Module, Predictive Failure Analysis, optional embedded hypervisor for virtualization, Systems Director Active Energy Manager, light path diagnostics, IBM Systems Director, IBM Server Guide, UpdateXpress, Dynamic System Analysis with Integrated RT Diagnostics, BladeCenter Open Fabric Manager
Operating systems	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware
Limited warranty	3-year customer replaceable unit and on-site limited warranty

- [HS23E details on PartnerWorld](#)
- [HS23E details on IBM.com](#)
- [HS23E competitive info on COMP](#)
- [HS23E configuration details](#)
- [HS23E options](#)
- [HS23E blog search](#)
- [HS23E Twitter search](#)



HS23E virtual tour

Figure H.5. IBM BladeCenter HS23E at a glance (and links to more detail).



- Provides superior performance with the latest Intel Xeon processor E5-2400 product family and 1600 MHz memory.

HX5

Going beyond the industry standards with unique innovations from fifth-generation IBM X-Architecture technology (eX5), the new IBM BladeCenter HX5 ([Figure H.6](#)) enables unprecedented performance and utilization in a blade form factor for data-base and virtualization. With MAX5 scalability, the HX5 blade offers memory capacity of up to 320 GB—in a double-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.

Flexible configurations make it easy to implement the right system. Get up and running up to four times faster by standardizing on a single platform for two- and four-socket server needs. Harness the MAX5 module to boost memory without adding processors or software license costs.

Here are some quick HX5 facts:

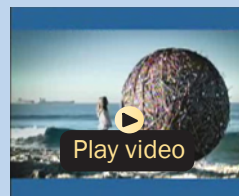
- Provides optimal performance for your demanding virtualization and database applications



Specifications

Form factor/height	Single-wide (30 mm), double-wide (60 mm)
Processor (max)	Intel Xeon E7-4800 and E7-2800 processors; 6/8/10 cores, up to 2.67 GHz; Up to 2 processors per single-wide HX5; scalable to 4 processors
Number of processors (std/max)	1/2 (scalable to 4)
Cache (max)	Up to 30 MB per processor (10 core)
Memory (max)	16 DDR-3 VLP DIMM slots, capacity up to 256 GB, per single-wide HX5 (scalable up to 640 GB max, at speeds up to 1067 MHz, via 40 DIMM slots, using a MAX5 expansion blade)
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 (with 50 GB SSDs)
Network interface	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE
RAID support	Optional RAID-0, -1, -1E
Systems management	Integrated systems management processor
Operating systems	Microsoft Windows, Red Hat Enterprise Linux, SUSE Linux Enterprise, VMware, Oracle Solaris
Limited warranty	3-year customer replaceable unit and on-site limited warranty

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



IBM BladeCenter viral video (1:15)

Figure H.6. IBM BladeCenter HX5 at a glance (and links to more detail).



- Reduces qualification time by standardizing on the same system for two- and four-socket server needs
- Scales memory without adding CPUs or software licenses
- Faster time-to-value by deploying workload-optimized systems.

Power Blades

These blade servers use the IBM POWER family of processors.

PS700, PS701, and PS702 Express

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

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

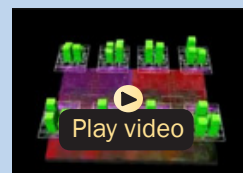


PS702 PS700 PS701

Specifications

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

- [PS700 Express details on PartnerWorld](#)
- [PS700 Express details on IBM.com](#)
- [PS700 Express competitive info on COMP](#)
- [PS700 blog search](#)
- [PS700 Twitter search](#)



POWER7 Chip animation

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



Specifications

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

- [PS701 Express details on PartnerWorld](#)
- [PS701 Express details on IBM.com](#)
- [PS701 Express competitive info on COMP](#)
- [PS701 blog search](#)
- [PS701 Twitter search](#)



POWER7 Innovation

Figure J.2. IBM BladeCenter PS701 Express 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	16 64-bit 3.0 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration
Level 2 (L2) cache	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core
Memory (std/max)	Base offering: 32 GB (8 x 4 GB); Express offering: 64 GB (16 x 4 GB), up to 128 GB maximum per blade, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz (4 GB DIMMs) 800 MHz (8 GB DIMMs)
Internal disk storage	2 300 or 600 GB 2.5" Serial Attached SCSI (SAS) 10K rpm non-hot-swappable disk drive; No disk drive required on base offering.
Networking	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual-gigabit Ethernet
I/O upgrade	2 PCI-E CIOv Expansion Card & two PCI-E CFFh High Speed Expansion Card
Optional connectivity	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
PowerVM	PowerVM Express Edition: Includes Virtual I/O Server (VIOS) with Integrated Virtualization Manager and PowerVM Lx86; PowerVM Standard Edition: Adds shared processor pools and micropartitioning; PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
Systems management	Integrated systems management processor, IBM Systems Director Active Energy Manager, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI compliant
Operating systems	AIX V5.3 or later, AIX V6.1 or later; IBM i 6.1 or later; SUSE Linux Enterprise Server 10 for POWER (SLES10 SP3) or later; SLES11 SP1 or later; Red Hat Enterprise Linux 5.5 for POWER (RHEL5.5) or later; RHEL5.1 or later
High availability	IBM PowerHA family

- [PS702 Express details on PartnerWorld](#)
- [PS702 Express details on IBM.com](#)
- [PS702 Express competitive info on COMP](#)
- [PS702 blog search](#)
- [PS702 Twitter search](#)



POWER7 overview (German)

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



Delivering on the promise for a highly dynamic infrastructure, the BladeCenter PS blades help in delivering superior business and IT services with agility and speed—all in a simple to manage highly efficient way. The PS700, PS701, and PS702 Express blades have been preconfigured and tested by IBM and are based on proven technology. Utilizing a 3.0 GHz 64-bit POWER7 processor and available in a four-core, eight-core, or 16-core configuration, they are optimized to achieve maximum performance for both the system and its virtual machines. Couple that performance with PowerVM and you are now enabled for massive workload consolidation to drive maximum system utilization, predictable performance, and cost efficiency.

Here are some quick PS700/701/702 facts:

- Consolidate on IBM BladeCenter Power Blades and virtualize applications to better utilize resources and amplify the already-significant advantages of BladeCenter efficiencies
- Simplifies your deployment with flexible configurations that make it easy to implement the right system and the ability to run AIX, IBM i, and Linux operating systems simultaneously
- Elegantly simple scalability allows easy expansion and pay-as-you-grow flexibility for the utmost in investment protection, performance growth, and time to value
- A secure, resilient infrastructure solution that helps drive down costs, reduce risk, improve energy efficiency, and enhance flexibility.



PS703 and PS704 Express

The IBM BladeCenter PS703 ([Figure J.4](#)) and PS704 ([Figure J.5](#)) Express are the premier blades for 64-bit applications. Minimize complexity, improve efficiency, automate processes, reduce energy consumption, and scale easily: these are the benchmarks that matter on a smarter planet. The new POWER7 processor-based PS blades automatically optimize performance and capacity at either a system or virtual machine level and benefit from the new POWER7 processor, which contains innovative technologies that help maximize performance and optimize energy efficiency. They represent one of the most flexible and cost-efficient solutions for UNIX, i, and Linux deployments available in the market. Further enhanced by their ability to be installed in the same chassis with other IBM BladeCenter blade servers, the PS blades can deliver the rapid return on investment that clients and businesses demand.

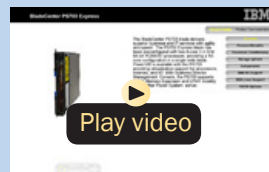
Delivering on the promise for a highly dynamic infrastructure, the BladeCenter PS blades help in delivering superior business and IT services with agility and speed—all in a simple to manage, highly efficient way. The PS703 and PS704 Express blades have been preconfigured and tested by IBM and are based on proven technology. Utilizing a 2.4 GHz 64-bit POWER7 processor and available in 16-core or 32-core configuration, they are optimized to achieve maximum performance for both the system and its virtual machines. Couple that performance with PowerVM and you are now enabled for massive workload consolidation to drive maximum system utilization, predictable performance, and cost efficiency.



Specifications

Form factor	Single-wide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
Processor cores	16 64-bit 2.4 GHz POWER7 cores with Altivec SIMD and Hardware Decimal Floating-Point acceleration
Level 2 (L2) cache	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core
Memory (std/max)	Base offering: 16 GB (4 × 4 GB); Express offering: 32 GB (4 × 8 GB), up to 128 GB maximum per blade, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz (4 GB DIMMs) 1066 MHz (8 GB DIMMs)
Internal disk storage	1 300 or 600 GB 2.5" Serial Attached SCSI (SAS) 10K rpm non-hot-swappable disk drive or 2 1.8" 177 GB Solid State Disks; No disk drive required on base offering
Networking	Integrated dual gigabit Ethernet ports; Virtualized ethernet provided by PowerVM VIOS
I/O upgrade	1 PCI-E CIOv Expansion Card and 1 PCI-E CFFh High Speed Expansion Card
Optional connectivity	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
PowerVM	PowerVM Express Edition: Supports 2 VMs/server and includes Virtual I/O Server (VIOS) and PowerVM Lx86 PowerVM Standard Edition: Scales to 10 VMs/core and adds suspend/resume and shared storage pools PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
Operating systems	AIX V5.3, V6.1, or AIX 7.1; IBM i 7.1 or 6.1.1; SUSE Linux Enterprise Server SLES11 SP1 or later; Red Hat Enterprise Linux 5.6 for POWER or later; RHEL6.0 or later
High availability	IBM PowerHA family

- [PS703 Express details on PartnerWorld](#)
- [PS703 Express details on IBM.com](#)
- [PS703 Express competitive info on COMP](#)
- [PS703 blog search](#)
- [PS703 Twitter search](#)



BladeCenter PS703 virtual tour

Figure J.4. IBM BladeCenter H with PS Blades, PS703 Express 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	32 64-bit 2.4 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration
Level 2 (L2) cache	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core
Memory (std/max)	Base offering: 32 GB (8 x 4 GB); Express offering: 64 GB (8 x 8 GB), up to 256 GB maximum, 32 DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz (4 GB DIMMs) 1066 MHz (8 GB DIMMs)
Internal disk storage	2 300 or 600 GB GB 2.5" Serial Attached SCSI (SAS) 10K rpm non-hot-swappable disk drive or four 1.8" 177 GB Solid State Disks; No disk drive required on base offering
Networking	Integrated quad gigabit Ethernet ports; Virtualized ethernet provided by PowerVM VIOS
I/O upgrade	2 PCI-E CIOv Expansion Cards and 2 PCI-E CFFh High Speed Expansion Cards
Optional connectivity	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
PowerVM	PowerVM Express Edition: Supports 2 VMs/server and includes Virtual I/O Server (VIOS) and PowerVM Lx86 PowerVM Standard Edition: Scales to 10 VMs/core and adds suspend/resume and shared storage pools PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
Operating systems	AIX V5.3, V6.1, or AIX 7.1; IBM i 7.1 or 6.1.1; SUSE Linux Enterprise Server SLES11 SP1 or later; Red Hat Enterprise Linux 5.6 for POWER or later; RHEL6.0 or later
High availability	IBM PowerHA family

- [PS704 Express details on PartnerWorld](#)
- [PS704 Express details on IBM.com](#)
- [PS704 Express competitive info on COMP](#)
- [PS704 blog search](#)
- [PS704 Twitter search](#)

Figure J.5. IBM BladeCenter PS704 Express at a glance (and links to more detail).



Here are some quick PS703/704 facts:

- Consolidate on IBM BladeCenter PowerBlades and virtualize applications to better utilize resources and amplify the already-significant advantages of BladeCenter efficiencies
- Simplifies your deployment with flexible configurations that make it easy to implement the right system and the ability to run AIX, IBM i, and Linux operating systems simultaneously
- Realize innovation with a flexible, scalable architecture that lets you choose the right solution for your dynamic business and delivers the utmost in investment protection, performance growth, and time to value
- A secure, resilient infrastructure solution that helps drive down costs, reduce risk, improve energy efficiency, and enhance flexibility.

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

MORE ON THE WEB

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



SCSI (SAS), helping to simplify blade I/O management and deployment so you can concentrate on realizing innovation in your business.

BladeCenter Open Fabric Manager

IBM BladeCenter Open Fabric Manager software is designed to help you easily manage I/O and network interconnects by virtualizing network parameters such as the World Wide Name (WWN) and Media Access Control (MAC) addresses. When you replace a blade or failover from one blade in a chassis to another blade in a different chassis, the LAN and SAN configurations are not affected. Once installed, the utility is resident in the built-in Advanced Management Module (AMM) so you can pre-configure LAN and SAN connections—I/O connections are made automatically when you plug in a blade. No special tools or training are required; just manage with an easy-to-use Web-based user interface. And since this software can be deployed on both new and existing BladeCenter systems through firmware upgrades, you can protect your current BladeCenter investment and simplify I/O.

Here are some BladeCenter Open Fabric Manager highlights:

- Save time—pre-configure over 11,000 LAN and SAN connections once for each blade server
- Manage growth and complexity—up to 256 chassis and up to 3,584 blade servers from a single Advanced Management Module



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 \(multiple videos\)](#)



BladeCenter Open Fabric Manager demo

- Remain open with infrastructure flexibility—works with all Ethernet, Fibre Channel, and SAS switch modules; across all chassis and most x86 and Power processor-based blade servers
- Connect with ease—with a simple Web-based user interface based on IBM Systems Director 6.2 for easy server and switch set-up, deployment, and management
- Manage risk to keep your business running—available automated I/O failover to standby blade.

Virtual Fabric

As server virtualization technology becomes more prevalent within data centers, more dynamic performance is needed for network bandwidth to satisfy these demands. With our Virtual Fabric solution for IBM BladeCenter, IBM can help you break the I/O bottleneck by allowing you to allocate bandwidth where it's needed, delivering maximum application agility.



Offering a full range of virtualization and convergence capabilities, the same network hardware can act as Ethernet, iSCSI, or Fibre Channel over Ethernet (FCoE) with bandwidths allocated in increments from 100 Mb to 1 Gb. The next-generation Virtual Fabric for IBM BladeCenter is the fast, flexible, easy, and reliable solution for I/O virtualization.

MORE ON THE WEB

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

Here are some overall Virtual Fabric facts:

- Requires up to 50 percent fewer adapters and up to 75 percent fewer switch modules
- Up to 64 percent lower energy consumption
- Simplified cabling and management
- Easily integrates into clients' existing setup (virtual or non-virtual).

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

IBM BladeCenter Virtual Fabric 10 Gb Switch Module

The IBM BladeCenter Virtual Fabric 10 Gb Switch Module 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



MORE ON THE WEB

- [IBM BladeCenter Virtual Fabric 10 Gb Switch Module Redbook info](#)
- [IBM BladeCenter Virtual Fabric 10 Gb Switch Module info on PartnerWorld](#)

Ethernet (FCoE) capable top-of-rack switch. This feature is available with software 6.3 and above at no additional cost.

Not only is this the most attractively priced 10 Gb switch when you factor in the switch, cables/transceivers, and software licenses, it also works with BladeCenter Open Fabric Manager, providing all the benefits of I/O Virtualization at 10 Gb speeds.

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

- Single-wide high-speed switch module
- Extremely low latency and unmatched throughput for IBM BladeCenter
- Fourteen internal auto-negotiating ports: 1 Gb or 10 Gb to the server blades
- Layer 2 and Layer 3 features standard
- 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 Advanced IBM Virtual Fabric functionality
- Support for as an FCoE Transit switch
- VMready brings VM awareness to the network for improved VM mobility
- Stacking support.

QLogic Virtual Fabric Extension Module

The QLogic Virtual Fabric Extension Module is another example of how IBM has been at the forefront of offering new technology to clients.

IBM was among the first

MORE ON THE WEB

- [QLogic Virtual Fabric Extension Module Redbook info](#)
- [QLogic Virtual Fabric Extension Module info on PartnerWorld](#)

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 IBM Virtual Fabric 10 Gb Switch Module for their LAN traffic can now combine it with this module and a Converged Network Adapter such as the QLogic 2-port 10 Gb CNA to converge their LAN and SAN on a single network. The QLogic Virtual Fabric Extension Module offers six ports of 8 Gb Fibre Channel connectivity, without the need for separate Fibre Channel expansion cards in the BladeCenter servers.

Emulex 10 GbE Virtual Fabric Adapter II/Advanced II

The Emulex 10 GbE Virtual Fabric Adapter II and Emulex 10 GbE Virtual Fabric Adapter Advanced II are enhancements to



the existing IBM BladeCenter Virtual Fabric portfolio. These adapters allow IBM clients to simplify their I/O infrastructure by reducing the number of switches needed inside the chassis. The Emulex 10 GbE Virtual Fabric Adapter II is a dual-port 10 Gb Ethernet card that supports 1 Gbps or 10 Gbps traffic, or up to eight virtual NIC (vNIC) devices.

The virtual NICs are configured to meet the client's mix of network connectivity and throughput demands for today's complex server application environments.

MORE ON THE WEB

- [Emulex 10 GbE Virtual Fabric Adapter II Redbook info](#)
- [Emulex 10 GbE Virtual Fabric Adapter II info on PartnerWorld](#)

Each physical 10 Gbps port can be divided into four virtual ports with bandwidth allocation in 100 Mbps increments to the maximum 10 Gbps per physical port. The Emulex 10 GbE Virtual Fabric Adapter II Advanced adds FCoE and iSCSI hardware initiator functionality.

The Emulex 10 GbE Virtual Fabric Adapter II supports the IBM Virtual Fabric 10 Gb Switch Module in IBM Virtual Fabric Mode. A firmware update is planned that will enable this card to function in Switch Independent Mode with other IBM BladeCenter 10 GbE switch offerings from Cisco and Brocade, and the 10 Gb Ethernet Pass-Thru Module for IBM BladeCenter.

Emulex 10 GbE Virtual Fabric Adapter II/Advanced II for HS23

The Emulex 10 GbE Virtual Fabric Adapter II (VFA II) and Emulex 10 GbE VFA Advanced II for IBM BladeCenter HS23 are the new options available to the existing IBM BladeCenter Vir-



MORE ON THE WEB

- [Emulex 10 GbE Virtual Fabric Adapter II for HS23 Redbook info](#)
- [Emulex 10 GbE Virtual Fabric Adapter II for HS23 info on PartnerWorld](#)

tual Fabric portfolio. These adapters are supported on the new HS23 blade to enable up to four uplink/downlink ports for increased I/O bandwidth and maximum performance. The combination of HS23 and Emulex options enables clients to simplify their I/O infrastructure by reducing the number of switches needed inside the chassis while supporting Ethernet and virtual NICs (vNICs) using the same hardware components.

The virtual NICs are configured to meet the client's mix of network connectivity and throughput demands for today's complex server application environments. Both physical 10 Gbps ports on the adapter can be divided into four virtual ports with bandwidth allocation in 100 Mbps increments up to the maximum of 10 Gbps per physical port. The Emulex 10 GbE VFA Advanced II adds FCoE and iSCSI hardware initiator functionality to enable data center infrastructure convergence.

Emulex 10 GbE Virtual Fabric Adapter/Advanced

The Emulex 10 GbE Virtual Fabric Adapter for IBM BladeCenter is a dual-port 10 Gb Ethernet card that supports 1 Gbps or 10 Gbps traffic, or up to eight virtual NIC

MORE ON THE WEB

- [Emulex 10 GbE Virtual Fabric Adapter Redbook info](#)
- [Emulex 10 GbE Virtual Fabric Adapter info on PartnerWorld](#)



devices. The virtual NICs are configured to meet the client's mix of network connectivity and throughput demands for today's complex server application environments. Each physical 10 Gbps port can be divided into four virtual ports with bandwidth allocation in 100 Mbps increments to the maximum 10 Gbps per physical port. The Emulex 10 GbE Virtual Fabric Adapter Advanced adds iSCSI hardware initiator functionality.

Brocade Converged 10 GbE Switch Module

The Brocade Converged 10 GbE Switch Module and Brocade 2-Port 10 Gb Converged Network Adapter are part of a leading Converged Ethernet solution for IBM BladeCenter that offers Fibre Channel investment protection, maximum bandwidth and performance, and simplicity in a converged environment. The Brocade Converged 10 GbE Switch Module also features Dynamic Ports on Demand capability through the Port Upgrade Key. This capability allows you to enable any combination of Fibre Channel and Ethernet ports based on your infrastructure requirements, and to experience Converged Ethernet benefits without significant investment.

MORE ON THE WEB

- [Brocade Converged 10 GbE Switch Module Redbook info](#)
- [Brocade Converged 10 GbE Switch Module info on PartnerWorld](#)



Brocade Converged 10 GbE Switch Module overview (2:43)



With the base model Converged 10 GbE Switch Module, you can enable 16 of the 30 ports on the switch (eight 10 Gb CEE external ports, eight 8 Gb FC external ports, and 14x 10 Gb CEE internal ports). If you purchase the Port Upgrade Key, you can enable all 30 ports on the Switch Module for a fully realized Converged Ethernet solution.

Broadcom 2-port 10 Gb Virtual Fabric Adapter

The Broadcom 2-port 10 Gb Virtual Fabric Adapter for IBM BladeCenter is a part of IBM's comprehensive networking portfolio of 1 GbE and 10 GbE adapters and delivers industry-leading performance and scalability per watt, reducing requirements for power and cooling. Protocol offloads enable efficient use of computing resources, support more virtual machines per CPU, and reduce the number of servers required to support data center demands. These adapters allow IBM clients to simplify their I/O infrastructure by reducing the number of switches needed inside the chassis.

The Broadcom 2-port 10 Gb Virtual Fabric Adapter can be configured to operate in virtual NIC mode, where up to eight virtual NIC devices can be enabled. Each physical 10 Gbps port can be divided into four virtual ports with bandwidth allo-

MORE ON THE WEB

- [Broadcom 2-port 10 Gb Virtual Fabric Adapter Redbook info](#)
- [Broadcom 2-port 10 Gb Virtual Fabric Adapter info on PartnerWorld](#)



MORE ON THE WEB

- [Brocade 10 Gb Gen 2 2/4 port Ethernet Expansion Card Redbook info](#)
- [Brocade 10 Gb Gen 2 2/4 port Ethernet Expansion Card info on PartnerWorld](#)

cation in 100 Mbps increments to the maximum 10 Gbps per physical port.

Broadcom 10 Gb (Gen 2) 2-port and 4-port Ethernet Expansion Cards

IBM is committed to offering both function and flexibility to our clients through our products. IBM BladeCenter was the first to offer end-to-end 10 Gb Ethernet in a blade server configuration, and these expansion cards are part of that offering. IBM offers two new versions of the card, 2-port and 4-port, both based on the new Broadcom 57711 controller. The existing cards, based on the proven Broadcom 57710 module, will continue to be available to support customers who want to maintain a consistent hardware configuration.

Ethernet Switch Modules

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

MORE ON THE WEB

- [Ethernet I/O info on IBM.com](#)

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 14 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.

MORE ON THE WEB

- [10 Gb Ethernet Pass-Thru Module Redbook](#)
- [10 Gb Ethernet Pass-Thru Module info on PartnerWorld](#)

IBM iFlow Director

Reduce complexity and costs associated with appliance sprawl by consolidating on an IBM BladeCenter platform with a high-performance, low-latency statistical load balancer integrated into a 10 Gigabit Ethernet (GbE) blade switch: IBM iFlow Director. The IBM iFlow Director is designed to deliver high availability, scalability, and lower cost of ownership for wireless gateways, security gateways, traffic management, service differentiation, lawful interception, and network surveillance solutions.

Networks are changing. Voice, video, storage, and data are quickly converging onto a single backbone. Growth in cloud services and Web 2.0 multimedia content is pushing bandwidth demand to the network edge. The convergence of fixed and mobile networks to a common next-generation network



Interface Protocol (IP) infrastructure is driving exponential growth in network traffic. Threats due to malicious attacks are increasing, and both

businesses and consumers are demanding that their service providers incorporate more defenses into the network. As a result, there is a growing demand for network appliance vendors who provide traffic inspection, bandwidth optimization, security, and lawful interception services to offer gateway solutions at high-speed traffic choke points.

Here are some quick IBM iFlow Director facts:

- High performance, low latency stateless statistical load distribution system for IBM BladeCenter H and HT; Delivers high availability with extensive server health-check mechanisms for rapid failure detection and recovery
- Operates in transparent Layer 2 mode or full Layer 3 mode
- Supports IPv4 and IPv6
- Supports advanced routing and policy-based routing for traffic steering
- Supports flow persistency in order to maintain consistent data flows
- Is extremely cost effective compared to external load balancers
- Is scalable from 1 to up to 84 servers across multiple BladeCenter chassis.

MORE ON THE WEB

- [iFlow Director info on IBM.com](#)
- [iFlow Director info on PartnerWorld](#)



MORE ON THE WEB

- [IBM BladeCenter Layer 2/3 Copper/Fiber Gigabit Ethernet Switch Module Redbook info](#)
- [IBM BladeCenter Layer 2/3 Copper/Fiber Gigabit Ethernet Switch Module info on PartnerWorld](#)

IBM BladeCenter Layer 2/3 Copper and Fiber Gigabit Ethernet Switch Module

As business applications become more and more demanding, data centers have become more complex, cumbersome, and expensive to manage. IBM BladeCenter offers solutions to help lower costs while enhancing performance by accommodating many integration technologies.

The IBM BladeCenter 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.

IBM BladeCenter Layer 2-7 Gigabit Ethernet Switch Module

IBM System Networking offers a Layer 2-7 Gigabit Ethernet Switch Module (GbE SM) that lets you consolidate full Layer 2-7 LAN switching capabilities within an IBM BladeCenter chassis. Consolidation flattens the topology of the data center infrastructure and reduces the number of discrete devices, management consoles, and manufacturers with which you must work. The L2-7 GbE SM includes advanced security,



MORE ON THE WEB

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

high availability, and performance features, further reducing the need for discrete function-specific appliances.

The result is dramatic simplification of the data center infrastructure and this translates into faster performance, higher availability, greater scalability, stronger security, simplified management, and lower TCO.

Here are some quick IBM Layer 2-7 facts:

- Improve application availability and boost application performance
- Increase application and server scalability
- Enhance application and server security
- Simplify server deployment and management
- Reduce data center total cost of ownership (TCO).

Cisco Catalyst Switch Module 3012

The Cisco Catalyst Switch Module 3012 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 Module 3012 is engineered with unique technologies specifically designed to meet



the rigors of blade server-based application infrastructure

MORE ON THE WEB

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

for the small and 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
- Operates in standard I/O module bay across all chassis types
- 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
- Supports Layer 2 and basic Layer 3 switching (static routing and RIP)
- 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 Module 3110G and 3110X are Gigabit Ethernet Switch Modules in a standard switch-bay form-factor for use in all BladeCenter chassis. These stackable switches are full wire-rated, non-blocking switches for use with high performance servers. The 3110G offers four external RJ-45 Gigabit Ethernet connections and the 3110X offers one external 10 Gb Ethernet slot (for use with an X2 trans-



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](#)
- [Cisco Catalyst Switch Module 3110X Redbook](#)

ceiver module) for making 10 Gb uplinks to backbone switches or routers.

Intelligent Copper Pass-Thru Module

Pass-thru modules are I/O options that can be used for direct connections of blade ports to the external infrastructure devices such as network switches. The Intelligent Copper Pass-thru Module for IBM BladeCenter

MORE ON THE WEB

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

(ICPM) is similar to a traditional network patch-panel. The Intelligent Copper Pass-thru Module connects the blade servers in the BladeCenter unit to an existing network infrastructure. No configuration of the copper pass-thru module is required. The Intelligent Copper Pass-thru Module provides a single connection from each blade to one RJ-45 connection that can go directly to an external switch or patch panel.

IBM BladeCenter 1/10 Gb Uplink Ethernet Switch Module

To address evolving networks, IBM System Networking offers a leadership product for the IBM BladeCenter portfolio that helps meet the demand of networks in transition like no other



MORE ON THE WEB

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

switch in the blade market: the IBM BladeCenter 1/10G Uplink Ethernet Switch Module.

The IBM BladeCenter 1/10G Uplink Ethernet Switch Module offers a great price-performance ratio. Its six 1 GbE RJ45 links can be easily deployed in today's networks, while its three 10 GbE SFP+ ports provide an easy migration path to tomorrow's 10 GbE networks. Compared to other vendor's 10 GbE switches, the 1/10GE switch prepares you for the future and is only half the price of some alternative offerings in the market. Advanced Layer 3 routing protocols like Open Shortest Path First (OSPF) and Border Gateway Protocol (BGP) are included in the switch price. Other blade Ethernet switch vendors require you to pay extra for these features.

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

- Improve application availability and boost application performance
- Future proof your data center with 1/10 Gigabit Ethernet (GbE) connectivity
- Enhance application security with network virtualization
- Simplify server deployment and management.



MORE ON THE WEB

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

Server Connectivity Module for IBM BladeCenter

The IBM BladeCenter Server Connectivity Module (SCM) provides a simple Ethernet interface option for connecting the IBM BladeCenter system to the network infrastructure.

Cisco Nexus 4001I Switch Module for IBM BladeCenter

The Cisco Nexus 4001I Switch Module is a blade switch solution for the BladeCenter H and HT chassis providing the server I/O solution required for high-performance, scale-out, virtualized, and non-virtualized x86 computing architectures. It is a line rate, extremely low-latency, non-blocking, Layer 2, 10 Gigabit Ethernet blade switch that is fully compliant with Fibre Channel over Ethernet (FCoE) and IEEE Data Center Bridging standards.

MORE ON THE WEB

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

Fibre Channel Switch Modules

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

MORE ON THE WEB

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



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](#)
- [Cisco 4 Gb 10 and 20-port Fibre Channel Switch Redbook](#)

Cisco 4 Gb 10- and 20-port Fibre Channel

The Cisco Systems 4 Gb 10-port and 20-port Fibre Channel Switch Modules for IBM BladeCenter provide high-performance end-to-end SAN solutions using 4 Gb Fibre Channel technology. These modules allow seamless integration of IBM BladeCenter into existing Cisco SANs, and have functions equivalent to the Cisco MDS 9124 switch.

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

The Brocade Enterprise 10-port and 20-port 8 Gb SAN Switch Modules for IBM BladeCenter deliver embedded Fibre Channel switching with the industry's fastest Fibre Channel throughput performance (8 Gbps). The 10-port and 20-port switches provide basic FC switch functionality while the Enterprise 20-Port model is a fully enabled switch with a complete set of advanced SAN fabric service licensed features.

MORE ON THE WEB

- [Brocade 10- and 20-port 8 Gbp SAN Switch info on PartnerWorld](#)
- [Brocade 10- and 20-port 8 Gbp SAN Switch info on IBM.com](#)
- [Brocade 10- and 20-port 8 Gbp SAN Switch Redbook](#)



MORE ON THE WEB

- [QLogic Intelligent 8 Gb Pass-Thru Fibre Channel Module info on PartnerWorld](#)
- [QLogic Intelligent 8 Gb Pass-Thru Fibre Channel Module Redbook](#)

QLogic Intelligent 8 Gb Pass-Thru Fibre Channel Module

The QLogic 8 Gb and 4/8 Gb Intelligent Pass-thru Modules for IBM BladeCenter provide seamless integration of an IBM BladeCenter solution into existing Fibre Channel storage networks using N_Port ID Virtualization (NPIV) technology. Each module concentrates multiple blade servers into the external ports, which in turn connect to external Fibre Channel switches that support NPIV. The pass-thru module presents one or more blade servers per port to the fabric. The module expands the fabric, but unlike a full fabric switch, it does not count against the fabric domain.

QLogic 20-port 8 Gb SAN Switch Module

The QLogic 20-port 8 Gb and 4/8 Gb SAN Switch Modules for IBM BladeCenter are a high-speed addition to the BladeCenter switch portfolio.

Each module helps enable

scalability in storage area network (SAN) size and complexity while maintaining ease of management. These modules are full-fabric Fibre Channel (FC) switches which enable high performance SAN connectivity of up to 8 Gbps.

MORE ON THE WEB

- [QLogic 20-port 8 Gb SAN Switch Module info on PartnerWorld](#)
- [QLogic 20-port 8 Gb SAN Switch Module Redbook](#)



InfiniBand Switch Modules

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

Voltaire 40 Gb InfiniBand Switch Module

Clients want to increase the use of their existing servers to reduce overall cost as well as the IT footprint within the organization. IBM BladeCenter offers several choices, including servers, chassis, and types of interconnect fabric. This solution offers

MORE ON THE WEB

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

end-to-end 40 Gb (4X QDR) InfiniBand connectivity. Clients can take advantage of the resiliency of BladeCenter as well as the performance of 4X QDR InfiniBand in a single package.

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.



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.

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

The IBM BladeCenter S SAS RAID Controller Module enables a fully redundant storage area network (SAN) based on the high-performance, fully duplex 3 Gbps technology. With this innovative solution, small offices across the world can benefit from blades, SAN storage, networking, and management, all integrated into a neat BladeCenter S chassis.

Here are some quick SAS RAID Controller Module facts:

- Fully redundant SAN integrated into BladeCenter S chassis
- High-performance, fully duplex, 3 Gbps speeds
- Support for RAID 0, 1, 5, 10

MORE ON THE WEB

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

- Supports two disk storage modules (DSM) with up to 12 x 3.5 inch SAS or Nearline SAS drives.

SAS Connectivity Module

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

Here are some quick SAS Connectivity Module facts:

- Enables up to 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 enable fully redundant capability in BladeCenter chassis
- High-performance, fully duplex, 3 Gbps speeds.

MORE ON THE WEB

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

6

IBM System Networking

The combination of powerful systems for virtualization and converged networks will greatly optimize data center efficiency. However, it requires a closer collaboration in the entire solution stack, including network switching. For years, IBM has been a trusted vendor for enterprise-class servers, and we are now pleased to offer a broad range of networking switches.

MORE ON THE WEB

- [Overview of all IBM System Networking on IBM.com](#)

System Networking Basics

Networking is an essential element in a dynamic infrastructure and an integral part of the strategy to reduce costs, improve services, and manage risk. Organizations must continue to focus on server and storage hardware optimization, technology enhancements, service management improvement, security, resiliency, and integration projects between IT and extended business assets. However, it is important to realize that the network is essential to support these initiatives and to ensure that the maximum benefit is derived.





Five important trends are reshaping today's data center networks:

1. Expanding system virtualization (e.g., VMware, Microsoft's Hyper-V, Xen, and KVM): Organizations of all sizes are enhancing their IT agility through the use of cloud-service architectures to enable rapid deployment of new services and to support rapid growth in any particular service. Additionally, organizations are improving their return on their IT investments through the use of virtualization to support server consolidation. It has been estimated that, in distributed computing environments, up to 85 percent of computing capacity sits idle. Server virtualization and consolidation, however, also consolidates network traffic, resulting in very different network traffic characteristics—driving up bandwidth requirements, starting at the server adapters and continuing through network access and into the network core.
2. Increasing Virtual Machine (VM) mobility: Once virtualized systems have been implemented, it is only natural to want to take advantage of VM-mobility capabilities (such as VMware's VMotion) for higher service availability and performance. Because of the way IP routing protocols work, however, in order for a VM to successfully move from one system to another, both systems must be on the same IP "subnet," driving the need for fundamental changes to data center network designs—also called "flatter" networks. In addition, however, many organizations use Virtual LANs (VLANs), Access Control Lists (ACLs), and Quality of Service (QoS) settings in the network to enforce systems security and improve service performance. Consequently, when a VM moves, the network



must be “VM aware” in order to move those network settings along with it.

3. Growth in distributed application models: Network traffic to and from transaction-based applications historically flowed into the data center directly to the server that would respond to the transaction and the response would flow straight back to the requester (often called “north/south” traffic). With today’s distributed application environments such as web services, service oriented architectures, and scale-out application environments, however, a single request can result in many sub-requests flowing back and forth between back-end systems (“east/west” traffic). It has been estimated, today, that 80 percent or more of data center traffic is east/west traffic. And, because that traffic is between computing systems, the overall responsiveness of the IT service is extremely sensitive to network latency. Consequently, in order to deliver satisfactory IT services, organizations must focus on very-low-latency switching at the server network edge switches.
4. Pressure to support network convergence: Storage networks have grown to where the costs of running separate networks are significant—and an attractive target for IT operational cost-cutting initiatives. Likewise, “lossless” Ethernet technologies (e.g., data center bridging standards) are getting to the point that they can provide a viable converged alternative to separate storage and data networks. And, with the pressures to increase bandwidths—for both storage and data network—being driven by virtualization and consolidation, storage and data network convergence seems inevitable.



Network upgrades, particularly for the server network edge switches, will be required in order to deliver those lossless Ethernet capabilities.

5. Increasing energy costs and constraints: Data center energy costs are significant and, in some cases, constraints on available power has prevented organizations from meeting growing IT service requirements. It has been estimated that networking equipment uses about one-sixth of a data center's overall power requirements making energy efficiency a key requirement for all new networking equipment. In addition, many data centers are adopting "hot-aisle/cold-aisle layouts" in order to improve cooling efficiency; consequently, it is important to ensure that the air flow of networking switches matches that of the rest of the systems in the rack.

Seeing that those trends all intersect at the data center server-access switches and recognizing that those switches can either facilitate or inhibit success in responding to those trends, IBM has made a significant investment in its System Networking portfolio. IBM offers:

- A portfolio of server-access switches from IBM System Networking (2010 BNT acquisition) with 1 Gb, 10 Gb, and 40 Gb Ethernet, delivering:
 - Substantially better price/performance
 - Virtual Machine awareness through VMready technology
 - Low-latency
 - Lossless Ethernet support



- Industry-leading energy efficiency
- Data center core and wide area network access switches
- Switches supporting Fiber Channel Over Ethernet and connectivity to the leading Fiber Channel SANs
- Campus networking switches with robust support for Power Over Ethernet (for devices such as IP telephones, wireless access points, and security cameras).

IBM System Networking Product Quick Reference

IBM System Networking enables an open approach to data center networking, ensuring that clients can implement smarter computing solutions using best-in-class networking equipment. In this section, we will explore the IBM System Networking portfolio of switches and routers.

IBM System Networking Switches

In October 2010, IBM System Networking was created at IBM to bring speed and intelligence to the network edge. In this section, we will take a look at the portfolio of offerings. In October 2011, IBM announced IBM Networking Operating System and IBM System Networking Element Manager, giving IBM System Networking our own OS and management tools for our portfolio of IBM engineered and designed products. You will also notice that IBM's strategy has moved to a focus on promoting and marketing our own portfolio of Ethernet offerings using IBM technical innovation.



IBM VMready

IBM VMready is switch-resident software that reduces the complexity of configuring and managing virtual machines throughout the network, making it VM-Aware. The network can be configured and managed for thousands of virtual ports (v-ports), rather than just a few physical ports, without manual intervention.

With VMready, as VMs migrate across physical hosts, so do their network attributes automatically. VMready allows you to manage virtual machines as they are added, moved, and removed, while retaining the same ACLs, QoS, and VLAN attributes. VMready allows for a “define once, use many” configuration that evolves as the server and network topologies evolve.

MORE ON THE WEB

- [VMready info on PartnerWorld](#)
- [VMready info on IBM.com](#)

VMready works with all virtualization products, including VMware, Microsoft’s Hyper-V, Xen, PowerVM, and KVM, without modification of Virtual Machine Hypervisors or guest operating systems. Virtual Vision enables network virtualization between data centers.

IBM Distributed Virtual Switch 5000V

The IBM System Networking Distributed Virtual Switch 5000V is an advanced, feature-rich distributed virtual switch for VMware environments with policy-based virtual machine (VM) connectivity. The IBM Distributed Virtual Switch (DVS) 5000V enables network administrators familiar with IBM System Networking switches to manage the IBM DVS 5000V just like IBM physical switches using advanced networking, trouble-



shooting, and management features so the virtual switch is no longer hidden and difficult to manage.

Support for Edge Virtual Bridging (EVB) based on the IEEE 802.1Qbg standard enables scalable, flexible management of networking configuration and policy requirements per VM, and eliminates many of the networking challenges introduced with server virtualization. The IBM DVS 5000V works with VMware vSphere 5.0 and beyond and interoperates with any 802.1Qbg-compliant physical switch to enable switching of local VM traffic in the hypervisor or in the upstream physical switch. This provides a competitive advantage for IBM with VMware.

MORE ON THE WEB

- [IBM DVS 5000V info on PartnerWorld](#)
- [IBM DVS 5000V info on IBM.com](#)

IBM Programmable Network Controller

The IBM Programmable Network Controller (IBM PNC) provides an OpenFlow-based network fabric with centralized control of network flows and unlimited virtual machine (VM) mobility—implemented in enterprise-class software. The controller is our first Software Defined Networking (SDN) offering, which is an emerging standard for building fast and intelligent networks.

With the Programmable Network Controller, data flow control is abstracted from static individual switches to dynamic programmable network-level control. Administrators can quickly create and control virtual networks for each application environment or network service. They can scale highly



virtualized application infrastructures, multi-tenant networks on public or private clouds.

By implementing the network fabric's packet forwarding control logic in a software-defined controller, the IBM PNC centralizes the logic that is traditionally embedded in the control plane function of Ethernet switches and routers. Unlike conventional switches that are statically configured once and then must be configured whenever application workloads change or traffic patterns fluctuate, administrators can use the IBM PNC to dynamically direct traffic across multiple switches throughout one or more data centers.

MORE ON THE WEB

- [IBM PNC info on PartnerWorld](#)
- [IBM PNC info on IBM.com](#)

IBM RackSwitch Portfolio

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

MORE ON THE WEB

- [IBM System Networking RackSwitch Sales Kit](#)

IBM RackSwitches are virtual—providing rack-level virtualization of networking interfaces for a rack full of server and storage systems—decoupling the scaling of networking and



computing capacity via on-switch VMready software. VMready enables the movement of virtual machines—providing matching movement of VLAN assignments, ACLs, and other networking and security settings. VMready works with all leading VM providers (VMware, Citrix Xen, PowerVM, KVM, Microsoft Hyper V, etc.).

IBM RackSwitches are cool—implementing a choice of directional cooling to maximize data center layout and provisioning. Its superior air-flow design complements the hot-aisle and cold-aisle data center cooling model.

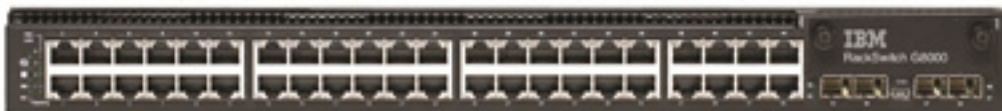
IBM RackSwitches are easy—with server-oriented provisioning via point-and-click management interfaces, along with the optional IBM System Networking Element Manager software package for updating large groups of switches.

IBM RackSwitches are designed with line-rate throughput and low latency with some at significantly less than 700 nanosecond.

IBM RackSwitch G8000

The IBM System Networking RackSwitch G8000 ([Figure B.1](#)) is an Ethernet switch specifically designed for the data center, providing a virtualized, cooler, and simpler network solution.

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



- [G8000 info on PartnerWorld](#)
- [G8000 info on IBM.com](#)

Figure B.1. IBM System Networking RackSwitch G8000 (and links to more detail).

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

The G8000 is easier—with server-oriented provisioning via point-and-click management interfaces, along with optional IBM system networking element manager for updating large groups of switches.

Here are some quick G8000 facts:

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



IBM RackSwitch G8052

The IBM System Networking RackSwitch G8052 ([Figure B.2](#)) is an Ethernet switch specifically designed for the data center, providing a virtualized, cool, and easy network solution.

The RackSwitch G8052 is virtualized—supporting IBM VM-ready technology, an innovative, standards-based solution to manage virtual machines (VMs) in small to large-scale data center and cloud environments. VMready works with all leading VM providers. The RackSwitch G8052 is cool—implementing a choice of directional cooling to maximize data center layout and provisioning. Its superior airflow design complements the hot-aisle and cold-aisle data center cooling model.

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

Here are some quick G8052 facts:

- 48 × 1 GbE RJ45 ports and 4 standard 10 GbE SFP+ ports
- Choice of airflow direction, allowing for significant savings in cooling costs



- [G8052 info on PartnerWorld](#)
- [G8052 info on IBM.com](#)

Figure B.2. IBM RackSwitch G8052 (and links to more detail).

- Low 130 W power rating and variable speed fans help reduce power consumption
- Network virtualization—VMready automatically detects virtual machine movement from one physical server to another.

IBM RackSwitch G8124E

The IBM RackSwitch G8124E ([Figure B.3](#)) is a 10 Gigabit Ethernet switch specifically designed for the data center, providing a virtualized, cooler, and easier network solution. The G8124E offers 24 10 Gigabit Ethernet ports in a high-density, 1U footprint. Designed with top performance in mind, the RackSwitch G8124E provides line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data and large data-center grade buffers to keep traffic moving.

The G8124E is virtualized—providing rack-level virtualization of networking interfaces. VMready software enables movement of virtual machines—providing matching movement of VLAN assignments, ACLs, and other networking and security settings. VMready works with all leading VM providers, such as VMware, KVM, Citrix, Xen, IBM PowerVM, and



- [G8124E info on PartnerWorld](#)
- [G8124E info on IBM.com](#)

Figure B.3. IBM RackSwitch G8124E (and links to more detail).



Microsoft Hyper-V. The G8124E also supports Virtual Fabric, which allows for the carving up of a physical NIC into 2–8 virtual NICs (vNICs) and creates a virtual pipe between the adapter and the switch (using the IBM Networking OS) for improved performance, availability, and security, while reducing cost and complexity.

The G8124E is cooler—implementing server-like directional cooling to maximize data center layout and provisioning. Its superior airflow design complements the hot-aisle and cold-aisle data center cooling model. G8124E models come in either rear-to-front or front-to-rear airflow models, allowing customers to design their data center based on their hot- and cold-aisle implementation.

Here are some quick G8124E Facts:

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



IBM RackSwitch G8264

The IBM RackSwitch G8264 ([Figure B.4](#)) is a 10 and 40 Giga-bit Ethernet (GbE) switch specifically designed for the data center, providing speed, intelligence, and interoperability on a proven platform.

The RackSwitch G8264 offers the flexibility to use break out cables in the 40 GbE ports supporting up to 64x10 GbE ports in a small 1U footprint. Designed with top performance in mind, the RackSwitch G8264 provides line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data. Large data center grade buffers keep traffic moving. Hot swap redundant power and fans, along with numerous high availability features, enable the RackSwitch G8264 to be available for business-sensitive traffic.

The low latency offered by the RackSwitch G8264 makes it ideal for latency-sensitive applications such as high performance computing clusters and financial applications. The G8264 supports the newest protocols—including Data Center Bridging/Converged Enhanced Ethernet (DCB/CEE) for support of Fibre Channel over Ethernet (FCoE) and iSCSI.



- [G8264 info on PartnerWorld](#)
- [G8264 info on IBM.com](#)

Figure B.4. IBM RackSwitch G8264 (and links to more detail).



Here are some quick G8264 facts:

- Optimized for applications requiring high bandwidth and low latency
- Up to 64 1 Gb/10 Gb SFP+ ports in a 1U form factor
- Future-proofed with four 40 Gb QSFP+ ports
- 1.28 Tbps non-blocking throughput and around 880 nano-seconds latency
- Stacking support—up to eight switches
- Open Flow 1.0 support enabling innovation in networking and routing protocols for the future
- IBM VMready helps reduce configuration complexity and improves security levels in virtualized environments with VM mobility
- IBM Virtual Fabric capability allows for the carving up of a physical NIC into multiple virtual NICs.

IBM RackSwitch G8264T

The RackSwitch G8264T ([Figure B.5](#)) can be leveraged as part of a comprehensive 10GBase-T solution offering from IBM, which includes servers, storage, and networking, providing better virtualization, better management, and a cost-effective option for next generation data centers. Flexible connectivity across distances up to 100 m at a low cost makes the G8264T an optimal choice for connecting high-speed server and storage devices.



- [G8264T info on PartnerWorld](#)
- [G8264T info on IBM.com](#)

Figure B.5. IBM RackSwitch G8264T (and links to more detail).

Here are some quick G8264T facts:

- Optimized for low cost cabling using CAT 6 and 6a
- Up to 48 1 Gb/10 Gb 10Gbase-T ports in a 1U form factor
- Future-proofed with four 40 Gb QSFP+ port, which can also be used for 10 Gb SFP+ connections via breakout cables
- 1.28 Tbps non-blocking throughput and around 3.2 micro-second latency.

IBM System Networking RackSwitch G8316

The IBM System Networking RackSwitch G8316 ([Figure B.6](#)) is a 40 Gigabit Ethernet (GbE) aggregation switch designed for the data center, providing speed, intelligence, and interoperability on a proven platform.

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



tion layer switch when used with the 10/40 GbE RackSwitch G8264 at the access layer.

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

The low latency offered by the RackSwitch G8316 makes it ideal for latency-sensitive applications such as high performance computing clusters and financial applications. The G8316 supports the newest protocols—including Data Center Bridging/Converged Enhanced Ethernet (DCB/CEE) for support of Fibre Channel over Ethernet (FCoE).

Here are some quick G8316 facts:

- Optimized for applications requiring high bandwidth and low latency



- [G8316 info on PartnerWorld](#)
- [G8316 info on IBM.com](#)

Figure B.6. IBM System Networking RackSwitch G8316 (and links to more detail).



- Sixteen 40 Gb QSFP+ ports in a 1U form factor
- Up to 64 10 Gb SFP+ ports to form a high-density 10 Gb cluster
- Powerful control plane providing higher performance to aggregate multiple racks of servers
- 1.28 Tbps non-blocking throughput.

Converged Switch B32

The IBM b-type Converged Switch B32 ([Figure B.7](#)) is designed to provide outstanding performance with a reliable platform that helps reduce cabling complexity, equipment acquisition costs, and operational costs associated with space, power consumption, and cooling. This multi-protocol top-of-rack switch features excellent space efficiency and low power consumption, leading the way toward a “greener” data center.

The B32 features eight 8 Gbps FC ports along with 24 CEE ports with 10 Gbps link speeds. The CEE ports are capable of transporting both FC storage area network (SAN) data and



- [Converged Switch B32 info on PartnerWorld](#)
- [Converged Switch B32 info on IBM.com](#)

Figure B.7. IBM b-type Converged Switch B32 (and links to more detail).



Ethernet LAN traffic—eliminating the need for separate SAN and LAN adapters and cables.

Here are some quick Converged Switch B32 facts:

- Outstanding performance with eight Fibre Channel (FC) ports concurrently active at 8 Gigabits per second (Gbps) and 24 Converged Enhanced Ethernet (CEE) ports concurrently active at 10 Gbps link speeds
- High density design with 32 ports in a 1U enclosure
- “Green” energy efficiency significantly reduces power consumption while generating less heat
- Enterprise-class availability features such as hot-swappable, redundant, and integrated fan and power supply assemblies
- Streamlines management by utilizing IBM System Storage Data Centre Fabric Manager (DCFM) and extensions for FCoE and CEE.

Brocade VDX 6730 Converged Switch

The Brocade VDX 6730 Converged Switch for IBM ([Figure B.8](#)) connects to FC storage area networks (SANs) in addition to FCoE, iSCSI, and NAS storage, providing unified Ethernet storage connectivity options. It is available in two models—the 2U Brocade VDX 6730-76 with sixty 10 GbE LAN ports and sixteen 8 Gbps native FC ports, and the 1U Brocade VDX 6730-32 with twenty-four 10 GbE LAN ports and eight 8 Gbps native FC ports. IBM models ship with 8 Gbps FC SWL transceivers standard allowing for connections up to 150 m. Both VDX models come with dual power supplies and customers have the choice of front-to-back or back-to-front airflow models.



- [Brocade VDX 6730 info on PartnerWorld](#)
- [Brocade VDX 6730 info on IBM.com](#)

Figure B.8. The Brocade VDX 6730 Converged Switch for IBM (and links to more detail).

Here are some quick Brocade VDX 6730 facts:

- 10 Gigabit Ethernet (GbE) FCoE switch with LAN and native Fibre Channel ports
- Supports multiple protocols including Fibre Channel over Ethernet (FCoE), iSCSI, and NAS
- Streamlines management by utilizing Brocade Network Advisor and available integration with IBM System Director
- Ideal for customers looking to connect to existing Brocade SANs.

Juniper Ethernet Switches

Juniper has a strong heritage in the high-end Internet Service Provider, and IBM offers a couple of switches via IBM System x sales channels.

Ethernet Switch J48E

Running Juniper Networks JUNOS Software operating system, the IBM Ethernet Switch J48E ([Figure J.1](#)) was designed for



high-performance server access deployments. A single switch can be deployed initially; as requirements grow, Virtual Chassis technology allows up to nine additional switches to be interconnected over a 128 gigabit-per-second (Gbps) back-plane and managed as a single device, with a single configuration file and OS image. Modular Gigabit Ethernet (GbE) and 10-Gigabit Ethernet (10 GbE) uplink module options enable Virtual Chassis technology to be extended to switches in different racks or even in different data centers.

The Ethernet Switch J48E combines the high availability (HA) and carrier-class reliability of modular systems, and it is designed to deliver:

- 1 RU, 320 watts with power over Ethernet
- 48 ports of 10/100/1000BASE-T ports
- Virtual chassis technology allowing up to 480 ports as a single logical device
- Optional 10 GbE uplink ports to j-Series core switches (4274Exx and 4274-Mxx)



- [J48E info on PartnerWorld](#)
- [Ethernet Switch J-type e-series info on IBM.com](#)

Figure J.1. IBM Ethernet Switch J48E (and links to more detail).



- Eight ports of Power over Ethernet
- Redundant, internal hot-swappable power supplies
- Hot-swappable fan tray with redundant blowers
- Consistent modular JUNOS control plane feature implementation
- Dual route engines with Graceful Routing Engine Switchover (GRES)
- Single management interface
- Scales from 48 to 480 ports with up to twenty 10 GbE uplinks.

Juniper Networks EX2200 Ethernet Switch

The Juniper Networks EX2200 Ethernet Switch ([Figure J.2](#)) offers an economical, entry-level, stand-alone solution for top-of-rack server applications, access-layer deployments in branch and remote offices, and campus networks. Four platform configurations are available, offering 24 and 48 10/100/1000BASE-T ports with or without Power over Ethernet (PoE). Each EX2200 switch supports four fixed front panel GbE uplink ports with pluggable optics (purchased separately) for high-speed backbone or link aggregation connections. With a packet switching capacity of 56/104 Gbps, Ethernet throughput of 41.7/77.4 Mpps (wire speed), eight hardware queues for QOS, and four SFP uplinks, the EX2200 is designed to deliver the ultimate 1 Gigabit Ethernet top-of-rack solution. If your application includes a converged environment of servers, PCs, VoIP, and video, the EX2200 provides



- [EX2200 info on PartnerWorld](#)
- [EX2200 info on IBM.com](#)

Figure J.2. Juniper Networks EX2200 Ethernet Switch (and links to more detail).

the highest levels of flexibility (i.e., POE and POE+) and features in its class, while delivering a reliable platform for unifying enterprise communications.

Here are some quick EX2200 facts:

- Delivers high availability and high performance in a power-efficient 1U form factor
- Includes 4 Gigabit Ethernet SFP uplink ports that provide high-speed connectivity to aggregation-layer switches or other upstream devices
- JUNOS operating system delivers a consistent feature set and shortens the learning curve, lowering operational expense.

About the Editor

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