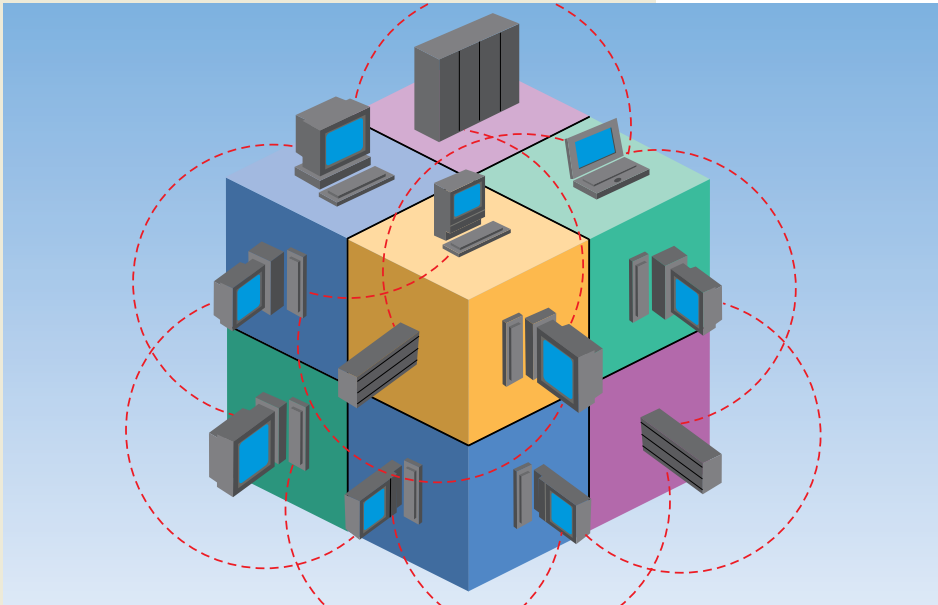


IBM System x and BladeCenter Business Partner Guidebook

Your Roadmap to
Success with IBM
System x, BladeCenter,
and IntelliStation



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Edited by Jim Hoskins

IBM System x and BladeCenter Business Partner Guidebook

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IBM System x and BladeCenter Business Partner Guidebook

Sixth Edition

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

Edited by Jim Hoskins

(version 6.0e)



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Dear Colleagues:

IBM is deeply committed to providing you the support you need to meet your clients' current needs. As our x86 market evolves to more sophisticated technology—such as virtualization and multicore—you can be confident that IBM will provide the best technology along with the comprehensive support you need to grow your skills and address new and expanded opportunities.



As part of this partnership, it is important that we make working with IBM as easy as possible, particularly facilitating your use of IBM tools and resources and helping you navigate the IBM infrastructure. IBM is pleased to provide the 2Q 2007 *IBM System x & BladeCenter Guidebook*—an interactive ebook with the resources, product quick references, and program details to help you sell the System x brand. We've also incorporated a new "9-Step Quick Start" to get you up to speed quickly so your selling can be productive immediately.

System x is an exciting place to be right now. IBM has the best, most innovative products on the market—from our X3 Architecture high performance systems, to our comprehensive and differentiated towers and racks, to our industry-leading IBM BladeCenter. IBM is at the forefront of helping clients get

the most from their IT through virtualization, using industry-leading tools and software such as IBM Director, Virtualization Manager and its streamlined integration with VMware. On another front, IBM's Cool Blue portfolio lets you help your customers tackle today's tough energy challenges. This quarter we will enhance Cool Blue with our newly announced low voltage blades, racks and options.

For those of you who are existing IBM Business Partners, thank you for your business, your commitment, and for representing IBM so well. To new IBM partners or those considering a partnership, we welcome you, and we're pleased you are joining us to deliver IBM's excellent products and services to our mutual customers. Regardless of whether you are a new or an existing partner, we expect you will find this guide informative and helpful in growing our partnership and in building your own business success.

Please let us know how IBM can continue to help you succeed.

Regards,

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What's New in This Edition?

This edition of the ebook has been updated to include IBM System x, BladeCenter, and IntelliStation products/enhancements announced through April 17, 2007.

Here are some of the update highlights for this edition:

- [Focus on Energy Management](#)
- [IBM Global Financing](#)
- [x3455 Enhancements](#)
- [x3655 Enhancements](#)
- [x3755 Enhancements](#)
- [HS21 Enhancements](#)
- [LS21 Enhancements](#)
- [LS41 Enhancements](#)

Your 9-Step Quick Start

Take these 9 steps to “hit the ground running” as a new IBM Business Partner.

1. Check for Updated Editions of This eBook

This ebook 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 one on the cover) and this ebook 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.

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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,

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

3. Plug in to IBM Product and Program Communications

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

MORE ON THE WEB

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4. Review the System x Express Portfolio

The IBM Express portfolio is a set of IBM products and services (e.g., servers, storage, printers, services, etc.) specially configured and priced for the small and mid-sized business environment. Most System x, some BladeCenter, and all IntelliStation products are now offered as Express models, which offer more aggressive pricing, faster availability and ease of installation. Become familiar with IBM Express and you will have solutions for your customers that you can deploy quickly and grow as needed.

MORE ON THE WEB

- [IBM Express portfolio](#)

5. Understand the Express Seller Program

IBM Express Seller is a marketing program that enables Business Partners to more efficiently sell the IBM Express portfolio of offerings (described in step 3). It offers extensive marketing support including “air cover” advertising and customizable

materials to help you generate leads.

Learn how to leverage this program and you will be on the way to increased profits.

MORE ON THE WEB

- [Express Seller Toolkit](#)

6. Learn to Quickly Find IBM Product Information

IBM maintains a search page that allows you to quickly find detailed product information from IBM announcement letters

(one of these is released for every product IBM announces), the IBM Sales Manual

(a comprehensive collection of detailed info on all IBM products), and much more. Give it a try so you will know how to find what you need when you need it.

MORE ON THE WEB

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

7. 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](#)

8. 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 get points by completing these modules which can be redeemed for merchandise at participating retailers. You can earn additional points for reporting sales through KYI.

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

MORE ON THE WEB

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

9. 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.

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- [Explore training and certification opportunities](#)

Introduction

About This eBook

This MaxFacts™ interactive ebook 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 or suggested improvements to this ebook to moreinfo@maxpress.com.

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

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- Click on the “Table of Contents” links to go directly to that part of the ebook
- Search for keywords in the document using the Acrobat Reader “Find” function (the binocular icon on the toolbar).

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1

Welcome to the Team

In this chapter, we cover the basics of 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 and blade hardware offerings and channel programs that when coupled with our software, services and storage expertise creates a channel partner that can take your business wherever it wants to go.

It is this dedication to the success of our channel partners that helped IBM earn a Five-Star Partner rating for 2007 from *VARbusiness* Magazine as well as a Channel Champion Award for Programs and Support in the SMB/Volume Server category from *Computer Reseller News* Magazine.

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

Consider these facts about IBM:

- One of the world's top ten most valuable brands
- Number one in worldwide server sales
- Second largest software business in the world
- In each year for over a decade, IBM has earned more patents than any competitor, according to the U.S. Patent Office.

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

MORE ON THE WEB

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

Why IBM System x?

IBM System x helps you take back control and reduce complexity by simplifying systems management for industry-standard computing environments. System x servers provide innovative technology features that deliver both time and cost-savings benefits. With outstanding value, System x servers showcase the best of IBM engineering, including the IBM X-Architecture technology and the IBM PowerExecutive portfolio covered later in this chapter.

Here are just a couple examples of the many accolades

MORE ON THE WEB

- [System x awards and reviews](#)
- [More System x reviews](#)

System x has earned from the industry:

x3550 and x3950 review in Linux Magazine

"The x3550 and x3950 machines have a cool, Darth Vader black case and cool blue LEDs—true geek eye-candy—but the machine's screaming performance and flawless installation and operation is what really impressed me... Both servers (x3550 and x3950) were incredibly cool to the touch even after running for weeks nonstop with active virtual machines. The systems are amazingly quiet as well."

—Linux Magazine, Jan 2007

x3500 review in Serverwatch.com

"IBM x3500, No Ordinary Workgroup Server... Since the x3500 pricing starts very low, it's amazing to find such wonderful features."

—Serverwatch.com, Jan 2007

Why IBM BladeCenter?

So, you're considering or you are ready to make the move to blade technology and you're wondering why you should choose IBM BladeCenter.

To make the decision easy for you, here are four simple and compelling reasons.

Technology Leadership

While blade servers are the fastest growing segment among all servers, not all blades are created equal. IBM is clearly the

innovator in the blade segment. IBM has held the full-year market share lead for four consecutive

years—from 2003-2006. As a market leader, IBM has helped many businesses migrate from racks to blades and from competitor blades to BladeCenter, and has the experience to help lead a successful transition. By migrating to an industry leader in blades, you not only help protect your investment moving forward, but you can realize immediate benefits versus the competition in terms of power and cooling, I/O and flexibility, which in turn can translate into significant cost savings.

MORE ON THE WEB

- [Videos: Customers using BladeCenter](#)

Investment Protection

IBM believes preserving your system investment through compatible chassis is very important. This means that most IBM BladeCenter blades and—more importantly—switches, can be seamlessly moved between chassis. How does this help you? When you need to upgrade, you don't have to take apart your foundation and reinvest in infrastructure each time technology changes. Instead, you can add a blade or new storage functionality as your needs change or as new technology arrives. This gives you investment protection and incredibly flexible, mix-and-match deployment choices. Some customers even move I/O adapters from older blades to their new blades.

MORE ON THE WEB

- [BladeCenter Competitive info](#)

In addition, IBM has designed BladeCenter with extreme levels of redundancy—with a redundant-path midplane and redundant connections on each blade—to help avoid a potential single point of failure.

Power and Cooling Savings

Energy savings are important for everyone since the cost to power and cool servers is becoming a huge piece of the total-cost-of-computing pie. Through research and investment in

MORE ON THE WEB

- [Cool Blue energy management](#)
- [PowerExecutive](#)
- [Power Configurator](#)

systems architecture, IBM develops some of the most efficient components for its blade servers. This means IBM BladeCenter servers can require less power and be easier

and less costly to cool than competitive servers. In fact, based on IBM internal testing of AMD and Intel processor-based blades, BladeCenter can save you up to 24 percent over comparable HP blades. Other examples include:

- *Energy-efficient power supplies*—that can operate at over 90 percent efficiency in converting AC power to DC power compared to an industry standard of 70 percent.
- *Two hot-swappable redundant blowers*—that draw only 60W between them to cool the entire BladeCenter system. Competitor blade designs can require dozens of non-hot-swappable fans per chassis, consuming hundreds of watts of power. Fewer points of failure and less power consumed can mean lower costs and greater uptime.

- *IBM PowerExecutive*—a plug-in for IBM Director that provides the ability to plan, predict, monitor and cap power consumption based on your BladeCenter hardware configuration. It also allows you to reduce the infrastructure required for redundancy, by using fewer servers with smaller power feeds and potentially lowering your overall data center support costs.
- *Reduced power usage vs. 1U servers*—BladeCenter’s integrated design means that fewer devices, such as PDUs, may be required. In addition, devices such as switches and bridges, may require less power because they share the integrated BladeCenter power supplies instead of having their own. As a result, BladeCenter power savings vs. 1U servers can be improved by as much as 30-40 percent. In a packed data center, this can add up to quite an energy savings over the course of a year.

Intelligent I/O

With four processor choices and up to quad-core capability now available, the processing capacity you need to do more with blades is here. But without smart systems design, processing power is useless. End to end, BladeCenter is designed for optimal throughput, offering significantly more bandwidth and adaptability than our competitors. With BladeCenter Virtual Fabric Architecture you get the intelligent I/O needed to unleash the power in your processors, including:

MORE ON THE WEB

- [IBM Virtual Fabric Architecture](#)

- Integrated full 10 Gb Ethernet. Our competitors don't offer 10 Gb Ethernet. This means we give you up to ten times the Ethernet performance.
- Integrated 4X InfiniBand. Dell doesn't offer InfiniBand and IBM delivers twice the number of InfiniBand connections per server as HP.
- Up to 40 percent greater bandwidth per blade than HP.
- Ability to support up to 8 ports on a single 30 mm blade or up to 12 ports on a 60 mm blade. For more information on how IBM provides industry-leading performance, availability and manageability through the BladeCenter I/O subsystem—including cards, modules and switches—visit the IBM page.

Flexibility and Choice

As a big believer in openness and flexibility, IBM provides you with a variety of choices to help create the right solution for your business. With IBM BladeCenter, you get:

- A portfolio of four chassis that share common components like blades, switches and management modules.
- The largest portfolio of servers including Intel Xeon, AMD Opteron, IBM PowerPC and Cell Broadband Engine-based blades.
- The broadest ecosystem of solution providers in the blade environment. It's a myriad of software, specialized applications, I/O expansion cards, SAN switching, networking and

high-performance interconnects that provide you with comprehensive blade solutions—giving you more flexibility.

With an open design specification, BladeCenter encourages vendors to build complementary solutions. Nearly 100 companies are already producing solutions for BladeCenter—giving you even more choices for the future. In further support of openness and flexibility, IBM founded Blade.org, an open community that develops and advances next-generation technologies for blades. Analyst Joe Clabby said, “I think when IBM created Blade.org and made the specs available right away, it really fueled the growth around that product line.” Clabby continues, “Those other blade systems are good products, but IBM has the strongest ecosystem everyone’s jumping on it.”

MORE ON THE WEB

- [Blade Open Specification](#)
- [Blade.org](#)

Focus on Energy Management

With the rising costs of electricity and real estate, today’s data centers are fast becoming oceanfront property. And every day, the thirst for speed and capacity drives the need for more systems with faster processors, more memory and more storage, thereby sending the thermostat, power meter and IT managers’ blood pressure through the roof.

IBM is at the forefront of the energy challenge, and is committed to working with you to beat the heat. In fact, IBM has led the technology industry in energy-smart innovation for

more than 40 years—beginning with power and cooling breakthroughs on the mainframe. Today we leverage that knowledge, research and development, and intellectual property into IBM X-Architecture technology to bring you a time tested—and proven—approach to intelligent energy design.

Just how much can you save with low power models? Here is an example. IBM Power Configurator measured an 11 percent improvement in total system power efficiency when using low-voltage Intel Xeon L5320 (1.86 GHz) processors within an x3650 server when compared with the same configuration using the standard 80 watt processor. This results in an estimated energy savings of almost a kilowatt per hour per rack of servers, depending on application workloads. As noted from the microprocessor vendor Intel Corp, the Intel Xeon low voltage processors offer 35 to 50 percent less processor power consumption at the same performance level as the mainstream 80 watt to 120 watt quad core versions.

But lower power processors are just the beginning. IBM's approach to the energy challenge is multifaceted, incorporating system design and the Cool Blue portfolio of IBM innovations. It's all part of the X-Architecture technology (covered next) which lies at the heart of innovation that matters.

X-Architecture Innovation

IBM relies on deep business experience, renowned research capabilities, and world-class technology to help businesses move forward via innovation. IBM's ultimate goal is to provide innovation that matters to you—innovation that helps you solve old problems in new and better ways. However, innovation is only

the process; success is the result. According to IDC1, nearly 70 percent of IT server spending in 2010 will be on x86 servers.

Once, there was a perception in the industry that these servers were suitable primarily for filling low-end computing niches, such as file-and-print, e-mail and departmental serving. IBM was among the first vendors to envision that x86 servers could take on a much broader role. In 1998, recognizing that x86 servers needed many of the same reliability, serviceability, availability, and performance attributes as mainframes and other advanced servers, IBM introduced x86 servers incorporating X-Architecture technologies. These game-changing technologies, including x86 industry firsts such as Chipkill memory protection, light path diagnostics and Predictive Failure Analysis, helped elevate x86 servers from their limited roles to their present status as mission-critical, mainstream enterprise servers. The competition has been playing catch-up ever since.

For a complete look at IBM x-Architecture innovation, its evolution and why IBM systems equipped with X-Architecture technologies run faster—yet cooler—and use less power, click the links in the More on the Web box.

MORE ON THE WEB

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

Proactive Management

Inexpensive servers aren't so inexpensive if they require excessive administrative or servicing time to bring them online and keep them that way. Hardware and software tools that simplify deployment, monitor system health, limit power us-

age, and report pending problems are crucial to keeping costs under control. IBM offers a number of tools to help you tame the complexity of systems management and administration while managing costs, including IBM Director software, IBM Remote Deployment Manager (RDM), IBM UpdateXpress, IBM Virtualization Manager, IBM PowerExecutive, IBM Dynamic System Analysis (DSA), Predictive Failure Analysis (PFA), Baseboard Management Controller (BMC), and IBM Remote Supervisor Adapter II SlimLine, to name a few.

Adaptive Performance

As always, performance is a major concern for most customers. However, the emphasis now has shifted from processor clock speed to the number of processor cores, the amount and speed of memory, and even the design of the memory bus and processor cache. For example, to get double the performance of a single-core processor, a dual-core processor requires double the memory. More than that, however, it requires equally fast memory.

For a truly flexible and adaptable data center, you need the ability to increase performance on demand, with a minimum of fuss and cost. System x delivers this flexibility. For example, consider the x3950 server with XpandOnDemand capability. It's a 3U Intel Xeon-based 1-to-4-processor rack server, with support for up to 64 GB of DRAM and four HDDs. If you ever find the need for more processors and memory, simply attach a 3U x3950 MXE chassis to the x3950 via the supplied cable. It immediately doubles your processor and memory capacity. Still not enough? Add up to six more x3950 MXE chassis to the

x3950, for a whopping total of 32 processors (in 32U), 512 GB of RAM, and 32 HDDs. If your needs run to blade servers, consider the AMD Opteron LS41 for IBM BladeCenter server. It's a standard single-wide (30mm) 1-2 processor blade server that supports up to 16 GB of PC2-5300 or 32 GB of PC2-4200 DRAM and an internal HDD. Should you need more processing power, a second blade (an optional 30mm Multiprocessor Expansion Unit) can be snapped onto the first blade in the adjacent blade slot, doubling the processor and memory capacity of the now double-wide blade.

Modular Optimization

High performance is only useful when a server is up and running. Consequently, reliability, availability and serviceability are more important than ever. To this end, IBM incorporates a number of innovations as standard equipment in its System x and BladeCenter servers such as light path diagnostics, hot-swap/redundant components, and IBM Xtended I/O.

Integrated Infrastructure

Inexpensive "scale-out" servers offer great flexibility in deployment. However, their very existence creates complexity. All those 1U and 2U servers have to be housed in racks and interlinked with a web of KVM cables, KVM switches, network cables, network switches, power distribution units, and more. Managing this complexity takes time and costs money. As a result, anything you can do to simplify the process can help save you money. One approach is to replace many individual

1U/2U rack servers with a few chassis containing blade servers; another is to simplify the cabling and other infrastructure components used with your rack servers. And, of course, you can use both approaches as appropriate. The beauty of the BladeCenter architecture is that now everything needed for the solution can be housed and managed from a single point of control.

Power Management

Managing power and cooling resources has become a critical issue in the data center as power consumption and thermal loads increase. Successfully meeting these power and cooling challenges requires well-thought-out IT products, smart data

MORE ON THE WEB

- [PowerExecutive info and demo on IBM.com](#)
- [Cool Blue info on IBM.com](#)

center design and a method for efficiently controlling and monitoring your systems' power and heat requirements.

Cool Blue

The IBM Cool Blue portfolio of tools demonstrates leadership thinking and sets the industry direction for optimal thermal efficiency. This efficiency is delivered through a number of technologies common to both System x and BladeCenter to help improve your server and data center power management, including low-voltage processors, 2.5-inch HDDs, IBM Rear Door Heat eXchanger, calibrated vectored cooling, and energy-efficient power supplies.

PowerExecutive

In order to put control of processor power-saving features at the fingertips of administrators, IBM developed IBM PowerExecutive. PowerExecutive is a powerful software tool designed to take advantage of new processor features, such as balancing the performance of the system according to available power input.

PowerExecutive, a plug-in for IBM Director, provides the ability to plan, predict, monitor and cap power consumption based on your System x or BladeCenter hardware configuration. It also allows you to reduce the infrastructure required for redundancy, by using fewer servers with smaller power feeds and potentially

lowering your overall data center support costs. It does this, for example, by invento-

rying all components at the blade level, then adding up the power draw for each blade and tracking that usage. In failure mode, IBM PowerExecutive (via the BladeCenter Management Module or Advanced Management Module, for example) might request that certain blades in each domain throttle down to reduce power consumption.

MORE ON THE WEB

- [IBM Express Advantage on PartnerWorld](#)
- [Express Seller Toolkit on PartnerWorld](#)

System x Naming Structure

The naming structure used with System x products assigns a meaning to each of the numbers. For example, in the name

“IBM System x3800” (or x3800 for short) the first number position indicates the type of server, so the “3” in “x3800” tells you it’s an x86 server. The second number (an “8” in this case) is an indication of functionality. The third number tells you the type of mechanical packaging, “0” for tower or “5” for rack, so you know the x3800 is packaged as a tower. The fourth number position tells you whether the server uses Intel processors “0” or AMD processors “5,” so you know the x3800 uses Intel processors.

What Are IBM Express Offerings?

While the needs of small and mid-sized 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-sized customers and the IBM Business Partners that help service them. Express offerings retain the functions and features sought most by mid-sized 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 configura-

tions suitable for most implementations are provided. IBM offers many System x, BladeCenter, and IntelliStation products through the IBM Express program. In doing so, these product lines are offered at lower prices, are easier to order in pretested configurations, and are easier to install.

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 ebook, 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 ebook 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.

Here are a couple of quick tips to getting the most out of the IBM PartnerWorld Web site:

- 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).
- There is a great deal of information of use to System x Business Partners behind the “System Sales” link on the PartnerWorld home page. Click on that link (enter your user ID and password) and then you can use the filtering function shown at the top of the page. For example, you can use the pull-down menus to set “Geography” to your country and “product” to “System x” to reduce the amount of information you need to review when looking for what you need.
- Once you are on the System Sales page, you can see all of the resources related to a specific product line by typing the

MORE ON THE WEB

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

product name in the “System Sales Search” box located on the right side of the page (NOT the general search box at the top of the page). Make sure you have selected the right product area before you click the search button.

IBM System x and BladeCenter Education

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

The Campus

The Campus is a Web-based directory of both sales and technical educational resources for many different IBM products. When you arrive at The Campus home page (after entering

MORE ON THE WEB

- [System x sales education from The Campus](#)
- [System x technical education from The Campus](#)
- [BladeCenter sales education from The Campus](#)
- [BladeCenter technical education from The Campus](#)

your PartnerWorld user ID and password), you can select from several different options in the “System Storage”

window. You will then be taken to a list of educational opportunities (books, CDs, live classroom education, etc.) pertinent to the topic you select.

The Campus provides you with road maps and other tools that help you select the educational offering appropriate for

your needs. When you find what you need, you can order or register for education online.

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 education listings on PartnerWorld](#)
- [BladeCenter education listings on PartnerWorld](#)

Know Your IBM (KYI)

Know Your IBM is a global, permission-based interactive marketing and selling resource for Business Partners. It provides customized, online education modules focusing on product and solution areas where participating Business Partners are targeting greater growth.

The education helps increase understanding and awareness of the key fea-

tures and business benefits of IBM products, solutions, and offerings. Incentives offered in conjunction with Know Your IBM are designed to motivate sales professionals to complete the education modules and offer rewards for performance.

MORE ON THE WEB

- [Know Your IBM training modules](#)

IBM Professional Certification Program

The IBM Professional Certification program offers a business solution for skilled IT professionals who seek to develop and

demonstrate their expertise to the world. It's designed to validate your skills and demonstrate your proficiency in the latest IBM technology and solutions. It helps to make certain that you have the capability to perform role-related tasks and

MORE ON THE WEB

- [IBM Professional Certification info](#)

activities at a specified level of competence. The program is beneficial for those who wish to validate their skills,

as well as for companies that wish to ensure certain performance levels for their employees.

IBM Professional Certifications are associated with an individual, not a company or an organization. The target audience for certification includes employees of Business Partner firms, customers, IBM employees, and independent consultants who sell, support, or service IBM products.

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.
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.

Performance Benchmarks

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

MORE ON THE WEB

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

Success Stories, References, Case Studies

It is often helpful to make prospective customers aware of other businesses that have successfully implemented solutions based on System x and BladeCenter. For this reason, IBM maintains a database of existing customer success stories, complete with company profiles, identified needs, solutions, and resulting benefits.

MORE ON THE WEB

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

IBM Business Partners can use these success stories with customers to advance the sell cycle. To see what is available, simply follow the links provided in the “More on the Web” box.

Sources for Competitive Marketing Information

IBM maintains a Web site called “Comp,” which is a worldwide portal for information that will help you win in competitive marketing situations. It includes a searchable set of reports, presentations, and quick reference cards about the marketplace, competitors, and competitive products. You will find materials developed by IBM as well as outside sources such as Gartner, IDC, DH Brown, and IDEAS International.

At the “Comp” site, you can also download the “IBM System x Competitive Sales Tool” (after requesting a password via e-mail), which is updated regularly and is the most extensive source of competitive information. Be sure you also sign

MORE ON THE WEB

- [IBM “Comp” Web site](#)
- [IBM System x competitive sales tool](#)

up to automatically receive e-mail notification (along with the new password you will need) when a new version of the tool is posted.

You can also sometimes find some “product-to-product comparison” information by using the keyword search function provided within the System Sales pages of the PartnerWorld Web site, but this should be considered a secondary source of competitive information.

ePlaybook for System x and BladeCenter

You’ll find all you need to get started in our ePlaybook on System Sales on the PartnerWorld Web site. Here you will find links to download presentations, on-demand webcasts, and other resources to help you unleash the power of our unique

technologies. You will find everything you need to know about the latest System x and BladeCenter sales plays and initiatives—with a special focus on the SMB market.

There are chapters that cover the big plays so you can learn more about what's driving revenue growth right now. Use the decision matrices to Choose the Right Tactic that can address your client's pain-points. Download the "reasons of call," proposal letters, presentations, benchmarks and sales tools to help you identify, progress and close deals. Find tips for increasing deal size with services (new this quarter), options and storage, and including relevant financing highlighted to improve your odds of winning the sale.

MORE ON THE WEB

- [ePlaybook for System x & BladeCenter](#)

Configurator Tools for Specifying Servers

IBM has created several tools to help you configure specific server solutions as necessary to get pricing and place an order. There are tools (PDF files, spreadsheets, etc.) that help you configure System x servers, BladeCenter servers, and racks of servers. You can explore these tools by following the link provided in the "More on the Web" box.

MORE ON THE WEB

- [Configurator Tools](#)

Adding Accessories and Upgrades to Your Proposals

There are many optional accessories and upgrades for all IBM System x and BladeCenter servers. These options include

MORE ON THE WEB

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

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 link in the "More on the Web" box.

Adding Storage to Your Proposals

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

The IBM System Storage DS3000 series product family replaces the IBM TotalStorage DS300 and DS400 disk systems. The 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, mak-

ing 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.

MORE ON THE WEB

- [Free ebook: IBM System Storage Business Partner Guidebook](#)
- [Storage products for System x and BladeCenter servers on IBM.com](#)

- 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-sized business environment (see “What Are ‘IBM Express’ Offerings?” in Chapter 1).

Attach Connector Cross Selling Tool

Attach Connector is designed to super-size your sales by helping you sell more IBM hardware, software and services with each sales opportunity. This cross-selling tool carefully walks you through a sale by providing the right questions to ask to uncover new opportunities and deliver more complete solutions. As you select an IBM point product, a list of most common attach elements is suggested. The tool also provides key play opportunities where you can pass discounts and promotions to clients, as well as the IBM Competitive Advantage—why IBM over other specific companies.

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

MORE ON THE WEB

- [Attach Connector cross selling tool](#)

System x Turn-Key Solutions

Working closely with IBM Business Partners, IBM has tuned-up and optimized the System x portfolio of servers in order to provide a flexible, cost-effective platform for building solutions. The result—highly reliable servers that can scale quickly, easily and inexpensively, so you can stretch your IT budget and confidently execute your business objectives, even as conditions change.

For example, the IBM BladeCenter Solution for Bioinformatics offers a set of open source applications and tools that are optimized for price and performance. The applications and tools are enabled by PowerPC server blades running in a BladeCenter that is optimally-configured for a bioinformatics environment. The blades are two-way, 64-bit processors that run the Linux operating system.

MORE ON THE WEB

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

For complete information on all System x solutions, follow the link provided in the “More on the Web” box.

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 & non-IBM hardware, software and services, with a full range of flexible, low-rate offerings. IGF’s customers find that financing their information technology

solutions offers many advantages in both robust and difficult economic climates, because financing frees up their capital for other investments. Many information technology installations, including those for customer relationship management, data mining and e-business, require a substantial investment. IGF financing enables customers to pay for their new technology in affordable, monthly payments during the life of the project. Our customers run the gamut from the smallest, family-owned business purchasing a single server and software to

MORE ON THE WEB

- [IBM Global Financing](#)

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.

System x HPC Cluster Solutions

A cluster is defined as a multi-server system comprised of interconnected computers and associated networking and storage devices that are unified via systems management and networking software to accomplish a specific purpose. In short, a cluster provides “commodity-level super computing” to meet the needs of High Performance Computing (HPC) applications.

System x High Performance Computing clusters are IBM’s HPC offerings to the marketplace (computer-aided engineering, EDA, oil & gas, life sciences, financial services, public sector, etc.). IBM has long dominated the HPC marketplace.

System x servers are used as “compute nodes” to build IBM clusters,

especially the dual-socket systems (rack-optimized or blade) along with industry-leading, third-party/OEM components.

IBM is now very actively pursuing the “departmental/workgroup” clusters space. In addition to IBM’s flagship Linux clusters offering (the IBM System Cluster 1350), IBM is working with Microsoft’s Windows Computer Clusters Server, a cluster operating system from Microsoft, and selling/assembling/implementing these clusters entirely through our Partners.

MORE ON THE WEB

- [HPC clusters sales kit](#)
- [Departmental & workgroup HPC clusters resource kit](#)

Technical Support for Business Partners

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

- Remote solution design assistance/review

- Technical marketing assistance
- Product and promotion information
- Configuration assistance
- Competitive product information
- Sales strategy information
- Solution assurance assistance.

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

MORE ON THE WEB

- [Contact Techline](#)
- [Technical Sales Library](#)
- [PartnerWorld Technical Resources & Support](#)

3

System x Product Quick Reference

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

MORE ON THE WEB

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

Tower Servers

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

x206m

The IBM eServer x206m (Figure T.1) features easy management, deployment, and service, providing outstanding perfor-



Specifications

Form factor/height	Tower/5U
Processor (L2 cache/CPU GHz/ front-side bus MHz max)	Intel Pentium D (dual-core) (2 x 2 MB/up to 3.2/800) or Intel Pentium 4 (1 MB or 2 MB/up to 3.4/800), both support EM64 T.
Number of processors (std/max)	1/1
Memory (max)	Up to 8 GB PC2-4200 DDR II
Expansion slots	2 PCI, 2 PCI-X (model dependent) and 2 PCI-Express
Disk bays total/hot-swap	4 fixed simple swap or hot-swap Serial ATA disk drives or 4 hot-swap Serial Attached SCSI disk drives
Maximum internal storage	Up to 1.2 TB hot-swap Serial Attached SCSI HDDs, or up to 1 TB hot-swap, simple-swap or fixed Serial ATA HDDs
Network interface Integrated	10/100/1000 Ethernet
Power supply (std/max)	400W 1/1 or 430W hot-swap redundant 2/2
Hot-swap components	Hard disk drives, power supplies (model dependent)
RAID support Integrated	IBM ServeRAID-8e (RAID-0, RAID-1), optional upgrade to RAID-5 and RAID-6
Systems management	IPMI 1.5-compliant mini-BMC, IBM Director, Alert Standard Format 2.0, ServerGuide, optional Remote Supervisor Adapter II and optional Remote Deployment Manager
Operating systems supported	Microsoft Windows, Red Hat, Linux, SUSE LINUX, Novell NetWare, OS 4690
Limited warranty	1-year or 3-year onsite limited warranty

- [x206m details on PartnerWorld](#)
- [x206m details on IBM.com](#)
- [x206m competitive info on COMP](#)

Figure T.1. IBM eServer xSeries 206m at a glance (and links to more detail).

mance and high availability at an entry-level price. The x206m is highly expandable and provides unprecedented system availability. On select models, upgrade hard disk drives (HDDs) from low-cost, fixed Serial ATA (SATA) to Serial Attached SCSI (SAS), a new HDD technology that adds more performance and features. And even if an HDD or power supply fails, the x206m can stay up and running with features such as hot-swap SATA and SAS HDDs and redundant power supplies.

New features such as DDR II memory and PCI Express help extend the life of your system. Dual-core processor models provide higher performance for systems running multiple applications. Protect your data with IBM ServeRAID8e, which provides RAID 0 or 1 with features beyond those of standard server operating systems.

Here are some quick x206m facts:

- Manage your business with a server that offers many configurations and room to grow
- New technologies such as dual-core processors help protect your investment
- New, high availability features help keep systems running.

x3105

The x3105 (Figure T.2) is an ideal server for small businesses purchasing a first server for file and print or small business applications. In addition, add tape backup, UPSs and other options to the x3105 to protect business-critical data as your



Specifications

Form factor/height	Tower
Processor (max)	AMD Opteron 1000 series (dual-core) or AMD Athlon 3500+ (single-core)
Number of processors (std/max)	1/1
Cache (std/max)	2x1 MB or 512 KB (model dependent)
Memory (std/max)	512 MB or 1 GB/8 GB DDR II 667 MHz via 4 DIMM slots
Expansion slots	2 PCI, 2 PCI-Express (x8, x8)
Disk bays	2 Serial ATA (SATA) or nearline SATA
Maximum internal storage	1 TB SATA
Other disk bays	One 5.25" bay for CD-RW/DVD combo or CD-ROM standard One 5.25" bay for additional optical or tape drive optional One 3.5" bay for diskette drive optional
Network interface	Integrated Gigabit Ethernet
Power supply (std/max)	310W 1/1
RAID support	OS RAID-0, -1; hardware-based RAID-0, -1 optional
Ports	Front: two USB Rear: four USB, one Ethernet, one serial, one parallel
Systems management	IBM ServerGuide
Operating systems supported	Windows Small Business Server 2003, Microsoft Windows Server 2003 Standard Edition/Enterprise Edition, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Novell Netware
Limited warranty	1-year onsite limited warranty

- [x3105 details on PartnerWorld](#)
- [x3105 details on IBM.com](#)
- [x3105 competitive info on COMP](#)

Figure T.2. IBM System x3105 at a glance (and links to more detail).

needs arise. IBM ServerGuide helps you install the operating system, getting you up and running quickly. The x3105 can also be ordered with Microsoft Windows Small Business Server 2003 preinstalled. Along with its affordable price, the x3105 includes the latest server technologies your business needs to stay competitive, such as dual-core processors and ECC memory—providing a dependable small business server solution.

Here are some quick x3105 facts:

- Built to last, protecting your investment as your business grows
- Easy to use so you can spend your time managing your business
- Affordable, yet includes the latest server technology.

x3200

With unprecedented system availability, the x3200 (Figure T.3) can help you maximize uptime for your file and print or network infrastructure applications. Select SATA, near-line SATA or Serial Attached SCSI hard disk drives (HDDs) depending on your reliability requirements. If a hard disk drive or power supply fails, the x3200 can stay up and running with redundant power supplies and hot-swap SATA and SAS HDDs.

Standard on select models, integrated hardware RAID-0 or -1 provides protection for your business critical data. Optional upgrades to RAID-5 or tape backup solutions are also available.



Specifications

Form factor/height	Tower/5U
Processor (L2 cache/CPU GHz/front-side bus MHz max)	Quad-Core Intel Xeon (2x4 MB/2.13 GHz/1066 MHz), Dual-Core Intel Xeon (4 MB/up to 2.4 GHz/1066 MHz), Intel Pentium D (dual-core) (2x2 MB/up to 3.4 GHz/800 MHz) or Intel Pentium 4 (1 MB/3.2 GHz/800 MHz)
Number of processors (std/max)	1/1
Memory (max)	Up to 8 GB DDR II 667 MHz
Expansion slots	3 PCI and 2 PCI-Express (x8, x1) Dedicated Remote Supervisor Adapter II slot Slotless hardware RAID-0, -1
Disk bays (total/hot-swap)	Four 3.5" simple-swap or hot-swap Serial ATA hard disk drives (HDDs) or four 2.5" or 3.5" hot-swap Serial Attached SCSI HDDs
Maximum internal storage	Up to 1.2 TB Serial Attached SCSI (SAS) HDDs or up to 3.0 TB Serial ATA HDDs
Network interface	Integrated Gigabit Ethernet
Power supply (std/max)	400W 1/1 or 430W hot-swap redundant 2/2 (model dependent)
Hot-swap components	Hard disk drives, power supplies (model dependent)
RAID support	Integrated hardware RAID-0, -1 (model dependent) Optional upgrade to RAID-5 and RAID-6
Ports	Front: Two USB, Rear: Four USB; one Ethernet; two serial; one parallel; keyboard and mouse
Systems management	IPMI 1.5-compliant mini-BMC, IBM Director, Alert Standard Format 2.0, IBM ServerGuide, optional Remote Supervisor Adapter II and optional Remote Deployment Manager
Operating systems supported	Microsoft Windows Server, Linux, Novell NetWare, IBM OS 4690

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

Figure T.3. IBM System x3200 at a glance (and links to more detail).

The x3200 helps minimize management costs for distributed or remote applications. It supports industry-standard, IPMI-based systems management and the IBM Remote Supervisor Adapter II for advanced hardware management—enabling your IT staff to do more with less.

Here are some quick x3200 facts:

- Affordable uni-processor tower server for medium-sized businesses or distributed large enterprises
- More availability and management features than other systems in its class
- Quad-core and dual-core Intel Xeon processors deliver high performance.

x3400

The IBM System x3400 (Figure T.4) is an excellent low-cost solution for growing businesses or branch offices that rely on 24x7 availability and mission-critical applications. Optional features let you configure a server customized for your needs—from basic file-and-print to a robust, mission-critical application server—saving you time and money.

For small organizations with big plans, the x3400 can grow with you. Deploy an infrastructure with less hardware that supports the same—or more—applications. Start with a basic configuration and add features and capacity to accommodate your growing business.

For branch offices with demanding, complex data transactions, the x3400 offers dual-socket computing power and



Specifications

Form factor/height	Tower/5U
Processor (max)	Dual-Core Intel Xeon Processor 5130 up to 2.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon Processor E5320 up to 1.86 GHz
Number of processors (std/max)	1/2
L2 cache	2x2 MB (dual-core) or 2x4 MB (quad-core)
Memory (std/max)	1 GB/32 GB Fully Buffered DIMM 667 MHz via 8 DIMM slots
Expansion slots	3 PCI-Express, 2 PCI-X and 2 PCI
Disk bays (total/hot-swap)	4/0 or 8/8 (model dependent)
Maximum internal storage	4.0 TB hot-swap SATA, 2.4 TB hot-swap SAS, or 2.0 TB simple-swap SATA
Network interface	Integrated Gigabit Ethernet
Power supply (std/max)	670W 1/1 or 835W 1/2
Hot-swap components	Power supply, fans and hard disk drives
RAID support	Integrated RAID-0/-1/-10/-IE/-6, optional RAID-5
Systems management	Automatic Server Restart; Predictive Failure Analysis on hard disk drives, processors, VRMs, fans and memory; integrated IPMI System Management Processor; IBM Director; optional Remote Supervisor Adapter II SlimLine and ServerGuide
Operating systems supported	Microsoft Windows Server 2003, Windows 2000/Advanced Server, Red Hat Linux, SUSE Linux, Novell NetWare, VMware ESX Server, SCO UnixWare, SCO OpenServer
Limited warranty	1-year or 3-year onsite limited warranty

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

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

support for up to eight-core processor performance, making the x3400 an affordable yet robust system. Optional redundant features help maintain business-critical availability and uptime.

Select configurations of the x3400 are part of the IBM Express Portfolio designed and priced to meet the needs of mid-sized businesses. Reliable and easy to manage, Express models/configurations vary by country.

Here are some quick x3400 facts:

- Value-priced, 2-socket design allows for affordable business growth and performance
- Flexible configuration options meet today's business needs while allowing for future growth
- Optional redundant features help protect business-critical data with minimal IT support.

x3500

The IBM System x3500 (Figure T.5) delivers unprecedented performance and reliability for demanding distributed environments that rely on 24x7 availability of mission-critical applications. With up to eight-core processor performance at lower power consumption per core, the x3500 offers leading-edge capacity and high-speed I/O scalability. A long-life platform with 24-month availability, the x3500 minimizes deployment and support concerns.



Specifications

Form factor	Tower/5U
Processor (max)	Dual-Core Intel Xeon Processor 5160 up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon Processor X5355 up to 2.66 GHz and up to 1333 MHz front-side bus
Number of processors (std/max)	1/2
L2 cache	2x2 MB (dual-core) or 2x4 MB (quad-core)
Memory (std/max)	1 GB/48 GB Fully Buffered DIMM 667 MHz via 12 DIMM slots
Expansion slots	3 PCI-Express, 2 PCI-X and 1 PCI
Disk bays (total/hot-swap)	8/8
Maximum internal storage	2.4 TB hot-swap SAS, 4 TB hot-swap SATA
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	835W 1/2
Hot-swap components	Power supply, fans and hard disk drives
RAID support	Integrated RAID-0, -1, -1E, -5, -6, -10
Systems management	Automatic Server Restart; IBM Predictive Failure Analysis on hard disk drives, processors, VRMs, fans and memory; light path diagnostics with side viewable panel; integrated IPMI System Management Processor; IBM Director; optional Remote Supervisor Adapter II SlimLine and IBM ServerGuide
Operating systems supported	Microsoft Windows Server 2003, Windows 2000/Advanced Server, Red Hat Linux, SUSE Linux, Novell NetWare, VMware ESX Server, SCO OpenServer, SCO UNIXware
Limited warranty	3-year onsite limited warranty

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

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

Take advantage of virtualization with the x3500. Deploy an infrastructure with less hardware that supports the same—or more—applications with lower hardware support costs.

The x3500 offers many advanced availability features standard, including advanced data protection for high system reliability at no extra cost. Other high-availability features such as redundant components, advanced memory protection, integrated systems management and large storage capacity help keep your system up and running 24x7.

Select configurations of the x3500 are part of the IBM Express Portfolio, designed and priced to meet the needs of mid-sized businesses. Reliable and easy to manage, Express models/configurations vary by country.

Here are some quick x3500 facts:

- Achieve excellent price/performance with this industry-leading, two-socket server
- Stable platform life optimizes IT investment
- Manage and protect mission-critical applications with scalable memory, I/O and storage.

x3800

The IBM System x3800 (Figure T.6) delivers outstanding performance, high availability and manageability that you demand along with advanced, integrated technologies that help protect your IT investment—features that you would expect in more high-end systems but at an affordable price.



Specifications

Form factor	Tower or 7U rack
Processor (max)	Intel Xeon Processor MP up to 3.66 GHz (single-core) and 3.50 GHz (dual-core)/667 MHz front-side bus
Number of processors (std/max)	1 or 2/4
Cache (max)	1 MB L2 per processor (single-core) and up to 2 MB L2 (dual-core) and up to 16 MB L3 (dual-core)
Memory (max)	1 GB or 2 GB/64 GB PC2-3200 DDR II SDRAM
Disk bays (total/hot-swap)	12/12 3.5" Serial Attached SCSI (SAS)
Maximum internal storage	3.6 TB SAS (supports 300 GB SAS HDDs)
I/O slots (total/hot-swap)	6/6, two Active PCI-X 2.0/266 MHz and four PCI-Express x8
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	775W 2 or 3/3 hot-swap (N+1)
Hot-swap components	Power supplies, fans, memory, hard disk drives and PCI-Express and PCI-X adapters
RAID support	RAID-0, -1, -5, -10, -1E, -50, -60 optional (ServeRAID-8i)
Systems management	Alert on LAN 2, Automatic Server Restart, IBM Director, IBM ServerGuide, Remote Supervisor Adapter II SlimLine optional, light path diagnostics (independently powered), Predictive Failure Analysis on processors, VRMs, fans, power supplies and memory, Wake on LAN
Operating systems supported	Microsoft Windows Server 2003 (Standard and Enterprise editions 32-bit and 64-bit), 32- and 64-bit Red Hat Enterprise Linux and SUSE Enterprise Linux, VMware ESX Server
Limited warranty	3-year onsite limited warranty

- [x3800 details on PartnerWorld](#)
- [x3800 details on IBM.com](#)
- [x3800 competitive info on COMP](#)

Figure T.6. IBM System x3800 at a glance (and links to more detail).

The x3800, an IBM System x tower-based system designed with the X3 chipset, delivers the third generation of main-frame-inspired IBM Enterprise X-Architecture technology. Driving mission-critical applications such as Enterprise Resource Planning, collaboration (IBM Lotus Notes and Microsoft Exchange e-mail applications), terminal serving and database applications, the x3800 excels at performing transaction-intensive, traditional back-office and branch-office functions.

Here are some quick x3800 facts:

- Combines 64-bit breakthrough, four-processor performance with up to 3.6 TB of high-speed internal storage
- Supports high-performance, dual-core Intel Xeon Processors MP and runs 32- and 64-bit applications simultaneously, providing headroom and potential investment protection
- High-availability features such as three levels of memory protection and optional advanced systems management help provide high reliability
- Supports new PCI-Express I/O technology while maintaining legacy PCI-X 2.0 compatibility.

Rack-Optimized Servers

In this section, we explore the IBM System x servers that use the industry-standard rack packaging. These are designed com-

MORE ON THE WEB

- [Overview of all System x “rack-optimized” servers](#)

pactly to fit into industry-standard 19-inch server racks that save valuable data center floor space.

x3250

The IBM System x3250 (Figure R.1) is a single-socket server that is easy to deploy, manage and service. It provides outstanding performance and reliability at an entry-level price. The x3250 offers remote monitoring and alerting capabilities that provide strong systems management.

Designed for high-performance, quad-core and dual-core 64-bit processors, the x3250 can optimize performance of your Web and network infrastructure. For a performance boost, choose models with Intel Xeon or Intel Pentium D processors, while those running less demanding applications may prefer the Intel Celeron processor.

Serial Attached SCSI (SAS) HDDs and PCI-Express ensure even greater integrated I/O performance and compatibility with next-generation devices for added long-term investment protection.

Here are some quick x3250 facts:

- Lower costs with ease of management, deployment and service
- Maximize and protect your IT investment with resiliency and flexibility
- A range of processor choices offering multiple levels of price/performance.



Specifications

Form factor/height	Rack (22" depth)/1U
Processor (L2 cache/CPU GHz/front-side bus MHz max)	Intel Xeon (quad-core) (8 MB/up to 2.4 GHz/1066 MHz) or Intel Xeon (dual-core) (2 MB or 4 MB/up to 2.4 GHz/1066 MHz) or Intel Pentium D (dual-core) (4 MB/up to 3.4 GHz/800 MHz) or Intel Celeron (256 KB/2.93 GHz/533 MHz)
Number of processors (std/max)	1/1
Memory (std/max)	512 MB or 1 GB/8 GB DDR II 667 MHz via 4 DIMM slots
Expansion slots	2 PCI-Express (x8)
Disk bays (total/hot-swap)	Up to two 3.5" simple-swap Serial ATA or two 3.5" hot-swap Serial ATA or Serial Attached SCSI (SAS) hard disk drives, or four 2.5" hot-swap SAS
Maximum internal storage	1.0 TB Serial ATA or 600 GB Serial Attached SCSI
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	350W 1/1
Hot-swap components	Serial ATA and Serial Attached SCSI hard disk drives
RAID support	Integrated hardware RAID-0, -1 (model dependent) and RAID-5 optional
Ports	Front: two USB; Rear: serial, two USB, two Ethernet, video, mouse, keyboard
Systems management	IPMI 1.5-compliant mini-BMC, Automatic Server Restart, IBM Director, IBM ServerGuide, Remote Deployment Manager, IBM Wake on LAN, optional Remote Supervisor Adapter II SlimLine
Operating systems supported	Microsoft Windows Server, Linux, Novell NetWare

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

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

x306m

The IBM eServer xSeries 306m (Figure R.2) features easy management, deployment and service, providing outstanding performance and high availability at an entry-level price.



Specifications

Form factor/height	22" depth/1U
Processor (L2 cache/CPU GHz/front-side bus MHz max)	Intel Pentium D (dual-core) (2 MB or 4 MB/up to 3.2/800) or single-core Intel Pentium 4 (1 MB or 2 MB/up to 3.6/800), both support Intel Extended Memory 64 Technology
Number of processors (std/max)	1/1
Memory (std/max)	512 MB/8 GB PC4200 DDR II via 4 DIMM slots
Expansion slots	2 PCI-X 64-bit/100 MHz or 1 PCI-Express x8 and 1 PCI-X 64-bit/100 MHz
Disk bays total/hot-swap	Up to 2 simple-swap Serial ATA, or 2 hot-swap Serial ATA or Serial Attached SCSI hard disk drives
Maximum internal storage	500 GB Serial ATA or 600 GB Serial Attached SCSI
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	350W 1/1
Hot-swap components	Serial ATA and Serial Attached SCSI hard disk drives
RAID support	Integrated ServeRAID-8e, ServeRAID-7t for simple-swap Serial ATA hard disk drives
Systems management	Automatic Server Restart, IBM Director, ServerGuide, Remote Deployment Manager, Wake on LAN, optional Remote Supervisor Adapter II
Operating systems supported	Microsoft Windows Server, Linux, Novell NetWare

- [x306m details on PartnerWorld](#)
- [x306m details on IBM.com](#)
- [x306m competitive info on COMP](#)

Figure R.2. IBM eServer xSeries 306m at a glance (and links to more detail).

The x306m is an easy-to-use server ideally suited for handling Web content-serving and edge-of-network applications. Integration of industry-standard software tools and remote systems management, monitoring and alerting capabilities combine to deliver stress-free systems management and high availability.

Here are some quick x306m facts:

- Facilitates ease of management, deployment and service
- Offers resiliency and performance in an entry-level server
- Utilizes next-generation technologies while maximizing and protecting your IT investment.

x3455

The IBM System x3455 (Figure R.3) delivers robust performance in a small package at an affordable price. For scientific, technical and financial applications, the x3455 provides the latest AMD Opteron dual-core processors—helping process data more quickly. The x3455 also provides outstanding memory performance with power-efficient DDRII memory and AMD DirectConnect architecture. And high-performance, highly reliable 3.5" SAS hard disk drives deliver blazing access to data compared to SCSI drives.

The x3455 addresses traditional HPC application bottlenecks with non traditional, innovative server architecture. IBM Xcelerated Memory Technology allows six DIMMs per processor to run at 667 MHz, compared to the industry standard of four DIMMs, which means faster access for large



Specifications

Form factor/height	1U rack server
Processor	AMD Dual-Core Opteron Model 2210, 2214, 2216, 2218, 2220, 2222 SE
Number of processors (std/max)	1/2
Cache (max)	2 MB per socket
Memory (std/max)	2x512 MB/48 GB PC5300 ECC DDR II SDRAM IBM Chipkill 667 MHz via 12 DIMM slots
Expansion slots	PCI-Express (1) x16 standard; optional (1) x8 or (1) HTx
Disk bays (total)	2
Maximum internal storage	1.5 TB SATA II or 600 GB SAS (3.0 Gbps)
Network interface	Integrated dual Gigabit Ethernet
Power-total system input requirements	Visit ibm.com/systems/x for more on the Power Calculator
Power supply	650W capacity
RAID support	Optional RAID-0, -1 for internal drives using the IBM HBA Controller
Remote systems management	Integrated BMC features Serial over LAN (IPMI 2.0-compliant), Cluster Systems Management, IBM Director
Operating systems supported	Microsoft Windows Server 2003, Red Hat Linux, SUSE Linux
Limited warranty	1-year customer replaceable unit and onsite limited warranty

- [x3455 details on PartnerWorld](#)
- [x3455 details on IBM.com](#)
- [x3455 competitive info on COMP](#)

Figure R.3. IBM System x3455 at a glance (and links to more detail).

memory configurations. As well, IBM eXtended I/O technology featuring PCI-Express slots (one being interchangeable with an HTX slot) means greater flexibility for cluster interconnect preferences.

Here are some quick x3455 facts:

- Xcelerated Memory Technology maximizes performance for your memory-intensive environments
- Achieve greater flexibility and scalability in clustering with IBM eXtended I/O design
- Choice of high-performance SAS or price/performance SATA drives.

x3550

Designed for applications ranging from Web serving to workload consolidation and virtualization, the IBM System x3550 (Figure R.4) offers high-speed, dual-core and quad-core processors with blazing front-side bus speed. Optimized for exceptional application computing, the x3550 features a highly functional infrastructure that addresses more memory, lowers power consumption and provides dramatic systems performance increases.

Standard integrated data protection with hardware RAID and 2.5" SAS hard disk drives keeps your data safe and readily available. Super-efficient network communication and hot-swap redundant power help keep your business humming at lower support costs.



Specifications

Form factor/height	Rack/1U
Processor (max)	Dual-Core Intel Xeon Processor 5160 up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon Processor X5355 up to 2.66 GHz and up to 1333 MHz frontside bus
Number of processors (std/max)	1/2
L2 cache	2x2 MB (dual-core) and 2x4 MB (quad-core)
Memory (std/max)	1 GB or 2 GB/32 GB Fully Buffered DIMM 667 MHz
Expansion slots	2 PCI-Express (x8) half-length, full-height or optional riser card for 1 PCI-X (64-bit 133 MHz)
Disk bays (total/hot-swap)	2/2 or 4/4
Maximum internal storage	293.6 GB hot-swap SAS or up to 1.5 TB simple-swap SATA
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	670W 1/2
Hot-swap components	Power supply, fans, hard disk drives (select models)
RAID support	Integrated RAID-0, -1, -10, optional RAID-5, -6
Systems management	IBM PowerExecutive (included with IBM Director), Integrated Service Processor, Diagnostic LEDs, drop-down light path diagnostics panel, Automatic Server Restart, optional Remote Supervisor Adapter II SlimLine, IBM Director, IBM ServerGuide and optional Remote Deployment Manager
Operating systems supported	Microsoft Windows Server 2003, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, TurboLinux Enterprise Server, Novell NetWare and VMware ESX Server
Limited warranty	3-year onsite limited warranty

- [x3550 details on PartnerWorld](#)
- [x3550 details on IBM.com](#)
- [x3550 competitive info on COMP](#)

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

Fault protection comes integrated in the x3550. IBM PowerExecutive delivers advanced control to help monitor power usage and achieve decreased infrastructure, power and cooling costs. Hot-swap, redundant fans keep components cool without taking the server offline.

Select configurations of the x3550 are part of the IBM Express Portfolio, designed and priced to meet the needs of mid-sized businesses. Reliable and easy to manage, Express models/configurations vary by country.

Here are some quick x3550 facts:

- High-performance design to maximize your IT investment
- Improved business availability with IBM Xtended Design Architecture features
- New design and tools for optimized power management.

x3650

For constrained data center environments, the IBM System x3650 (Figure R.5) offers unprecedented performance and reliability. Optimized for up to eight-core processor performance, the x3650 delivers rack-dense, dual-core or quad-core computing power, an impressive 12 DIMM memory design and super-efficient network communication.

Innovation comes standard on the x3650. Anywhere/any-time management keeps assets under control.

IBM PowerExecutive delivers advanced control, monitoring power consumption while achieving decreased cooling costs.



Specifications

Form factor/height	Rack/2U
Processor (max)	Dual-Core Intel Xeon Processor 5160 up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon Processor X5355 up to 2.66 GHz and up to 1333 MHz frontside bus
Number of processors (std/max)	1/2
L2 cache	2x2 MB (dual-core) or 2x4 MB (quad-core)
Memory (std/max)	1 GB or 2 GB/48 GB Fully Buffered DIMM 667 MHz via 12 DIMM slots
Expansion slots	4 PCI-Express or 2 PCI-X and 2 PCI-Express
Disk bays (total)	Six 3.5" or eight 2.5" (SFF)
Maximum internal storage	1.8 TB hot-swap SAS or 3.0 TB hot-swap SATA
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	835W 1/2
Hot-swap components	Power supply, fans and hard disk drives
RAID support	Integrated RAID-0, -1, -10, optional RAID-5, -6
Systems management	IBM PowerExecutive (included with IBM Director), Integrated Service Processor, Diagnostic LEDs, drop-down light path diagnostics panel, Automatic Server Restart, optional Remote Supervisor Adapter II SlimLine, IBM Director, IBM ServerGuide and optional Remote Deployment Manager
Operating systems supported	Microsoft Windows Server 2003, Windows 2000/Advanced Server, Red Hat Linux, SUSE Linux, Novell NetWare, VMware ESX Server
Limited warranty	3-year onsite limited warranty

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

Figure R.5. IBM System x3650 at a glance (and links to more detail).

The optional RSA II SlimLine card keeps slots free while expanding systems management functionality.

Here are some quick x3650 facts:

- Get superior performance with new dual-core or quad-core processors and faster memory
- Use new integrated solutions to manage your resources
- Protect IT investments with scalable memory, I/O and storage on a long-life server platform.

x3650 T

The IBM System x3650 T (Figure R.6) takes carrier-grade servers and next-generation networks to new levels. Built especially for network equipment providers and service providers, this powerful NEBS-3/ETSI-compliant server is rich in design and functionality. The x3650 T is equipped with dual, redundant hot-swap DC or AC power supplies for high availability, up to six PCI slots for extreme expandability, and an external alarm panel providing 24/7 surveillance of system outages. The x3650 T features a long production life cycle, providing businesses investment protection.

Here are some quick x3650 T facts:

- Delivering superior performance, this carrier-grade, industry-standard Intel processor-based solution is optimized for the telecommunications environment
- Two 3.2 GHz/800 MHz front-side bus Intel Xeon processors provide the engine for high compute environments

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



Specifications

Form factor/height	2U rack-optimized
Processor (max)	Up to two Intel Xeon 3.2 GHz/800 MHz front-side bus
Number of processors (std/max)	2/2
Cache (max)	2 MB L2
Memory (max)	16 GB ECC DDR II 400 ECC
Expansion slots	6 maximum
Disk bays (total)	2
Maximum internal storage	293.6 GB Ultra320 SCSI
Network interface	Dual Gigabit Ethernet
Power supply (std/max)	2/2 (DC or AC models)
Hot-swap components	Power supply (same cage for DC/AC power supply)
RAID support	Integrated RAID-0, -1
Systems management	Integrated Intel BMC
Operating systems supported	Microsoft Windows, Red Hat Linux, SUSE Linux
Limited warranty	3-year limited warranty

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

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

- First Intel Extended Memory 64 Technology-enabled telecommunications rackmount server.

x3650 NAS

IBM System x3650 NAS (Figure R.7) separates dedicated file-serving functions from application operations thereby relieving the CPU from being overburdened. With the Windows Storage Server 2003 R2 Operating System and IBM Tivoli Continuous Data Protection (CDP) transparent backup software, achieve higher performance and save valuable network bandwidth and critical user productivity.

IBM storage servers offer many of the benefits of shared pool storage solutions like storage area networks (SANs) but without complicated installation and administration. These also support heterogeneous clients and servers utilizing common network access protocols: NFS for UNIX and Linux servers, and CIFS. A remotely accessible user interface helps manage print and file quotas and easily integrate into existing AD environments.

MORE ON THE WEB

- [What is a NAS Server?](#)

The preconfigured ServerProven hardware and IBM ServeRAID reliability make this an optimized solution that decreases capital equipment costs and reduces IT staff hours. By making storage devices LAN addressable, this frees storage from direct attachment to a consolidated server and enables any-to-any connectivity, which can be clustered for failover redundancy.

Here are some quick x3650 NAS facts:



Specifications

Form factor/height	Rack/2U
Processor (max)	Dual-Core Intel Xeon Processor 5130 2.0 GHz
Number of processors (std/max)	1/2
Cache (max)	2x2 MB
Memory (std/max)	1 GB/48 GB Fully Buffered DIMM 667 MHz via 12 DIMM slots
Expansion slots	4 PCI-Express or 2 PCI-X and 2 PCI-Express
Disk bays (total/hot-swap)	8/8
Maximum internal storage	1.8 TB hot-swap SAS, 15 TB hot-swap SAS (external)
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	835W 1/2
Hot-swap components	Power supply, fans and hard disk drives
RAID support	Integrated RAID-1/RAID-5
Systems management	IBM PowerExecutive (included with IBM Director), Integrated Service Processor, Diagnostic LEDs, drop-down light path diagnostics panel, Automatic Server Restart, optional Remote Supervisor Adapter II SlimLine, IBM Director, ServerGuide and optional Remote Deployment Manager
Operating systems supported	Microsoft Windows Storage Server 2003 R2 Standard or Enterprise Edition
Limited warranty	3-year onsite limited warranty

- [x3650 NAS details on PartnerWorld](#)
- [x3650 NAS details on IBM.com](#)
- [x3650 NAS competitive info on COMP](#)

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

- Get storage growth consolidation and central management locally and remotely
- Use in minutes and manage easily with the preloaded and preconfigured storage solution
- Protect IT investments with flexible end-user backup and a gateway to existing storage networks.

x3655

The IBM System x3655 (Figure R.8) provides you the confidence to deploy business applications that can help you get to market faster, build better products and better understand your customers.

These applications require memory intensive performance, and the x3655 delivers. With features such as dual-core processors, 16 available DIMMs with up to 64 GB of DDR II memory and robust I/O, customers can configure to meet their needs. And IBM PowerExecutive delivers advanced control to help monitor power usage and achieve decreased infrastructure power and cooling costs. Grow your compute power without growing your data center.

Keep it simple and protect your data with light path diagnostics, hot-swap and redundant components and the optional Remote Supervisor Adapter II SlimLine.

With the x3655, leverage AMD Opteron performance and IBM reliability to help improve your competitiveness.

Here are some quick x3655 facts:



Specifications

Form factor/height	2U
Processor (max)	AMD Dual-Core Opteron Model 2220 (2.8 GHz) or AMD low-power Dual-Core Opteron Model 2210 HE (1.86 GHz)
Number of processors (std/max)	1/2
Memory (max)	64 GB DDR II 667 MHz via 16 DIMMs
Expansion slots	Standard: 2 PCI-Express x8 (low-profile) and 1 PCI-Express x4 (low-profile); Optional: 1 HTx (full-height/full-length) Riser, 1 PCI-X 133 MHz (full-height/full-length) or 1 PCI-E x16 (full-height/full-length) Riser
Disk bays (total/hot-swap)	Eight SFF (2.5") hot-swap SAS hard disk drives (HDDs) or six 3.5" hot-swap SAS/SATA HDDs
Maximum internal storage	1.8 TB hot-swap SAS or 4.5 TB hot-swap SATA
Network interface	Integrated dual Gigabit Ethernet with TCP/IP Offload Engine (TOE)
Power supply (std/max)	835W 1/2
Hot-swap components	Power supply, hard disk drives, cooling fans
RAID support	RAID-0, -1, -10 standard, RAID-5, -6, -10, -50, -60 and battery backup optional
Systems management	Baseboard Management Controller IPMI 2.0 standard, Remote Supervisor Adapter II SlimLine optional
Operating systems supported	Microsoft Windows Server 2003, Microsoft Windows Small Business Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESX Server
Limited warranty	3-year onsite

- [x3655 details on PartnerWorld](#)
- [x3655 details on IBM.com](#)
- [x3655 competitive info on COMP](#)

Figure R.8. IBM System x3655 at a glance (and links to more detail).

- Maximize reliability and performance for enterprise applications that are key to your business
- Achieve greater flexibility and scalability with IBM eXtended I/O and design
- Save time and money through efficient power management, systems management and deployment.

x3755

The IBM System x3755 (Figure R.9) provides breakthrough performance for High Performance Computing (HPC) and Business Performance Computing applications that demand maximum memory availability. With the innovative IBM CPU Pass Thru card, delivering near linear performance and flexible configurations, the x3755 is uniquely advantaged in the industry. For instance, the x3755 configured with three processors plus the CPU Pass Thru card outperformed the HP DL585G2 by 27.7 percent configured with four processors.

The x3755 excels at high-speed memory access—critical for HPC applications. It delivers the memory capacity and speed demanded by scientific and technical computing. Through Xcelerated Memory Technology, the x3755 helps achieve low latency and high-speed access to memory data, especially for large memory configurations. It delivers up to 25 percent faster memory throughput, resulting in up to 15 percent better system performance. The x3755 provides maximum memory availability in a 4-socket system.

Here are some quick x3755 facts:



Specifications

Form factor/height	4U
Processor (max)	AMD Dual-Core Opteron Model 8222 SE (3.0 GHz)
Number of processors (std/max)	1/4 or 2/4
Cache (max)	1 MB L2
Memory (max)	128 GB DDR II 667 MHz
Expansion slots	7 total: 4 PCI-Express (1) x16; (2) x8; (1) x4 and 2 PCI-X (133 MHz/100 MHz); 1 HTx (half-length)
Disk bays (total/hot-swap)	4/4
Maximum internal storage	1.2 TB (4 x 300 GB)
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	1500W (1/2)
Hot-swap components	Power supply, HDDs, cooling fans
RAID support	Integrated RAID-0, -1, -10, RAID-5 optional
Systems management	Baseboard Management Controller IPMI 2.0 standard, optional RSA II SlimLine
Operating systems supported	Microsoft Windows 2003 (32-bit/64-bit), Red Hat Enterprise Linux 4.0 (32-bit/64-bit), SUSE Linux Enterprise Server 9.0 (32-bit/64-bit), VMware ESX Server 3.0
Limited warranty	3-year onsite replaceable unit and onsite limited warranty

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

Figure R.9. IBM System x3755 at a glance (and links to more detail).

- Achieve extreme performance for compute-intensive applications
- Outstanding leadership with IBM Xcelerated Memory Technology
- Delivers superb performance per watt with this cost-effective solution.

x3850

The IBM System x3850 (Figure R.10) delivers outstanding performance, extremely low latency and high availability and manageability along with advanced, integrated technologies that help protect your IT investment. The x3850 is designed with IBM X3 Architecture, the third generation of mainframe inspired IBM Enterprise X-Architecture Technology, and 64-bit Intel Xeon Processors MP. Driving mission-critical applications, including Enterprise Resource Planning, database serving or custom-developed, Java technology-based applications like IBM WebSphere software, the x3850 excels at performing transaction-intensive, back-office functions.

The x3850 provides more computing power in a smaller form factor (3U) than many competitive models, giving organizations powerful commercial application-hosting capabilities in a compact design. It delivers up to 16 times the memory addressing and up to three times the CPU bus bandwidth compared to previous server designs. Using the IBM XA-64e chipset, the x3850 sets a new standard for industry-leading 4-processor x86 performance by intelligently managing frequently accessed data.



Specifications

Form factor/height	Rack/3U
Processor (max)	Intel Xeon Processor MP up to 3.66 GHz (single-core) and 3.50 GHz (dual-core)/667 MHz front-side bus
Number of processors (std/max)	1 or 2/4
Cache (max)	1 MB L2 per processor (single-core) and up to 2 MB L2 (dual-core) and up to 16 MB L3 (dual-core)
Memory (std/max)	2 GB or 4 GB/64 GB PC2-3200 DDR II SDRAM
I/O slots (total/hot-swap)	6/6, two Active PCI-X 2.0/266 MHz and four PCI-Express x8
Disk bays (total/hot-swap)	6/6 2.5" Serial Attached SCSI (SAS)
Maximum internal storage	440.4 GB Serial Attached SCSI
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	1300W 1 or 2/2 hot-swap
Hot-swap components	Power supplies, fans, memory, hard disk drives and PCI-Express/PCI-X adapters
RAID support	RAID-0, -1, -5 optional (ServeRAID-8i)
Systems management	IBM Alert on LAN, Automatic Server Restart, IPMI 2.0, IBM Director, IBM ServerGuide, Remote Supervisor Adapter II SlimLine integrated (model dependent), light path diagnostics (independently powered), Predictive Failure Analysis on hard disk drives, processors, VRMs, fans and memory, IBM Wake on LAN
Operating systems supported	Microsoft Windows Server 2003 (Standard and Enterprise editions 32-bit and 64-bit), Red Hat Linux, SUSE Linux, Microsoft Windows 2000 (Server and Advanced Server), VMware ESX Server
Limited warranty	3-year onsite limited warranty

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

Figure R.10. IBM System x3850 at a glance (and links to more detail).

Here are some quick x3850 facts:

- Delivers breakthrough, four-processor performance with 64-bit memory addressability through IBM X3 Architecture, the third generation of IBM Enterprise X-Architecture
- Supports high-performance, dual-core 64-bit Intel Xeon Processors MP and runs 32- and 64-bit applications simultaneously, providing headroom and investment protection
- High-availability features such as three levels of memory protection and optional advanced systems management help provide high reliability
- Supports new PCI-Express I/O technology while maintaining legacy PCI-X 2.0 compatibility.

High-performance Scalable Servers

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

MORE ON THE WEB

- [Overview of all xSeries “high-performance” servers](#)

x3950

The IBM System x3950 (Figure S.1) is built on IBM X3 Architecture that delivers mainframe-inspired enhancements to the high-performance x86 server industry. With a balanced focus on providing breakthrough 64-bit performance and high avail-



Specifications

Form factor/height	Rack/3U per chassis
Processor (max)	Intel Xeon Processor MP up to 3.50 GHz (dual-core)/667 MHz front-side bus
Number of processors (std/max)	2/4 per chassis, 32 per configuration
Cache (max)	Up to 2 MB L2 and up to 16 MB L3
Memory (std/max)	2 GB or 4 GB/64 GB PC2-3200 DDR II per chassis, 512 GB maximum
Disk bays (total/hot-swap)	6/6 (per chassis) 2.5" Serial Attached SCSI (SAS)
Maximum internal storage	440.4 GB SAS per chassis (supports 36.4 GB and 73.4 GB hard disk drives)
I/O slots (total/hot-swap)	6/6 (per chassis) Active PCI-X 2.0, all slots supporting up to 266 MHz
Network interface	Integrated dual Gigabit Ethernet
Power supply (std/max)	1300W 220V 2/2
Hot-swap components	Power supplies, fans, memory, HDDs and PCI-X adapters
RAID support	Integrated RAID-0, -1, -5, -10, -50, -6 (model dependent)
Systems management	Alert on LAN 2, Automatic Server Restart, IBM Director, IBM ServerGuide, Remote Supervisor Adapter II SlimLine, light path diagnostics (independently powered), Predictive Failure Analysis on hard disk drives, processors, VRMs, fans and memory, Wake on LAN
Operating systems supported	Microsoft Windows Server 2003 (Standard, Enterprise and Datacenter editions 32-bit and 64-bit), 32- and 64-bit Red Hat Enterprise Linux and SUSE Enterprise Linux, Microsoft Windows (Server and Advanced Server), VMware ESX Server
Limited warranty	3-year onsite limited warranty

- [x3950 details on PartnerWorld](#)
- [x3950 details on IBM.com](#)
- [x3950 competitive info on COMP](#)

Figure S.1. IBM System x3950 at a glance (and links to more detail).

ability, the x3950 is designed for the changing business needs of enterprise customers—at a low entry price point.

This flagship System x server introduces improved modularity and partitioning with its 3U, 4 CPU, 6 I/O slot modular building-block design. Starting with a base two-processor configuration, add CPU, I/O and memory capacity incrementally as your business needs change, scaling up to 32 processors across eight chassis. Take advantage of the configuration flexibility of the x3950 to build the optimal system for scale-up database and Enterprise Resource Planning or scale-out virtualization for server consolidation.

Here are some quick x3950 facts:

- Delivers breakthrough performance with 64-bit memory addressability through IBM X3 Architecture, the third generation of IBM Enterprise X-Architecture
- Supports high-performance, dual-core 64-bit Intel Xeon Processors MP, and runs 32- and 64-bit applications simultaneously providing headroom and investment protection
- Features IBM XpandOnDemand scalability, allowing you to pay-as-you-grow with up to 32 high-performance, 64-bit Intel Xeon Processors MP
- Leverages years of IBM virtualization and partitioning expertise and the enterprise-proven reliability of IBM mainframe servers.

4

BladeCenter Product Quick Reference

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

What Is a BladeCenter 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 into a bookshelf. The resulting computer system is called a BladeCenter. The chassis is equipped with interconnecting midplanes (which provide the electrical connection between blades) and redundant components to achieve increased density, reduced electrical power requirements, higher reliability, and lower costs as 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.

MORE ON THE WEB

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

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 module, 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 processor-based, AMD processor-based, IBM POWER micro-processor-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.

Original BladeCenter Chassis

With 14 server bays, the original BladeCenter chassis (Figure C.1) enables you to pack up to 84 two-way servers into an industry-standard rack. High-performance density helps you concentrate as much computing power as possible into your



- [BladeCenter chassis details on PartnerWorld](#)
- [BladeCenter chassis Announcement Letter, Feb 06](#)
- [BladeCenter chassis details on IBM.com](#)
- [BladeCenter chassis competitive info on COMP](#)
- [BladeCenter Express chassis](#)

Figure C.1. IBM BladeCenter chassis (and links to more detail).

data center. Innovative design reduces cables by up to 83 percent, saving you installation time and money.

There is also a lower cost BladeCenter Express chassis designed for small-scale installations. It offers the same high-availability features of BladeCenter without some of the storage and redundant management features.

Here are some quick BladeCenter chassis facts:

- With a design that's both intelligent and simple, IBM BladeCenter tightly integrates storage, networking, servers and applications

- Flexible modular technology integrates Intel processor-based, IBM POWER processor-based and AMD Opteron processor-based blade servers into the BladeCenter architecture
- Management tools integrated into BladeCenter help simplify administration to help lower costs and improve control of the data center
- BladeCenter supports many operating systems—allowing you to choose the one that best suits your business needs.

BladeCenter T Chassis

Designed to satisfy the rugged demands of the telecom industry, the BladeCenter T is NEBS 3/ETSI-compliant, compact, tough, flexible, and proven to meet the most stringent industry standards and testing (Figure C.2).

BladeCenter T transforms the way telecommunication services and products are created, deployed, operated, and maintained. It marries the power, agility, innovation, and cost structures of enterprise computing with the ruggedness and reliability demands of the telecom marketplace to launch the new era of on demand, next-generation communications.

Here are some quick BladeCenter T chassis facts:

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



- [BladeCenter T details on PartnerWorld](#)
- [BladeCenter T Announcement Letter, Feb 06](#)
- [BladeCenter T chassis details on IBM.com](#)
- [BladeCenter T chassis competitive info on COMP](#)
- [BladeCenter T Compatibility Guide](#)

Figure C.2. IBM BladeCenter T chassis (and links to more detail).

- Innovative, modular design delivers the reliability, flexibility and performance density capable of supporting an IP-based, next-generation network application infrastructure integrating voice, data and multimedia
- Integration of servers, I/O, storage, operating systems and applications into a single, compact network platform that is ideal for deploying autonomic capabilities, enabling an on demand operating environment.

BladeCenter H Chassis

With IBM BladeCenter H (Figure C.3), you can take advantage of even more powerful performance and features while preserving your existing BladeCenter investment. BladeCenter H offers a host of new features and functionality, making it the ideal platform to run your next-generation, high-performance business-critical applications. Designed to support full performance 4X InfiniBand fabrics and future applications requiring 10 Gb Ethernet or 10 Gb Fibre Channel, BladeCenter H is optimized for today's IT environment and primed for future applications. While virtualization is nothing new to the



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

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

BladeCenter family, BladeCenter H takes it to the next level by enabling server, storage, and I/O virtualization across multiple chassis of blades, making it ideal for even the most demanding IT environments.

BladeCenter H offers exceptional efficiency for mission-critical environments. Whether you're limited by space constraints, cooling capacity, or IT personnel, BladeCenter allows you to get the most from limited resources.

Here are some fast BladeCenter H facts:

- With a design that's both intelligent and simple, IBM BladeCenter H integrates storage, networking, servers, management and applications
- Flexible modular technology integrates Intel processor-based, IBM POWER processor-based and AMD Opteron processor-based blade servers into the BladeCenter architecture
- Management tools integrated into BladeCenter help simplify administration and maximize the efficiency of IT staffs to help lower costs and improve control of the data center
- BladeCenter supports countless operating systems and applications—allowing you to choose the ones that best suit your business needs all in a single platform
- BladeCenter offers a broad range of networking options integrated into the chassis to simplify infrastructure complexity and manageability while helping lower total cost of ownership.

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 ser-



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

Figure C.4. IBM BladeCenter HT at a glance (and links to more detail).

vices planes for telecommunications equipment manufacturers and service providers.

Here are some quick BladeCenter HT Chassis facts:

- With a design that delivers investment protection, IBM BladeCenter HT integrates the server blades, switches, networking, storage, I/O, and management platforms that are supported across the BladeCenter family.
- Helps reduce network infrastructure costs 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
- Increase network infrastructure performance with dual-core and quad-core Intel, AMD and IBM POWER processor blades
- Dramatically increase high-speed connectivity and throughput with multi-terabit networking (more than 1.2 Tbps throughput on backplane) and 40 Gbps per blade server
- Improve network flexibility and interoperability bridging new services to control gateways supporting SS7, VoIP, legacy PSTN, WAN devices and network interfaces with special purpose telecommunications blades
- Efficiently consolidate network resources while delivering high scalability for NGN applications such as IPTV, VoD and IMS, with higher port concentrations and 10 Gbps Ethernet network bandwidth
- BladeCenter supports numerous operating systems and applications, 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 review with customers
- 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 and/or data center (IBM Director)
- Increase flexibility and choice with a single family of compatible systems, designed for deployment in a telecom central office and/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:

- Intel Blades
- AMD Blades
- POWER Blades.

Intel Blades

These blade servers are based on Intel processors and are named using an “HS” prefix.

HS20

The IBM BladeCenter HS20 (Figure H.1) is designed to support high-performance Intel Xeon Processors and is packed with high-availability features. The HS20 delivers density without sacrificing processor performance or availability.

Here are some fast HS20 facts:

- High-density modular blade server designed to support the entire family of BladeCenter chassis
- Designed to take less time to install and fewer people to maintain, helping reduce IT infrastructure costs
- Intel Extended Memory 64 Technology provides a smooth transition to 64-bit applications without sacrificing price-performance
- Two-processor scalability enables scaling up to meet computing requirements.

HS20 ultra low power

The IBM BladeCenter HS20 ultra low power (Figure H.2) is designed to support high-performance Intel Xeon Processors and provides high-availability features. As such, it delivers density and power efficiency without sacrificing processor performance or availability.

Here are some fast HS20 ultra low power facts:

- High-density modular blade server designed to support the entire family of BladeCenter chassis



Specifications

Processor	Intel Xeon Processor up to 3.80 GHz (some models support Intel EM64T)
Number of processors (std/max)	1/2
Cache (max)	1 MB or 2 MB (model dependent)
Memory (std/max)	Up to 16 GB PC2-3200 DDR2
Internal hard disk drives	Up to 2 Ultra320 SCSI HDDs installed on each blade (or plus support for up to 2 hot-swap Ultra320 SCSI drives with optional SCSI Storage Expansion Unit)
Maximum internal RAID support	746.8 GB (with optional SCSI Storage Expansion Unit) storage Integrated RAID-1 standard on blade server, integrated RAID-1E with SCSI Expansion Unit 2 option (on select blades)
Network	Dual Gigabit Ethernet
I/O upgrade	1 expansion card connection
Systems management	Integrated systems management processor
Operating systems	Windows Server, Linux, Netware, Solaris

- [HS20 details on PartnerWorld](#)
- [HS20 details on IBM.com](#)
- [HS20 competitive info on COMP](#)

Figure H.1. IBM BladeCenter HS20 at a glance (and links to more detail).

- Designed to take less time to install and fewer people to maintain, helping reduce IT infrastructure costs
- Ultra low power Intel Xeon dual-core processors provide excellent performance per watt



Specifications

Processor	Intel Xeon dual-core ultra low-power processor up to 2 GHz
Number of processors (std/max)	1/2
Cache (max)	1 MB or 2 MB (model dependent)
Memory (std/max)	Up to 16 GB PC2-3200 DDRII
Internal hard disk drives	Up to 2 SAS HDDs installed on each
Maximum internal storage	146 GB
RAID support	Integrated RAID 0,1 standard on blade server
Network	Dual Gigabit Ethernet
I/O upgrade	1 expansion card connection
Systems management	Integrated systems management processor
Operating systems	Windows Server, Linux, Netware

- [HS20 ultra low power details on PartnerWorld](#)
- [HS20 ultra low power details on IBM.com](#)
- [HS20 ultra low power competitive info on COMP](#)

Figure H.2. IBM BladeCenter HS20 ultra low power at a glance (and links to more detail).

- Two-processor scalability enables scaling up to meet computing requirements.

HS21

The IBM BladeCenter HS21 (Figure H.3), coupled with the BladeCenter chassis, delivers advanced application serving with performance, density, and scalability ideal for enterprise environments.

Here are some quick HS21 facts:

- Blade servers supported in IBM BladeCenter chassis
- Powerful, low voltage quad-core processors and high-performance quad-core processor
- Shared 2 MB L2 cache per core (8 MB per processor)
- 1066 or 1333 MHz front-side bus (FSB)
- Dual Gigabit Ethernet connections
- Up to 32 GB of high-speed memory with ECC (four DIMM slots x 4 GB/DIMM on 30-mm blade and eight DIMM slots x 4 GB/DIMM with Memory and I/O Expansion Blade)
- Up to two non-hot-swap SAS SFF HDDs (36, 73, and 146 GB each) with RAID 0 and 1 in the single-wide configurations
- Optional IBM BladeCenter Storage and I/O Expansion Blade with support for up to three additional hot-swap SAS SFF HDDs with RAID 0 and 1, and optional RAID 5, as well as two additional I/O expansion slots



Specifications

Processor	Dual-Core Intel Xeon Processor up to 3.00 GHz or Quad-Core Intel Xeon Processor up to 2.66 GHz and up to 1333 MHz front-side bus
Number of processors (std/max)	1/2
Cache (max)	4 MB L2 shared (dual-core) or 2x4 MB L2 (quad-core)
Memory (std/max)	Up to 16 GB Fully Buffered DIMMs (internal) and up to 32 GB with Memory and I/O Expansion Unit
Internal hard disk drives	Up to two Small Form Factor (2.5") 10,000 rpm SAS HDDs installed on each blade (plus support for up to 3 hot-swap SAS drives with optional storage and I/O blade)
Maximum internal storage	734 GB (with optional SIO blade)
RAID support	Integrated RAID-0 or -1 standard on blade server, integrated RAID-1E or RAID-5 optional with SIO Blade
Network	Dual Gigabit Ethernet (TOE capable), up to 8 ports optional
I/O upgrade	1 PCI-X expansion card connection (traditional) and 1 PCI-Express (high speed)
Systems management	Integrated systems management processor
Operating systems	Windows Server, Linux, Netware, Solaris

- [HS21 details on PartnerWorld](#)
- [HS21 details on IBM.com](#)
- [HS21 competitive info on COMP](#)

Figure H.3. IBM BladeCenter HS21 at a glance (and links to more detail).

- Advanced high-availability and systems-management features.

HS21 XM

Designed to support high-performance Dual-Core or Quad-Core Intel Xeon Processors and packed with high availability features, the HS21 XM blade (Figure H.4) delivers density without sacrificing processor performance or availability.

Here are some quick HS21 XM facts:

- High-density modular blade server designed to support the entire family of BladeCenter chassis
- Higher internal memory combined with multi-core processors at 64-bit delivers leadership performance for multi-threaded applications
- Featuring new high-speed fabrics with BladeCenter H to deliver greater bandwidth and performance
- Supports new IBM 4 GB Modular Flash Drive for optimized durability, reliability and power efficiency
- Helps reduce power and cooling costs while delivering substantial performance gains over earlier technology—true performance efficiency.

AMD Blades

These blade servers are based on AMD processors and are named using the “LS” Prefix.



Specifications

Processor	Dual-Core Intel Xeon 5160 up to 3.00 GHz or Quad-Core Intel Xeon E5345 up to 2.33 GHz and up to 1333 MHz front-side bus
Number of processors (std/max)	1/2
Cache (max)	4 MB L2 shared (dual-core) or 2x4 MB L2 (quad-core)
Memory (std/max)	Up to 32 GB with Fully Buffered DIMMs
Internal hard disk drives	One Small Form Factor (2.5") 10,000 rpm SAS HDD installed on each blade and one optional internal IBM 4 GB Modular Flash Drive (plus support for up to 3 hot-swap SAS drives with optional storage and I/O blade)
Maximum internal storage	587.2 GB (with optional SIO blade)
RAID support	Integrated RAID-0 or -1 standard on blade server, integrated RAID-1E or RAID-5 optional with SIO Blade
Network	Dual Gigabit Ethernet (TOE capable), up to 12 ports optional with SIO blade and MSIM card
I/O upgrade	1 PCI-X expansion card connection (traditional) and 1 PCI-Express (high-speed)
Systems management	Integrated systems management processor
Operating systems	Windows Server, Linux, VMWare, Netware, Solaris

- [HS21 XM details on PartnerWorld](#)
- [HS21 XM details on IBM.com](#)
- [HS21 XM competitive info on COMP](#)

Figure H.4. IBM BladeCenter HS21 XM at a glance (and links to more detail).

LS20

Extend the capabilities of your high-density BladeCenter with LS20 for BladeCenter blade servers (Figure L.1) that include AMD Opteron 32- or 64-bit processors. These low power, full-



Specifications

Processor	AMD Opteron Model 246, 250, 252, 254, 270, 275 and 280
Number of processors (std/max)	1/2
Cache	1 MB L2 per processor core
Memory	Up to 16 GB DDR VLP memory
Internal hard disk drives	Up to 2 Ultra320 SCSI HDDs
Maximum internal storage	146.80 GB
Network	2 integrated Gigabit Ethernet controllers
I/O upgrade	1 expansion card connection
Systems management	Integrated systems management processor
Operating systems	Windows, Linux, Solaris

- [LS20 details on PartnerWorld](#)
- [LS20 details on IBM.com](#)
- [LS20 competitive info on COMP](#)

Figure L.1. IBM BladeCenter LS20 at a glance (and links to more detail).

performance Opteron processors are ideal for clients concerned with power consumption and heat output. They help to reduce the operational cost in deploying these blades. The Opteron processors support 32- and 64-bit operating systems from Linux Red Hat, SUSE Linux, and Microsoft. These processors can also run in legacy mode (where a 32-bit application runs under a 64-bit operating system) and remain fully compatible with 32-bit applications and operating systems.

Here are some quick LS20 facts:

- High-density modular blade server designed to support the entire family of BladeCenter chassis
- Designed to take less time to install and fewer people to maintain, helping reduce IT infrastructure costs
- Provides a smooth transition to 64-bit applications without sacrificing the price/performance of the existing ecosystem
- Two-processor scalability enables scaling up to meet computing requirements.

LS21

The LS21 blade server (Figure L.2) is a high-performance blade that delivers performance, density and availability.

Here are some quick LS21 facts:

- High-density modular blade server designed for use in the entire family of IBM BladeCenter chassis
- Designed to take less time to install and fewer people to maintain, helping reduce IT infrastructure costs



Specifications

Processor	AMD Opteron Model 2210EE, 2210HE, 2212, 2212HE, 2216HE, 2218, 2218HE and 2220
Number of processors (std/max)	1/2
Cache	1 MB L2 per processor core
Memory	Up to 32 GB DDR II VLP memory
Internal hard disk drives	One SAS HDD
Maximum internal storage	73.4 GB internally; up to 293.6 GB with storage and I/O expansion blade installed
Network	2 integrated Gigabit Ethernet controllers
I/O upgrade	1 PCI-X expansion connector and 1 PCI-Express expansion connector
Systems management	Integrated systems management processor
Operating systems	Windows, Linux, Solaris

- [LS21 details on PartnerWorld](#)
- [LS21 details on IBM.com](#)
- [LS21 competitive info on COMP](#)

Figure L.2. IBM BladeCenter LS21 at a glance (and links to more detail).

- Provides a smooth transition to 64-bit applications without sacrificing the price/performance of the existing ecosystem.

LS41

The LS41 blade server (Figure L.3) is a high-performance blade that delivers performance, density and availability.



Specifications

Processor	AMD Opteron Model 8212, 8212HE, 8216, 8216HE and 8218
Number of processors (std/max)	2/4
Cache	1 MB L2 per processor core
Memory	Up to 64 GB DDR II VLP memory
Internal hard disk drives	2 SAS HDDs
Maximum internal storage	146 GB internally; up to 367 GB with SIO installed
Network	4 integrated Gigabit Ethernet controllers
I/O upgrade	2 PCI-X expansion connectors and 1 PCI-Express expansion connector
Systems management	Integrated systems management processor
Operating systems	Windows, Linux

- [LS41 details on PartnerWorld](#)
- [LS41 details on IBM.com](#)
- [LS41 competitive info on COMP](#)

Figure L.3. IBM BladeCenter LS41 at a glance (and links to more detail).

Here are some fast LS41 facts:

- High-density modular blade server designed for use in the entire family of IBM BladeCenter chassis
- Designed to take less time to install and fewer people to maintain, helping reduce overall IT infrastructure costs
- Provides a smooth transition to 64-bit applications without sacrificing the price/performance of the existing ecosystem
- Up to four dual-core processors matched with plenty of memory to handle the most demanding workloads.

POWER Blades

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

JS21

The BladeCenter JS21 (Figure J.1) represents a convergence of leadership and value, combining support of AIX 5L, IBM’s industrial-strength UNIX, Linux, Advanced POWER Virtualization and AltiVec SIMD acceleration into a single, highly reliable, high-performance blade server.

Combining AIX 5L and Linux support with the high-speed BladeCenter H chassis, the JS21 delivers leadership SIMD acceleration for data-intensive or floating-point-intensive scientific applications.

Here are some quick JS21 facts:



Specifications

Form factor	Single-wide blade server for BladeCenter
Processors	64-bit IBM PowerPC 970MP with integrated AltiVec SIMD accelerator
Number of processors	2-socket single-core (2.7 GHz) or 2-socket dual-core (2.3 GHz or 2.5 GHz)
Level 2 (L2) cache	1 MB per core
Memory (std/max)	1 GB (2-core) or 2 GB (4-core); up to 16 GB maximum per blade; 400 or 533 MHz ECC Chipkill DDR2 SDRAM; 4 DIMM slots
Internal disk storage	Up to two 2.5" Serial Attached SCSI (SAS) 10K RPM 36 GB or 73 GB non-hot-swap hard drives per blade, maximum 146 GB
RAID support	Integrated controller for RAID 0/10 mirroring
Networking	Integrated Broadcom 5780 17X PCI-Express controller with Dual Gigabit Ethernet, optional Dual Gigabit Ethernet daughter card
I/O upgrade	Integrated PCI-Express connector for high-speed daughter cards, Integrated connector for legacy daughter cards
Optional connectivity	4 Gb Fibre Channel, 1 or 10 Gigabit Ethernet, 1X or 4X InfiniBand
Advanced POWER Virtualization	Virtual LAN, POWER Hypervisor, Micro-Partitioning, Shared processor pool, Virtual I/O Server, Integrated Virtualization Manager
Systems management	Integrated systems management processor, IBM Director, light path diagnostics, Predictive Failure Analysis, IBM PowerExecutive, Cluster Systems Management, Serial Over LAN, IPMI-compliant
Operating systems	AIX 5L V5.2 and above, SUSE Linux Enterprise Server (SLES) 9 for POWER and above, Red Hat Enterprise Linux (RHEL) AS 4 for POWER and above

- [JS21 details on PartnerWorld](#)
- [JS21 details on IBM.com](#)
- [JS21 competitive info on COMP](#)

Figure J.1. IBM BladeCenter JS21 at a glance (and links to more detail).

- Premier blade solution for 64-bit UNIX, HPC Linux clusters and server consolidation
- Now available as a 2.3 GHz 4-core SMP for value oriented clients
- Compatible with IBM BladeCenter, BladeCenter H and BladeCenter T chassis for deployment flexibility
- Can take advantage of IBM Advanced POWER Virtualization.

JS21 Express

The IBM BladeCenter JS21 Express blade server (Figure J.2) is a feature-rich, preconfigured blade designed to meet the stringent requirements of small businesses for advanced technology at a very attractive price. The JS21 Express delivers many leading-edge technologies—support for the IBM AIX 5L and Linux operating systems, IBM Advanced POWER Virtualization (APV) and AltiVec SIMD acceleration functionality—in a single, highly reliable, high-performance, yet cost-efficient blade server.

The JS21 Express represents one of the most cost-efficient solutions for UNIX and Linux deployment available in the market.

Here are some quick JS21 Express Facts:

- Pre-configured JS21 blade server optimized with fast memory and lots of storage
- Combines deployment flexibility of IBM BladeCenter with ease of management



Specifications

Form factor	Single-wide blade server for BladeCenter
Processors	64-bit IBM PowerPC 970MP with integrated AltiVec SIMD accelerator
Number of processors	Two-socket single-core (2.7 GHz or 2.6 GHz) or two-socket dual-core (2.5 GHz or 2.3 GHz)
Level 2 (L2) cache	1 MB per core
Memory (std/max)	2 GB (2 x 1 GB in single-core) or 4 GB (2 x 2 GB in dual-core), up to 16 GB maximum per blade, ECC Chipkill DDR2 SDRAM running at 533 MHz, 4 DIMM slots
Internal disk storage	One 73 GB 2.5" Serial Attached SCSI (SAS) 10K rpm hard disk drive standard; up to two 36 GB or 73 GB non-hot-swap hard drives per blade, maximum 146 GB
RAID support	Integrated controller for RAID 0/1 mirroring
Networking	Integrated Broadcom 5780 controller with Dual Gigabit Ethernet, optional dual gigabit Ethernet daughter card
I/O upgrade	Integrated PCI-Express connector for high-speed daughter cards, integrated connector for legacy daughter cards
Optional connectivity	4 Gb Fibre Channel, 1 or 10 Gigabit Ethernet, 1X or 4X InfiniBand
Optional Advanced POWER Virtualization Systems management	Virtual LAN, POWER Hypervisor, Micro-Partitioning, Shared processor pool, Virtual I/O Server with Integrated Virtualization Manager
Operating systems	Integrated systems management processor, IBM Director, light path diagnostics, Predictive Failure Analysis, IBM PowerExecutive, Cluster Systems Management, Serial Over LAN, IPMI-compliant AIX 5L V5.2 and V5.3, SUSE Linux Enterprise Server 9 for POWER, Red Hat Enterprise Linux AS 4 for POWER

- [JS21 Express details on PartnerWorld](#)
- [JS21 Express details on IBM.com](#)
- [JS21 Express competitive info on COMP](#)

Figure J.2. IBM BladeCenter JS21 Express at a glance (and links to more detail).

- Takes advantage of virtualization technologies to help increase utilization and decrease costs.

Switch Modules

In this section, we examine some switch modules used to add function within a BladeCenter.

Ethernet

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

Cisco Gigabit Ethernet

The Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM BladeCenter provides BladeCenter customers with Cisco's Ethernet switching technology integrated within the

MORE ON THE WEB

- [Cisco Gigabit Ethernet info on PartnerWorld](#)
- [Cisco Gigabit Ethernet info on IBM.com](#)

BladeCenter chassis. This switch option further enhances BladeCenter's value proposition by seamlessly interfacing to

customers' existing data networks using industry pervasive, SNMP-based management tools such as CiscoWorks.

Here are some quick Cisco Gigabit Ethernet Switch facts:

- Supports high-availability networks through support of advanced STP protocols and trunk failover functionality
- Optimizes delivery through support of multicast protocols such as IGMP snooping

- Eases network management through support of Cisco IOS, CiscoWorks, and Cluster Management System
- Ensures network security through support of RADIUS, TACACS+, 802.1x and other authentication protocols.

Cisco Fiber Gigabit Ethernet

The Cisco Systems Fiber Intelligent Gigabit Ethernet Switch Module (IGESM) option offers BladeCenter customers Cisco's world-class Ethernet switching technology integrated within the BladeCenter chassis. It further enhances BladeCenter's value proposition by easily interfacing to a customer's existing fiber-based data network using Cisco standard Small Form Factor Pluggable (SFP) modules.

MORE ON THE WEB

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

Here are some quick facts about the IGESM:

- External SFP-based ports for fiber connectivity (SFPs available from Cisco)
- Supports high availability networks through support of advanced STP protocols and trunk failover functionality
- Optimizes delivery through support of multicast protocols such as IGMP snooping
- Eases network management through support of Cisco IOS, CiscoWorks, and Cluster Management System

- Ensures network security through support of RADIUS, TACACS+, 802.1x and other authentication protocols.

Nortel 10 Gb Ethernet

The Nortel 10 Gb Ethernet Switch Module for IBM BladeCenter is a new switch option especially designed for the next-generation IBM BladeCenter chassis that enables administrators

MORE ON THE WEB

- [Nortel 10 Gb Ethernet Announcement Letter](#)
- [Nortel 10 Gb Ethernet info on PartnerWorld](#)
- [Nortel 10 Gb Ethernet info on IBM.com](#)

to provide full Layer 2/3 10 Gb LAN switching and routing capabilities to each server within a BladeCenter chassis.

Such consolidation flattens the topology of the data center infrastructure through convergence of storage and data networks, thus reducing the number of discrete devices, management consoles, and different management systems.

Here are some quick Nortel 10 Gb Ethernet Switch facts:

- 10 Gb Ethernet connectivity to all server blades within a chassis
- 200 Gbps aggregate switching capacity (20 ports at 10 Gb per port) and 400 Gbps full duplex
- Full Layer 2 Switching and Layer 3 Routing to provide flexible in-chassis traffic management and sophisticated security
- Fiber XFP interconnect options (SR or LR) with six 10 Gb ports and one copper 1 Gb management port (RJ-45)

- High-availability features for simplified deployment and lower Total Cost of Ownership (TCO)
- Dual 10 Gb Ethernet connectivity from each blade server to high-speed switch bays
- Lower cost 10 Gb connectivity enabled by direct 10 Gb connections over BladeCenter H midplane, eliminating the need for XFPs between the blade and switch modules
- Higher performance through support of iSCSI and TCP/IP offload protocols.

Nortel Layer 2/3 10 Gigabit Uplink Ethernet

IBM delivers the answer for bandwidth-hungry applications—the Nortel Layer 2/3 10 Gb Uplink Ethernet Switch Module (10 Gb ESM). This switch provides up to 45 Gbps non-blocking, line-speed bandwidth to meet your application requirements. With three 10 Gb uplink ports that can be trunked together—and 15 non-blocking Gigabit Ethernet ports—the 10 Gb ESM offers performance with room to spare for growing application needs.

Here are some quick Nortel Layer 2/3 10 Gigabit Uplink facts:

MORE ON THE WEB

- [Nortel Layer 2/3 10 Gigabit Uplink Ethernet Switch Module info on PartnerWorld](#)
- [Nortel Layer 2/3 10 Gigabit Uplink Ethernet Switch Module info on IBM.com](#)

- Three 10 Gb uplinks at line-speed provide maximum bandwidth to any BladeCenter chassis
- Industry-standard ACLs, advanced traffic management, dynamic routing with RIP, OSPF, BGP and VRRP. Unmatched network-wide Quality of Service for time-sensitive applications such as VOIP and IPTV
- High availability with L2 failover, Uplink Fast, Spanning Tree, Multiple and Rapid Spanning Tree, Router Redundancy Protocol (VRRP) and Equal Cost Multiple Routing (ECMP) for OSPF
- Standard-based VLANs for traffic segregation. Advanced filtering. Support for RADIUS, TACACS/TACACS+, and 802.1x for port security ensures end-to-end data integrity
- Flexible and simple management via Web browser or industry-standard CLI.

Nortel Layer 2/3 Copper Gigabit Ethernet

The Nortel Layer 2/3 Copper Gigabit Ethernet Switch Module offers new, integrated switch options enabling you to consolidate full Layer 2/3 LAN switching and routing capabilities into a single BladeCenter chassis. This consolidation helps flatten the data center infrastructure and reduces the number of discrete devices, management consoles, and equipment ven-

MORE ON THE WEB

- [Nortel Layer 2/3 Copper Gigabit Ethernet Switch info on PartnerWorld](#)
- [Nortel Layer 2/3 Copper Gigabit Ethernet Switch info on IBM.com](#)

dors that administrators need to deal with, helping to lower costs and simplify deployment.

Here are some quick Nortel Layer 2/3 Copper Gigabit Ethernet Switch facts:

- Offers six copper uplinks and strongest price/performance benefits
- Delivers complete Layer 2 and 3 functionality—routing, filtering, traffic queuing
- Better serves the processing demands of bandwidth-intensive applications
- Provides port flexibility and traffic management to improve maintenance
- Provides upgrade path to full Layer 4-7 services.

Nortel Layer 2/3 Fiber Gigabit Ethernet

The Nortel Layer 2/3 Fiber Gigabit Ethernet Switch Module enables you to consolidate full Layer 2/3 LAN switching and routing capabilities into a single BladeCenter chassis. This consolidation helps flatten the data center infrastructure and reduces the number of discrete devices, management con-

MORE ON THE WEB

- [Nortel Layer 2/3 Fiber Gigabit Ethernet Switch info on PartnerWorld](#)
- [Nortel Layer 2/3 Fiber Gigabit Ethernet Switch info on IBM.com](#)

soles, and equipment vendors that administrators need to deal with, helping to lower costs and simplify deployment.

Here are some quick Nortel Layer 2/3 Fiber Gigabit Ethernet Switch facts:

- Offers six fiber uplinks (with SFPs) and strong price/performance benefits
- Delivers complete Layer 2 and 3 functionality—routing, filtering, traffic queuing
- Better serves the processing demands of bandwidth-intensive applications
- Provides port flexibility and traffic management to improve maintenance
- Provides upgrade path to full Layer 4-7 services.

Nortel Layer 2-7 Gigabit Ethernet

This option introduces Layer 2-7 forwarding decision capabilities and security features. Up to two Gigabit Ethernet modules can reside in the network slots of the BladeCenter chassis in addition to the current installation. They can be hot-plugged into BladeCenter without disrupting normal operations. The switch connects to the server blades via the

MORE ON THE WEB

- [Nortel Layer 2-7 Gigabit Ethernet Switch info on PartnerWorld](#)
- [Nortel Layer 2-7 Gigabit Ethernet Switch info on IBM.com](#)

14 internal Gigabit Ethernet interfaces (server ports) over the BladeCenter midplane. It supplies four external Gigabit Ethernet interfaces to the outside world. A console interface is available for diagnostics and direct communication between the Gigabit Ethernet Switch and the BladeCenter Management Module.

Here are some quick facts about the Nortel Layer 2-7 Gigabit Ethernet Switch:

- Increases application availability and performance
- Better serves the processing demands of bandwidth-intensive applications
- Greater infrastructure scalability
- Enhanced server security
- Delivers application and server load balancing.

Server Connectivity Module for IBM BladeCenter

As small and mid-sized businesses try to squeeze more value from their IT systems and on-site networking skills, the Server Connectivity Module for IBM BladeCenter delivers a range of capabilities in scalable, flexible configurations. An intuitive graphical user interface (GUI) and integrated man-

MORE ON THE WEB

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

agement software make this module affordable and simple for IT administrators to deploy, manage and maintain—delivering more value with fewer resources. And the networking features of the Server Connectivity Module have been designed to prevent an improperly configured device from disrupting the network infrastructure, helping enable critical system uptime and uninterrupted operation.

Here are some quick facts about this module:

- Serves the needs of small and medium-sized business customers
- Easy to install, configure and manage through an easy-to-use browser-based interface
- Ideal for environments where a separation between the server and networking domains is preferred.

Fibre Channel

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

Cisco 4 Gb 10 and 20 Port Fibre Channel

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

MORE ON THE WEB

- [Cisco 4 Gb 10 and 20 Port Switch Announcement Letter](#)
- [Cisco 4 Gb 10 and 20 Port Switch info on PartnerWorld](#)
- [Cisco 4 Gb 10 and 20 Port Switch info on IBM.com](#)

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

- Enables high-performance end-to-end 1, 2 and 4 Gigbits per second SAN solutions for the data center
- Affordable 10-port and 20-port offerings available for small, medium and large enterprise business needs
- Exciting addition to the Cisco Ethernet and MDS family of products
- Includes Tivoli SAN manager enhancements to better manage MDS9000 with integrated IBM SAN Volume Controller
- 10-port upgrade available for on demand scaling to a 20-port switch
- Cisco SFPs are required
- Long-wave 41Y8600
- Short wave 41Y8598
- Short wave 4-pack 41Y8596

Brocade 10-port and 20-port SAN

IBM adds more value to BladeCenter with integrated Brocade storage area network (SAN) switch modules with 4 Gbps performance. Compatibility and full interoperability with existing Brocade fabrics and IBM System Storage SAN switches en-

hance scalability. Additional features help improve system SAN security and performance. And by providing full inte-

gration of Brocade enterprise fabric into the BladeCenter architecture, the Brocade SAN switch helps improve system manageability and simplifies the infrastructure.

Here are some quick Brocade SAN Switch facts:

- Enables high-performance end-to-end 1, 2 and 4 Gigbits per second SAN solutions for the data center
- Affordable 10-port and 20-port offerings available for small, medium and large enterprise business needs
- Easy-to-use non-disruptive upgrade doubles the 10-port switch connectivity to 20-ports when your business needs change
- Integrates the Brocade SAN fabric to simplify deployment/management and reduce infrastructure complexity and total cost of ownership
- Utilizes Brocades proven Silkworm technology and is fully backward compatible and interoperable with Silkworm and IBM TotalStorage b-type SAN switches.

MORE ON THE WEB

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

QLogic 10-port and 20-port 4 Gb Fibre Channel

The QLogic 10- and 20-port 4 Gb Fibre Channel Switch Modules and 4 Gb expansion card for IBM BladeCenter enable an end-to-end 4 Gb SAN solution for blade servers. Both 10- and 20-port modules offer easy-to-

MORE ON THE WEB

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

use wizards, storage area network (SAN) management flexibility and interoperability with other major manufacturers' FCSW2- and FCSW3-compliant storage networking products.

Here are some quick QLogic Fibre Channel Switch facts:

- Enables high-performance end-to-end 1, 2 and 4 Gigabits per second SAN solutions
- Provides interoperability in open mode leveraging standards-compliant (FCSW2 & FCSW3) SANs
- Affordable 10-port and 20-port offerings available—ideal for small, medium and large enterprise business needs
- Easy-to-use software upgrade doubles your 10-port switch connectivity to 20 ports for on demand scalability
- Included with every switch, QLogic's SANsurfer Management Suite eases installation, configuration and management of your SAN infrastructure—all from one GUI.

McDATA 10-port and 20-port 4 Gb Fibre Channel

The McDATA 10-port and 20-port Fibre Channel Switch Modules are designed to address the needs of small, medium, and large SAN environments. These high performing, simple-to-use switches deliver up to six external ports for 1, 2, and 4 Gbps fabrics. These switches can be used to create a wide range of high-performance SAN solutions from single-switch

MORE ON THE WEB

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

configurations to multi-switch data centers. Easy to deploy, these switches provide

centralized management as well as McDATA-capable fabric services. Along with the industry-leading network and storage flexibility of IBM BladeCenter, this offering delivers the functionality, performance, manageability, scalability, and security required by demanding storage area networks (SANs).

Here are some quick McDATA Fibre Channel Switch facts:

- Enables high-performance end-to-end 1, 2 and 4 Gigabits per second SAN solutions
- Allows seamless integration of BladeCenter into McDATA environments
- Affordable 10-port and 20-port offerings available—ideal for small, medium and large enterprise business needs
- Easy-to-use software upgrade doubles your 10-port switch connectivity to 20 ports for on demand scalability

- Includes McDATA SANbrowser—easy-to-use embedded Web GUI to configure, manage, and maintain your McDATA SAN
- Provides nondisruptive code load activation using McDATA HotCAT functionality
- Supports optional McDATA SANtegrity Security software to help protect data and manage data access.

InfiniBand

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 will cover a module that allows BladeCenter to participate with Infiniband.

Cisco InfiniBand

The Cisco InfiniBand Switch Module for IBM BladeCenter and the Cisco InfiniBand HCA Expansion Card enable organizations to leverage the InfiniBand standard to create HPC solutions based on cost-effective BladeCenter blade clusters. BladeCenter with the InfiniBand switch solution delivers a potent combination of exceptionally high-connection bandwidth and extremely low node-to-node latency. As a

MORE ON THE WEB

- [Cisco InfiniBand Switch info on PartnerWorld](#)
- [Cisco InfiniBand Switch info on IBM.com](#)

result, a BladeCenter cluster with the Infiniband switch solution can, in some cases, deliver performance comparable to a single, high-end, monolithic server—at a fraction of the cost.

Here are some quick facts about this module:

- Scales-out data centers by interconnecting blades and chassis together with InfiniBand as the interconnect
- Leverages high bandwidth and low latency characteristics of the InfiniBand standard with Remote Direct Memory Access (RDMA)
- Enables consolidation of LAN and SAN connectivity for an entire data cluster to a centralized location
- Virtualizes and shares I/O and storage across an entire BladeCenter or collection of BladeCenters for cost savings and high availability.

Cisco Systems 4x InfiniBand

The Cisco Systems 4x InfiniBand Switch Module delivers high performance, low-latency server switching required to enable

MORE ON THE WEB

- [Cisco Systems 4x InfiniBand Switch info on PartnerWorld](#)
- [Cisco Systems 4x InfiniBand Switch info on IBM.com](#)

BladeCenter server systems to form high-performance clusters and

grids that deliver the performance required to realize the full potential of next-generations applications and systems.

Here are some quick facts about this switch:

- Provides 14 ports of 10-Gbps (4X) server connectivity to blades with less than 200 nanoseconds (ns) port-to-port latency and eight equivalent 4X external ports from the BladeCenter H chassis
- Supports Message Passing Interface (MPI), IP over InfiniBand (IPoIB), and Sockets Direct Protocol (SDP), which use InfiniBand Remote Direct Memory Access (RDMA) to support the most demanding high-performance computing applications and high-performance database clusters
- Integrated with Cisco's latest release of Vframe—server fabric virtualization software—which offers rapid provisioning and real time re-hosting of server and network interfaces with policy based utilization and high availability rules.

QLogic InfiniBand Ethernet Bridge

Leveraging the existing InfiniBand switches available for BladeCenter H, the QLogic InfiniBand Ethernet Bridge Module for IBM BladeCenter provides up to six 1 Gb Ethernet connections to the chassis. When interconnected, these bridge modules provide Ethernet interfaces to the chassis or rack of InfiniBand-connected blades. When configured as such, bridges can be shared across chassis and serve as gateways to InfiniBand traffic for another chassis. This enables a completely

MORE ON THE WEB

- [QLogic InfiniBand Ethernet Bridge Announcement Letter](#)
- [QLogic InfiniBand Ethernet Bridge info on PartnerWorld](#)
- [QLogic InfiniBand Ethernet Bridge info on IBM.com](#)

self-contained cluster of InfiniBand-based BladeCenter blades and/or chassis to connect to the external network with little or no external switching.

Here are some quick QLogic InfiniBand Ethernet Bridge facts:

- Enables InfiniBand within the chassis while seamlessly connecting the chassis to the external Ethernet network
- Used in conjunction with the Cisco 4X InfiniBand Switch module and provides up to six 1 Gb Ethernet connections to the external network
- Bridges enable consolidation of LAN and SAN connectivity for an entire data cluster to a single fabric
- Leverages powerful I/O capability of BladeCenter H without any reduction in switching capacity.

QLogic InfiniBand Fibre Bridge

Leveraging the existing InfiniBand switches available for BladeCenter H, the QLogic InfiniBand Fibre Channel Bridge Module for IBM BladeCenter provides up to six 4 Gb Fibre Channel connections to the chassis. When interconnected, these bridge modules provide Fibre Channel interfaces to the chassis or rack of InfiniBand-connected blades. When config-

ured as such, bridges can be shared across chassis and serve as gateways to

MORE ON THE WEB

- [QLogic InfiniBand Fibre Bridge Announcement Letter](#)
- [QLogic InfiniBand Fibre Bridge info on PartnerWorld](#)
- [QLogic InfiniBand Fibre Bridge info on IBM.com](#)

InfiniBand traffic for another chassis. This enables a completely self-contained cluster of InfiniBand-based BladeCenter blades and/or chassis to connect to the external network with little or no external switching.

Here are some quick QLogic InfiniBand Fibre Bridge facts:

- Enables InfiniBand within the chassis while seamlessly connecting the chassis to the external Fibre Channel fabric
- Used in conjunction with the Cisco 4X InfiniBand Switch module and provides up to six 4 Gb Fibre Channel connections to the external network
- Bridges enable consolidation of LAN and SAN connectivity for an entire data cluster to a single fabric
- Leverages powerful I/O capability of BladeCenter H without any reduction in switching capacity.

5

IntelliStation Product Quick Reference

In this chapter, we explore the IBM IntelliStation Pro products and online resources. This is a set of computer systems designed for use by a single user who needs more power than a traditional personal computer can provide. These systems are particularly useful for applications such as engineering, electronic design, digital content creation, scientific R & D, oil exploration, medical imaging, drug discovery, and more. There are three groups within the IntelliStation family: A Pro, Z Pro, and M Pro. Let's take a look at each.

A Pro

The IntelliStation A Pro (Figure I.1) delivers exceptional performance and reliability with the latest technology additions, including the AMD Opteron 256 (3.0 GHz single core) processor and two new graphics card solutions from NVIDIA—the Quadro FX 4500 X2 and Quadro FX 1500. The extreme Quadro FX 4500 X2 solution is architected with two NVIDIA Quadro FX 4500 graphics processing units (GPUs) and advanced graphics in a single slot solution. The Quadro FX 1500 mid-range graphics solution offers exceptional price/performance for professional 3D applications.



Specifications

Processor	Single-core Dual-core	AMD Opteron Model 250, 252, 254, 256 AMD Opteron Model 275, 280, 285
Cache	1 MB L2 cache per processor core	
Core logic A	MD-8000 series with HyperTransport Technology	
Memory (std/max)	2, 4, 8 GB/16 GB3 PC3200 ECC DDR SDRAM, 8 slots	
Available graphics	Standard features: PCI Express x16, certified OpenGL drivers, dual-display capable Multi-GPU, Ultra High Performance: NVIDIA Quadro FX 4500 X2 Extreme 3D: NVIDIA Quadro FX 4500 High Advanced 3D: NVIDIA Quadro FX 3500 Advanced 3D: NVIDIA Quadro FX 1500 Performance 2D: NVIDIA Quadro NVS 285	
Power supply	530W; 3 temperature-controlled fans	
Internal storage	Up to 1 TB SATA, 1.2 TB Ultra320 SCSI	
Controllers	SATA and dual-channel, 64-bit Ultra320 integrated	
Slots	PCI Express x16, 64-bit/133 MHz PCI-X, 64-bit/100 MHz PCI-X	
Bays (total/open)	(3/2) 3.5" internal, (1/1) 3.5" external, (2/1) 5.25" external	
Ports	5 USB 2; 2 IEEE 1394; 2 serial; 1 parallel	
Operating system (preinstalled)	Microsoft Windows XP Professional x64 Edition or Red Hat Enterprise Linux 4 WS (64-bit), (others supported)	
Supported applications	Visit ibm.com/servers/intellistation/pro/isv/index.html	
Universal manageability	Visit ibm.com/servers/eserver/xseries/systems_management/director_4.html	
3D pointing device	IBM 3D SpacePilot Input Device (40K9202)	
Rack mounting kit	(09N4300), NetBAY Rack (9306420)	

- [A Pro 6217 details on PartnerWorld](#)
- [A Pro 6217 details on IBM.com](#)
- [A Pro 6217 competitive info on COMP](#)

Figure I.1. IBM IntelliStation A Pro 6217 at a glance (and links to more detail).

Both mid-range and extreme graphics solutions combine with A Pro's quality, precision, and performance engineering to help streamline the production process and enable a faster time to market. The A Pro is certified by third parties for industry-leading CAD, geoseismic, and visualization applications.

Here are some quick A Pro facts:

- Dual-capable AMD Opteron 200 Series processors up to 2.8 GHz; dual-core Opteron processor
- Models 275 at 2.2 GHz, Model 280 at 2.4 GHz; Model 285 at 2.6 GHz
- Microsoft Windows XP Professional x64 Edition available preinstalled
- Red Hat Enterprise Linux 4 WS (64-bit) available preinstalled
- Up to 16 GB1 PC3200 ECC memory (8 GB per processor, dual-channel) with 128-bit controller
- PCI Express x16 2D/3D graphics from NVIDIA with dual-display support
- Choice of SATA or dual-channel Ultra320 SCSI hard disk drives
- Scalable 6-slot x 6-bay minitower with 530W quiet power supply.

Z Pro

The IntelliStation Z Pro (Figure I.2) is a high-performance, robust graphics workstation that helps optimize compute-intensive 2D/3D applications. It is ideal for demanding techni-



Specifications

Form factor	Tower/5U
Processor	Up to two Dual-Core Intel Xeon Processors up to 3.00 GHz and up to 1333 MHz front-side bus
Cache (max)	Up to 4 MB L2
Core logic	Intel ESB2M chipset; 1333 MHz system bus
Memory (std/max)	4 GB/32 GB DDR II Fully Buffered DIMM 667 MHz via 8 DIMM slots
Available graphics	NVIDIA NVS 285; NVIDIA FX 550; NVIDIA FX 1500; NVIDIA FX 3500; NVIDIA FX 4500
S.M.A.R.T. hard disk drives	SATA: 80 GB/7,200 rpm; up to 250 GB/7,200 rpm (optional) Ultra320 SCSI: 73.4 GB/10,000rpm (15,000 rpm optional); 300 GB/10,000 rpm (optional)
Controllers	Integrated SAS and SATA
Slots (total/open)	5/4: 2x PCI-Express x8 or x16; 2 PCI-X and 1 PCI
Bays (total/open)	6 bays (2/1) 5.25" external, (4/3) 3.5" external
Operating systems supported	Red Hat Enterprise Linux (64-bit), Genuine Windows XP Professional (32-bit) and XP Pro x64 edition
Supported applications	Visit ibm.com/servers/intellistation/pro/isv/index.html for the list of engineering, electronic design automation, digital media, geophysical and life science applications.
Rack mounting	Rack kit (39Y9707)

- [Z Pro details on PartnerWorld](#)
- [Z Pro details on IBM.com](#)
- [Z Pro competitive info on COMP](#)

Figure I.2. IBM IntelliStation Z Pro at a glance (and links to more detail).

cal users, from engineers and molecular chemists to animators and geologists.

For demanding graphics-rich applications, the Z Pro offers dual-socket computing power and supports up to four-core processor performance with expandable memory. The Z Pro features flexible configurations to help meet current and future applications needs. Leverage the Z Pro expandability for multi-threaded applications—when the time is right.

Here are some quick Z Pro facts:

- Superior application and graphics performance with new dual-core processors
- Enhanced memory configurations excel at handling large 2D and 3D models
- Expanded selection of graphics card offerings deliver flexible and powerful graphics performance.

M Pro

The IBM IntelliStation M Pro (Figure I.3) delivers a highly available compact workstation designed to fit tight spaces and tight budgets. With a range of dual-display graphics card solutions from NVIDIA available, you can choose the option that best meets your requirements, whether you're working with basic 2D or highly advanced large-assembly 3D models.

Designed to help optimize the user experience, the IntelliStation M Pro offers a streamlined design with tool-free access to slots and bays and color-coded components. Best of all, the workstation is small enough to fit in tight spaces.



Specifications

Processor	Intel Core 2 Duo up to 2.66 GHz or Core 2 Quad up to 2.4 GHz, both up to 1066 MHz front-side bus
Cache (max)	Up to 8 MB (Core 2 Quad) L2
Core logic	Intel 975X chipset
Memory (std/max)	512 MB or 1 GB or 2 GB/8 GB DDR II Unbuffered DIMM 667 MHz via 4 DIMM slots
Available graphics	NVIDIA NVS 285; NVIDIA FX 550; NVIDIA FX 1500; NVIDIA FX 3500
S.M.A.R.T. hard disk drives	SATA: 160 GB/7,200rpm; up to 750 GB/7,200rpm (optional) SAS: 73 GB/15,000rpm
Controllers	Integrated SATA standard and/or SAS (by additional card—model dependent)
Slots (total/open)	4 slots: PCI-Express x16 (2/1); PCI-Express x4 (1/1); PCI 32-bit/33 MHz (1/1)
Bays (total/open)	6 bays (2/1) 5.25" external, (4/3) 3.5" internal/external
Operating systems supported	Microsoft Windows XP Professional (32-bit) and XP Pro x64 edition, Red Hat Enterprise Linux (32-bit and 64-bit), Windows Vista Business (64-bit)
Supported applications	Visit ibm.com/servers/intellistation/pro/isv/index.html
Rack mounting	Not applicable
Power supply	400W with temperature-controlled, variable-speed fans
Network interface	Integrated Gigabit Ethernet
Ports	8 USB 2.0 (2 front, 6 back); 2 IEEE 1394 (1 front, 1 back); 2 serial; 1 parallel
Audio	HD audio, microphone in, line in/out, headphone jack, integrated speaker

- [M Pro details on PartnerWorld](#)
- [M Pro details on IBM.com](#)
- [M Pro competitive info on COMP](#)

Figure I.3. IBM IntelliStation M Pro at a glance (and links to more detail).

Server-like performance and memory protection reduce tedious waiting time. Plus an integrated Trusted Platform Module for hardware encryption, with separate purchase of third-party applications, helps increase data and storage security by allowing the right people to have access to the right information.

Here are some quick M Pro 6218 facts:

- Delivers performance with quad-core technologies and dependability with Windows Vista Business
- Leverages innovative design to help maximize usability and reduce noise
- Offers robust client systems management tools.

About the Author

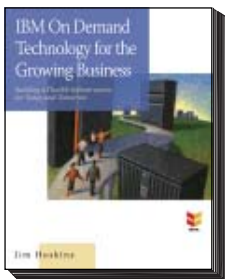
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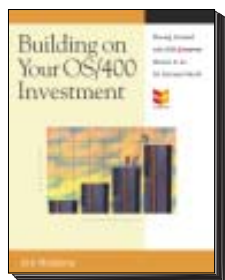
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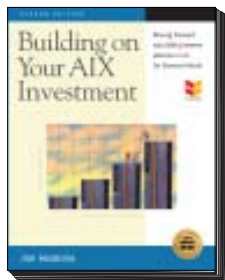
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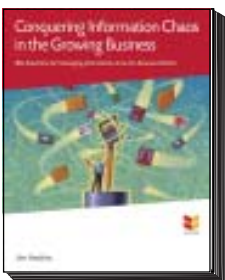
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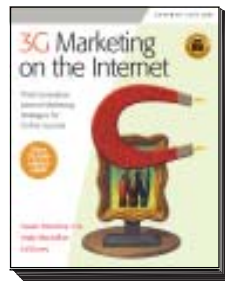
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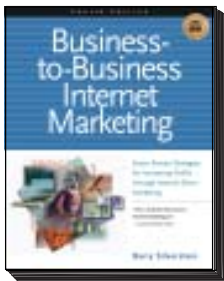
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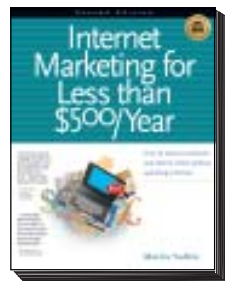
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