An affordable single-socket, dual-core server with high performance and data protection for small and medium businesses

IBM

Product Guide
September 2006

IBM System x3200

Product Overview

Value-priced performance, capacity and availability

The **single-socket** IBM® System **x3200**, incorporating IBM **X-Architecture**™ features, provides outstanding value to workgroups by combining scalable performance and availability features at an outstanding price. The x3200 supports the latest **dual-core** Intel® **Xeon**™ and **Pentium® D** processors, designed with either an **800MHz** or a **1067MHz** front-side bus (FSB), **64-bit extensions** (**EM64T**), and **2MB** or **4MB** L2 cache, to help provide customers with the computing power they need to match their business needs and growth. For the first time in a product of this class, the x3200 supports Xeon processors, which provide outstanding longevity and stability, in addition to substantially improved performance compared to the previous-generation x206m server. (Future models will support the **quad-core** Xeon processor, when available.) In addition, the x3200 uses industry-standard **667MHz PC2-5300 ECC** (Error Checking and Correcting) memory—for high performance and reliability.

All models offer impressive scalability, including dual-processor support, up to **8GB** of memory and up to **four simple-swap** or **hot-swap** *enterprise-class* **Serial ATA** (SATA) hard disk drives with a total capacity of up to **2TB**[1], or up to **four** high-performance **hot-swap Serial-Attach SCSI** (SAS) drives with an internal storage capacity of **1.2TB**. For additional performance and high availability, the x3200 offers *integrated* hardware **RAID-0/1/1E** support standard in the *hot-swap* SAS/SATA models (optional for *simple-swap* SATA models). To meet customers' backup requirements, the x3200 supports a choice of **half-high tape drives**, a **DVD-RAM** optical drive, or a **GoVault** removable disk drive. The x3200 ships as a tower unit; an optional **rack conversion kit** turns the x3200 into a **5U** rack-mounted server to save precious data center floor space.

Standard in the x3200 is a **mini Baseboard Management Controller (mBMC)** that enables users to manage and control the server easily—both locally and remotely. This high level of manageability is designed to keep costs down and the system up—even when network usage increases. Other advanced features that help maximize network availability by increasing uptime, include **simple-swap** or **hot-swap/redundant HDDs**, **hot-swap/redundant power** and **fans**; **temperature-controlled fans** with **Calibrated Vectored Cooling**™; and industry-standard **IPMI 1.5** support, including **highly secure remote power control**.

With the inclusion of unique IBM service and support features such as **IBM Director**, **IBM ServerGuide**™ and support for the optional **IBM Remote Supervisor Adapter II SlimLine**, the x3200 is equally well designed for a locally managed data center environment as for a remotely managed or stand-alone environment, while offering maximum availability.

For a balance of high-performance dual-core processing, high availability and vast internal SAS storage at a budget price, the x3200 is the ideal system.

Selling Features

Price/Performance

The x3200 offers numerous features to boost performance and reduce product and operating costs:

- Models containing the **dual-core Pentium D** processor, with fast **800MHz** front side bus and **4MB** of independent (**2MB** *per core*) Level 2 cache, offer high-performance at an entry price.

- Models containing the **dual-core Xeon** processor, with high-end **1066MHz** front side bus and **2MB** or **4MB** of shared Level 2 cache, offer superior performance and durability, capable of tackling the toughest jobs.

- **Low-voltage processors** draw less power and produce less waste heat than high-voltage processors, thus helping to reduce data center energy costs.

- Ultra-fast **667MHz PC2-5300 DDR II** ECC memory offers high speed and high availability.

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[1] GB equals 1,000,000,000 bytes and TB equals 1,000,000,000,000 bytes when referring to hard disk drive capacity. Accessible capacity may be less.

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- One **x8 high-speed PCI-E** adapter slot offers investment protection by supporting high-performance adapters, such as Ethernet, Fibre Channel and InfiniBand cards, none of which will run in older conventional PCI slots.

- Integrated *hardware* **RAID-0/1/1E** support at no extra charge and without consuming a valuable adapter slot. RAID-0 offers improved disk performance via data striping; RAID-1 offers disk mirroring for high availability, and RAID-1E provides mirroring functionality with an odd number of drives.

- Support for up to **four 3.5-inch hot-swap SAS** or **SATA** hard disk drives standard in some models offer high-performance with high availability. The SAS/SATA controller provides full-duplex (**2 x 300MBps**) data transfers for SAS drives. For lower cost with high capacity, other models support up to **four simple-swap Serial ATA** drives. The SATA drives offer performance approximately equal to that of Ultra320 SCSI.

- The integrated **Gigabit Ethernet** controller with **IPMI 1.5** support provides high-speed network communications.

- A **high degree of device integration**, including SAS/SATA, RAID, Gigabit Ethernet, systems management and video controllers, lowers costs and frees up valuable adapter slots.

Flexibility

The x3200 has the ability to grow with a customer's application requirements, thanks to:

- Support for a choice of **dual-core Pentium D** processors with **2.8** and **3.4GHz** clock rates, **800MHz** FSB and **130W** power draw, or **dual-core Xeon** processors with **1.86, 2.13,** and **2.4GHz** clock rates, **1066MHz** FSB, and **65W** power draw.

- Up to **8GB** of high-speed DDR2 system memory.

- **Five** *available* adapter slots: **two high-performance PCI-E** (**x8**, **x1**), and three **legacy PCI** (32-bit, 33MHz) slots in all models.

- The **seven USB 2.0** ports (six external, one *internal*) are up to **40X** faster[2] than older **USB 1.1** ports. This provides speedy access to external HDDs (non-arrayed), optical drives, internal and external tape drives, and other USB devices. Two ports are on the front of the unit and four are on the back, for easy access. The internal port is reserved for a half-high tape drive.

- **Up to four** internal **3.5-inch simple-swap SATA** or **hot-swap SAS** or **SATA HDDs** and a **half-high tape** drive, **DVD-RAM** drive or **GoVault** drive. This provides tremendous internal storage capability, along with full data backup.

- Alternatively, iSCSI or Fibre Channel-attached storage can be attached using **IBM System Storage**™ or **TotalStorage** servers.

Manageability

Powerful systems management features simplify local and remote management of the x3200:

- The x3200 includes a **mini Baseboard Management Controller (mBMC)** to monitor server availability, perform Predictive Failure Analysis, etc., and trigger IBM Director alerts.

- Integrated **IPMI 1.5** support alerts IBM Director to anomalous environmental factors, such as voltage and thermal conditions. It also supports **highly secure remote power control** using data encryption.

- IBM **Director 5.1x** is provided for proactive systems management. It comes with a portfolio of tools, including *Management Processor Assistant, RAID Manager, Update Assistant, Software Distribution* and a *Real Time Diagnostics* tool. In addition, IBM Director offers extended systems management tools for additional server management and increased availability.

- An optional **Remote Supervisor Adapter II SlimLine** provides additional systems management capabilities, including *Web-based out-of-band control; virtual floppy and optical drive support; Windows "blue screen" error capture; LDAP and SSL support;* and *remote redirection of PCI video, text, keyboard and mouse*. And it does all this without consuming a valuable adapter slot.

Availability and Serviceability

The x3200 provides many features to simplify serviceability and increase system uptime:

- x3200 servers use standard ECC memory, which can correct certain types of memory errors. This can help reduce downtime caused by memory failure.

- **Toolless cover removal** provides easy access to upgrades and serviceable parts. Similarly, the **Remote Supervisor Adapter II SlimLine**, **simple-swap** or **hot-swap/redundant HDDs**, as well as **hot-swap/redundant fans** and **power supplies** (model-specific) can be installed and replaced without tools, meaning greater system uptime while these components are being serviced.

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[2] Data transfer rates may be less than the maximum possible.

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- Integrated **RAID-1/1E arrays** allow the server to keep operating in the event of a drive failure
- **IPMI 1.5** supports highly secure remote system power control using data encryption. This allows an administrator to restart a server without having to visit it in person, saving travel time and getting the server back up and running quickly and securely.
- **Temperature-controlled fans** adjust to compensate for changing thermal characteristics. At the lower speeds they draw less power and suffer less wear. Equally important in a crowded data center, temperature-controlled fans produce less ambient noise in the data center than if they were constantly running at full speed.
- The **three-year (parts and labor) limited onsite warranty**[3] offered on selected models (Machine Type **4363**) helps give your customers peace of mind and greater investment protection than a one-year warranty does.

Key Features

High-Performance Processors

The x3200 supports either an Intel Pentium processor or an Intel Xeon processor, allowing customers to choose the most appropriate processor for their business needs. The x3200 offers a choice of processor clock rates, FSB speeds and power draw:

- **130W dual-core Pentium D** processor model **915 or 945** (operating at **2.8** or **3.4**GHz, respectively) with 64-bit extensions, an **800MHz** FSB, and **4MB** of L2 processor cache (**2MB** *per core*)
- **65W dual-core Xeon** processor models **3040** or **3050** (operating at **1.86** or **2.13GHz**, respectively), with 64-bit extensions, *low power draw*, a **1066MHz** FSB, and **2MB** of **shared** L2 processor cache
- **65W dual-core Xeon** processor model **3060** (operating at **2.4GHz**), with 64-bit extensions, *low power draw*, a **1066MHz** FSB, and **4MB** of **shared** L2 processor cache

The **dual-core Xeon** processors contain one **unified shared 4MB** cache, while the **Pentium D** processors have **independent 2MB** caches (2MB per core). The shared cache is dynamically allocated between the two cores as needed. The two cores appear to software as two physical processors. Dual-core processors offer considerably higher performance than a same-speed processor with a single core.

Intel **Extended Memory 64 Technology (EM64T)** 64-bit extensions allow the Xeon processor to use large memory addressing when running with a 64-bit operating system. This in turn lets individual software processes directly access more than 4GB of RAM, which was the limit of 32-bit addressing. This can result in much higher performance for certain kinds of programs, such as database management and CAD. Additional registers and instructions (SSE3) can further boost performance for applications written to use them. Customers should contact their software provider to determine their software support for EM64T.

The **1066MHz** FSB (which connects memory to the processor) boasts a peak rate of **8.53GBps**, or up to **one-third** higher throughput at the same processor clock speed than an **800MHz** FSB (**6.4GBps**) used in the Pentium D systems. This may result in much higher data transfer rates.

Intelligent Power Capability powers individual processor elements on and off as needed, to reduce power draw.

Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.
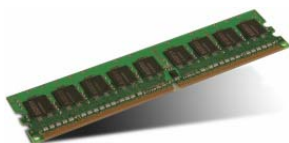
High-Speed DDR II ECC Memory

The x3200 supports up to **8GB** of memory in **4** DIMM sockets. It uses **PC2-5300** double data rate II (DDR II) memory (operating at **667MHz**) for faster access, and provides ECC memory protection.

The x3200 supports either **1**, **2**, or **4** DIMMs. When 2 or 4 DIMMs are installed, memory operates in **two-way interleaved** mode for increased performance.

Memory is available in kits consisting of *one* **512MB** or *two* **1GB** or **2GB** DIMMs.

Hot-Swap/Redundant Components

System availability is maximized through the use of hot-swap and redundant components, including:

- **Hot-swap/redundant** or **simple-swap hard disk drives** (with **RAID-1/1E** protection standard)
- **Hot-swap, redundant power supplies** (optional, model-specific)

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[3] For terms and conditions or copies of the IBM Statement of Limited Warranty, call 800-772-2227 in the U.S. In Canada call 800-426-2255. Telephone support may be subject to additional charges. For warranties including onsite labor, a technician is sent after IBM attempts to resolve the problem remotely. International warranty service is available in any country in which this product is sold.

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Disk/Tape Controllers

Some x3200 models include an integrated **four-port LSI 1064e SAS/SATA** controller. Other x3200 models include a **SATA** controller only, integrated into the Intel chipset. (All models provide a dedicated internal SATA port for a GoVault removable disk backup device.)

The integrated controller in all **hot-swap** models supports up to **four** internal **SAS** LVD (low-voltage differential) **hot-swap** drives standard , and provides data transfer speeds of up to **300MB** per second[4] in *each* direction (**full-duplex**) for **SAS** drives, for an aggregate speed of **600MBps**, nearly double that of Ultra320 SCSI's **320MBps** (half-duplex) bandwidth. The serial design of the SAS bus allows maximum performance to be maintained as additional drives are added. This controller also supports up to **four** Serial ATA **(SATA)** drives at **300MBps** (**half-duplex**).

The integrated controller in the *hot-swap* models offers *hardware* **RAID-0**/**1**/**1E** support for SAS or SATA drives.

The *simple-swap* SATA models offer an integrated **SATA** controller, which supports up to **four** internal **simple-swap** LVD **SATA** drives at the same **300MBps** (**half-duplex**) throughput.

Large HDD Storage Capacity

The x3200 offers a choice of disk storage, supporting up to **four** 3.5-inch **simple-swap** Serial ATA (**SATA**) drives or **four hot-swap** high-performance Serial-Attach SCSI (**SAS**) or SATA drives:

SAS

- **10,000** RPMs — 36.4, 73.4, 146.8 or **300GB** (**1.2TB** maximum)—hot-swap
- **15,000** RPMs — 36.4, 73.4 or **146.8GB** (**587.6TB**)

SATA

- **7,200** RPMs — 80, 160, 250 or **500GB** (**2.0TB**)—simple-swap or hot-swap

Notes: Enterprise-class 500GB SATA drives offer increased reliability compared to lower-capacity SATA drives. Hot-swap SAS drives use the Converged Tray for interchangeability with other IBM System x™ and IBM eServer™ xSeries® systems.

If the customer needs more storage space, terabyte capacities are possible with external direct-attach, NAS and SAN solutions.

Drive Bays

All x3200 models contain **7** drive bays standard. All models offer **two 5.25-inch** bays, **four 3.5-inch** HDD bays, and **one 3.5-inch** floppy drive bay. Some models support up to **four hot-swap SAS** or **SATA** drives; other models support up to **four simple-swap SATA** drives.

An optical drive (either a **48X** CD-ROM or **48X/32X/48X/16X** CD-RW/DVD-ROM Combo drive, depending on the model) with an IDE interface ships standard in one 5.25-inch bay. The other 5.25-inch bay supports one of several backup options: a **half-high tape** drive, a **DVD-RAM** drive, or a **GoVault** removable disk drive. The tape drive must have a **SCSI** or **USB 2.0** interface. (A SCSI tape drive would require an optional SCSI controller; an internal USB port is provided standard.) The GoVault drive has a **SATA** interface. No diskette drive is supplied with any model; an *external* USB floppy drive may be used, if needed.

Hot-swap and simple-swap drives may be inserted or removed through the front of the server. **Hot-swap** drives *do not* require powering off the system. **Simple-swap** SATA drives *do* require powering off the system first; however, no tools or jumpers are required for installation and removal, allowing for faster, simpler servicing than fixed drives.

For still more storage, a direct-attach, iSCSI, or SAN external expansion option can be added, using an optional controller.
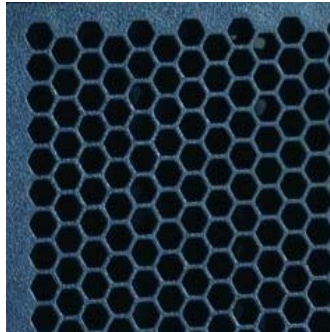
Internal Backup

The x3200 supports several internal **half-high backup** options. Supported technologies include:

- **DDS-6**
- **DLTV4**
- **DVD-RAM**
- **GoVault**
- **LTO-3 Ultrium**
- **VXA-3**

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[4] Data transfer rates depend on many factors and are often less than the maximum possible.

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Gigabit Ethernet Controller

The x3200 includes **one** integrated **Broadcom 5721** Gigabit Ethernet controller for up to 10X higher maximum throughput than a 10/100 Ethernet controller.

It also supports highly secure remote power management using **IPMI 1.5**, plus **Wake on LAN**® and **PXE** (Preboot Execution Environment) flash interface. Optional PCI adapters offering failover and load balancing between adapters are available for added throughput and increased system availability.

High-Performance Adapter Slots

The x3200 provides **two PCI-E (PCI Express) full-length/full-height** adapter slots (**Slots 1** and **2**). One (Slot **2**) is a **x8** ("by 8") **4GBps** slot, capable of supporting **x1/x4/x8** adapters at full speed. The other (Slot **1**) is a **x1** (500MBps) slot. **Slots 3**, **4,** and **5** are **full-length/full-height** legacy **33MHz PCI** slots.

PCI-Express is a high-performance, low-latency, next-generation serial I/O bus that is rapidly replacing the older parallel PCI and PCI-X buses. A **x8** PCI-E adapter offers approximately *four times* the maximum throughput of a 133MHz PCI-X adapter[5]. (A **x1** adapter offers throughput similar to a 64-bit **66MHz** PCI-X slot.)

The RAID daughtercard and Remote Supervisor Adapter II SlimLine card plug into dedicated slots on the planar. This, coupled with the fact that the **SAS/SATA**, **Gigabit Ethernet**, **systems management** and **video** controllers are integrated onto the system board, means that all PCI/PCI-E adapter slots are all *available*, which offers customers a wide degree of latitude in expansion options.

Ultra-Efficient Cooling

Strategically located fans, combined with efficient airflow paths, provide highly effective system cooling for the x3200, known as **Calibrated Vectored Cooling**. The server includes **three hot-swap** fans. In addition, each power supply contains a fan.

The fans automatically adjust speeds in response to changing thermal requirements, from minimum RPMs to maximum, depending on the zone, redundancy, and internal temperatures. When the temperature inside the server increases, the fans speed up to maintain the proper ambient temperature. When the temperature returns to a normal operating level, the fans return to their default speed. Why not simply run the fans at 100% capacity all the time? For several good reasons: to reduce the ambient noise, reduce the wear-and-tear on the fans and reduce the server power draw. The reduction in ambient noise and power draw may be relatively minor for a single server, but put dozens or hundreds in a data center and it can make a big difference!

In addition, the server uses **hexagonal ventilation holes** in the chassis. Hexagonal holes can be grouped more densely than round holes, providing greater airflow through the system cover.

This cooling scheme is important because newer, more powerful, processors generate a significant amount of heat, and heat must be controlled for the system to function properly.

Other Features

- **Seven USB 2.0 ports** — Provides flexibility to add high-speed external devices. The USB 2.0 specification supports up to 480Mbps transfer rates. (Note: Not all USB 2.0 devices are capable of achieving this rate.) Two ports are provided on the front of the server, four are on the back, and one is internal to support a USB-interface tape drive.

- **Remote Supervisor Adapter II SlimLine support** — This optional full-function systems management adapter adds local and remote management functions without consuming an adapter slot.

- **Toolless chassis** — The cover can be opened without tools, and many components can be installed or removed and replaced without tools, including the optical drive, hot-swap HDDs, PCI and PCI-E adapters, as well as the integrated RAID controller and optional Remote Supervisor Adapter II SlimLine. This can save a servicer significant time.

Rack Cable Management and KVM Console Switching

IBM Advanced Connectivity Technology (**ACT**) is an optional feature that offers many advantages over standard KVM cabling across the entire System x and xSeries product line. So now customers can interconnect all of their servers with one smart cabling architecture. ACT cabling eliminates the need for one-to-one direct connections between each server and a KVM switch by using a daisy-chain approach.

Here's how it works: A KVM Conversion Option (**KCO**) plugs into the back of any System x or xSeries server and converts the KVM signal to standard CAT5 network cabling signals. Inexpensive CAT5 cable (with RJ-45 connectors on each end) then daisy-chains the first server to a KCO in the next server in the rack. Because CAT5 cabling is industry-standard, customers can assemble cables to fit on-site. There is a short KCO dongle (250mm/10") for servers without a cable management arm and a longer (1.5m/5 ft) one for servers that do have cable management arms. The KCO allows up to 16 servers to be chained together for common management. If customers have x330/x335 servers in the rack, there is a special

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110mm (4") C2T Conversion Option (**CCO**) that takes the C2T output and converts it to CAT5 signals for input to one of the CAT5-based switches.

There are two new CAT5-based console switches available to manage the servers via the KCO and CCO kits: Local Console Manager (**LCM**), a 4-port CAT5 console switch and Remote Console Manager (**RCM**), a 16-port switch. Each converts the CAT5 signals back to KVM signals for input to a management station.

Using the LCM, up to 16 servers can easily be daisy-chained together (using 16 KCOs) to *each* of its four CAT5 inputs, enabling the management of up to **64** servers. It provides a single user with local access over all connected systems. The RCM can handle up to **256** servers using any combination of KCO and CCO kits, and supports a single local user and up to two remote users simultaneously. *The illustration below shows a sample ACT configuration:*

Extensive System Support Features

The IBM services and technical support portfolio provides world-class, consistent, high-quality service and support. The x3200 server offers a number of tools and services designed to make ownership a positive experience. From the start, IBM programs make it easier for customers to plan for, configure and purchase System x or xSeries servers, get them running and keep them running long-term. These features include IBM Express Portfolio, IBM ServerProven®, the IBM Rack Configurator, IBM System x and BladeCenter Power Calculator, IBM ServerGuide, IBM Electronic Service Agent™, Product Customization Services and extensive technical support offerings.

This System x server is part of the **IBM Express Portfolio**, designed, developed and priced to meet the specific needs of midsized businesses. The IBM Express Portfolio of solutions is easy to acquire, install and manage. And they leverage IBM technology to provide tangible solutions to help you solve business problems in an on demand world.

The IBM **ServerProven** program provides the confidence that specific options and operating systems have been tested on the server and are officially supported to work together. It is updated frequently to ensure that the latest compatibility information is always at your customers' fingertips.

IBM **Rack Configurator** is a downloadable tool that simplifies the often complex chore of configuring a full rack of servers and confirming that customers have all the cables, power distribution units, KVM (keyboard, video and mouse) switch boxes and other components they need, as well as the proper airflow clearances, electrical circuits and other environmental conditions.

IBM **System x and BladeCenter Power Calculator** helps IT managers plan for data center power needs, by providing the following information for specific configurations of System x and BladeCenter systems: *power input* (watts), *PDU sizing* (amps), *heat output* (BTUs), *airflow requirements through chassis* (CFM), *VA rating*, *leakage current* (mA), and *peak inrush current* (amps).

IBM **ServerGuide** (installed from CD) simplifies the process of installing and configuring System x and xSeries servers. ServerGuide goes beyond mere hardware configuration by assisting with the automated installation of the Microsoft® Windows® Server 2000 and 2003 operating systems, device drivers and other system components, with minimal user intervention. (Drivers are also included for support of Novell NetWare, Red Hat Linux and SUSE LINUX.) This focus on deployment helps customers reduce both their total cost of ownership and the complexity that administrators and technical personnel face.

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IBM offers an innovative "call home" feature that allows System x and xSeries servers to automatically report hardware problems to IBM support, which can even dispatch onsite service[6] if necessary to those customers entitled to onsite support under the terms of their warranty or an IBM Maintenance Agreement. The IBM **Electronic Service Agent** is a downloadable software tool available from the IBM support Web site at no extra charge. It resides on a server and provides electronic support and problem management capabilities through a highly secure electronic dialogue between customer systems and IBM. Electronic Service Agent monitors networked servers for hardware errors and it can perform hardware and software inventories and report inventory changes to IBM. All information sent to IBM is stored in a highly secure database and used for improved problem determination.

Additional services include hardware warranty upgrades and factory-installed **Product Customization Services** (PCS), such as asset tagging, hardware integration, software imaging and operating systems personalization.

IBM offers extensive **technical support** by phone and via the Web. Support options include links to forums/newsgroups, problem submission, online shopping support, service offerings, device drivers for all IBM product lines, software downloads and even upcoming technical seminar worldwide schedules and registration. Also available are remote installation, configuration and usage support for System x and xSeries hardware and software, as well as onsite custom services to give customers the level of expertise they require.

Advanced Systems Management Capabilities

The x3200 has a high level of systems management capabilities that are well-suited to remote locations as well as to stand-alone environments. Features include the mini Baseboard Management Controller (mBMC), Automatic Server Restart, Wake on LAN® support, PXE support, redictive Failure Analysis, IBM Director and support for an optional Remote Supervisor Adapter II SlimLine.

The BMC provides industry-standard **Intelligent Platform Management Interface** (**IPMI**) **1.5**-compliant systems management. It provides a number of important system functions, including:

- Monitoring of system and battery voltage, system temperature, fans, power supplies, processor and DIMM status
- Product ID and Family ID detection
- Highly secure remote power on/off
- System reset control
- NMI/SMI detection and generation
- System diagnostic LED control (power, HDD, activity, alerts, heartbeat)
- Proxy server support
- LAN messaging and alerting
- Local update of BMC firmware
- Other mandatory and optional IPMI BMC functions

The BMC alerts IBM Director to anomalous environmental factors, such as voltage and thermal conditions—even if the server has failed.

The x3200 also supports an optional IBM **Remote Supervisor Adapter II SlimLine** for additional systems management capabilities, including:

- Serial over LAN
- Text and graphical console redirection over LAN
- Web-based out-of-band control
- Windows "blue screen" capture
- Remote virtual floppy and CD-ROM
- High-speed remote redirection of PCI video, keyboard and mouse
- SSL (Secure Socket Layer) and LDAP (Lightweight Directory Access Protocol) support

Automatic Server Restart (ASR) helps reduce downtime by restarting the server automatically in the event of a system lockup. ASR technology is a combination of hardware circuitry tied into the server's system reset function and a device driver. As long as the server continues running, the ASR watchdog timer will keep being reset, but if the operating system crashes or the hardware freezes somehow the ASR software will be unable to reset the hardware timer. If the timer is not reset within five minutes, it automatically triggers the ASR hardware, which immediately restarts the server (and logs an ASR event with IBM Director). These features are designed so that *no more than five minutes can pass before the server is restarted*.

Wake on LAN permits the server to be remotely powered on if it has been shut off. Once powered up, the server can be controlled across the network, using the **Preboot Execution Environment** (PXE).

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Like Wake on LAN, PXE is system firmware. It allows software such as the optional **IBM Remote Deployment Manager** to take control of a system before the BIOS, operating system or applications are loaded (using Wake on LAN/PXE) and lets an administrator perform many low-level tasks remotely that would otherwise require a visit to each system. These tasks may include such things as formatting a hard disk drive, updating system firmware, or deploying a Windows or Linux operating system.

Predictive Failure Analysis (PFA) is designed to allow the x3200 to detect impending failure of supported components (processors, memory, fans, and hard disk drives) as much as 48 hours before actual failure, and alert the administrator through IBM Director. This gives customers the ability to replace the failing component *before* it fails, resulting in increased uptime.

IBM Director 5.1x software for advanced workgroup management is included with the x3200. IBM Director comes with a portfolio of tools, including *Management Processor Assistant, Rack Manager, RAID Manager, Update Assistant and Software Distribution. System Availability* (a no-charge download) and *Capacity Manager* (sold separately) are available as add-ons for additional server management and increased availability. IBM Director provides a single uniform graphical interface for all of these systems management functions.

IBM Director enables the customer to customize thresholds and monitor system components (for things like temperature, voltage regulation, etc.) to help maximize uptime.

Key Options

IBM options for System x servers let customers take their servers to a higher level

Make sure that customers know they can rely on System x options to supply a complete solution for their business needs. Options help them create an optimized server system to meet their data protection, storage and availability needs. Every IBM option is designed and tested for peak performance and flexibility, helping to maximize the customer's return on investment. The combination of System x servers and options lets customers keep their fingers on the pulse of their e-business.

Memory — Memory is a significant factor in systems application performance. Adding more memory to a System x server is one of the most effective ways to increase application performance. For best performance in a server with a dual-core processor, there should be twice as much memory available as for a single-core processor. When memory is installed in pairs, the x3200 provides two-way interleaving for added performance.

Hard Disk Drives — IBM hard disk drives help customers improve the transaction and cost performance of their System x servers. The choice of hard disk drives can be a critical aspect of maximizing the I/O throughput of the system. **SAS** hard disk drives are available for the x3200 with capacities up to **300GB** (3.5-inch) at **10,000** RPMs and up to **146.8GB** at **15,000** RPMs. Enterprise-class SATA hard disk drives are available with capacities up to **500GB** (3.5-inch) at **7,200** RPMs.

Power Supply — The optional second power supply for the x3200 enables redundancy for hot-swap power.

Remote Supervisor Adapter II SlimLine — The x3200 includes a plethora of systems management features built-in; however, sometimes additional management capability is needed. In those situations, the Remote Supervisor Adapter II SlimLine not only offers powerful new features, it does so without taking up a valuable PCI-E adapter slot, using a dedicated slot on the motherboard instead.

External SAN, iSCSI, and direct-attach storage is available using one of several IBM TotalStorage host bus adapters.

The **IBM TotalStorage DS300** offers remote SAN storage using the **iSCSI** storage protocol across IP networks. The DS300 scales up to **4.2TB** of storage capacity using standard hot-swap Ultra320 SCSI HDDs (the same drives as in System x servers) in a **14-drive 3U** cabinet. Three models offer single or dual RAID controllers (with each controller supporting two Gigabit Ethernet ports), up to 256MB or 1GB of cache memory, and dual redundant power supplies and fans.

TotalStorage products are designed to support the large and growing data-storage requirements of business-critical applications. Storage solutions for the x3200 include the **DS4000, DS6000**, and **DS8000** series storage servers. Because TotalStorage Fibre Channel solutions can support connectivity distances of up to **10km (6.2 miles)** at Fibre Channel rates of up to **4Gbps**, companies can more easily configure offsite System x servers and storage systems to keep critical data available around the clock—even in the event of a catastrophe.

These storage servers are designed to provide highly-available Fibre Channel RAID protected storage that provides the foundation for Storage Area Networks (SANs). They provide end-to-end Fibre Channel solutions with high-availability fault-tolerant components.
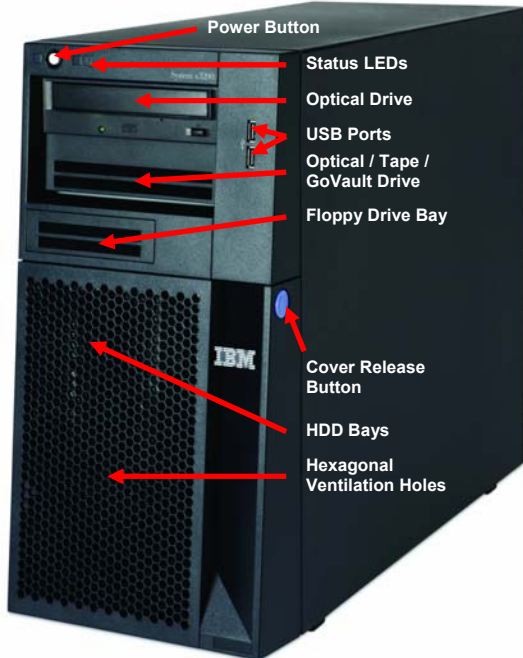
The **iSCSI HBA Adapter for IXA Connectivity** is a PCI adapter for selected System x and xSeries servers that provides a direct **1GBps** link to an IBM System i5 or iSeries server. This connection allows customers to centralize their Microsoft Windows and System i5 or iSeries storage and consolidate the operations and backup of their System x, xSeries, System i5 and iSeries systems into a single infrastructure. It enables the tightest possible integration between Windows and System i5/iSeries data and applications, and allows as many as **32** servers to attach to one System i5 or iSeries system to
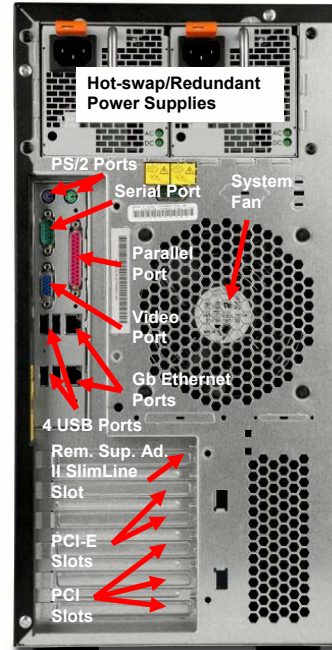
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share the iSeries server's systems management, CD-ROM, tape and disk storage via the iSeries dynamic virtual storage architecture. This can take the place of a SAN for a customer with an established System i5 or iSeries infrastructure.
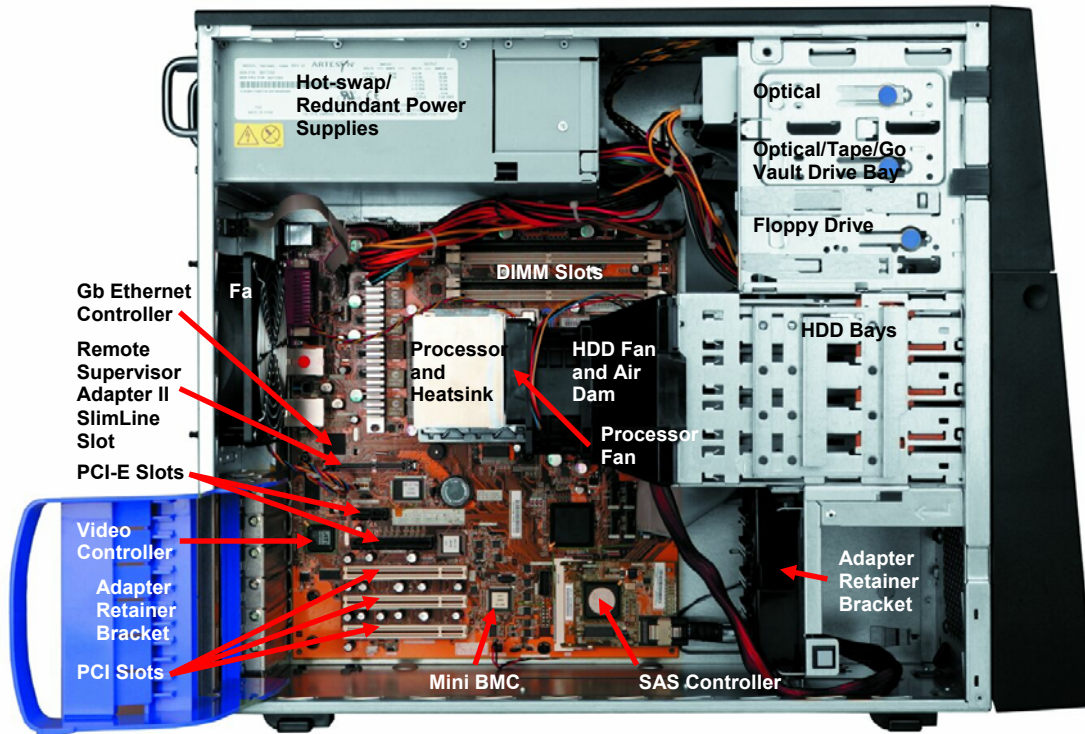
x3200 Images

Front View

- Power Button
- Status LEDs
- Optical Drive
- USB Ports
- Optical / Tape / GoVault Drive
- Floppy Drive Bay
- Cover Release Button
- HDD Bays
- Hexagonal Ventilation Holes

Rear View

- Hot-swap/Redundant Power Supplies
- PS/2 Ports
- Serial Port
- System Fan
- Parallel Port
- Video Port
- Gb Ethernet Ports
- 4 USB Ports
- Rem. Sup. Ad. II SlimLine Slot
- PCI-E Slots
- PCI Slots

Interior View

- Hot-swap/ Redundant Power Supplies
- Optical
- Optical/Tape/Go Vault Drive Bay
- Floppy Drive
- DIMM Slots
- HDD Bays
- Gb Ethernet Controller
- Fa
- Remote Supervisor Adapter II SlimLine Slot
- Processor and Heatsink
- HDD Fan and Air Dam
- Processor Fan
- PCI-E Slots
- Video Controller
- Adapter Retainer Bracket
- Adapter Retainer Bracket
- PCI Slots
- Mini BMC
- SAS Controller

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An affordable single-socket, dual-core server with high performance and data protection for small and medium businesses

x3200 Specifications		
Machine type	**4362-2xX/2xY, 3xX/3xY, 4xX/4xY, 5xX/5xY, 6xX/6xY (1 yr. war.)** **4363-2xX/2xY, 3xX/3xY, 4xX/4xY, 5xX/5xY, 6xX/6xY (3 yr. war.)**	
Form factor	Tower (convertible to 5U rack)	
Processor type	**Dual-core** Intel **Pentium D (9xx)** **2.8GHz** 915 (2xX/2xY), **3.4GHz** 945 (3xX/3xY)	**Dual-core** Intel **Xeon (30xx)** **1.86GHz** 3040 (4xX/4xY), **2.13GHz** 3050 (5xX/5xY), **2.4GHz** 3060 (6xX/6xY)
Maximum processor power draw	**130W** (2xX/2xY, 3xX/3xY)	**65W** (4xX/4xY, 5xX/5xY, 6xX/6xY)
Front-side bus (FSB) speed	**800MHz** (2xX/2xY, 3xX/3xY)	**1066MHz** (4xX/4xY, 5xX/5xY, 6xX/6xY)
# of processors standard / maximum	1 / 1	
Internal L2 cache	**4MB** (independent 2MB cache per core)—2xX/2xY, 3xX/3xY	**2MB** (shared 2MB cache)—4xX/4xY, 5xX/5xY	**4MB** (shared 4MB cache)—6xX/6xY
Chipset	Intel 3000	
Standard / maximum memory[7]	**512MB** (1 x 512MB) / **8GB** (22X/22Y, 2BX/2BY, 32X/32Y, 3BX/3BY, 42X/42Y, 4BX/4BY)	**1GB** (2 x 512MB) / **8GB** (24X/24Y, 2DX/2DY, 43X/43Y, 4CX/4CY, 44X/44Y, 4DX/4DY, 5xX/5xY, 6xX/6xY)
Standard memory type	Unbuffered PC2-5300 (**667MHz**) DDR II ECC (non-Chipkill)	
Memory interleaving	Yes (two-way with pairs of DIMMs)	
DIMM capacities supported	512MB, 1GB, 2GB	
# of DIMM sockets total / available	**4 / 3** (22X/22Y, 2BX/2BY, 32X/32Y, 3BX/3BY, 42X/42Y, 4BX/4BY)	**4 / 2** (24X/24Y, 2DX/2DY, 43X/43Y, 4CX/4CY, 44X/44Y, 4DX/4DY, 5xX/5xY, 6xX/6xY)
# of DIMMs supported	1, 2, or 4	
Online spare memory supported	No	
Memory mirroring supported	No	
# of drive bays total / available	7 / 5 (52X/52Y, 57X/57Y, 5BX/5BY, 5GX/5GY)	7 / 6 (all other models)
# of HDD drive bays total / available	**4 / 3** 3.5-inch (52X/52Y, 57X/57Y, 5BX/5BY, 5GX/5GY)	**4 / 4** 3.5-inch (all other models)
# of 5.25" bays total / available	2 / 1 (optical drive installed)	
Maximum HDD capacity standard	**1.2TB** (4 x **300GB**) 3.5-inch **hot**-swap **SAS**	**2TB** (4 x **500GB**) 3.5-inch **hot**-swap **SATA**	**2TB** (4 x **500GB**) 3.5-inch **simple**-swap **SATA**
HDD capacities supported	**3.5-inch SAS** 73.4, 146.8, **300GB** — **10K** RPMs; 36.4, 73.4, **146.8GB** — **15K** RPMs	**3.5-inch SATA** 80, 160, 250, **500GB** — **7.2K** RPMs
# of HDDs standard	160GB **simple**-swap SATA (43X/43Y, 4CX/4CY)	160GB **hot**-swap SATA (57X/57Y, 5GX/5GY)	None (all other models)
# of optical drives standard	1 IDE **CD-ROM** (48X, in dedicated 5.25" bay)—Machine Type 4362	1 IDE **CD-RW/DVD-ROM** Combo (48X/32X/48X/16X, in dedicated 5.25" bay)—Machine Type 4363
# of diskette drives standard	None, except by special bid (USB-attach)	
Internal backup drives supported	1 **half-high** tape drive (uses one 5.25" bays) SCSI or USB; or 1 GoVault (SATA)	

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An affordable single-socket, dual-core server with high performance and data protection for small and medium businesses

x3200 Specifications		
Disk drive technology	3.5-inch **hot**-swap **SAS/SATA** (24X/24Y, 2DX/2DY, 44X/44Y, 4DX/4DY, 56X/56Y, 57X/57Y, 5FX/5FY, 5GX/5GY, 62X/62Y, 6BX/6BY, 64X/64Y, 6DX/6DY)	3.5-inch **simple**-swap **SATA** (22X/22Y, 2BX/2BY, 32X/32Y, 3BX/3BY, 42X/42Y, 43X/43Y, 4BX/4BY, 4CX/4CY, 52X/52Y, 5BX/5BY)
Integrated disk controller	Four-port LSI 1064e SAS/SATA—hot-swap models	Four-port SATA (via chipset)—simple-swap models
# of disk drives supported *per port*	1	
Integrated RAID controller	**LSI 1064e** (**hot**-swap models only) for RAID 0/1/1E	
Optional RAID controllers supported	**LSI 1064e** (**simple**-swap models only) for RAID 0/1/1E	
# of adapter slots total / available	5 / 5	
# of PCI-E x8 slots (4GBps)	**1** full-height/full-length	
# of PCI-E x1 slots (500MBps)	**1** full-height/full-length	
# of legacy 33MHz legacy PCI slots	**3**	
# of video ports	1	
Video controller	ATI Radeon ES1000	
Video memory	16MB SDRAM	
Maximum video resolution at 32-bit color	1024 x 768 x 24-bit color at 85Hz	
Gigabit Ethernet controller	Broadcom BCM5721	
# of Gigabit Ethernet ports	1 (rear)	
# of RS485 ports	None	
# of serial ports	2[8] (rear)	
# of parallel ports	1 (rear)	
# of PS/2 mouse ports	1 (rear)	
# of PS/2 keyboard ports	1 (rear)	
# of USB 2.0 ports	**6** *external* ports (2 front, 4 rear), plus **1** *internal* connector for tape drive	
Integrated systems management controller	Yes (mBMC)	
Optional systems management adapter	Remote Supervisor Adapter II SlimLine	
Light path diagnostics support	None	
Predictive Failure Analysis support	Processors, memory, voltage regulator modules (VRDs), HDDs, PCI-E slots, and fans	
Power supply size	**430W** universal, autoswitching (56X/56Y, 57X/57Y, 5FX/5FY, 5GX/5GY, 64X/64Y, 6DX/6DY)	**400W** universal, autoswitching (all other models)
# of power supplies standard / maximum	1 / 2 (56X/56Y, 57X/57Y, 5FX/5FY, 5GX/5GY, 64X/64Y, 6DX/6DY)	1 / 1 (all other models)
Hot-swap/redundant power supported	Yes / Yes (56X/56Y, 57X/57Y, 5FX/5FY, 5GX/5GY, 64X/64Y, 6DX/6DY)	No (all other models)
# of fans/blowers standard / maximum	3 / 3 (plus one fan per power supply)	
Hot-swap/redundant fans supported	No	
Heat emitted: minimum / maximum	630 / 1784 (model-specific)	

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x3200 Specifications		
BTUs per hour		
Maximum altitude	7,000 ft; 2,133 m	
Operating temperature range	50 – 95º F; 10 – 35º C (up to 3,000 ft / 914.4 m); 50 – 90º F; 10 – 32º C (3,000 ft to 7,000 ft / 914.4m to 2,133m)	
Operating humidity range	8-80%	
Dimensions (HWD) / weight	17.25" (438mm) **H** 8.5" (216mm) **W** 21.25" (540mm) **D** 30.4" (772mm) **D** (with redundant power)	36 (minimum) – 56 **lb** (maximum) 16.3 – 25.2 **kg**
Operating systems supported	Microsoft Windows Server 2003 & R2 (Standard/Web/Enterprise Editions) 32/64-bit, Windows 2000 (Server/Advanced Server), RHEL 4/5 32/64-bit, SLES 9/10 32/64-bit, SLES 9 Open Enterprise Server, Novell Open Enterprise Server (NetWare 6.5), NetWare 6.5/NetWare 6.5 Open Enterprise Server, SCO UnixWare 7.1.3, IBM OS4690	
Length of limited warranty	**3 years** (parts and labor)[9] — Machine Type **4363**	**1 year** (parts and labor) — Machine Types **4362**

The Bottom Line

The x3200 is an extremely powerful entry system, building on the legacy of the x206m server by incorporating leading-edge industry-standard features and adding IBM-unique innovations:

Performance

- **High-throughput processors** — **1.86** to **2.4GHz dual-core Xeon** processors or **3.0** to **3.4GHz dual-core Pentium D** processors
- **Large cache** — **2MB** or **4MB** of L2 processor cache
- **64-bit extensions** (EM64T)
- **High-performance front-side bus** —**800MHz** or **1066MHz** FSB (model-specific)
- **Fast memory** —**667MHz PC2-5300 DDR II** ECC memory standard with **two-way interleaving**
- **Fast disk technology** — Integrated **SAS/SATA** controller and slotless *hardware*-based **RAID** controller (standard in hot-swap models; optional in simple-swap models)
- **Fast communications** — Integrated **Gigabit Ethernet** controller
- **Fast I/O** —**PCI-E x8** adapter slot

Flexibility

- **Large memory capacity** — Up to **8GB** of **ECC memory**, using **4** DIMMs
- **High-capacity disk storage** — Up to **1.2TB** of internal **hot-swap SAS** storage or **2TB** of **hot-swap** or **simple-swap SATA** storage
- Support for an **optional half-high tape**, **DVD-RAM** or **GoVault** drive (in *addition* to the eight HDDs)
- **High-performance external expansion** — **Seven** 480Mbps **USB 2.0** ports (two front, four rear, one internal)
- *Hardware*-based **RAID-0/1/1E** support *standard* in **hot-swap** models, *optional* in **simple-swap** models
- **Six** *available* adapter slots:
  - ❑ **One x8**[10] **PCI-E** slot (4GBps)
  - ❑ **One x1**[11] **PCI-E** slots (500MBps)
  - ❑ **Three 33MHz** legacy **PCI** slots
- Integrated **CD-ROM** drive
- Optional **iSCSI HBA Adapter for IXA Connectivity** (to System i™/iSeries™ servers)

Manageability, Serviceability and Availability

- IBM **Director** systems management software, including:
  - ❑ IBM Management Processor Assistant
  - ❑ IBM Rack Manager

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 ❑ IBM RAID Manager
 ❑ IBM Update Assistant
 ❑ IBM Software Distribution
 ❑ IBM System Availability

- **Integrated mini Baseboard Management Controller** (mBMC), with **IPMI 1.5** compliance, including highly secure remote power control
- **ECC memory protection**
- **PFA support** for processors, memory, voltage regulator modules, HDDs, PCI-E slots, and fans
- Support for **highly available** *hardware*-based **RAID-1/1E** arrays standard, without consuming an adapter slot
- **Hot-swap SAS, hot-swap SATA** or **simple-swap SATA** hard disk drives
- **Ultra-efficient cooling**
- Optional **hot-swap/redundant power supplies**
- Optional **Remote Supervisor Adapter II SlimLine** daughter card (no slot required)
  - ❑ Supports the **LDAP** and **SSL** industry standards
- Optional **tower-to-rack conversion kit**

System x Server Recommendation Map
Tower Servers

Solution Area	Requirements									Towers				
	Scalability	Floating Point Performance	Memory Throughput	Integer Performance	I/O & Storage	Density	High Availability	Systems Management	Distributed Deployment	x3105	x3200	x3400	x3500	x3800
Business Continuity					■		■			○ Good	⌣ Better	⌣ Better	● Best	● Best
Database			■		■		■			○ Good	⌣ Better	⌣ Better	● Best	● Best
E-mail / Collaboration				■			■			⌣ Better	● Best	● Best	● Best	⌣ Better
File & Print					■		■			● Best	● Best	● Best	⌣ Better	○ Good
Hosted Client	■			■			■			○ Good	○ Good	⌣ Better	● Best	⌣ Better
Security			■				■			⌣ Better	● Best	● Best	● Best	⌣ Better
Virtualization & SCON	■				■					○ Good	○ Good	○ Good	● Best	● Best
Web Serving			■			■				⌣ Better	⌣ Better	⌣ Better	● Best	⌣ Better
Branch Office					■		■			⌣ Better	● Best	● Best	● Best	○ Good
Content / Doc Mgmt	■		■							⌣ Better	⌣ Better	⌣ Better	● Best	● Best
ERP/SCM/CRM/PLM	■			■			■			○ Good	○ Good	⌣ Better	● Best	● Best
Point of Sale							■			⌣ Better	● Best	⌣ Better	○ Good	○ Good

Legend: ■ Important   ▨ Nice to Have   ☐ Can do without   ● Best   ⌣ Better   ○ Good

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