High-performance, flexible partitioning and mission-critical availability for database, ERP and server consolidation

IBM @server® **xSeries 460**

The IBM @server xSeries® 460 is built on new IBM @server X3 Architecture that delivers mainframe-inspired enhancements to the high-performance x64 server industry. With a balanced focus on providing breakthrough 64-bit performance and high availability, the x460 is designed for the changing business needs of enterprise customers.

Built on the leadership of generations of XpandOnDemand servers, this flagship xSeries 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 partitioning flexibility of the x460 to build the optimal configuration for scale-up database and ERP or scale-out virtualization for server consolidation.

Highlights

■ **Delivers breakthrough, x64 performance with 64-bit memory addressability through IBM** @server® **X3 Architecture, the third generation of IBM Enterprise X-Architecture™**

■ **Features XpandOnDemand™ scalability, allowing you to pay as you grow with high-performance, 64-bit Intel® Xeon® Processors MP up to 32 processors**

■ **Supports high-performance, dual-core 64-bit Intel Xeon Processors MP, and runs 32- and 64-bit applications simultaneously providing additional headroom and investment protection**

■ **Leverages years of IBM server deployment expertise and the enterprise-proven reliability of the Intel architecture design**

Get it now

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to buy direct or to locate an IBM reseller

With X3 Architecture, IBM asserts its leadership position in the 8-processor[1] and greater server industry to deliver a breakthrough x64 server. The x460 delivers an unprecedented combination for an industry-standard server—pay-as-you-grow scalability, 64-bit memory addressability, mainframe-inspired latency reductions and advanced availability technologies, all at a price less expensive than comparably performing RISC®/UNIX® systems.

Improved XpandOnDemand modularity

Featuring XpandOnDemand flexibility, the x460 powers pay-as-you-grow modular scalability to meet the diverse needs of today's mission-critical applications. This technology helps IT administrators, including:

- *Leverage the industry's only x64 server available from a major vendor that scales greater than four processors with 64-bit Intel Xeon Processors MP*
- *Scale up to 32 processors for better performance with dual-core technology*
- *With each four CPU addition, six PCI-X 2.0 slots and up to 16 DIMM slots are also available*

- *Improve utilization with more flexible, chassis-based partitioning up to eight x460 chassis connected for SMP or arranged into 4-processor, 8-processor and 16-processor partitions*
- *Maximum configuration for the x460 is 32 processors, 128 DIMM slots supporting up to 512GB of memory and 48 PCI-X 2.0 slots across eight chassis*

XpandOnDemand provides a route to higher performance on Microsoft® Windows® or Linux® using industry-standard hardware. Each x460 can scale from two processors to four processors in a single chassis (expanding beyond 4 processors requires one or more 3U MXE-460 Modular Expansion Enclosures with matching processors). Grow to 8 processors simply by connecting two 4-processor chassis, up to 16 processors in four chassis, or up to 32 processors by connecting eight chassis. This enables the addition of CPU, I/O and memory capacity as your needs change to conform to the demanding requirements of business-critical transaction workloads like virtualization, enterprise resource planning, customer relationship management and database applications.

Breakthrough x86-64 performance

Built on the third generation of IBM Enterprise X-Architecture (which has claimed numerous number-one benchmarks in its history), the x460 establishes a new standard for industry-leading x64 performance. With enhanced XceL4v™ Dynamic Server Cache, the x460 exploits up to 256MB of dynamic, virtual Level 4 cache per four CPUs. With its mainframe-inspired snoop filter integrated in the processor/memory controller, the x460 intelligently tracks data stored across the dual front-side bus. This improves overall performance dramatically by minimizing bus congestion and substantially reducing latency compared to competing x64 designs.

With Intel Extended Memory 64 Technology (Intel EM64T), the x460 supports 64-bit extensions, turning this x64 server into a data powerhouse ready for the transition to mainstream 64-bit applications from proprietary RISC/UNIX servers. Featuring 64-bit memory addressability, the x460 is capable of supporting up to 512GB of total memory to load entire databases into main memory for extremely fast transaction processing.

Availability without compromise

The x460 also delivers the high availability that mission-critical workloads require with a memory subsystem that provides outstanding defenses against downtime. IBM Active Memory™ offers outstanding availability features that are OS independent for maximum flexibility, including:

- *IBM Chipkill™ memory, allowing correction of multiple, single-bit errors using off-the-shelf DIMMs*
- *IBM Memory ProteXion™, keeping the server running by rerouting data in the event of an on-DIMM chip failure to enhance the effectiveness of Chipkill technology*
- *Memory Mirroring, protecting data by writing simultaneously to independent redundant memory cards*
- *Hot-swap memory, enabling the replacement of failed DIMMs while the system is running*
- *Hot-add memory as supported by Windows Server 2003, powering the dynamic addition of main memory to increase performance*

The x460 also comes with IBM Director software, an outstanding suite of proactive server tools, and the integrated Remote Supervisor Adapter II SlimLine, a server within the server that helps to remotely monitor system health and deliver high-speed text and console redirect.

These combined capabilities power virtual 24x7 operations with IBM Predictive Failure Analysis® to monitor critical components and trigger alerts before problems arise. IBM light path diagnostics expedites repairs by pinpointing faulty components with easy to locate LEDs.

Enterprise operating system flexibility

The IBM Datacenter Solution Program offers a wide array of technical services for running Windows Server 2003 up to the maximum 32-way configuration. Cost-effective Red Hat® Enterprise Linux or SUSE LINUX Enterprise Server solutions provide reliable enterprise operating systems that help support the constant uptime required by today's data center.

New economies for investment protection

Many of the integrated features and innovations offered in the x460 also help deliver investment protection by making organizations ready for the next evolution in enterprise server technologies—the migration to 64-bit applications on industry-standard x64 hardware. Supporting cutting-edge dual-core processors, the x460 features IBM Calibrated Vectored Cooling™, which helps keep internal components cool for optimum performance and greater longevity. With simultaneous 32- and 64-bit software compatibility provided by Intel EM64T, the x460 also helps protect the value of your software investment with a framework that supports new 64-bit enterprise applications along with 32-bit legacy applications and system tools. And the x460 features Active PCI-X 2.0 with up to 266 MHz bandwidth per slot, the new standard for high performance server I/O that also preserves compatibility with the existing install base of PCI and PCI-X 1.0 adapters.

For more information

World Wide Web

U.S.	**ibm.com**/servers/eserver/xseries/ x460.html
Canada	**ibm.com**/ca/servers/eserver/xseries/ x460.html

Reseller locator

U.S.	1 800 426-4968
Canada	1 800 426-2255

xSeries 460 at a glance

Form factor/height	Rack/3U per chassis
Processor (max)	Intel Xeon Processor MP up to 3.33 GHz (single-core) and up to 3.0 GHz (dual-core)/667 MHz front-side bus, both support Intel Extended Memory 64 Technology
Number of processors (std/max)	2/4 per chassis, 32 per configuration
Cache (max)	1MB L2/up to 8MB L3 per processor (single-core) and 2x2MB L2 (dual-core) XceL4v Dynamic Server Cache (up to 256MB per chassis)
Memory[2] (std/max)	2GB/64GB PC2-3200 DDR II per chassis, 512GB maximum
Disk bays (total/hot-swap)	6/6 (per chassis) 2.5" Serial Attached SCSI (SAS)
Maximum internal storage[2,3]	440.4GB SAS per chassis (supports 36.4GB and 73.4GB 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	RAID-0, -1, -5 optional (ServeRAID™-8i)
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 x64[4]), 32- and 64-bit Red Hat Enterprise Linux and SUSE Enterprise Linux[4], Microsoft Windows 2000 (Server and Advanced Server), VMware™ ESX Server™
Limited warranty[5]	3-year onsite limited warranty

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VMware and ESX Server are trademarks of VMware, Incorporated.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product and service names may be trademarks or service marks of others.

[1] IDC, 4Q 2004, IDC Server Tracker

[2] Maximum internal hard disk and memory capacities may require the replacement of any standard hard drives and/or memory and the population of all hard disk bays and memory slots with the largest currently supported drives available. When referring to variable speed CD-ROMs, CD-Rs, CD-RWs and DVDs, actual playback speed will vary and is often less than the maximum possible.

[3] When referring to storage capacity, GB = 1,000,000,000 bytes. Accessible capacity is less.

[4] When available.

[5] Visit **ibm.com**/pc/safecomputing periodically for the latest information on safe and effective computing. Warranty information: For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12195, RTP, N.C. 27709, Attn: Dept. JDJA/B203. IBM makes no representation or warranty regarding third-party products or services including those designated as ServerProven or ClusterProven. Telephone support may be subject to additional charges. For onsite labor, IBM will attempt to diagnose and resolve the problem remotely before sending a technician.