IBM System x3455 two-socket, 1U server features AMD Opteron quad-core processors and Xcelerated Memory Technology

At a glance

The System x3455 server has the power, scalability, control, and serviceability needed to handle compute-intensive applications in Linux™ clustering:

- Ultrathin, rack-optimized, 1U high
- AMD Opteron quad-core processors with 512 KB of L2 cache per core and 2 MB of shared L3 cache
- 2 GB standard PC2-5300 ECC double data rate (DDR2) RDIMM memory; addressable up to 48 GB
- Standard one 160 GB¹ SATA 7,200 rpm HDD
- Integrated SATA controller and optional SAS controller
- PCI riser cards to support the following mix of cards:
  - One PCI-E x16
  - One PCI-E x8 or one HTX
- 650-watt, auto-ranging power supply
- Embedded systems management processor
- Integrated dual Gigabit Broadcom Ethernet
- One serial port (16550A-compatible), six USB ports (two front, four rear), two RJ-45 ports, and one video port

Overview

This ultrathin 1U, rack-optimized System x3455 server is a two-socket, eight-core capable, modular server that is purpose-built for high-performance computing (HPC) and optimized for clustered environments. The System x3455 in a dual-processor configuration has 48 GB memory capacity as compared to 32 GB commonly found with many 1U servers with Opteron processors. This difference enables you to take advantage of smaller, less-expensive memory to meet certain memory configurations. Further, stunning memory performance can be achieved with IBM Xcelerated Memory Technology, which extends memory performance to new performance levels.

The System x3455 server introduces support for professional 3D graphics cards to meet industrial and product lifecycle management (PLM) and digital rendering organizations' needs for 3D application performance and overall superior compute performance in the same server.

Energy management and performance features

The System x3455 system offers the latest technologies, including X-Architecture™ Calibrated Vectored Cooling. This innovative
technology keeps internal components cooled for optimal performance and longevity and allows
the server to pack more performance into smaller designs. The System x3455 server also
implements AMD Dual Dynamic Power Management capabilities to allow independent control of
power to the processing cores and the integrated memory controller. The server also includes
energy-efficient power supplies.

The System x3455 server offers the following features:

• Quad-core Opteron processors 2352, 2356, and 2360 SE
• On the standard model:
  – PC2-5300 667 MHz ECC DDR2
  – 160 GB 7,200 rpm HDD
  – Dual Gigabit Broadcom Ethernet controllers
• Twelve memory slots that support up to 48 GB on two-socket models for demanding
  applications, plus failover capability
• Integrated SATA controller and optional SAS support
• Support for 32- and 64-bit operating systems

System availability and manageability

The following availability and manageability features help diagnose problems quickly, even from
remote locations:

• IPMI 2.0 integrated Baseboard Management Controller (BMC)
• Remote power control for accessing and managing your server remotely
• TextConsole redirect with serial over LAN
• Early warning of problems before they occur; Predictive Failure Analysis® (PFA) on
  processors, voltage regulator module (VRM), memory, fans, power supply, and HDD options
• Fast and easy servicing; improved diagnostics and Diagnostic LED indicator

Service and support

• ServerGuide and IBM Director
• Web support
• Warranty (7940): One year, customer replaceable unit (CRU) or on-site labor, limited
  warranty; optional warranty service upgrades
• Warranty (7941): Three year, CRU or on-site labor, limited warranty; optional warranty
  service upgrades

Note: The 7941 is only available through special bid and should not be included in any
announcement material.

Key prerequisites

• Monitor
• Universal serial bus (USB) keyboard
• USB mouse
• Rack

Planned availability dates

• July 7, 2008: 7940-62G
System x3455 related options

The System x3455 server has two processor sockets. Each of these sockets supports quad-core AMD Opteron processors. These processors are available at a range of speeds, up to 2.5 GHz. Each processor core has a separate integrated full-speed, 512 KB L2 cache per core and 2 MB of shared L3 cache. This system supports the installation of a second processor using like processors.

**High-performance server subsystems:** These servers are high-throughput, quad-core, two-socket AMD Opteron-based network servers with excellent scalability when you add memory and a second processor.

A second processor socket on the system board supports the installation of a second processor. High-speed 667 MHz DDR SDRAM is optimized for processor-to-memory subsystem performance. The System x3455 server uses the Broadcom ServerWorks HT2100 and HT1000 chip sets to maximize throughput from processors to memory. These new processors and chips provide:

- HTX
- PCI Express
- SATA
- Broadcom 5706 Ethernet

**Standard System x3455 configurations**

**Note:** The 7941 is only available through special bid and should not be included in any announce material.

<table>
<thead>
<tr>
<th>MT/Mod</th>
<th>Processor</th>
<th>Memory</th>
<th>Optical</th>
<th>HDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>7940-32G</td>
<td>2.1 GHz 2 MB 2352</td>
<td>115 W 2 GB None</td>
<td>160 GB SATA, fixed</td>
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<tr>
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<td>2.3 GHz 2 MB 2356</td>
<td>115 W 2 GB None</td>
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<tr>
<td>7940-62G</td>
<td>2x2.5 GHz 2 MB 2360SE</td>
<td>137 W 8 GB None</td>
<td>160 GB SATA, fixed</td>
<td></td>
</tr>
</tbody>
</table>

**Additional features**

- System board contains six DIMM connectors on single processor systems and 12 DIMM connectors on dual processor systems supporting 512 MB, 1 GB, 2 GB, and 4 GB of PC2-5300 667 MHz ECC DDR2 RDIMM.
  - Supports up to 48 GB of system memory
  - Permits two DIMMs to be accessed at the same time (via memory interleaving using paired, identical memory DIMMs), resulting in much higher memory bandwidth from main memory
  - Supports mixed memory sizes, as long as each DIMM pair is made up of identical modules (same part number, same size, and same speed)
  - Features Chipkill™ memory (1 GB and larger DIMMs only)

**Note:** Only dual-processor systems support 48 GB of memory. Single processors support only 24 GB.

- SATA controller supports SATA data storage up to 1.5 TB (two 750 GB SATA drives).
- Optional SAS HDD support for up to 600 GB internally and can support additional drives externally.
- Dual full-duplex Broadcom 5706 Gigabit Ethernet PCI controllers speed network communications to LAN clients.

The System x3455 subsystems are tuned to provide solid system throughput from processor, to memory, to bus, to disk-intensive I/O. These features combined with SMP capability make this server an excellent choice for:

- Scientific and technical computing
High-availability and serviceability features: The System x3455 server subsystem delivers excellent reliability and serviceability features:

- ECC DIMMs combined with an integrated ECC memory controller, integrated inside each processor, allow the system to correct many single-bit memory errors and some multi-bit memory errors.
- Chipkill memory, on all DIMMs except 512 MB, enables a failing memory chip on a memory DIMM to be taken offline without disruption to the system's memory, thus allowing normal system operation to continue.
- Processors have ECC on their L2 cache to improve data integrity and help reduce downtime.
- PFA on HDD options, memory, processors, VRMs, and fans alerts the system administrator of an imminent component failure.
- Dual Broadcom 5706 Gigabit Ethernet controllers support:
  - Failover, Adapter Fault Tolerance (AFT)
  - PXE 2.0 Boot Agent
  - TCP/IP Offload
  - Wake on LAN®
  - Load balancing or teaming
- Worldwide, voltage-sensing 650-watt power supply features auto restart.
- Cooling blowers and fans provide added reliability:
  - Two power supply fans
  - Three blowers for processors, memory, and HDD bays
  - Fan speed controls incorporated to reduce noise while reducing system temperatures
- Embedded systems management processor enables diagnostic, reset, power-on self-test (POST), and auto recovery functions; monitoring temperature, voltage, and fan speed; alerts generated when thresholds exceeded (refer to the Limitations section for restrictions).
- Information LED panel gives visual indications of system well-being.
- CD-ROM diagnostics and a diagnostic LED indicator help you find a failing component, which may reduce downtime and service costs.
- System board, adapter cards, processor, and memory can be accessed easily.

Expandability and growth: The System x3455 server contains high levels of function and storage capacity for a 1U, 19-inch rack-drawer package. It supports customer installation of adapters, processors, memory, and HDD options. Functions (such as SVGA video, SATA, IDE, and two Gigabit Ethernet controllers) are integrated on the system board. Features include:

- Rack-optimized design for 19-inch-wide industry-standard rack cabinets supported in the NetBAY42 and NetBAY25
- Twelve DIMM connectors that permit support for up to 48 GB of system memory when both processor sockets are populated
- Available riser card configurations to support PCI-E and HTX I/O adapters:
  - One PCI-E x16 riser card
  - One HTX riser or one PCI-E x8 riser card
• Internal data storage up to:
  – 1.5 TB (using two 750 GB SATA HDDs)
  – 600 GB (using two 300 GB SAS HDDs)
• Optional CD-RW/DVD optical drive
• ATI RN50B video controller with 16 MB of memory

**Systems management:** The System x3455 server also features Cluster Systems Management software and IBM Director, a powerful, highly integrated, systems management software solution built on industry standards and designed for ease of use. Exploit your existing enterprise or workgroup management environments and use rich security features to access and manage physically dispersed IT assets more efficiently over the Internet. It can help reduce costs through potentially:

• Reduced downtime
• Increased productivity of IT personnel and end users
• Reduced service and support costs

IT administrators can view the hardware configuration of remote systems in detail and monitor the usage and performance of critical components, such as processors, HDDs, and memory.

IT administrators have comprehensive, virtual on-site control of System x™ servers with the ability to remotely:

• Access the server, often regardless of its status
• Inventory and display detailed system and component information
• View server boot-up during POST
• Browse and delete logs of events and errors
• Reset or power cycle the server
• Monitor and set thresholds on server health including:
  – Operating system load
  – POST time-out
  – Voltage
  – Temperature
• Set proactive alerts for critical server events including PFA on HDDs
• Define automated actions, such as:
  – Send an e-mail or page to an administrator
  – Execute a command or program
  – Pop up an error message to the IBM Director console
• Flash BIOS
• Monitor and graph the use of server resources such as:
  – Memory
  – Processor
  – HDDs
• Identify potential performance bottlenecks and react to prevent downtime

IBM Director Agent provides integration into leading workgroup and enterprise systems management environments via Upward Integration Modules (available from IBM and third parties). Advanced management capabilities built into System x servers are available through:

• Tivoli® Enterprise and Tivoli NetView®
World-class support tools and programs:
The System x3455 server includes a number of tools and programs designed to make ownership a positive experience. From the start, IBM programs help you purchase servers, get them running, and keep them running. IBM can help your company maintain ownership of technology leadership network servers.

- IBM CRU and on-site, one-year limited warranty with next-business-day (NBD) service (same-business-day service optionally available) helps protect your investment if a problem occurs. This service also includes replacement of parts identified through PFA.
- IBM CRU and on-site, three-year limited warranty with next-business-day (NBD) service (same-business-day service optionally available) helps protect your investment if a problem occurs. This service also includes replacement of parts identified through PFA.
- The ServerProven® program lets you confidently configure your server with various devices and operating systems. This program includes compatibility information from actual testing of the System x3455 server with various adapters and devices.
- The ServerGuide™ CD library includes online publications, in addition to utilities and drivers that enable assisted loading of popular network operating systems.
- Electronic support on the Web provides additional support in an easy-to-use format.

Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at


Product positioning

The System x3455 server excels at compute-intensive applications and is ideal for clients requiring large memory addressability and outstanding cluster performance at an affordable price.

The highly manageable, ultrathin 1U, rack-optimized platform offers impressive scalability. It includes dual-socket, quad-core AMD Opteron 2300 series processors with HyperTransport technology (a high-speed, point-to-point link between each processor and the I/O subsystems that delivers outstanding performance by bypassing many key bottlenecks). An integrated memory controller in each processor reduces latency for faster memory access. The System x3455 system offers up to 48 GB of memory using industry-standard error checking and correcting (ECC) PC5300 667 MHz double data rate 2 (DDR II) memory with IBM Chipkill technology for high performance and reliability. Additionally, the System x3455 servers feature IBM Xcelerated Memory Technology, which enables faster access to data, and helps enable outstanding performance for large memory configurations. It can support 667 MHz memory access speed for fully populated memory configurations of more than four DIMMs per processor as compared to the industry standard of 533 MHz. Dual integrated Gigabit Ethernet controllers are standard, as are IBM extended I/O high-performance PCI Express (PCIe) adapter slots.

The System x3455 server is an energy-efficient system for high-performance computing. With the introduction of the newest AMD processors, the System x3455 server features Dual Dynamic Power Management (DDPM) technology for optimum power consumption and increased performance. DDPM's separate power planes for processing cores and memory controller means cores can operate at reduced power consumption levels while the memory controller continues to run at full speed. In addition, the memory controller can operate at a higher frequency for increased bandwidth and performance. IBM Calibrated Vectored Cooling technology keeps internal components efficiently cooled and the IBM Cool Blue portfolio offers a
comprehensive solution that addresses power and cooling concerns at the server, rack, and datacenter level.

Additionally, the System x3455 server introduces support for professional 3D graphics cards from NVIDIA to meet the needs of industrial, PLM, and digital rendering organizations for 3D application performance and overall superior compute performance in the same server. Standard in the System x3455 server is an integrated Baseboard Management Controller (BMC), optimized for HPC cluster manageability, that enables you to control the server easily, both locally and remotely.

Reference information

1. When referring to HDD or tape backup capacity, GB stands for 1,073,741,824 bytes. Total user capacity may vary depending on operating environments.

2. The Microsoft Windows Preinstallation Environment software included as part of ServerGuide software, may be used for boot, diagnostic, setup, restoration, installation, configuration, test, or disaster recovery purposes only.

   **Note:** The Microsoft Windows Preinstallation Environment software contains a security feature that will cause an end user customer's system to reboot without prior notification to the end user customer after 24 hours of continuous use of the Microsoft Windows Preinstallation Environment. During routine usage of ServerGuide, which does not usually require usage of the Microsoft Windows Preinstallation Environment software for such an extended time period, this condition should not occur.

3. Some programs may not be available in all countries.

4. You may be asked certain diagnostic questions before a technician is sent.

5. For information on IBM's Statement of Limited Warranty, contact your IBM representative or reseller. Copies are available upon request.

6. GHz and MHz denote the internal and/or external clock speed of the microprocessor only, not application performance. Many factors affect application performance.

7. IBM makes no warranties, expressed or implied, regarding non-IBM products and services that are ServerProven. Including but not limited to implied warranties of Merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

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