Welcome to:

IBM System x Systems Overview

System x3650
XTW108d
January 2008
System x3650 - At A Glance

- Choice of new dual-core E5205 Intel Xeon processor
- High availability with hot-swap redundant cooling, power, and hard drive options
- Up to 1066 MHz front side bus speed of new models
- IBM Active Energy Manager provides advanced datacenter power notification and management
- Use either high-performance SAS or low-cost SATA drives
System x3650 - Product Overview (1 of 2)

- Intel Xeon two-socket server
  - Quad-core up to 3.16 GHz with 12 MB L2 cache and up to a 1333 MHz FSB
  - Dual-core up to 3.0 GHz with 4 MB L2 cache and up to a 1333 MHz FSB

- Compact, rack-optimized, 2U package

- 1, 2, or 4 GB standard of PC2-5300 memory

- 12 DIMM slots total
  - 48 GB maximum
  - Active Memory including memory mirroring, online-spare memory, and Chipkill

- Integrated Dual Gigabit Broadcom 5708 Ethernet controller
  - Including TOE

- Four I/O slots
  - Two PCI-E x8
  - Two PCI-E x8 or two PCI-X

- Power and Cooling
  - One voltage-sensing 835-watt power supply
  - A second 835-watt supply is optional
  - Five fans are located throughout the server
  - Each power supply installed has an additional fan
  - A redundant power option is available that contains five additional fans
  - Supports IBM Active Energy Manager
System x3650 - Product Overview (2 of 2)

- Integrated SAS / SATA controller
  - Supports RAID 0, 1, and 10
  - ServeRAID 8k SAS controller optional
    - Supports additional RAID levels 1E, 5, and 6

- Hot-Swap SAS / SATA models
  - Eight 2.5-in hot-swap SAS and one 3.5-in tape drive (shown)
  - Six 3.5-in hot-swap SAS / SATA
  - No storage standard
  - Maximum Capacity
    - 3.5-inch SAS – 1.8 TB (6 x 300 GB)
    - 2.5-inch SAS – 1.2 TB (8 x 146 GB)
    - 3.5-inch SATA – 4.5 TB (6 x 750 GB)

- Ports
  - One serial, six USB (two front and four rear), two ethernet, one RSA II ethernet, one external SAS connector, and two video (one front and one rear)

- 3 Year Limited Warranty
System x3650 - Executive Summary

Positioning
• Stable business-critical application server

Key Messages
• Superior performance per watt with up to two quad core processors and highly dense memory designs with 12 DIMM slots
• Consolidate workloads and optimize more advanced solutions architectures at incredible IT savings and lower power levels
• Protect IT investments with scalable memory, I/O and storage on a server platform with stable life cycle

Leadership Functions
• Better availability than HP with integrated SAS and tape storage
• Enhanced scalability over Dell with flexible I/O choices
• Superior power management tools with IBM PowerExecutive over Dell
**System x3650 - Product Positioning**

**Positioning:** Stable business-critical application server.

**Business Benefits**
- Stable platform design minimizes deployment and support costs
- Advanced power management helps to lower data center electricity and cooling costs
- 24x7 data availability to protect business critical data

**Target Markets**
- Large & Medium Enterprises
- Datacenter environments

**Target Applications**
- e-Business Applications
- Collaboration
- Virtualization and Consolidation
- Front-end applications (SAP, Oracle)

**New Technology**
- SAS Hard Drives: Faster storage performance
- IBM PowerExecutive 2.0: Data Center level power management and control
- New integrated tape: Data Security
- TOE Network offload technologies: Hardware accelerated networking for maximum performance
- Fully Buffered Memory: Better memory scalability for maximum performance
- High Speed PCI Express: Performance scalability for business growth

**Competitive Advantages**

**Dell: PowerEdge 2950**
- More I/O for more performance and investment protection
- Advanced power management can save money
- 12 dimm slots versus 8 on Dell for more total memory and more flexible memory choices

**HP: ProLiant DL 380 G5**
- Better storage options: deployment flexibility
- Advanced power management can save money
- 12 dimm slots versus 8 on HP for more total memory and more flexible memory choices
System x3650 - Front View (2.5-inch models)

- Operator Information Panel
- Video Port
- CD/DVD Drive
- USB Ports (2)
- SAS Drives (8)
System x3650 - Front View (3.5-inch models)

- Operator Information Panel
- CD/DVD Drive
- USB Ports (2)
- Video Port
- SAS Drives
- Optional Tape Drive
System x3650 - Rear View

- AC / DC Power LEDs
- Power Supply Filler Panel
- Power Supply One
- System Management Ethernet Port
- External SAS Port
- Serial
- Video
- Ethernet Ports (2)
- USB Ports (4)
System x3650 - Interior View

- Fans (5)
- CPUs (2)
- Redundant Fans Locations (5)
- PCI Riser card
- Power Supplies (2)
System x3650 - Processor Subsystem (1 of 3)

The IBM System x3650 feature the Intel dual-core Xeon processor 5100 and 5200 series processors

Intel Xeon 5100 and Xeon 5200 Series processors feature:

- Intel® Core™ microarchitecture
- Intel® Virtualization Technology
- Intel® Extended Memory 64 Technology (EM64T)
- Enhanced Intel® SpeedStep Technology

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Processor Speed</th>
<th>Power Consumption</th>
<th>L2 Cache Size</th>
<th>Front-side Bus Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xeon E5205</td>
<td>1.86 GHz</td>
<td>65 Watt</td>
<td>6 MB</td>
<td>10666 MHz</td>
</tr>
<tr>
<td>Xeon 5160</td>
<td>3.0 GHz</td>
<td>80 Watt</td>
<td>4 MB</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon 5140</td>
<td>2.33 GHz</td>
<td>65 Watt</td>
<td>4 MB</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon 5130</td>
<td>2.0 GHz</td>
<td>65 Watt</td>
<td>4 MB</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon 5110</td>
<td>1.6 GHz</td>
<td>65 Watt</td>
<td>4 MB</td>
<td>1066 MHz</td>
</tr>
</tbody>
</table>
System x3650 - Processor Subsystem (2 of 3)

The IBM System x3650 also feature the Intel quad-core Xeon processor 5300 series

Intel Xeon 5300 Series processors feature:

- 8MB (2x4MB) Shared L2 Cache
- Intel Core Microarchitecture:
- Intel® Virtualization Technology
- Intel® Smart Cache Technology
- Intel® Quick Data Technology
- Intel® Extended Memory 64 Technology (EM64T)
- Enhanced Intel® SpeedStep Technology

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Processor Speed</th>
<th>Power Consumption</th>
<th>Front-side Bus Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xeon X5365</td>
<td>3.00 GHz</td>
<td>120 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon X5355</td>
<td>2.66 GHz</td>
<td>120 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon L5320</td>
<td>1.86 GHz</td>
<td>50 Watt</td>
<td>1066 MHz</td>
</tr>
<tr>
<td>Xeon L5310</td>
<td>1.60 GHz</td>
<td>50 Watt</td>
<td>1066 MHz</td>
</tr>
<tr>
<td>Xeon E5345</td>
<td>2.33 GHz</td>
<td>80 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon E5335</td>
<td>2.00 GHz</td>
<td>80 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon E5320</td>
<td>1.87 GHz</td>
<td>80 Watt</td>
<td>1066 MHz</td>
</tr>
<tr>
<td>Xeon E5310</td>
<td>1.6 GHz</td>
<td>80 Watt</td>
<td>1066 MHz</td>
</tr>
</tbody>
</table>
The IBM System x3650 also feature the Intel quad-core Xeon processor 5400 series

Intel Xeon 5400 Series processors feature:

- 12MB (2x6 MB) Shared L2 Cache
- Enhanced Intel Core Microarchitecture
- Intel® Virtualization Technology
- Intel® FlexMigration
- Intel® Extended Memory 64 Technology (EM64T)
- Enhanced Intel® SpeedStep Technology

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Processor Speed</th>
<th>Power Consumption</th>
<th>Front-side Bus Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xeon X5460</td>
<td>3.16 GHz</td>
<td>120 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon X5450</td>
<td>3.0 GHz</td>
<td>120 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon E5440</td>
<td>2.83 GHz</td>
<td>80 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon E5430</td>
<td>2.66 GHz</td>
<td>80 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon E5420</td>
<td>2.5 GHz</td>
<td>80 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon E5410</td>
<td>2.33 GHz</td>
<td>80 Watt</td>
<td>1333 MHz</td>
</tr>
<tr>
<td>Xeon E5405</td>
<td>2.0 GHz</td>
<td>80 Watt</td>
<td>1333 MHz</td>
</tr>
</tbody>
</table>
System x3650 - Memory Subsystem

The IBM System x3650 supports:

• 512 MB, 1 GB, 2 GB, or 4 GB PC2-5300 667 MHz FBD ECC DDR2-SDRAM DIMMs

• Standard ship configuration:
  - 1 GB (2 x 512 MB), 2 GB (2 x 1 GB), or 4 GB (2 x 2 GB)
  - Active Memory™ including memory mirroring, online-spare memory, Chipkill (1 GB and larger DIMMs)

• Maximum configuration:
  - Twelve 4 GB DIMMs (48 GB)
System x3650 - Disk Subsystem

The IBM System x3650 is standard with integrated SATA / Serial Attached SCSI (SAS) controller

• Supports RAID levels 0, 1, and 10

• ServeRAID 8k-I SAS controller standard
  - Upgradeable to ServeRAID 8k
  - Supports additional RAID levels 1E, 5, and 6

• Standard Configuration
  - No hard drives standard

• Six or eight SAS or SATA drives maximum depending on model
  - Support for 73 GB, 146 GB, and 300 GB SAS hard drives
  - Support for 80 GB, 160 GB, 250 GB, 500 GB, and 750 GB SATA hard drives

• Maximum Configuration
  - 1.8 TB using six 300 GB 3.5-inch SAS drives
  - 1.2 TB using eight 146 GB 2.5-inch SAS drives
  - 4.5 TB using six 750 GB 3.5-inch SATA drives
System x3650 - Power and Cooling

The System x3650 is configured with:

- One voltage-sensing, hot-swap 835 watt power supply
- A second 835-watt supply is optional
- Five fans throughout the server
- Each power supply installed has an additional fan
- A redundant power option is available that contains five additional fans
System x3650 - Systems Management

The IBM System x3650 ships with:

- Baseboard Management Controller (BMC)
  - Supports IPMI 2.0 standard

- Light Path Diagnostics
  - Allows quick and easy identification of component failures

- IBM Systems Director
  - Integrated systems management tool
  - Ships with server on separate CD-ROMs or a fulfillment flyer is provided (geography-dependent)

- ServerGuide assists in the installation of operating systems

- PFA on processors, voltage regulator module (VRM), memory, fans, power supply, and HDD options

- IBM Active Energy Manager for advanced datacenter power notification and management to achieve lower heat output and reduced cooling needs

- Optional Remote Supervisor Adapter (RSA) II Slimline
System x3650 - Supported Operating Systems

- Windows Server 2003 R2 Datacenter Edition Unlimited Virtualization
- Windows Server 2003 R2 Datacenter Edition Unlimited Virtualization w/ High Avail. Program
- Windows Server 2003 Compute Cluster Edition
- Windows Compute Cluster Server 2003
- Windows Server 2003 / R2 Standard, Enterprise x64 Edition
- Windows Server 2003, Ent. Ed.(64 bit) w/Microsoft Cluster Service (MSCS)
- Windows Server 2003, Ent. Ed. w/Microsoft Cluster Service (MSCS)
- Windows Storage Server 2003 / R2, Standard, Enterprise Editions x64
- Windows 2000 Server, Advanced

- Red Hat Enterprise Linux 5 Server for x64
- Red Hat Enterprise Linux 5 Server for x64 with Xen
- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server Edition with Xen
- Red Hat Enterprise Linux AS, ES 3 / 4 for x86 and AMD64 / EM64T
- Red Hat Enterprise Linux 4 WS / HPC for x86 and AMD64 / EM64T
- SUSE LINUX Enterprise 9 / 10 for x86 and AMD64 / EM64T
- SUSE LINUX Enterprise 10 for x86 and AMD64 / EM64T with Xen
System x3650 - Problem Determination (1 of 3)

System State is a state of completion of one of six main power-up activities:

- **State 1**: No AC power
- **State 2**: AC power but no DC output
- **State 3**: System fails to complete POST
- **State 4**: System completes POST but NOS fails to start loading
- **State 5**: NOS fails to complete loading
- **State 6**: NOS completes loading but stops during normal operations
System x3650 - Problem Determination (2 of 3)
## System x3650 - Problem Determination (3 of 3)

<table>
<thead>
<tr>
<th>State</th>
<th>Information Gathering</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chassis Problem</td>
<td>Problem Determination Guide (PDSG)</td>
</tr>
<tr>
<td>2</td>
<td>BMC</td>
<td>Advanced Management Module</td>
</tr>
<tr>
<td>3</td>
<td>Check Point (CP) codes</td>
<td>PDSG Retain Tips IBM Support site</td>
</tr>
<tr>
<td></td>
<td>F1 (POST Error Log and System Error Log</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F2 Diagnostics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adapter BIOS messages</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>F2 Diagnostics</td>
<td>PDSG Retain Tips F2 Diagnostics</td>
</tr>
<tr>
<td>5</td>
<td>NOS boot messages</td>
<td>NOS Vendor messages</td>
</tr>
<tr>
<td></td>
<td>Blue screen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safe mode</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Dynamic System Analysis (DSA)</td>
<td>Dynamic System Analysis (DSA)</td>
</tr>
<tr>
<td></td>
<td>NOS Event logs</td>
<td></td>
</tr>
</tbody>
</table>
System x3650 - Developers Corner

Some observations about the IBM System x3650:

- Two additional I/O slots are provided
  - One for the optional Remote Supervisor Adapter II (RSAII)
  - One for hardware RAID support

- Cannot mix SAS and SATA drives in the same system
  - Cannot mix 3.5-inch and 2.5-inch drives

- Universal keyed SAS backplane supports both SAS and SATA hard drives

- Online-spare memory is supported
  - Disables a failed pair of DIMMs and activates an online-spare to replace the failed pair
  - Online-spare memory is enabled in the system BIOS
  - The online-spare DIMMs are not included in the total memory capacity of the system
  - The online-spare memory DIMMs must match for speed, type, and size (or larger) as the failed pair
System x3650 - Resources

• IBM System x3650 Announcements
  - January, 2008 (ENUS108-059)
    ▪ Additional dual-core processor option

• Dual-Core Intel® Xeon® Processor 5100 Series

• Quad-Core Intel® Xeon® Processor 5300 Series

• Quad-Core Intel® Xeon® Processor 5400 Series

• IBM System x Announcements