IBM System x3550 M4 servers include Intel Xeon multicore processors

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At a glance

IBM® System x3550 M4 servers deliver power, scalability, control, and serviceability for dynamic high-performance computing applications:

- Ultrathin, high-availability, and rack-optimized for 1U platform
- High-speed DDR-3 SDRAM Registered DIMMs standard; 24 DIMM slots that support up to 384 GB maximum memory with 16 GB optional DIMMs, or up to 768 GB of memory with LRDIMMs with the ability to run two DIMMs per channel at 1600 MHz with supported 1600 MHz RDIMMs
- Support for up to eight hot-swap 2.5-inch SAS/SATA HDDs or SSDs or up to three hot-swap SAS/SATA 3.5-inch HDDs
- Up to two x16 PCIe 3.0 slots on two-processor servers
- 750-watt auto-ranging power supplies
- Integrated systems management processor
- Integrated quad Gigabit Ethernet ports for high I/O capacity, plus two optional embedded 10 GbE ports
- One serial port (16550A-compatible)
- USB ports
  - 2.5-inch model has seven (two front, four back, and one internal)
  - 3.5-inch model has eight (three front, four back, and one internal)
- Two video ports (front and rear)

Overview

These 1U-high, rack-optimized servers feature extreme frequency, optimized performance, and systems management for business-critical applications and cloud deployments built on IBM X-Architecture®.
Optimized for performance

New, innovative, energy-smart design with powerful high-performance processors, a large capacity of high-performing DDR3 memory, and a no-compromise feature set ideal for business-critical applications and cloud deployments:

- Up to two eight-core powerful Intel Xeon™ E5-2600 series processors
- Twenty-four DIMM (RDIMM/UDIMM/LRDIMM) slots that enable you to deploy up to 384 GB of DDR3 SDRAM Registered DIMM memory, or up to 768 GB of memory with LRDIMMs, and fast memory bandwidth with the ability to run two DIMMs per channel at 1600 MHz with supported 1600 MHz' RDIMMs
- Integrated slotless 6 Gbps hardware RAID-0, -1, and -10 or optional RAID-5, -50 or -6, or -60 (model dependent) and up to 1GB Flashback cache
- Support for up to eight hot-swap 2.5-inch SAS/SATA HDDs or SSDs or up to three hot-swap SAS/SATA 3.5-inch HDDs
- Highly functional chipset optimized for better application computing for general business workloads
- Integrated quad Gigabit Ethernet ports for high I/O capacity, and optional two embedded 10 GbE ports
- One PCIe 3.0 x16 slot plus one PCIe x8/x16 or optional PCI-x slot that help provide flexibility, and greater performance with long-term investment protection
- New energy-efficient design incorporating 750-watt dc power supplies, up to twelve cooling fans (six banks of counter-rotating dual fans), and energy-efficient planar components to help lower operational costs
- Compliant with 80 PLUS Platinum and ENERGY STAR (model dependent)

Manage with efficiency

High-availability, manageability, and serviceability features help diagnose problems quickly, even from remote locations:

- IBM Systems Director Active Energy Manager™ for advanced datacenter power notification and management to help achieve lower heat output and reduced cooling needs
- Snoop filters to boost processor performance
- Integrated slotless SAS controller for up to eight 2.5-inch, hot-swap HDD bays
- Memory mirroring, configurable using Unified Extensible Firmware Interface (UEFI) setup
- iMM2 systems management processor with optional Feature on Demand (FoD) remote presence
- Monitoring and control of operating status and key server components
- PFA on selected components that warns of problems before they occur
- Fast and easy servicing through innovative light path diagnostics, improved onboard diagnostics, and LED diagnostic panel

Excellent RAS and outstanding uptime for an improved business environment

- Redundant, hot-swap components that make it easy to replace failures without taking your system down
  - Hot-swap, redundant fans with calibrated vectored cooling to keep components cool, and simplified fan replacement
  - Hot-swap, redundant power supplies to help reduce downtime
  - Hot-swap, RAID protection disk to help secure your data and reduce downtime
- Predictive Failure Analysis, which provides advanced warning on processors, memory, disks, fans, power supplies, and VRMs
- Drop-down light path diagnostics panel, which gives information about a failing component without requiring opening of the chassis or interrupting system operation, and expedites hardware repairs to dramatically reduce service time
• IBM Director and web support
• Three-year, customer replaceable unit (CRU) and on-site labor\(^2\), limited warranty\(^3\); optional warranty service upgrades available

\(^1\) GHz and MHz denote the internal and/or external clock speed of the microprocessor only, not application performance. Many factors affect application performance.

\(^2\) You may be asked certain diagnostic questions before a technician is sent.

\(^3\) For information on IBM Statement of Limited Warranty, contact your IBM representative or reseller. Copies are available upon request.

### Key prerequisites

• Monitor, USB keyboard, and USB mouse

**Note:** PS/2-style keyboard and mouse are not supported.

### Planned availability date

September 19, 2012

### Description

**System x3550 M4 server**

The System x3550 M4 server features Intel Xeon multicore processors that support internal processing speeds of up to 3.3 GHz\(^1\), and processing operations to memory up to 1600 MHz.

**High-performance server subsystems**

The System x3550 M4 expands the new server line by adding a higher level of processor power. This high-throughput, two-way multicore network server offers excellent performance and scalability when you add memory and a second processor. It incorporates powerful Xeon processors with up to 20 MB L3 cache. The advanced transfer L3 cache is integrated onto the processor and runs at the same clock speed. The advanced transfer cache is a result of a "backside bus" 256 bits wide. It features a quad-wide cache line that can transfer four 64-bit cache line segments at one time to deliver full-speed capability. The cache is eight-way set associative.

Two Intel Xeon processor connectors are standard on the system board to support installation of a second processor, up to 20M cache, and up to two 8.0 GT/s QuickPath Interconnects (QPIs) with new Hyper Threading and Intel\(^\text{TM}\) Turbo Boost Technology 2.0. High-speed PC3 DDR3 Advanced Memory Feature DIMMs run at up to 1600 MHz DRAM clock speed and offer maximum 12800 MBps bandwidth, processor-to-memory subsystem performance. The x3550 M4 server uses the Intel E5-2600 processor with Chipkill technology to maximize throughput from processors, to memory, to the 32-bit and 64-bit PCI buses.

**Additional features**

• Up to 16-core processing achieved with a second processor of equal speed and processor type.
• System board containing 24 DIMM (UDIMM/RDIMM/LRDIMM/HCDIMM) connectors supporting 4 GB, 8 GB, and 16 GB DDR3 PC3-12800 SDRAM ECC RDIMMs with:
- DDR3 memory for improved performance
- Up to 384 GB of system memory using 16 GB optional DIMMs or up to 768 GB of memory with 32 GB LRDIMMs
- Support for two DIMMs per channel at 1600 MHz with supported 1600 MHz RDIMMs

- Up to two PCIe 3.0 slots. Clients ordering a single-processor model can select:
  - Two PCIe 3.0 slots: one PCIe 3.0 x16 low profile and one x8 half length, full height (standard models).
  - An optional PCI-x half length, full height slot to replace one x8 half length, full height slot. With 2nd CPU population, clients can optionally buy one x16 half length, full height PCIe 3.0 slot to replace one x8 half length, full height slot.

- On standard models, four 2.5-inch bays or three 3.5-inch bays to support optional SAS/SATA HDDs and one bay to support an optical drive for 2.5-inch models.
- Intel i350-AM4 Quad-port Gbit Ethernet on board and embedded 10 GbE Dual-port options (on a reserved connector). The embedded card supports Emulex, QLogic, and Mellanox with different protocols like 10Gb SFP+ or 10BASE-T or InfiniBand.
- Compliant with 80 PLUS Platinum and ENERGY STAR (model dependent).

The System x3550 M4 offers solid system throughput from processor, to memory, to bus, to disk-intensive I/O. These features, combined with multicore capability, make the x3550 M4 server an excellent choice for a stand-alone or clustered general-business application, file, and print server.

**High-availability and serviceability features**

The System x3550 M4 subsystem delivers excellent reliability and serviceability features:

- Support for light path diagnostics with viewable drop-down panel, Wake on LAN, and PXE
- Up to six hot-swap dual-motor cooling fans
- Up to eight 2.5-inch HS HDDs with optional upgrade kit
- Chipkill memory that basically distributes information covered by error correction coding across separate memory chips; if any of the chips fail, the data can in many cases still be reconstructed from the remaining chips, and the system can continue running
- ECC L3 cache processors to help improve data integrity and help reduce downtime
- PFA on HDD options, memory, power supply, and fans (when Remote Supervisor Adapter is installed), to help alert the system administrator of imminent component failure
- Worldwide voltage-sensing 750-watt dc high-efficiency hot-plug power supply options
- IBM Integrated Management Module Advanced Upgrade (Feature on Demand (FoD)) to enable the remote presence and blue-screen capture features
- Integrated Management Module systems management processor that supports:
  - Automatic server restart (ASR)
  - Fan monitoring and control
  - Power supply monitoring
  - Temperature monitoring
  - Voltage monitoring
  - Power on/off, reset sequencing
  - LED controls (onboard diagnostics support with light path LED)
  - Remote power control
  - Local firmware update
- Error logging
- Information LED panel for visual indications of system well-being
- Onboard diagnostics with an LED map to locate a failing component, helping reduce downtime and service costs
- Support for virtual floppy (with optional IBM Integrated Management Module Advanced Upgrade) which enables a user to easily direct a remote host to boot, and use standard instructions stored anywhere on the network
- Easily accessible system board, adapter cards, processor, and memory
- CPU failure recovery in some configurations, which:
  - Forces the failed processor offline
  - Reboots the server automatically
  - Generates alerts
  - Continues operations with the working processor

**Expandability and growth**

The System x3550 M4 packs a lot of function and storage capacity into a 1U 19-inch rack-drawer package, yet it is amazingly easy to upgrade and service. Functions such as SVGA video, SAS, and full-duplex 10 Gbs Ethernet are integrated on the system board. Features include:

- Rack-drawer models designed for 19-inch-wide by 28-inch-deep industry-standard rack enclosures, such as the NetBAY42 SR
- Up to two PCIe 3.0 adapter card slots available; one PCIe x16 plus slot, plus one PCIe x8/x16 (with 2nd processor) or PCI-x slot (optional)
- System board optional upgrades (PCI slot not required)
  - IBM Integrated Management Module Advanced Upgrade. Remote presence function can be enabled by Feature on Demand (FoD).
- Support for up to 9 TB of internal data storage, using three 3 TB 3.5-inch SATA HDDs

**Systems management**

iMM2: The System x3550 M4 includes an Integrated Management Module that provides industry-standard Intelligent Platform Management Interface (IPMI) 2.0-compliant systems management. The IMM comes standard, and shares one of the four onboard Ethernet ports for access. The IMM can be accessed using software that is compatible with IPMI 2.0 (for example xCAT). The IMM is implemented using industry-leading OSA firmware and applications in conjunction with the Integrated Management Module.

Features and benefits:

- Monitoring:
  - System voltages
  - Battery voltage
  - System temperatures
  - Fan speed control
  - Fan tachometer monitor
  - Good Power signal monitor
  - System ID and planar version detection
  - System power and reset control
  - NMI detection (system interrupts)
  - SMI detection and generation (system interrupts)
  - Serial port text console redirection
  - System LED control (power, HDD, activity, alerts, and heartbeat)
• An embedded web server that gives you remote control from any standard web browser. No additional software is required on the remote administrator’s workstation.
• For users who are accustomed to a command-line interface (CLI), the ability of the administrator to use the CLI from a Telnet session to perform some of the functions that can be performed from the web server.
• Secure Sockets Layer (SSL) and Lightweight Directory Access Protocol (LDAP).
• Built-in LAN and serial connectivity that supports virtually any network infrastructure.
• Multiple alerting functions to warn systems administrators of potential problems through email, IPMI PETs, and SNMP.

With video compression now built into the adapter hardware, it is designed to allow the greater screen sizes and refresh rates that are becoming common in the marketplace. This feature helps enable the user to display server activities from power-on to full operation remotely with remote user interaction at virtually any time.

**IBM Integrated Management Module Advanced Upgrade (FoD)**

The optional IBM Integrated Management Module Advanced Upgrade delivers advanced control and monitoring features to manage your IBM System x3550 M4 server at virtually any time, from virtually any place. The key can be enabled by FoD. This key enables easy console redirection with text and graphics, and keyboard and mouse (operating system must support USB) support over the system management LAN connections.

**IBM Director**

The System x3550 M4 server is supported by 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 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 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.

IBM Director includes a portfolio of integrated server tools that work with the systems management monitoring functions. Typical functions and monitoring capabilities can include:

• PFA-enabled critical hardware components
• Temperature
• Voltage
• Fan speed
• Light path diagnostics

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 bootup 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:
  – Memory
  – HDDs
  – Power supplies
  – Fans
• Define automated actions, such as:
  – Send email or page to an administrator
  – Run a command or program
  – Send an error message to the IBM Director console
• Flash UEFI
• 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 integrates into leading workgroup and enterprise systems management environments through 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®
• Computer Associates Unicenter TNG
• HP OpenView
• Microsoft™ SMS
• BMC Patrol
• NetIQ

**IBM Active Energy Manager**

IBM Active Energy Manager support offers direct monitoring of power consumption and thermal load of your server through IBM Director. You can monitor power consumption to track utilization of energy resources. IBM Active Energy Manager is a leading solution on the market providing users with the combination of intelligence and features needed to effectively monitor power consumption in the datacenter. Active Energy Manager, an extension to IBM Director systems management software, allows clients to "meter" actual power usage and trend data for any single physical system or group of systems. Developed by IBM Research, Active Energy Manager utilizes IBM-developed monitoring circuitry to help identify how much actual power is being used and the temperature of the system. The software is available across the new IBM System x servers, as well as its BladeCenter® line of systems. With Active Energy Manager, the user can understand the actual power draw.

With the addition of the optional IBM Integrated Management Module Advanced Upgrade, the IT administrator achieves comprehensive, virtual on-site control of System x servers through the ability to remotely:

• Access the server, in many cases regardless of the status
• Inventory and display detailed system and component information
• View server bootup during POST
• Browse and delete logs of events and errors
• Reset or power cycle the server
• Run diagnostics, SCSI, and RAID setup during POST
• Monitor thresholds on server health, including:
  – Operating system load
  – POST time-out
  – Voltage
  – Temperature
• Set proactive alerts for critical server events, including PFA on:
  – Memory
  – Fans
  – HDDs
  – Power supplies
• Define automated actions, such as:
  – Send an email or a page to an administrator
  – Run a command or program
  – Send an error message to the director console
• Manage flash UEFI
• Monitor and graph the utilization of server resources, such as:
  – Memory
  – Processor
  – HDDs
• Identify potential performance bottlenecks and react to prevent downtime
• Monitor, manage, and configure RAID subsystems without taking them off line

**Advanced Configuration and Power Interface (ACPI)**

ACPI is an open industry specification that defines a flexible and extensible hardware interface for the system board. Software designers use this specification to integrate power management features throughout a computer system, including hardware, the operating system, and application software. This integration enables Microsoft Windows™ to determine which applications are active, and handle all of the power management resources for computer subsystems and peripherals.

**World-class support tools and programs**

The System x3550 M4 tools and programs can 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.

• The server purchase includes a three-year, customer replaceable unit (CRU) and on-site service, limited warranty; optional warranty service upgrades are available.
• The ServerProven® program lets you confidently configure your server with various devices and operating systems. This web-based program provides compatibility information from actual testing of the System x3550 server with various adapters and devices.
• Electronic support on the web offers additional support in an easy-to-use format.

**Standard System x3550 M4 configurations**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Processor</th>
<th>Memory</th>
<th>GT/s</th>
<th>Interface</th>
<th>HDD interface</th>
<th>HDD</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>791432x</td>
<td>3.3 GHz</td>
<td>4 GB</td>
<td>8.0</td>
<td>SAS/SATA</td>
<td>M5110</td>
<td>2.5-in</td>
<td>Open bay hot-swap 1 x 750W</td>
</tr>
<tr>
<td></td>
<td>Cache: 10 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7914M2x</td>
<td>2.9 GHz</td>
<td>4 GB</td>
<td>8.0</td>
<td>SAS/SATA</td>
<td>M5110</td>
<td>2.5-in</td>
<td>Open bay hot-swap 1 x 750W</td>
</tr>
<tr>
<td></td>
<td>Cache: 20 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The model "x" designation is geography-dependent and is spelled out explicitly in the **Product number** section.

**Accessibility by people with disabilities**

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


**Product positioning**

The System x3550 M4 server is a part of the System x rack-optimized server line. This two-socket server delivers Intel Xeon multi-core high-speed processors and excellent server function in an ultrathin, rack-optimized, 1U footprint.

**Optimized for speed**

The System x3550 M4 server offers new levels of fast Intel Xeon multicore processors with up to 8.0 GT/s and lower power for business-critical applications and cloud deployments. This server is uniquely optimized for better application computing with a highly functional chipset and twenty-four DIMM slots for a maximum of 384 GB of DDR-3 SDRAM Registered DIMM memory, or up to 768 GB of memory with LRDIMM.

**Innovation comes standard**

- Application efficiency increases with snoop filters that free up cache and improve processor performance.
- Supercharged TOE optimizes system performance by offloading protocol processing.
- A drop-down light path diagnostics panel improves in-rack manageability and allows easy problem identification.

**Ultimate fault-tolerant protection**

- A memory mirroring feature enables you to increase memory reliability.
- A SAS controller with RAID-0, -1, -10, -5, and -50 on hot-swap SAS models helps safeguard your data at no additional cost.

**Target applications**

- General purpose computing
- Database, ERP, mail, and Web 2.0 applications
- Business-critical applications and cloud deployments
- Finance trading applications
- High-performance computing
### GAV Models

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine</th>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM System x3550 M4</td>
<td>7914</td>
<td>32G</td>
<td>791432G</td>
</tr>
<tr>
<td></td>
<td>7914</td>
<td>M2G</td>
<td>7914M2G</td>
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</tbody>
</table>

### MTM Starting Point Models

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine</th>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM System x3550 M4</td>
<td>7914</td>
<td>FT3</td>
<td>7914FT3</td>
</tr>
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</table>

### Options:

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00D9440</td>
<td>Intel Xeon Processor E5-2658 8C 2.1GHz 20MB 1600MHz 95W W/Fan</td>
</tr>
<tr>
<td>00D9441</td>
<td>Intel Xeon Processor E5-2648L 8C 1.8GHz 20MB 1600MHz 70W W/Fan</td>
</tr>
<tr>
<td>94Y7631</td>
<td>IBM System x 750W High Efficiency -48 V DC Power Supply</td>
</tr>
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</table>

### Pseudo Options:

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00W2412</td>
<td>x3550 M4 2.5” one Simple Swap Kit</td>
</tr>
<tr>
<td>00D9438</td>
<td>Intel Xeon Processor E5-2658 8C 2.1GHz 20MB Cache 1600MHz 95W</td>
</tr>
<tr>
<td>00D9439</td>
<td>Intel Xeon Processor E5-2648L 8C 1.8GHz 20MB Cache 1600MHz 70W</td>
</tr>
</tbody>
</table>

### Publications

The following publications and CD-ROMs are shipped with the System x3550 M4.

- **System x3550 M4 Installation Guide** contains an introduction to the computer, installation and setup, installing options, reference information, and problem determination. The installation guide has easy-to-use text and illustrations to enable you to quickly set up your System x3550 M4.
- **Documentation/User's Guide CD** contains translated versions of the product user's guide.
- **ServerGuide** contains online publications and drivers to support the System x3550 M4. In addition, it includes a set of easy-to-use utilities to help you install the system using CDs of several popular network operating systems.

**Note:** Software versions, features, and functions shipped with these systems may change as new releases become available or may be discontinued at any time.


### Displayable softcopy publications

The product books are offered in displayable softcopy form. The displayable manuals are part of the basic machine-readable material. The files are shipped on CD-ROM. Terms and conditions for use of the machine-readable files are shipped with the files.
Services

Global Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an on-demand business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

http://www.ibm.com/services/

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

http://www.ibm.com/services/continuity

For details on education offerings related to specific products, visit


Select your country, and then select the product as the category.

Technical information

Specified operating environment

Physical specifications

Note: The model "x" designation is geography-dependent and is spelled out explicitly in the Product number section.

<table>
<thead>
<tr>
<th></th>
<th>791432x</th>
<th>7914M2x</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Xeon E5-2643 4C (130w)</td>
<td>Xeon E5-2690 8C (135w)</td>
</tr>
<tr>
<td>Internal speed</td>
<td>3.3 GHz</td>
<td>2.9 GHz</td>
</tr>
<tr>
<td>External speed</td>
<td>8.0 GTS</td>
<td>8.0 GTS</td>
</tr>
<tr>
<td>Number standard</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Maximum</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>L3 cache (full-speed)</td>
<td>10 MB</td>
<td>20 MB</td>
</tr>
<tr>
<td>Memory</td>
<td>4 GB ECC 1600 MHZ RDIMM</td>
<td>4 GB ECC 1600 MHZ RDIMM</td>
</tr>
<tr>
<td>RDIMMS</td>
<td>1 x 4 GB</td>
<td>1 x 4 GB</td>
</tr>
<tr>
<td>DIMM sockets</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Capacity (4)</td>
<td>768 GB</td>
<td>768 GB</td>
</tr>
<tr>
<td>Video</td>
<td>SVGA</td>
<td>SVGA</td>
</tr>
<tr>
<td>Memory</td>
<td>16 MB</td>
<td>16 MB</td>
</tr>
<tr>
<td>HDD controller</td>
<td>SAS/SATA</td>
<td>SAS/SATA</td>
</tr>
<tr>
<td>Channels</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Connector internal</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>RAID Controller</td>
<td>M5110</td>
<td>M5110</td>
</tr>
<tr>
<td>HDD (5)</td>
<td>9 (with upgrade)</td>
<td>9 (with upgrade)</td>
</tr>
<tr>
<td>5.25 slim</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.5-in tape</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hot-swap (3.5-in)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hot-swap (2.5-in)</td>
<td>8 (with upgrade)</td>
<td>8 (with upgrade)</td>
</tr>
<tr>
<td>Internal capacity</td>
<td>8 TB (with upgrade)</td>
<td>8 TB (with upgrade)</td>
</tr>
<tr>
<td>Bays available</td>
<td>5 (standard)</td>
<td>5 (standard)</td>
</tr>
<tr>
<td>5.25 slim</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.5-in tape</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
### Hot-swap (3.5-in)
- 0

### Hot-swap (2.5-in)
- 0

### Total PCI slots (6)
- 2

| PCI_E (x8) | 1 (standard) | 1 (standard) |
| PCI_E (x16) | 1 (standard) | 1 (standard) |

### System management
- Standard

### Ethernet controller
- Four 1 Gb

### Optical drive (SATA)
- Optional

### Power supply
- 750 W

### Number standard
- 1

### Maximum
- 2

### Hot-swap
- Yes

### Redundant power
- Optional

### Auto restart
- Yes

4 Maximum of 768 GB by using twenty-four 32 GB optional LRDIMMs.

5 The standard system can hold eight 2.5-inch HS HDDs. Maximum capacities are based on installation of eight 1 TB SAS HDDs with or three 3 TB 3.5-inch SATA HDDs.

6 PCIe is the standard feature for PCI or you may replace it with the PCI Riser Card PCI-X Option for PCI/PCI-X 133 MHz/100 MHz 64-bit, or 66/33 MHz/32 bit slots.

**Note:** For the latest information on supported options, refer to the Sales Manual or visit [http://www.ibm.com/servers/eserver/serverproven/compat/us/](http://www.ibm.com/servers/eserver/serverproven/compat/us/)

### Multi-Burner Plus Drive
- **Specifications**
  - DVD-ROM (6.6x-16x CAV, 4.7 GB DVD-ROM read): 9.17 - 22.16 Mbps
  - DVD-ROM (5.0x-126x CAV, 8.5 GB Dual-layer read): 6.8 - 16.62 Mbps
  - DVD-R/+R (3.3x-8X CAV, 4.7 GB DVD-R/+R read): 5.73 - 13.85 Mbps
  - DVD-R/+R (3.3x-8X CAV, 8.5 GB DVD-R/+R read): 4.58 - 11.08 Mbps
  - DVD-RW/+RW (3.3x-8X CAV, 4.7 GB DVD-RW/+RW read): 4.58 to 11.08 Mbps
  - DVD-RAM (6x-12x P Cav, 4.7 GB DVD-RAM read): 8.31 - 16.62 Mbps
  - CD-R/RW/ROM (17-40x CAV, read): 2.6 - 6.0 Mbps
  - DVD-R+R (1x -16X P Cav, 4.7 GB DVD-R/+R write): 9.9 - 22.16 Mbps
  - DVD-R/+R (2x-8X CLV, 8.5 GB DVD-R/+R Dual-layer write): 5.54 Mbps
  - DVD-RW (2x-6X CLV, 4.7 GB DVD-RW write): 8.31 Mbps
  - DVD+RW (3.3x - 8X ZCLV, 4.7 GB DVD+RW write): 4.57 - 11.08 Mbps
  - DVD-RAM (6x-16x PCav, 4.7 GB DVD-RAM write): 8.31 - 16.62 Mbps
  - CD-RW (8-32x ZCLV, write): 4.8 Mbps
- **Maximum burst data transfer rate:** Ultra DMA Mode 4: 66.6 Mbps
- **Average access times:**
  - DVD-ROM including latency and error correction: 145 ms
  - DVD-RAM including latency and error correction: 175 ms
  - CD-ROM including latency and error correction: 125 ms

### Video subsystem
- SVGA compatible video controller (Matrox G200eR2).
- Integrated on Integrated Management Module (IMM2).
- Integrated on planar and connected to the PCI bus.
- DDR3 528 or 504 MHz SDRAM video memory controller.
- Video memory is not expandable.
- One DVI (Digital Video Interface) is not used.
• Avocent Digital Video Compression (with IBM Integrated Management Module Advanced Upgrade option).

**Supported video modes**

<table>
<thead>
<tr>
<th>Width</th>
<th>Height</th>
<th>Refresh</th>
<th>Bpp</th>
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<tr>
<td>640</td>
<td>400</td>
<td>60, 72, 75, 85</td>
<td>8, 16, 32</td>
</tr>
<tr>
<td>800</td>
<td>600</td>
<td>56, 60, 72, 75, 85</td>
<td>8, 16, 32</td>
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<tr>
<td>1,024</td>
<td>768</td>
<td>60, 70, 75, 85</td>
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<tr>
<td>1,152</td>
<td>864</td>
<td>60</td>
<td>8, 16, 32</td>
</tr>
<tr>
<td>1,280</td>
<td>1,024</td>
<td>60</td>
<td>8, 16, 32</td>
</tr>
<tr>
<td>1,280</td>
<td>1,024</td>
<td>75, 85</td>
<td>8, 16</td>
</tr>
<tr>
<td>1,440</td>
<td>900</td>
<td>60</td>
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<td>60, 65, 70, 75, 85</td>
<td>8, 16</td>
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<tr>
<td>1,680</td>
<td>1,050</td>
<td>60, 75, 85</td>
<td>8, 16</td>
</tr>
</tbody>
</table>

The maximum resolution of the video controller is 1600 x 1200 at 75.

The maximum screen resolution is not supported for all Bits per Pixel (color depth) and refresh rates. The maximum Bits per Pixel (color depth) is not supported for all resolutions and refresh rates.

**Dimensions**

1U Rack Drawer

• Width: 429 mm (16.9 in.)
• Depth: 734 mm (28.9 in.)
• Height: 43 mm (1.7 in.)

Rack

• Weight (minimum configuration): 12.7 kg (28 lb)
• Weight (maximum configuration): 15.9 kg (35 lb)

**Electrical**

Models with 550 W power supplies:

• 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 6.5 A
• 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 3.3 A
• Input kilovolt-amperes (kVA) (approximately):
  – Minimum configuration: 0.14 kVA
  – Maximum configuration: 0.66 kVA

Models with 750 W power supplies:

• 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 8.9 A
• 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 4.5 A
  – Minimum configuration: 0.14 kVA
  – Maximum configuration: 0.90 kVA

Btu output:

• Minimum configuration: 460.62 Btu/hr (AC 135 watts)
• Maximum configuration: 2900.2 Btu/hr (AC 850 watts)

Noise level (horizontal position):

• Operating: 6.5 bels
• Idle: 6.3 bels

**Note:** The noise emission level stated is the declared (upper limit) sound power level, in bels, for a random sample of machines. All measurements are made in accordance with ISO 7779 and reported in conformance with ISO 9296.

System x3550 M4 servers are intended for use as rack-drawer servers and are tested and designed to operate in a horizontal position.

- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22, GOST R 51318.24, GOST R 51317.3.2, GOST R 51317.3.3
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1 /IEC60950-1,EK1-ITB2000)

**Operating environment**

**Air temperature:**

- Server on: 5°C to 40°C (41.0°F to 104°F); altitude: 0 to 915 m (3,000 ft) (60W to 95W processors models)
- Server on: 10°C to 35°C (50.0°F to 95°F); altitude: 0 to 915 m (3,000 ft) (115W to 130W processors models)
- Server on: 10°C to 27°C (50.0°F to 80.6°F); altitude: 0 to 304 m (1,000 ft) (135W processors models)
- Server off: 5°C to 45°C (41°F to 113°F)
- Shipping: -40°C to +60°C (-40°F to 140°F)

**Humidity:**

- For 115W to 130W processors and 135W processors models
  - Server on: 20% to 80%, maximum dew point 21°C, maximum rate of change 5°C/hr
  - Server off: 8% to 80%, maximum dew point 27°C
- For 60W to 95W processors models
  - Server on: 8% to 85%, maximum dew point 24°C, maximum rate of change 5°C/hr
  - Server off: 8% to 80%, maximum dew point 27°C
- Design to ASHRAE Class A3, ambient of 40°C, with relaxed support
  - Support cloud like workload with no performance degradation acceptable (Turbo-Off).
  - Under no circumstance, can any combination of worst case workload and configuration result in system shutdown or design exposure at 40°C.

**Hardware requirements**

For attended installation of an operating system, this server requires a compatible:

- Keyboard
- Mouse
- HDD
- Display

Unattended or remote installation may be performed without requiring some or all of these components. Review your unattended software installation program information for specific hardware configuration requirements.

For service, the server requires a compatible:
When having the unit serviced, plan to have these components attached to your server either directly or indirectly via a console switch.

**Software requirements**

The following software products have been tested by IBM and software publishers in the latest available versions, and where appropriate, are or will soon be certified by the publisher to be compatible with the System x3550 M4 server.

**Operating systems**

- **Microsoft**
  - Microsoft Windows Server 2008 R2
  - Microsoft Windows Server 2008, Datacenter x64 Edition
  - Microsoft Windows Server 2008, Enterprise x64 Edition
  - Microsoft Windows Server 2008, Standard x64 Edition
  - Microsoft Windows Server 2008, Web x64 Edition
  - Windows HPC Server 2008

- **Linux™**
  - SUSE Linux Enterprise Server 11 for AMD64/EM64T
  - Red Hat Enterprise Linux 5 Server x64 Edition

**Note:** For information on additional support, certification, version information, or network operating systems, visit [http://www-03.ibm.com/servers/eserver/serverproven/compat/us/](http://www-03.ibm.com/servers/eserver/serverproven/compat/us/)

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**Compatibility**

The System x3550 M4 systems contain licensed system programs that include set configuration, set features, and test programs. System UEFI is loaded from a "flash" EEPROM into system memory. This UEFI provides instructions and interfaces designed to support the standard features of the x3550 M4 and to maintain compatibility with many current software programs.

For detailed information about IBM and non-IBM devices, adapters, software, and network operating systems supported with xSeries® servers, visit [http://www-03.ibm.com/servers/eserver/serverproven/compat/us/](http://www-03.ibm.com/servers/eserver/serverproven/compat/us/)

Contact your IBM representative or IBM Business Partner, or refer to the IBM *Sales Manual* for information on the compatibility of hardware and software for System x servers. The *Sales Manual* is updated periodically as new features and options are announced that support these servers.

**Limitations**

- The System x3550 M4 server contains a single, configurable serial port. It can be configured to be operating-system-controlled, service-processor-controlled, or shared between the two. You can set the configuration by UEFI configuration. The default configuration from the factory is in the shared position. In the shared position, the service processor controls the port until the operating system is running, then the operating system takes control. The service processor
can regain control of the port for user-configured dial-out situations or if the operating system is not available, but operating system control cannot be reestablished without resetting the server.

- System x3550 M4 servers can address a maximum of 768 GB of system memory. All supported system memory is addressable through direct memory access. The System x3550 M4 server supports 2 GB, 4 GB, 8 GB, and optional 16 GB DDR-3 SDRAM Registered DIMMs or 32 GB LRDIMMs. Different types of DIMMs cannot coexist in the same system. Refer to the Planning information section for supported memory options.

- To ensure proper air flow for cooling, the System x3550 M4 server requires a rack with a perforated door, such as the NetBAY42 SR or NetBAY25 SR. An alternative is to remove the front door of rack cabinets where the door panel is of solid construction.

- Microprocessor upgrades must be of the same type and clock speed. Mixing microprocessors of different speeds or cache size is not supported.

- Solid-state memory cells have an intrinsic, finite number of write cycles that each cell can incur. As a result, each solid-state device has a maximum amount of write cycles it can be subjected to, documented as TBW (Total Bytes Written). IBM is not responsible for replacement of hardware that has reached the maximum guaranteed number of write cycles. This limit may be revealed as the device failing to respond to system generated commands or becoming incapable of being written to. Additional information is available at http://www-03.ibm.com/systems/x/options/storage/solidstate/index.html

Note: Refer to the Software requirements section for operating system limitations.

Planning information

Customer responsibilities

The System x3550 M4 server is designated as customer setup. Customer setup instructions are shipped with each system.

Configuration information

Integrated RAID-1 configuration

There are two manufacturing instructions (MI) available to allow the user to set up a RAID-1 configuration.

The two instructions are:

- Integrated Mirroring - Two HDDs required using Instruction 01R1356
- Integrated Mirroring with HotSpare - Three HDDs required using Instruction 01R1357

Cabling

Simple-swap non-RAID configuration contains cables supporting up to three 3.5-inch simple-swap non-RAID SATA drives. It does not contain any backplane.

Rack installations

System x3550 M4 server 1U rack-drawer models should be installed in a 19-inch rack cabinet designed for 28-inch deep devices, such as the NetBAY42U ER and NetBAY42U SR. Installation into some of the older Netfinity® racks (9306900, 9306910, and 9306200) requires a rack extension kit.

If a System x3550 M4 is mounted in a non-IBM rack, the rack must satisfy the following specifications:

- The rack must meet EIA-310-D standards for mounting flanges and hole locations.
• The front to rear distance of the mounting flanges must be 698.5 - 762 mm (27.5 in. - 30 in.).
• The thickness of the mounting flanges must be 1.9 - 3.3 mm.
• The mounting flanges must have either 7.1 mm (.28 in.) diameter holes or 9.6-mm (.38 in.) square holes on the standard EIA hole spacing.
• The rack must have a minimum depth of 70 mm (2.76 in.) between the front mounting flange and inside of the front door for appropriate cooling.
• The rack must have a minimum depth of 157 mm (6.2 in.) between the rear mounting flange and inside of the rear door to install the server and make space for cable management.
• The minimum side-to-side clearance in the rack between the front and rear mounting flanges must be 467 mm (18.2 in.) to accommodate the width of the server and the slide mounting brackets.
• The minimum side-to-side clearance in the rack between each door and the mounting flanges must be 484 mm (19.1 in.) to accommodate the slide mounting brackets.
• The rack must include perforated front and rear doors and must not prevent the flow of cool air into or out of the rack.
• The weight-handling capacity of the rack must be able to support the maximum rack configuration, including all servers, external cables, and PDUs.
• The rack must provide proper stabilization so that the rack does not become unstable when servers are pulled out for service.

**Supported memory options**

The following memory options are supported:

- 49Y1397 - 8GB (1x8GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM
- 49Y1399 - 8GB (1x8GB, 4Rx8, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM
- 49Y1404 - 4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP UDIMM
- 49Y1405 - 2GB (1x2GB, 1Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM
- 49Y1406 - 4GB (1x4GB, 1Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM
- 49Y1407 - 4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM
- 49Y1559 - 4GB (1x4GB, 1Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM
- 49Y1563 - 16GB (1x16GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM
- 90Y3109 - 8GB (1x8GB, 2Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM
- 90Y3105 - 32GB (1x32GB, 4Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP LRDIMM

**Power considerations**

The System x3550 M4 server includes a standard 550-watt ac or 750-watt ac hot-swap power supply.

**Note:** For information on additional support, certification, version information, compatibility, or network operating systems, visit


IBM makes no representation or warranty regarding third-party products, including those designated as ServerProven.

**Cable orders**
Four 10/100/1000 Mbps, full-duplex Ethernet PCI controllers, standard with the
System x3550 M4 server, are connected directly to an independent RJ-45 connector.
The RJ-45 connector provides a 10BASE-T, 100BASE-TX, and 1000BASE-TX interface
for connecting twisted-pair cable to the Ethernet network. Cabling is not included
with the server. To connect the Ethernet controller to a repeater or switch, use
an unshielded twisted pair (UTP) cable with RJ-45 connectors at both ends. For
100/1000 Mbps operation, Category 5 cabling must be used. For 10 Mbps operation,
Category 3, or better, cabling must be used.

There are no additional cabling requirements, other than for system power,
keyboard, mouse, and monitor connections.

Installability
The System x3550 M4 requires about 20 minutes for installation. Installation
includes unpacking, setting up, and powering on the system. Additional time is
required to install an operating system, additional adapters, or features.

Packaging

<table>
<thead>
<tr>
<th>Product</th>
<th>Package description</th>
<th>Boxes</th>
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<td>System unit carton</td>
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<td>CD - Documentation (installation</td>
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<tr>
<td></td>
<td>and User Guides)</td>
<td></td>
</tr>
</tbody>
</table>

The System x3550 M4 system is shipped as a single package. Other items are in
zipped bags or boxes.

Security, auditability, and control
Security and auditability features include:

- Power-on and privileged access password functions control access to the data
  and server setup program on the server.
- Set unattended boot mode allows the system keyboard to be locked to all entries
  except the password and at the same time allows other computers on the
  network to access the system disk drive.
- Selectable boot sequence can be used to prevent unauthorized installation of
  software or removal of data from the diskette drive.

The servers are intended to be installed in a rack and secured in a rack. It is a
customer's responsibility to ensure that the server is secure to prevent sensitive
data from being removed.

The customer is responsible for evaluation, selection, and implementation of security
features, administrative procedures, and appropriate controls in application systems
and communications facilities.

Global Technology Services
Contact your IBM representative for the list of selected services available in your
country, either as standard or customized offerings, for the efficient installation,
implementation, and/or integration of this product.
IBM Electronic Services

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

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To learn how Electronic Services can work for you, visit

http://www.ibm.com/support/electronic

Terms and conditions

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

Warranty period

- System - Three years
- Optional features - One year
- ServeRAID M5100 Battery - One year

Note: The ServeRAID M5100 Battery has a one-year warranty period effective on its "Date of Installation." All other product warranty terms for the machine remain unchanged.

An IBM part or feature installed during the initial installation of an IBM machine is subject to a full warranty effective on the date of installation of the machine. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty effective on its date of installation. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

The following have been designated as consumables, supply items, or structural parts and therefore not covered by this warranty:

- Tape filler
- EMC blank filler
• EIA sET kit
• HDD 4 slot HS kit
• 3.5-inch top cover
• 3.5-inch mechanical chassis
• Safety cover
• 2.5-inch top cover
• 16DR M4 tape bezel
• Airflow baffle
• Gen-III slide kit
• Gen-III 1U CMA kit
• 2.5-inch mechanical chassis
• DVD blank filler
• Blank fan filler
• MISC part kit
• Battery holder
• PSU filler
• CMA Assembly Kit
• CMA, 2U/4U kit
• Remote battery tray
• Gen-III 2U CMA Kit
• Slide kit
• RAID Batteries

Warranty service

If required, IBM provides repair or exchange service, depending on the type of warranty service specified below for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. Service levels are response-time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside normal IBM service area. Contact your local IBM representative or your reseller for country- and location-specific information.

The type of service is Customer Replaceable Unit (for example, keyboard, mouse, speaker, memory, or hard disk drive) Service and On-site Service.

Customer Replaceable Unit (CRU) Service

IBM provides a replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request. A CRU is designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU. Installation of Tier 1 CRUs, as specified in this announcement, is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service designated for your machine.

Based upon availability, a CRU will be shipped for next business day (NBD) delivery. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the
replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts or features have been designated as Tier 1 CRUs:

- CMOS batteries
- Hard disk drives
- Hot-swap fan
- Hot-swap AC power supply
- Memory DIMM
- Optical drive
- PCI adapter
- Power cord
- Service label
- System label
- Hypervisor USB key
- PCI riser
- RAID card without Battery
- Tape drive
- Ethernet daughter card
- Backplanes

**On-site Service**

At the discretion of IBM, you will receive CRU service or IBM or your reseller will repair the failing machine at your location and verify its operation. If required, On-site Repair is provided, nine hours per day, Monday through Friday excluding holidays, NBD response. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. On-site Service is not available in all countries, and some countries have kilometer or mileage limitations from an IBM service center. In those locations where On-site Service is not available, the normal in-country service delivery is used.

**International Warranty Service**

International Warranty Service (IWS) is available in selected countries or regions.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased.

Under IWS, warranty service will be provided with the prevailing warranty service type and service level available for the IWS-eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.

To determine the eligibility of your machine and to view a list of countries where service is available, visit


**Licensing**

Programs included with this product are licensed under the terms and conditions of the License Agreements that are shipped with the system.
Warranty service upgrades

IBM hourly service rate classification
Two

Field-installable features
Yes

Model conversions
No

Machine installation
Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

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IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM System x technical support website

http://www.ibm.com/systems/support/

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies. If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

Pricing

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**Corrections**

*(Corrected on November 27, 2012)*

The "Operating environment" section was revised.