

IBM System x3650 M2 server features new Intel Xeon 5500 Series processors with new microarchitecture design featuring Quick Path Interconnect (QPI) technology

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At a glance



Power, scalability, control, and serviceability for dynamic Web-serving and On Demand Business applications:

- Ultra-thin, high-availability, rack-optimized, 2U platform
- Powerful Intel® Xeon® 5500 series dual- or quad-core processor with new Intel Xeon 5500 series processors with new microarchitecture design featuring Quick Path Interconnect (QPI) technology
- 2, 4, or 8 GB of high-speed DDR3 SDRAM Registered DIMM memory; sixteen DIMM slots that support up to 128 GB maximum memory with 8 GB optional DIMMs
- Support for up to twelve 2.5-inch hot-swap SAS or hot-swap SATA HDDs or SSDs
- Four PCI-Express x8 Gen 2 slots
 - 2 x8 - Full length, full height.
 - 1 x8 - Half length, full height.
 - 1 x8 - Low Profile.
 - 4 x8 are convertible to 2 x16 via optional risers.
 - All 4 x8 slots are convertible to 2 x16 via optional risers.
- Optional support for PCI-X adapters with optional PCI-X 64-bit riser
- 675-watt, auto-ranging power supply
- Integrated systems management processor
- Integrated dual Gigabit Ethernet ports (standard) for high I/O capacity, plus two additional GbE ports (option) with failover capability

- One serial port (16550A-compatible), four USB ports (front and rear), and two video ports (front and rear)

Overview

New models of the System x3650 M2 feature new Intel dual-core and quad-core processors.

This 2U-high, rack-optimized server features superior power, optimized performance, and leadership virtualization and systems management for business-critical workloads built on IBM® X-architecture.

Optimized for energy efficiency and performance

Apply new, innovative energy-smart design with powerful high-performance processors, large capacity of high-performing DDR3 memory, and a no compromise feature set ideal for most general business applications:

- Dual-Core Intel Xeon Processor E5502
- Quad-Core Intel Xeon Processor E5504
- Quad-Core Intel Xeon Processor E5506
- Quad-Core Intel Xeon Processor L5506
- Quad-Core Intel Xeon Processor E5520
- Quad-Core Intel Xeon Processor L5520
- Quad-Core Intel Xeon Processor E5530
- Quad-Core Intel Xeon Processor E5540
- Quad-Core Intel Xeon Processor X5550
- Quad-Core Intel Xeon Processor X5560
- Quad-Core Intel Xeon Processor X5570
- New energy-efficient design incorporating low 675 W and very efficient power supplies, six cooling fans (three banks of counter-rotating dual fans), altimeter, and energy-efficient planar components to lower operational costs
- Highly functional chipset optimized for better application computing for general business workloads
- Sixteen DIMM slots that enable you to deploy up to 128 GB of DDR3 SDRAM Registered DIMM memory, with 2, 4 GB memory standard (model dependent) and 8 GB DIMM optional
- Standard SAS/SATA HDDs or SSDs with RAID support on hot-swap models
- Support for up to 12 hot-swap SAS/SATA HDDs or SSDs
- Integrated Dual Gigabit Ethernet ports (standard) for high I/O capacity plus, and two additional GbE ports (option) with failover capability
- Enabled for Embedded VMware ESXi 3.5 hypervisor (connector on an internal SAS riser card) activated with optional 2 GB USB key for leadership virtualization
- Four PCI-Express x8 high performance Gen 2 I/O slots to help provide greater network performance with long-term investment protection (4 PCIe x8 convertible to 2 x16 PCI-e or 4 PCI-X 64 bit slots)

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 SAS controller supporting up to twelve 2.5-inch hot-swap HDD bays (8 standard, 4-bay kit optional) with 4 RAID alternatives, helping to safeguard your data at no additional cost
- Memory mirroring, configurable using UEFI (Unified Extensible Firmware Interface) setup
- Integrated Management Module systems management processor (IMM)
- Monitoring and control of operating status and key server components
- Predictive Failure Analysis® (PFA) on selected components that warns of problems before they occur
- Fast and easy servicing: Innovative light path diagnostics, improved onboard diagnostics, and LED diagnostic panel
- Optional IBM Virtual Media Key to enable remote presence and blue-screen capture features.

Ultimate fault tolerant protection

- Hot-swap, redundant fans with calibrated vectored cooling, to keep components cool, and simplified fan replacement
- Optional hot-swap, redundant power supplies to help reduce downtime
- IBM Director and Web support
- Three-year, customer replaceable unit (CRU) and on-site labor¹, limited warranty²; optional warranty service upgrades available

¹ You may be asked certain diagnostic questions before a technician is sent.

² For information on IBM's 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

April 30, 2009

Description

System x3650 M2 server

The System x3650 M2 server features an Intel Xeon dual- or quad-core processor that supports internal processing speeds of up to 2.93 GHz, and processing operations to memory and the PCI bus at 133 MHz. They contain integrated, full-speed 4 MB or 8 MB ECC L2 cache.

High-performance server subsystems

These servers are high-throughput, network servers with excellent scalability when you add memory and a second processor. Data transfer across the system bus is at a 4X rate (four data transfers per clock) for an effective data transfer rate of up to 1333 MHz.

Two Intel Xeon connectors are standard on the system board to support installation of a second processor. High-speed DDR3 SDRAM Registered DIMM memory is

optimized for 800 MHz, 1066 MHz, or 1333 MHz processor-to-memory subsystem performance.

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

Model	Processor	Memory	HDD		HDD	Other
			GT/s	Interface		
7947-12x	1.86 GHz	2 GB	4.80	SAS/SATA	2.5-in	Open bay
	L2 Cache:	4 MB				hot-swap
7947-22x	2.00 GHz	2 GB	4.80	SAS/SATA	2.5-in	Open bay
	L2 Cache:	4 MB				hot-swap
7947-3Ax	2.13 GHz	2 GB	4.80	SAS/SATA	2.5-in	Open bay
	L2 Cache:	4 MB				hot-swap
7947-32x	2.26 GHz	2 GB	5.86	SAS/SATA	2.5-in	Open bay
	L2 Cache:	8 MB				hot-swap
7947-42x	2.26 GHz	2 GB	5.86	SAS/SATA	2.5-in	Open bay
	L2 Cache:	8 MB				hot-swap
7947-52x	2.40 GHz	2 GB	5.86	SAS/SATA	2.5-in	Open bay
	L2 Cache:	8 MB				hot-swap
7947-58x	2.40 GHz	8 GB	5.86	5 x 146GB HS SAS, 1 x 73GB 10K HS SAS SFF HDD, SAP Discovey		
	L2 Cache:	8 MB				
7947-62x	2.53 GHz	2 GB	5.86	SAS/SATA	2.5-in	Open bay
	L2 Cache:	8 MB				hot-swap
7947-72x	2.66 GHz	4 GB	6.40	SAS/SATA	2.5-in	Open bay
	L2 Cache:	8 MB				hot-swap
7947-92x	2.93 GHz	4 GB	6.40	SAS/SATA	2.5-in	Open bay
	L2 Cache:	8 MB				hot-swap

Note: All models contain a SATA Combo optical drive.

Additional features

- System board contains sixteen DIMM connectors, supporting 1 GB, 2 GB, or 4 GB DDR3 SDRAM Registered DIMM memory, with:
 - Support for up to 128 GB of system memory using optional 8 GB DIMM memory
 - Support for Chipkill™ memory
- SATA controller supporting one 12.7-mm (0.5-inch) CD-RW/DVD Combo drive
- Simple swap SATA drive support that employs high-speed (up to 1.5 Gbps) dual differential pairs to communicate with simple-swap SATA HDDs
- One full-duplex Broadcom 5709 Dual Gigabit Ethernet PCI controller speeding network communications to LAN clients

The System x3650 M2 subsystems are tuned to provide solid system throughput from processor, to memory, to bus, to disk-intensive I/O. These features combined with multicore capability make this server an excellent choice for:

- Database
- E-mail collaboration
- Linux® clusters
- File/print
- Virtualization

High-availability and serviceability features

The System x3650 M2 server subsystem delivers excellent reliability and serviceability features:

- Twelve 2.5-inch hot-swap SAS/SATA HDD or SSD bays capable
- Hot-swap, redundant cooling fans
- Optional hot-swap, 675 W redundant power supply
- ECC DIMMs combined with an integrated ECC memory controller correcting many soft and hard single-bit memory errors, while minimizing disruption of service to LAN clients

- Chipkill memory to detect and correct many multibit memory errors, helping keep the server up and running, while taking the inoperative memory offline
- ECC L2 cache processors to improve data integrity and help reduce downtime
- PFA on HDD options, memory, power supply, and fans, to alert the system administrator of an imminent component failure
- Dual Broadcom 5709 Gigabit Ethernet ports that support:
 - Failover, Adapter Fault Tolerance (AFT)
 - PXE 2.0 Boot Agent
 - IPMI 2.0 (Microsoft® Windows® only)
 - Wake on LAN®
 - Load balancing or teaming
 - TOE
- Worldwide, voltage-sensing 675-watt power supply with auto restart
- Up to three sets (two fans per set) of counter-rotating fans that provide excellent cooling for added reliability:
 - Each power supply comes with its own internal cooling fans.
 - Three fan sets cool processors, memory, and HDD bays.
 - Fan speed controls are incorporated to reduce noise, while reducing system temperatures.
- Integrated systems management processor for diagnostic, reset, POST, and auto recovery functions; monitoring temperature, voltage, and fan speed; alerts generated when thresholds are exceeded (refer to the [Limitations](#) section for restrictions)
- Information LED panel giving visual indications of system well-being
- Light path diagnostics and on-board diagnostics providing an error log that can help find a failing component, helping reduce downtime and service costs
- Easy access to system board, adapter cards, processor, and memory
- CPU failure recovery in dual-socket configurations:
 - Forces failed processor offline
 - Server reboot capability
 - Generates alerts
 - Continues operations with the working processor

Expandability and growth

The System x3650 M2 server contains high levels of function and storage capacity for a 2U, 19-inch rack-drawer package. It supports customer installation of adapters, processors, memory, and HDD options. Functions such as SVGA video, SATA, 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
- Sixteen DIMM connectors capable of support for up to 128 GB of system memory
- Twelve 2.5-inch slim-high, hot-swap SAS/SATA HDD or SSD bays
- Internal data storage up to 3600 GB (using twelve 300 GB SATA/SAS 2.5-inch HDDs)
- 12.7-mm (0.5-inch) CD-RW/DVD Combo drive

Systems management

Integrated Management Module (IMM)

The System x3650 M2 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 two onboard

Ethernet ports for access. The IMM can be accessed via software that is compatible with IPMI 2.0 (xCAT, for example). 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)
- The embedded Web server 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 administrator can also use the CLI from a Telnet session to perform some of the functions that can be performed from the Web server.
- Secure Socket Layer (SSL) and Lightweight Directory Access Protocol (LDAP).
- Built-in LAN and serial connectivity supports virtually any network infrastructure.
- Multiple alerting functions warn systems administrators of potential problems through e-mail, IPMI PETS, and SNMP.

This key enables easy console redirection with text and graphics, keyboard, and mouse support (operating system must support USB) over the system management LAN connections.

With video compression now built into the adapter hardware, the adapter allows the greater screen sizes and refresh rates that are usually 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 Director

The System x3650 M2 server also features 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 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.

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
 - Fans
 - Power supplies
 - HDDs
- Define automated actions, such as:
 - Send e-mail or page to an administrator
 - Execute a command or program
 - Pop up 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 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®
- Computer Associates Unicenter TNG
- HP OpenView
- Microsoft SMS
- BMC Patrol
- NetIQ

Intel Xeon processor option

These processors are ideal for data-intensive applications that range from data mining to evolving Web services. Innovative technologies deliver a processing speed of up to 2.93 GHz with a 1333 MHz FSB and up to 8 MB L2 cache for unpredictable server workloads and escalating computing needs.

These Intel Xeon processors with up to 8 MB L2 cache feature Intel Core microarchitecture with increased overall performance, greater energy efficiency, and more responsive multitasking. They help reduce thermal burdens in server datacenters.

ServeRAID-MR10is VAULT - 44E8695

ServeRAID-MR10is VAULT is a RAID controller with built-in crypto engine to encrypt data written to the hard drives. With an easy-to-use GUI it simplifies the complexity of key management, setup, and configuration.

This leading-edge implementation enables lower cost for securing stored data. This controller is applicable for the following usage scenarios:

- Helps protect sensitive data against theft
 - In an unsecure physical environment
 - From insiders in a secure location
- Helps during drive disposal or redeployment, helping protect against unauthorized access
- Enhanced encryption security and performance over software encryption solutions

Sensitive data includes patient records in doctor's offices, hospitals, and insurance companies, credit card or transaction data at retail stores and restaurants, bank records, personnel records, intellectual property, financial records, and others.

ServeRAID-MR10is VAULT SAS/SATA Controller is a PCIe RAID controller with stored data encryption for Internal System RAID 0, 1, 10, 5, 50, 6, and 60. This full-height, half-length adapter utilizes an LSI 1078DE controller with an x8 PCI Express host interface, eight internal SAS/SATA II 3 Gb/s ports, and battery-backed 256 MB 72-bit ECC DDR2 cache. MegaRAID Storage Manager (MSM), included with ServeRAID-MR10is, is a robust RAID and encryption management, configuration, and reporting application. The included battery enhances the ServeRAID-10is controller's performance by allowing data written to disk to be cached in battery-backed high-speed memory. The battery provides protection of cached data during an unexpected power outage.

The ServeRAID-MR10M SAS/SATA PCIe Controllers (44E8825) are covered by a one-year, Customer Replaceable Unit (CRU), limited warranty. Batteries are consumables; therefore, not covered under this warranty.

Note: Hot-swap models have either a BR10i or MR10i and both contain two ServeRAID™ connectors. Simple-swap models don't contain any ServeRAID connectors.

Features, functions, and benefits include:

- SAS/SATA II
- PCIe x8 bus
- RAID 0, 1, 10, 5, 50, 6, 60
- Stored data encryption
- Fixed 256 MB 72-bit BBU DDR2 cache memory
- Up to 72 hours cache backup with optional battery
- 2 x4 internal mini-SAS SFF-8087 connectors
- Up to 3 Gb/second of performance throughput for each port
- LSI 1078DE controller
- Global hot spare and rebuild

- Supported utilities: MegaRAID Storage Manager (MSM), IBM Director, Dynamic Systems Analysis (DSA), Command Line Interface (CLI), and flash drive

ServeRAID-MR10i SAS/SATA Controller (43W4296)

ServeRAID-MR10i provides full-function RAID and is installed in a dedicated PCIe slot. Battery backup of its 256 MB cache is enabled with the addition of ServeRAID-MR10i Li-Ion Battery (44E8826).

Features

- 256 MB DDR2 533 MHz cache
- Up to 72 hours of cache backup with optional battery
- RAID 0, 1, 10, 5, 0, 6, and 60
- Copyback
- One year, CRU, limited warranty

IBM System x Hot-Swap Power Supply options

- IBM System x 3650 675W Hot-Swap Power Supply (US) - 46M1075

High-performance server subsystems

The System x3650 M2 server expands the new server line by adding a higher level of processor power. This high-throughput, four-way multi-core network server offers excellent performance and scalability when you add memory and a second processor. It incorporates powerful Xeon processors with up to 8 MB L2 cache. The advanced transfer L2 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. High-speed PC3-10600 DDR3 Advanced Memory Feature DIMMs run at 667 MHz DRAM clock speed and offer maximum 10600 MB/s bandwidth, processor-to-memory subsystem performance. The x3650 M2 server uses the Intel 5500 chipset with Chipkill technology to maximize throughput from processors, to memory, to the 32-bit and 64-bit PCI buses.

Note: The System x3650 M2 server models use a Serial Attachment SCSI (SAS) controller for HDDs.

Additional features

- Eight-core processing achieved with a second processor of equal speed and processor type
- System board containing 16 DIMM connectors supporting 1 GB, 2 GB, 4 GB, and 8 GB DDR3 PC3-10600 SDRAM ECC DIMMs with:
 - DDR3 memory for improved performance
 - Up to 128 GB of system memory using 8 GB optional DIMMs
- High-speed, wide-bandwidth PCI-Express or PCI/PCI-X bus slots:
- Nine bays standard to support eight 2.5-inch standard SAS HDDs and a CD-R/CD-RW/DVD drive
- Dual Broadcom 5709 chip that supports dual Gigabit (10/100/1000) Ethernet ports, which speed network communications to LAN clients

The System x3650 M2 server offer solid system throughput from processor, to memory, to bus, to disk-intensive I/O. These features, combined with multi-core capability, make the x3650 M2 server an excellent choice for a stand-alone or clustered general-business application, file, and print server.

High-availability and serviceability features

- Support for light path diagnostics with viewable drop-down panel, Wake on LAN, and PXE
- Up to six hot-swap fans (three pairs)
- Up to twelve 2.5-inch HS HDDs with optional upgrade kit
- ServeRAID-BR10i SAS/SATA controller on most models that supports 0, 1, and 1E as standard
- 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 L2 cache processors to help improve data integrity and help reduce downtime
- Predictive Failure Analysis (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, 675-watt, hot-plug power supply featuring auto restart
- Optional 675-watt, hot-swap power supply upgrade for high-availability requirements
- Optional Virtual Media Key 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 Virtual Media Key), 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 configurations, which:
 - Forces the failed processor offline
 - Reboots the server automatically
 - Generates alerts
 - Continues operations with the working processor

Expandability and growth

The System x3650 M2 server packs a lot of function and storage capacity into a 2U 19-inch rack-drawer package, yet it is amazingly easy to upgrade and service. Functions such as SVGA video, SAS, and full-duplex 10/100/1000 Mbps 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

- Four PCI/PCI-Express adapter card slots available (2 x PCI-Express slots may be replaced by a riser card option to get two PCI-X slots)
- System board optional upgrades (PCI slot not required)
 - IBM Virtual Media Key
- One ServeRAID connector
- Support for up to 3600 GB of internal data storage, using twelve 300 GB SAS/SATA HDDs
- 8x-24x CD-R/CD-RW DVD Combo drive

Systems management

Integrated Management Module

The System x3650 M2 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 two onboard Ethernet ports for access. The IMM can be accessed via software that is compatible with IPMI 2.0 (xCAT, and more). The IMM is implemented using industry-leading OSA firmware and applications in conjunction with the Integrated Management Module (IMM).

- Features and benefits:
 - Monitoring of system voltages
 - Monitoring of battery voltage
 - Monitoring of system temperatures
 - Fan speed control
 - Fan tachometer monitor
 - Good Power signal monitor
 - System ID and planar version detection
 - System power control
 - System reset control
 - NMI detection (system interrupts)
 - SMI detection and generation (system interrupts)
 - Serial port text console redirection
 - System LED control (power, HDD, activity, alerts, heartbeat)
 - Support for IPMI V2.0-compliant management software (for example, xCAT)
 - The embedded Web server 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 administrator can also use the CLI from a Telnet session to perform some of the functions that can be performed from the Web server.
 - Secure Socket Layer (SSL) and Lightweight Directory Access Protocol (LDAP).
 - Built-in LAN and serial connectivity supports virtually any network infrastructure.
 - Multiple alerting functions warn systems administrators of potential problems through e-mail, IPMI PETS, and SNMP.

In addition, you can purchase an optional IBM Virtual Media Key to enable the remote presence and blue-screen capture features.

IBM Virtual Media Key to enable the remote presence and blue-screen capture features. You can add this key to the server through a connector on the planar.

IBM Virtual Media Key

The optional Virtual Media Key delivers advanced control and monitoring features to manage your IBM System x3650 M2 server at virtually any time, from virtually

any place. The key can be added to the server through a connector on the planar. 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.

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

IBM Director

The System x3650 M2 server features IBM Director, a powerful, highly integrated systems management software solution built on industry standards, and designed for ease of use.

You can exploit your existing enterprise or workgroup management environments and use rich security features that access and manage physically dispersed IT assets 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

IBM Director integrates leading workgroup and enterprise systems management environments via upward integration modules. This integration enables the advanced management capabilities built into the System x3650 M2 server to be accessed from:

- Tivoli Enterprise and Tivoli NetView
- Computer Associates Unicenter TNG Framework
- NetIQ -- BMC Patrol
- Microsoft SMS
- Intel LANDesk Management Suite

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 self-management features and a portfolio of proactive predictive tools that enable advanced xSeries® server management, resulting in higher server availability and reliability.

Its industry-standard foundation enables heterogeneous hardware support. It works with the integrated systems-management processor to access environmental system information.

The integrated systems management processor monitors and controls operating status for critical errors.

- Automatic server restart (ASR) monitors the operating system status and automatically restarts the server if the operating system fails to respond. An alert is then generated if the system has been restarted through ASR.
- Fan monitoring and control manages fan speed and automatically increases it to maintain system cooling if temperature thresholds are exceeded. An alert is generated if a fan:
 - Fails, or failure is predicted
 - Is installed or removed
- Power supply monitoring monitors for voltage ranges of supply.

- Temperature monitoring provides CPU and HDD backplane temperature information. An alert is generated if (preset) temperature warning thresholds are exceeded or restored, and if critical temperature thresholds are exceeded. Soft and hard system shutdowns are automatically initiated if critical temperature thresholds are exceeded.
- Voltage monitoring provides CPU and power subsystem voltage thresholds. An alert is generated if abnormal voltages are detected.
- Power on/off and reset sequencing are supported through system monitoring.
- Text console redirect features keyboard and mouse control.
- LED controls (light path support) provide onboard diagnostics with an LED map, which is illuminated in case of key component errors or failures to enable quick local diagnostics and servicing.
- Flash update enables updates to the Integrated Management Module (IMM) firmware.

The Integrated Management Module supports upgrading with the IBM Virtual Media Key to enable the remote presence and blue-screen capture features.

IBM Active Energy Manager

IBM Active Energy Manager 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 IBM's new System x servers, as well as its BladeCenter® line of systems. With Active Energy Manager, the user is able to understand the actual power draw.

With the addition of the optional IBM Virtual Media Key, 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
 - Power supplies
 - HDDs
- Define automated actions, such as:
 - Send an e-mail or a page to an administrator
 - Execute a command or program

- Pop-up 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 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 x3650 M2 server 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.

- Three years, CRU and On-site Service, limited warranty; optional warranty service upgrades 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 x3650 server with various adapters and devices.
- Electronic support on the Web offers additional support in an easy-to-use format.

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

Product positioning

The new System x3650 M2 server is a part of the System x rack-optimized server line. These two-socket servers deliver Intel Xeon dual- and quad-core power and excellent server function in an ultra-thin, rack-optimized, 2U footprint.

Optimized for speed

The new System x3650 M2 server offers new levels of fast Intel Xeon dual- and quad-core processors with up to 6.4 GT/s and lower power for datacenter environments and collaboration applications. This server is uniquely optimized for better application computing with a highly functional chipset and sixteen DIMM slots for a maximum of 128 GB of fully buffered DDR3 SDRAM Registered DIMM memory.

Innovation comes standard

- Boost application efficiency 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

- Memory mirroring feature enable you to increase memory reliability.
- SAS controller with RAID 0, 1, and 1E on hot-swap SAS models helps safeguard your data at no additional cost.

Target applications

- Database
- E-mail collaboration
- File/print
- Virtualization
- Linux clustering
- Scientific and technical computing

These powerful servers also meet traditional enterprise network server requirements, but with an added benefit of requiring less space.

Product number

Note: Australia, New Zealand are GAV (x = M).

Description	GAV number
IBM System x3650 M2	794712M
	79473AM
	794732M
	794742M
	794752M
	794762M
	794792M
	794722M
	794772M
794758M	

Note: Hong Kong (x = A & B) GAV models.

Description	GAV number
IBM System x3650 M2	794712A
	79473AA
	794732A
	794742A
	794752A
	794762A
	794792A
	794722A
	794772A
794758A	

IBM System x3650 M2	794712B
	79473AB
	794732B
	794742B
	794752B
	794762B
	794792B
	794722B
	794772B
794758B	

Note: Singapore, Thailand, Phillipines, Brunei, Malaysia, Myanmar, Vietnam, Indonesia, Laos, Cambodia and Taiwan (x = A) are GAV models.

Description	GAV number
IBM System x3650 M2	794712A

79473AA
 794732A
 794742A
 794752A
 794762A
 794792A
 794722A
 794772A
 794758A

Note: Taiwan (x = V) are GAV models.

Description	GAV number
IBM System x3650 M2	794712V
	79473AV
	794732V
	794742V
	794752V
	794762V
	794792V
	794722V
	794772V
	794758V

Note: Korea (x = K & R) GAV models.

Description	GAV number
IBM System x3650 M2	794712K
	79473AK
	794732K
	794742K
	794752K
	794762K
	794792K
	794722K
	794772K
	794758K
IBM System x3650 M2	794712R
	79473AR
	794732R
	794742R
	794752R
	794762R
	794792R
	794722R
	794772R
	794758R

Note: India, Nepal, Sri Lanka (x = Q) are GAV models.

Description	GAV number
IBM System x3650 M2	794712Q
	79473AQ
	794732Q
	794742Q
	794752Q
	794762Q
	794792Q
	794722Q
	794772Q
	794758Q

Note: PRC (x = C & N) machine type models.

Description	Machine type	Model	MTM number
IBM System x3650 M2	7947	12C	794712C

7947	32C	794732C
7947	32C	794732C
7947	42C	794742C
7947	52C	794752C
7947	62C	794762C
7947	92C	794792C
7947	22C	794722C
7947	72C	794772C
7947	58C	794758C

IBM System x3650 M2	7947	12N	794712N
	7947	3AN	79473AN
	7947	32N	794732N
	7947	42N	794742N
	7947	52N	794752N
	7947	62N	794762N
	7947	92N	794792N
	7947	22N	794722N
	7947	72N	794772N
	7947	58N	794758N

Note: Japan (x = J & E) GAV models.

Description	GAV number
IBM System x3650 M2	794712J
	794732J
	794732J
	794742J
	794752J
	794762J
	794792J
	794722J
	794772J

IBM System x3650 M2	794712E
	79473AE
	794732E
	794742E
	794752E
	794762E
	794792E
	794722E
	794772E
	794758E

The following are new unique option part numbers for System x3650 M2 server.

Description	Part
PCI-Express (2x8) Riser Card	46M1072
PCI-Exp (1x16) Riser Card (CTO)	46M1073
PCI-X Riser Card (CTO)	46M1074
+4 HDD Drive Enablement kit	46D2516
675w redundant power supply	46M1075
Dual-port 1 GB Ethernet Daughter Card	46M1076

Publications

The following publications and CD-ROMs are shipped with the x3650 M2 server:

- The x3650 M2 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 pictorials to enable you to quickly set up the System x3650 M2 server servers.
- IBM Director systems management software is included.

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

The *System x3650 M2 server Installation Guide* and *Problem Determination and Service Guide*, in U.S. English versions, are available from

<http://www-304.ibm.com/jct01004c/systems/support/>

Select "Product Support," "System x," then "Product family," and then click "Publications lookup."

The IBM Publications Center Portal

<http://www.ibm.com/shop/publications/order>

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

Displayable softcopy publications

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

Source file publications

The product books are offered in source file form.

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

<http://www.ibm.com/services/learning/index.html>

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

Technical information

Specified operating environment

Physical specifications

System x3650 M2 models - Standard model-dependent features

Note: All specifications below apply to all MTM in all geographies unless otherwise noted. See the Product number section for geography/country variations. Some models may not be available in some geographies.

	7947-12x	7947-22x	7947-3Ax
Processor	Xeon DC E5502	Xeon QC E5504	Xeon QC E5506
Internal speed	1.86 GHz	2.00 GHz	2.13 GHz
External speed	4.8 GTS	4.8 GTS	4.8 GTS
Number standard	1	1	1
Maximum	2	2	2
L2 cache (full-speed)	4 MB	4 MB	4 MB
Memory	2 GB ECC	2 GB ECC	2 GB ECC
RDIMMs	2 x 1 GB	2 x 1 GB	2 x 1 GB
DIMM sockets	16	16	16
Capacity (13)	128 GB	128 GB	128 GB

	7947-32x	7947-42x	7947-52x
Processor	Xeon QC E5520	Xeon QC L5520	Xeon QC E5530
Internal speed	2.26 GHz	2.26 GHz	2.40 GHz
External speed	5.86 GTS	5.86 GTS	5.86 GTS
Number standard	1	1	1
Maximum	2	2	2
L2 cache (full-speed)	8 MB	8 MB	8 MB
Memory	2 GB ECC	2 GB ECC	2 GB ECC
RDIMMs	2 x 1 GB	2 x 1 GB	2 x 1 GB
DIMM sockets	16	16	16
Capacity (13)	128 GB	128 GB	128 GB

	7947-62x	7947-72x
Processor	Xeon QC E5540	Xeon QC X5550
Internal speed	2.53 GHz	2.66 GHz
External speed	5.86 GTS	6.4 GTS
Number standard	1	1
Maximum	2	2
L2 cache (full-speed)	8 MB	8 MB
Memory	2 GB ECC	4 GB ECC
RDIMMs	2 x 1 GB	2 x 2 GB
DIMM sockets	16	16
Capacity (13)	128 GB	128 GB

	7947-92x
Processor	Xeon QC X5570
Internal speed	2.93 GHz
External speed	6.4 GTS
Number standard	1
Maximum	2
L2 cache (full-speed)	8 MB
Memory	4 GB ECC
RDIMMs	2 x 2 GB
DIMM sockets	16
Capacity (13)	128 GB

Common physical specs for standard models

Note: All specifications below apply to all MTM in all geographies unless otherwise noted. See the Product number section for geography/country variations.

Video	SVGA
SATA controller	SATA
Channels	4
Connector internal	4
HDD (10)	
Total bays	9 (standard)
5.25 slim	1
3.5-in tape	0
Hot-swap (3.5-in)	0

Hot-swap (2.5-in)	8 standard (12 max with upgrade kit)
Internal capacity	3600 GB (with upgrade kit)
Bays available	8
5.25 slim	0
3.5-in tape	0
Hot-swap (3.5-in)	0
Hot-swap (2.5-in)	8
Total PCI slots	4
PCI_E (x8)	4
System management	Standard
Ethernet controller	Two 1Gb
Optical drive (SATA)	Combination
Power supply	675 W (12)
Number standard	1
Maximum	2
Hot-swap	Yes
Redundant power	Optional
Auto restart	Yes

¹⁰ The standard system can hold eight 2.5-inch HS HDDs. Maximum capacities are based on installation of twelve 300 GB slim-high, SAS/SATA HDDs with the optional 4-Bay HDD expansion option.

¹¹ PCI_E 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.

¹² Models 58x, E2x, and E3x have two power supplies. **Note:** For the latest information on supported HDD options, refer to the Sales Manual or visit

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

¹³ Maximum of 128 GB by using 16 x 8 GB optional DIMMs.

8x-24x(15) CD-RW/DVD-ROM drive characteristics

- Formatted capacity: 650 MB
- Average access time: 120 ms
- Burst data transfer rate: 16.6 MB/s (ATA PIO Mode 4)
- Technology: Full constant angular velocity (CAV)
- Buffer size: 2 MB

¹⁵ 8x-24x CD-ROM variable read rate. Actual playback speed will vary and is often less than the maximum possible.

Video subsystem

- SVGA compatible video controller (Matrox G200)
- Integrated on Integrated Management Module (IMM)
- Integrated on planar and connected to the PCI bus
- DDR2-250MHz SDRAM video memory controller
- Video memory is not expandable
- One DVI (Digital Video Interface) is not used
- Avocent Digital Video Compression (with Virtual Media Key option)

Supported video mode capabilities for the SVGA PCI controller with a 200 MHz memory clock:

Microsoft Windows 2000 or Windows 2003 (32- and 64-bit) and
Linux (all distributions)

Resolution	Colors	Refresh rate (Hz)
------------	--------	-------------------

640 x 480 x 8	256	60, 72, 75, 85, 90, 100, 120, 160, 200
640 x 480 x 16	64K	60, 72, 75, 85, 90, 100, 120, 160, 200
640 x 480 x 32	16M	60, 72, 75, 85, 90, 100, 120, 160, 200
800 x 600 x 8	256	60, 70, 72, 75, 85, 90, 100, 120, 160, 200
800 x 600 x 16	64K	60, 70, 72, 75, 85, 90, 100, 120, 160, 200
800 x 600 x 32	16M	60, 70, 72, 75, 85, 90, 100, 120, 160
1024 x 768 x 8	256	60, 70, 72, 75, 85, 90, 100, 120, 140, 150, 160, 200
1024 x 768 x 16	64K	60, 70, 72, 75, 85, 90, 100, 120, 140, 150, 160, 200
1024 x 768 x 32	16M	60, 70, 72, 75, 85, 90, 100
1280 x 1024 x 8	256	60, 72, 75
1280 x 1024 x 16	64K	60, 72, 75
1280 x 1024 x 32	16M	60, 72, 75

Note: Some modes are not supported by all monitors.

Dimensions

2U Rack Drawer

- Width: 443.6 mm (17.5 in)
- Depth: 698.0 mm (27.5 in)
- Height: 85.4 mm (3.36 in)

Rack:

- Weight: (minimum configuration) 21.1 kg (46.5 lb)
- Weight: (maximum configuration) 29.6 kg (65 lb)

Electrical

- 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 7.8 A
- 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 3.8 A
- Input kilovolt-amperes (kVA) (approximately):
 - Minimum configuration: 0.12 kVA
 - Maximum configuration: 0.78 kVA
- Btu output:
 - Minimum configuration: 307 Btu/hr (90 watts)
 - Maximum configuration: 2262 Btu/hr (780 watts)
- Noise level (horizontal position): 6.5 bels (operating)
- Noise level (horizontal position): 6.3 bels (idle)

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

Power consumption

Note: All specifications below apply to all MTM in all geographies unless otherwise noted. See the Product number section for geography/country variations.

Machine type/Mod	Category	Power consumption(w)	CTP(MTOPS)	Energy consumption efficiency	Freq
7947-xxx	B(2005)C(2007)	101	29140	0.00347	60
All other MTMS	Exempt	Exempt	Exempt	Exempt	Exempt

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 x3650 M2 server are intended for use as rack-drawer servers and are tested and designed to operate in a horizontal position.

- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- IEC 60950-1:2001 (CB Certificate and CB Test Report)
- China CCC (GB4943-2001), GB9254-1998 Class A, GB17625.1-2003
- Taiwan BSMI CNS13438, Class A; CNS14336
- Korea KN22, Class A; KN24

Operating environment

- Temperature, server on:
 - 10.0 to 35.0 degrees C (50 to 95 degrees F) at 0 to 914.4 m (0 to 3,000 ft)
 - Decrease system temperature by 0.75 deg C for every 1000 feet increase in altitude
- Temperature, server off: 0 to 60 deg C (32.0 to 140.0 deg F)
- Temperature, shipment: -40 to 60 deg C (-40 to 140 deg F)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,133 m (7,000 ft)

Hardware requirements

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

- Keyboard
- Mouse
- HDD
- Display (E51, E54, P76, G78, LCD, or equivalent)

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:

- Keyboard
- Mouse
- HDD
- Display (E51, E54, P76, G78, LCD, or equivalent)

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 network operating systems are supported on the x3650 server:

- | | |
|-----------|---|
| Microsoft | <ul style="list-style-type: none"> - windows Server 2003, Web Edition - windows Server 2003, R2 Standard Edition - windows Server 2003, R2 Enterprise Edition - Windows Small Business Server R2 Standard Edition - Windows Small Business Server R2 Premium Edition |
| Linux | <ul style="list-style-type: none"> - Server 2003 R2 Standard Edition - Red Hat Enterprise Linux 4 AS for x86 - Red Hat Enterprise Linux 4 ES for x86 - Red Hat Enterprise Linux 4 for AMD64 and Intel EM64T |
| Novell | <ul style="list-style-type: none"> - SUSE Linux Enterprise Server 10 for x86 - SUSE Linux Enterprise Server 10 for AMD64 and EM64T |

Note: Certification is planned for all supported operating systems. For information on additional support, certification, and versions, visit

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

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

The following network operating systems are supported as preloads in the System x3650 M2 server:

- Windows Server 2003 R2 Standard Edition
- Windows Server 2003 R2 Enterprise Edition
- Windows Server 2003 R2 Standard x64 Edition
- Windows Server 2003 R2 Enterprise x64 Edition
- Red Hat Enterprise Linux AS 4 Standard**
- Red Hat Enterprise Linux ES 4 Standard**
- Red Hat Enterprise Linux WS 4 Standard**
- SUSE Linux Enterprise Server 9**

(**) Drop in box

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

<http://www-03.ibm.com/servers/eserver/serverproven/compat/us/>

Compatibility

The System x3650 M2 server 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 x3650 M2 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/>

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 servers. The Sales Manual is updated periodically as new features and options are announced that support these servers.

Limitations

- The System x3650 M2 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 x3650 M2 servers can address a maximum of 128 GB of system memory. All supported system memory is addressable through direct memory access. The System x3650 M2 server supports 1 GB, 2 GB, 4 GB, and optional 8 GB DDR3 SDRAM Registered DIMMs. All supported DIMMs can coexist in the same system. Refer to the [Planning information](#) section for supported memory options.
- To ensure proper air flow for cooling, the System x3650 M2 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.

Note: Refer to the [Software requirements](#) section for operating system limitations.

Planning information

Customer responsibilities

The System x3650 M2 server is designated as customer setup. Customer setup instructions are shipped with each system.

Configuration information

Bay configuration

The x3650 M2 Express Model contains 8 bays for 2.5-inch HDDs. The lower right bay on the system contains the slim-high CD-RW/DVD-ROM drive. Eight hot-swap bays on the server are ready for various supported hot-swap HDD or SSD drive options installation.

The 8x-24x CD-R/CD-RW DVD drive is connected to the planar through a combined power and signal cable.

Cabling - Standard non-RAID configurations

The System x3650 M2 server hot-swap model contains two DASD backplanes supporting up to 8 hot-swap, SAS-compliant drive bays. Two backplanes are connected to an SAS RAID controller through two cables.

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

Rack installations

System x3650 M2 server 2U rack-drawer models are designed to 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, 9306200) requires a rack extension kit.

If a System x3650 M2 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 between 698.5 mm and 762 mm (27.5 in and 30 in).
- The thickness of the mounting flanges must be between 1.9 mm and 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.

Processor upgrade options

- Dual-Core Intel Xeon Processor E5502 1.86GHz/4MB DDR3 800MHz/4.8GT/S 80W No Turbo - 46M1077
- Quad-Core Intel Xeon Processor E5504 2.00GHz/4MB DDR3 800MHz/4.8GT/S 80W No Turbo - 46M1078
- Quad-Core Intel Xeon Processor E5506 2.13GHz/4MB DDR3 800MHz/4.8GT/S 80W No Turbo - 46M1079
- Quad-Core Intel Xeon Processor L5520 2.26GHz/8MB DDR3 1066MHz/5.8GT/S 80W No Turbo - 46M1080
- Quad-Core Intel Xeon Processor E5520 2.26GHz/8MB DDR3 1066MHz/5.8GT/S 80W Turbo - 46M1081
- Quad-Core Intel Xeon Processor L5506 2.13GHz/4MB DDR3 800MHz/4.8GT/S 80W Turbo - 46M1082
- Quad-Core Intel Xeon Processor E5530 2.40GHz/8MB DDR3 1066MHz/5.8GT/S 80W Turbo - 46M1083
- Quad-Core Intel Xeon Processor E5540 2.53GHz/8MB DDR3 1066MHz/5.8GT/S 80W Turbo - 46M1084
- Quad-Core Intel Xeon Processor X5550 2.66GHz/8MB DDR3 1333MHz/6.4GT/S 95W Turbo - 46M1085
- Quad-Core Intel Xeon Processor X5560 2.80GHz/8MB DDR3 1333MHz/6.4GT/S 95W Turbo - 46M1086
- Quad-Core Intel Xeon Processor X5570 2.93GHz/8MB DDR3 1333MHz/6.4GT/S 95W Turbo - 46M1087

Supported memory options

The following memory options are supported:

- 44T1480 - 1GB (1x1GB) Single Rank
- 44T1481 - 2GB (1x2GB) Dual Rank
- 44T1482 - 2GB (1x2GB) Single Rank
- 44T1483 - 4GB (1x4GB) Dual Rank

Power considerations

The System x3650 M2 server includes a standard 675-watt hot-swap power supply. This power supply supplies sufficient power to run the server. A System x3650 M2 675-watt hot-swap power supply upgrade is optionally available to support redundancy.

Cable orders

Two 10/100/1000 Mbps, full-duplex Ethernet PCI controllers, standard with the System x3650 M2 server, are connected directly to an independent RJ-45 connector. The RJ-45 connector provides a 10BaseT, 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 x3650 M2 server 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

Product	Package description	Boxes
System x3650 M2	System unit carton	1
	Contents:	
	System unit	
	Rack kit	
system x3650 M2	System unit carton	1
	Contents:	
	Flyer - Important Notices	
	Rack Installation Instructions	
	CD - Documentation V1.0 (installation and User Guides)	
	CD - Director V6.1	
	IBM Director	
	CD - Ethernet VT	

The System x3650 M2 server 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.

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.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems

enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

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

Terms and conditions

IBM System x3650 M2

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

Warranty period

- System Unit - Three years
- Optional features - One year

Optional IBM features initially installed in an IBM machine carry the same warranty period as the machine. If installed after the initial machine installation, they carry the balance of the machine warranty or the optional feature warranty, whichever is greater.

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

- System batteries
- 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 Web site. 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 IBM's normal 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 specified below, On-site Service.

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 have been designated as Tier 1 CRUs:

- Air baffles
- Blank filler
- Cable-management arm
- Hard disk drives
- Hot-swap fan
- Hot-swap AC power supply
- Lift handle kit
- Memory DIMM
- Memory expansion card
- Optical drive
- PCI adapter
- PCI divider
- Power cord
- Service label
- System label
- Top cover
- Fan Bracket
- Hyper visor USB Key
- PCI Riser
- RAID Card w/o Battery
- Tape Drive
- Virtual Media Key
- Ethernet Daughter Card

On-site Service

This provides On-site Repair, 9 hours per day, Monday through Friday excluding holidays, NBD response. IBM or your reseller will repair the failing machine at your location and verify its operation. 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

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/warrantyform?brandind=5000008>

For more information on IWS, refer to Services Announcement [AA01-3100](#), dated September 28, 2001.

Licensing

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

Machine Code

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting

http://www-304.ibm.com/systems/support/machine_warranties/machine_code.html

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 Web site

<http://www-304.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.

IBM hourly service rate classification

One

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.

Graduated program license charges apply

No

Licensed machine code

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the

customer. You can obtain the agreement by contacting your IBM representative or visiting

http://www-304.ibm.com/systems/support/machine_warranties/machine_code.html

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 Web site:

<http://www-304.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.

Educational allowance

None

Pricing

For all local charges, contact your IBM representative.

AP distribution

Country/Region	Announced
AP IOT	
ASEAN*	Yes
India/South Asia**	Yes
Australia	Yes
People's Republic of China	Yes
Hong Kong S.A.R of the PRC	Yes
Macao S.A.R of the PRC	Yes
Taiwan	Yes
Korea	Yes
New Zealand	Yes
Japan IOT	Yes
Japan	Yes

* Brunei Darussalam, Indonesia, Cambodia, Lao People's Democratic Republic, Malaysia, Philippines, Singapore, Thailand, and Vietnam

** Bangladesh, Bhutan, India, Sri Lanka, Maldives, Nepal, and Afghanistan

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For the most current information regarding IBM products, consult your IBM representative or reseller, or visit the IBM worldwide contacts page

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Corrections

(Corrected on July 27, 2009)

Models were added to the **Product number** section.

(Corrected on May 21, 2009)

Models were added to the **Product number** section.

(Corrected on May 12, 2009)

Under **Processor upgrade options**, the processor descriptions were revised.

(Corrected on April 13, 2009)

The **AP distribution** section was updated.