IBM

Innovation comes standard

IBM X-Architecture® technology

IBM System x servers

Highlights

- **Build a cost-effective, flexible IT environment with IBM X-Architecture® technology.**

- **Achieve maximum performance per watt with the latest quad-core Intel® Xeon® processors.**

- **Help save money on energy costs by proactively controlling power with IBM PowerExecutive™ technology.**

- **Help lower the total cost of managing and supporting your networked systems with IBM Director tools.**

Leadership with X-Architecture innovation

The X-Architecture blueprint focuses on meeting client needs in the x86 environment through innovative design and the application of technology. Now in its fourth generation, X-Architecture technology delivers IBM System x™ and BladeCenter® servers that combine technology innovation with industry-standard hardware and software for rock-solid servers with the following:

- *Adaptive performance—balancing system design for maximum performance*
- *Modular optimization—designing systems with innovation as a standard*
- *Efficient power and cooling—managing the increasing operational cost of technology*
- *Proactive management—providing intuitive tools for easy systems management*
- *Integrated infrastructure—integrating servers, storage and networking*

These revolutionary advances help you build a cost-effective, flexible IT environment and help you become an agile business.

Adaptive performance

The IBM System x family is powered by high-octane, dual-core and quad-core Intel Xeon processors and dual-core AMD Opteron processors. With a wide range of scale-out and scale-up offerings, the System x family scales up to 32 sockets. While new quad-core processing provides the basis for increased system performance, it's IBM's balanced system design—more memory and more I/O than competitive systems—that allows you to realize enhanced performance—ideal for a virtualized world.

Modular optimization

High performance is only useful when a server is up and running. Consequently, reliability, availability and serviceability are more important than ever. IBM incorporates a number of innovations as standard features in its System x and BladeCenter servers. Innovations like light path diagnostics help minimize downtime and IBM eXtended I/O™ allows you to change your I/O configuration as your performance requirements increase.

Power efficiency

IBM combines proactive energy management tools with power efficient systems to help you save money on energy costs. IBM PowerExecutive technology can help you collect actual energy data, cap system power utilization and control your energy consumption. An integrated hardware and software solution building block,

PowerExecutive allows you to match business goals with power and thermal limits at the system, chassis, rack and data center levels to help you save money on energy costs. The x3650, x3655, x3550 and blade systems offer special configurations that provide equivalent performance as standard configurations but lower power—perfect for dense, power constrained data centers.

Proactive management

IBM Director 5.20 is an integrated suite of software tools that provide a consistent, single point of server management and automation. IBM Director's open design and support for industry standards enable heterogeneous hardware management with broad platform and operating system support. IBM Director can help you:

- *Reduce downtime*
- *Increase productivity of IT personnel and end users*
- *Reduce service and support costs*

IBM is a recognized leader in virtualization. And these new servers are designed to help you achieve the efficiency of virtualization, so you can maximize the business value of your server investment. With the new IBM Director extension, IBM Virtualization Manager, managing your virtualized server is even easier, giving you a single interface to manage both physical and virtual systems.

Integrated infrastructure

Tackle your IT complexity with IBM BladeCenter. BladeCenter helps you simplify by bringing together servers, storage and networking into a single enclosure and tying it together with powerful solution management tools. And, BladeCenter servers and switches can be easily moved between chassis—including BladeCenter, BladeCenter H, BladeCenter HT and BladeCenter T. Visit **ibm.com**/systems/bladecenter for more information.

Clustering solution

The IBM System Cluster 1350 aggregates a variety of IBM System x and BladeCenter servers to form a high-performance, highly scalable Linux® solution for scientific, technical and commercial computing workloads. Since all components of the Cluster 1350 portfolio are cluster-tested in our labs, built in our factories and shipped intact and ready for installation at your site, you can be sure they deliver the ultimate in reliability.

Microsoft solutions

IBM System x servers provide outstanding performance and functionality running the Windows® operating system. System x supports a range of offers from select products preloaded with the Windows operating system for customers who desire one-stop shopping to distributing the Datacenter Edition for customers demanding scalability and reliability.

Linux solutions

IBM works with the leading Linux distribution companies, Red Hat Enterprise and SUSE Linux, a Novell company, to offer tested and validated configuration for System x servers. This helps deliver outstanding performance and functionality. System x servers support a broad range of server offerings preloaded with the Linux operating system for customers who desire one-stop shopping for Linux. The range of Linux offerings available on System x servers gives you the flexibility to choose the optimum Linux implementation for your needs.

Leverage storage technology

Efficiently handling the growing amounts of data is one of the keys to success for an on demand business.

The IBM System Storage™ family of products offers a broad portfolio of scalable, open and innovative storage technology, including disk and tape storage systems, storage networking solutions, and virtualization and storage management software. Visit **ibm.com**/servers/storage for more information on System Storage solutions.

System x model	x3105	x3200	x3400
Form factor	Tower	Tower, 5U	Tower, 5U
Processor	AMD Opteron 1000 series (dual-core) or AMD Athlon 3500+ (single-core)	Quad-Core Intel Xeon up to 2.13 GHz, Dual-Core Intel Xeon up to 2.4 GHz, Intel Pentium® D (dual-core) up to 3.4 GHz or Intel Pentium 4 up to 3.2 GHz	Dual-Core Intel Xeon 5130 up to 2.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon Processor E5320 up to 1.86 GHz
Number of processors (std/max)	1/1	1/1	1/2
Cache (max)	2x1 MB or 512 KB (model dependent)	Up to 4 MB or 2x4 MB	2x2 MB L2 (dual-core) or 2x4 MB L2 (quad-core)
Memory[1] (std/max)	512 MB or 1 GB/8 GB DDR II 667 MHz via 4 DIMM slots	Up to 8 GB DDR II 667 MHz	1 GB/32 GB Fully Buffered DIMM 667 MHz via 8 DIMM slots
Expansion slots	2 PCI, 2 PCI-Express (x8, x8)	3 PCI and 2 PCI-Express (x8, x1), dedicated Remote Supervisor Adapter II slot, slotless hardware RAID-0, -1	3 PCI-Express, 2 PCI-X, and 2 PCI
Disk bays (total/hot-swap)	2 Serial ATA (SATA) or near-line SATA	Four 3.5" simple-swap or hot-swap Serial ATA hard disk drives or four 2.5" or 3.5" hot-swap Serial Attached SCSI hard disk drives	4/0 or 8/8 (model dependent)
Maximum internal storage[1,2]	1.5 TB SATA	Up to 1.2 TB Serial Attached SCSI (SAS), or up to 3.0 TB Serial ATA	4.0 TB hot-swap SATA, 2.4 TB hot-swap SAS or 2.0 TB simple-swap SATA
Network interface	Integrated Gigabit Ethernet	Integrated Gigabit Ethernet	Integrated Gigabit Ethernet
System management processor	IBM ServerGuide™	IPMI 1.5-compliant mini-BMC, IBM ServerGuide, optional Remote Supervisor Adapter II	Integrated IPMI System Management Processor, optional Remote Supervisor Adapter II SlimLine
Power supply (std/max)	310W 1/1	400W 1/1 or 430W hot-swap redundant 2/2 (model dependent)	670W 1/1 or 835W 1/2
Hot-swap components	Not applicable	Hard disk drives, power supplies (model dependent)	Power supply, fans, hard disk drives
Light path diagnostics	Not applicable	Limited	Limited
RAID support	OS RAID-0, -1; hardware-based RAID-0, -1 optional	Integrated hardware RAID-0, -1 (model dependent), optional upgrade to RAID-5, -6	Integrated RAID-0, -1,-10, optional RAID-5
System x OS compatibilities support	Red Hat Linux, SUSE Linux, Microsoft® Windows, Novell NetWare	Red Hat Linux, SUSE Linux, Microsoft Windows, Novell NetWare, IBM OS 4690	Red Hat Linux, SUSE Linux, Microsoft Windows, Novell NetWare, VMware ESX Server, SCO UNIXware, SCO OpenServer

System x model	x3500	x3800	x3250
Form factor	Tower, rack/5U	Tower, rack/7U	Rack (22" depth)/1U
Processor	Dual-Core Intel Xeon 5160 up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon Processor X5355 up to 2.66 GHz and up to 1333 MHz front-side bus	Intel Xeon Processor MP up to 3.66 GHz (single-core) and up to 3.50 GHz (dual-core)/667 MHz front-side bus	Intel Xeon (quad-core) up to 2.4 GHz or Intel Xeon (dual-core) up to 2.4 GHz, or Intel Pentium D (dual-core) up to 3.4 GHz or Intel Celeron up to 2.93 GHz
Number of processors (std/max)	1/2	1 or 2/4	1/1
Cache (max)	2x2 MB L2 (dual-core) or 2x4 MB L2 (quad-core)	1 MB L2 per processor (single-core) and up to 2 MB L2 (dual-core) and up to 16 MB L3 (dual-core)	2 MB or 4 MB (dual-core) or 4 MB (dual-core) or 256 KB
Memory[1] (std/max)	1 GB/48 GB Fully Buffered DIMM 667 MHz via 12 DIMM slots	1 GB or 2 GB/64 GB PC2-3200 DDR II SDRAM	512 MB or 1 GB/8 GB DDR II 667 MHz via 4 DIMM slots
Expansion slots	3 PCI-Express, 2 PCI-X and 1 PCI	6, two Active PCI-X 2.0/266 MHz and four PCI-Express x8	2 PCI-Express (x8)
Disk bays (total/hot-swap)	8/8	12/12 3.5" Serial Attached SCSI	Up to two 3.5" simple-swap Serial ATA or two 3.5" hot-swap Serial ATA or Serial Attached SCSI hard disk drives, or four 2.5" hot-swap SAS
Maximum internal storage[1,2]	2.4 TB hot-swap SAS, 4.0 TB hot-swap SATA	3.6 TB SAS (supports 300 GB SAS HDDs)	1.0 TB Serial ATA or 600 GB Serial Attached SCSI
Network interface	Integrated dual Gigabit Ethernet	Integrated dual Gigabit Ethernet	Dual Gigabit Ethernet
System management processor	Integrated IPMI System Management Processor, optional Remote Supervisor Adapter II SlimLine	IBM ServerGuide, optional Remote Supervisor Adapter II SlimLine	IPMI 1.5-compliant mini-BMC, IBM ServerGuide, optional Remote Supervisor Adapter II SlimLine
Power supply (std/max)	835W 1/2	775W 2 or 3/3 hot-swap (N+1)	350W 1/1
Hot-swap components	Hard disk drives, power supply, fans	Power supply, fans, memory, hard disk drives, and PCI-Express and PCI-X adapters	Serial ATA and Serial Attached SCSI hard disk drives
Light path diagnostics	Yes	Yes	Not applicable
RAID support	Integrated RAID-0, -1, -1E, -5, -6, -10	RAID-0, -1, -5 optional (IBM ServeRAID™-8i)	Integrated hardware RAID-0, -1 (model dependent), optional RAID-5
System x OS compatibilities support	Red Hat Linux, SUSE Linux, Microsoft Windows, Novell NetWare, VMware ESX Server, SCO OpenServer, SCO UNIXware	Red Hat Linux, SUSE Linux, Microsoft Windows, VMware ESX Server	Red Hat Linux, SUSE Linux, Microsoft Windows, Novell NetWare

System x model	x3455	x3550	x3650
Form factor	1U	Rack/1U	Rack/2U
Processor	AMD Dual-Core Opteron Model 2210, 2214, 2216, 2218, 2220, 2222 SE	Up to two Quad-Core Intel Xeon X5355 up to 2.66 GHz or Dual-Core Intel Xeon 5160 up to 3.0 GHz, both up to 1333 MHz front-side bus (model dependent)	Dual-Core Intel Xeon Processor 5160 up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon Processor X5355 up to 2.66 GHz and up to 1333 MHz front-side bus
Number of processors (std/max)	1/2	1/2	1/2
Cache (max)	2 MB per socket	2x2 MB L2 (dual-core) or 2x4 MB L2 (quad-core)	2x2 MB L2 (dual-core) or 2x4 MB L2 (quad-core)
Memory[1] (std/max)	2x512 MB/48 GB PC5300 ECC DDR II SDRAM IBM Chipkill™ 667 MHz via 12 DIMM slots	1 GB or 2 GB/32 GB Fully Buffered DIMM 667 MHz	1 GB or 2 GB/48 GB Fully Buffered DIMM 667 MHz via 12 DIMM slots
Expansion slots	PCI-Express (1) x16 standard, optional (1) x8 or (1) HTx	2 PCI-Express (x8) half-length, full-height or optional riser card for 1 PCI-X (64-bit 133 MHz)	4 PCI-Express or 2 PCI-X and 2 PCI-Express
Disk bays (total/hot-swap)	2	2/2 or 4/4	Six 3.5" or eight 2.5" (SFF)
Maximum internal storage[1,2]	1.5 TB SATA II or 600 GB SAS (3.0 Gbps)	293.6 GB hot-swap SAS or up to 1.5 TB simple-swap SATA	1.8 TB hot-swap SAS or 3.0 TB hot-swap SATA
Network interface	Integrated dual Gigabit Ethernet	Integrated dual Gigabit Ethernet	Integrated dual Gigabit Ethernet
System management processor	Integrated BMC features Serial over LAN (IPMI 2.0-compliant), IBM Director, Cluster Systems Management	Integrated Service Processor, supports optional Remote Supervisor Adapter II SlimLine	Integrated Service Processor, optional Remote Supervisor Adapter II SlimLine
Power supply (std/max)	650W capacity	670W 1/2	835W 1/2
Hot-swap components	Not applicable	Power supply, fans, hard disk drives (select models)	Power supply, fans and hard disk drives
Light path diagnostics	Yes	Yes	Yes
RAID support	Optional RAID-0, -1 for internal drives using the IBM HBA Controller	Integrated RAID-0, -1, -10, optional RAID-5, -6	Integrated RAID-0, -1, -10, optional RAID-5, -6
System x OS compatibilities support	Red Hat Linux, SUSE Linux, Microsoft Windows	Red Hat Linux, SUSE Linux, Microsoft Windows, Novell NetWare, VMware ESX Server	Red Hat Linux, SUSE Linux, Microsoft Windows, Novell NetWare, VMware ESX Server

System x model	x3655	x3755	x3850	x3950
Form factor	2U	4U	Rack/3U	Rack/3U per chassis
Processor	AMD Dual-Core Opteron Model 2220 (2.8 GHz) or AMD low-power Dual-Core Opteron Model 2210 HE (1.86 GHz)	AMD Dual-Core Opteron Model 8222 SE (3.0 GHz)	Intel Xeon Processor MP up to 3.66 GHz (single-core) and 3.50 GHz (dual-core)/667 MHz front-side bus	Intel Xeon Processor MP up to 3.50 GHz (dual-core)/667 MHz front-side bus
Number of processors (std/max)	1/2	1/4 or 2/4	1 or 2/4	2/4 per chassis, 32 per configuration
Memory[1] (std/max)	64 GB DDR II 667 MHz via 16 DIMMs (max)	128 GB DDR II 667 MHz (max)	2 GB or 4 GB/64 GB PC2-3200 DDR II SDRAM	2 GB or 4 GB/64 GB PC2-3200 DDR II per chassis, 512 GB maximum
Expansion slots	Standard: 2 PCI-Express x8 (low-profile) and 1 PCI-Express x4 (low-profile)	7 total: 4 PCI-Express (1) x16; (2) x8; (1) x4 and 2 PCI-X (133 MHz/100 MHz); 1 HTx (half-length)	6, two Active PCI-X 2.0/ 266 MHz and four PCI-Express x8	6 (per chassis) Active PCI-X 2.0, all slots supporting up to 266 MHz
Disk bays (total/hot-swap)	Eight SFF 2.5" hot-swap SAS hard disk drives (HDDs) or six 3.5" hot-swap SAS/SATA HDDs	4/4	6/6 2.5" Serial Attached SCSI	6/6 (per chassis) 2.5" Serial Attached SCSI
Maximum internal storage[1, 2]	1.8 TB hot-swap SAS or 4.5 TB hot-swap SATA	1.2 TB (4 x 300 GB)	440.4 GB Serial Attached SCSI	440.4 GB SAS per chassis (supports 36.4 GB and 73.4 GB HDDs)
Network	Integrated dual Gigabit Ethernet with TCP/IP Offload Engine (TOE)	Integrated dual Gigabit Ethernet	Integrated dual Gigabit Ethernet	Integrated dual Gigabit Ethernet
System management processor	Baseboard Management Controller IPMI 2.0 standard, Remote Supervisor Adapter II SlimLine optional	Baseboard Management Controller IPMI 2.0 standard, Remote Supervisor Adapter II SlimLine optional	IPMI 2.0, integrated Remote Supervisor Adapter II SlimLine (model dependent)	Remote Supervisor Adapter II SlimLine standard
Power supply (std/max)	835W 1/2	1500W 1/2	1300W 1 or 2/2 hot-swap	1300W 220V 2/2
Hot-swap components	Power supply, HDDs, cooling fans	Power supply, HDDs, cooling fans	Power supplies, fans, memory, hard disk drives and PCI-Express/PCI-X adapters	Power supplies, fans, hard disk drives, PCI-X adapters and memory
RAID support	RAID-0, -1, -10 standard, RAID-5, -6, -10, -50, -60 and battery backup optional	Integrated RAID-0, -1, -10 standard, RAID-5 optional	RAID-0, -1, -5 optional (ServeRAID-8i)	Integrated RAID-0, -1,-5 (model dependent)
System x OS compatibilities support	Red Hat Linux, SUSE Linux, Microsoft Windows, VMware ESX Server	Red Hat Linux, SUSE Linux, Microsoft Windows, VMware ESX Server	Red Hat Linux, SUSE Linux, Microsoft Windows, VMware ESX Server	Red Hat Linux, SUSE Linux, Microsoft Windows, VMware ESX Server

For more information:

IBM Express Portfolio

Select configurations of System x servers are part of the IBM Express Portfolio™, designed and priced to meet the needs of mid-sized businesses. Reliable and easy to manage, Express models and configurations vary by country.

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[1] Maximum internal hard disk and memory capacities may require the replacement of any standard hard drives and/or memory and the population of all hard disk bays and memory slots with the largest currently supported drives available.

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