

Innovative modular technology achieves outstanding performance density and affordable availability



IBM BladeCenter solutions



Your priorities are clear: contain costs, deal with a shortage of skilled people and meet the challenge of today's on demand business. In short, manage the components of your IT organization or communications network so they contribute to business success in today's on demand world.

Highlights

- *Flexible modular technology integrates powerful dual-core and quad-core Intel®, IBM POWER™ and AMD Opteron processor-based blade servers into the IBM BladeCenter® architecture*
- *Take advantage of advanced management tools like IBM Director software, enabling comprehensive management of the BladeCenter solution*
- *Choice of four BladeCenter chassis to match diverse environments and performance requirements*

Take control of your infrastructure

Tackle your IT complexity with BladeCenter. Its design gathers computing resources into high-density enclosures that support hot-swappable, high-performance 2-processor dual-core or quad-core Intel processor-based and 2-processor dual-core POWER and new 2-processor and 4-processor single-core and dual-core AMD Opteron-based blade servers.

BladeCenter simplifies by bringing together your network and storage switching into a single enclosure, and then ties it all together with unified,

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ibm.com to locate an IBM reseller or for more information.

powerful solution management tools. The result is an effectively managed infrastructure that helps maximize resource productivity and minimize IT and network administration costs. BladeCenter gives control back to the IT or network manager.

Designed to solve real-world problems

The BladeCenter design addresses your most serious issues: manageability, scalability, capacity, performance, cooling, power and space constraints. IBM blade servers are designed to take less time to install and fewer people to maintain, helping reduce IT and network infrastructure costs.

Your enterprise or network can benefit from simplified management, fast installation, modular scalability and high availability. And BladeCenter delivers improved space efficiency compared to most 1U solutions.

Collaborate to innovate

IBM has opened the design specifications for BladeCenter allowing other companies to easily design compatible networking switches, blade adapter cards (daughter cards) and appliance and communications blades for the platform. The open BladeCenter design specifications are intended to harness

the development power of the industry and deliver an even more comprehensive solution to customers.

BladeCenter solutions make adding capacity simple, affordable and cost-effective. BladeCenter's technology features deliver an effective scale-out architecture that enables quick response to changing business conditions.

- Outstanding blade density

BladeCenter efficiently uses data center floor space with up to 14 2-processor blades or up to seven 4-processor blades in a BladeCenter chassis. The design features innovative I/O technology and cutting-edge processor technology.

- Affordable availability for mission-critical business and telecom applications

The four BladeCenter chassis feature high-availability passive mid-planes and redundant hot-swap cooling and power, helping to reduce single points of failure. Tight integration of key components such as networking services, centralized management and applications helps to enable high availability.

The BladeCenter ecosystem

The four BladeCenter chassis—the BladeCenter, BladeCenter H, BladeCenter T and the new BladeCenter HT—continue the legacy of open, cross-functional design. That means all BladeCenter chassis support all blades, switches, storage, I/O and ecosystem components—providing investment protection and reducing obsolescence.

BladeCenter HT, the newest member of the BladeCenter family, offers a host of new features and functionality. This makes BladeCenter HT the ideal platform to run telecom equipment and Service Provider next-generation, high-performance core telecom network applications, including Internet Protocol TV, IP Multimedia Subsystem and Advanced Security.

For rich telecom features and functionality, the BladeCenter HT is a NEBS-3-/ETSI-compliant chassis (planned), featuring long production life, making it ideal for deployment of next-generation networks in central offices or data center environments.

Application flexibility

BladeCenter architecture is based on industry standards to support deployment of third-party software and hardware. IBM works with industry-leading technology companies to support innovative solutions running on Linux®, Windows®, IBM AIX®, Novell and Sun Solaris operating systems.

BladeCenter can take advantage of the flexibility provided by the Linux operating system. Linux offers power, high security and reliability for business and infrastructure applications.

BladeCenter supports the Microsoft® Windows Server™ 2003 and Windows 2000 operating systems (model dependent), enabling customers to migrate existing or deploy new Windows environments on this platform. The unique advantages offered by BladeCenter combined with the broad array of applications supported on Windows deliver a valuable proposition for customers.

Empower your IT

The BladeCenter Advanced Management Module boosts administrator productivity and reduces skill-level requirements, which can help reduce costs, improve overall productivity and make administration easier. It delivers

incredible control of the solution. Unlike traditional servers and some competitive blades with a myriad of separate management tools, the management module provides a single point of control for the solution.

With the tight integration of storage, networking, servers and applications, the BladeCenter design is both intelligent and simple. IBM has created an ideal environment to maintain your data center or telecom central office.

Powerful management tools

IBM Director delivers advanced, proactive management, providing rich and broad systems management capabilities. Some of the IBM Director tools include:

- **Capacity Manager (optional)**
Helps predict future server bottlenecks and proactively alerts administrators, automating corrective actions to minimize downtime.
- **System Availability**
Tracks and provides graphical views of system downtime or uptime for systems or groups of systems, helping save labor costs.
- **Rack Manager**
Provides a graphical drag-and-drop interface that simplifies rack hardware management.

- **IBM PowerExecutive™**
Provides accurate detail about power usage, empowering customers to take charge of their power and cooling requirements.

- **IBM Predictive Failure Analysis® and light path diagnostics**
Help reduce administration costs while increasing availability.

IBM Director unleashes the power of BladeCenter, giving you comprehensive remote management from a single graphical console. IBM Director automates and simplifies IT and networking tasks, letting you deploy, configure, manage and maintain up to hundreds of blade servers.

Visit ibm.com/servers/eserver/xseries/systems_management/index.html for more information about IBM Director.

BladeCenter options

These options provide choices to help create customized solutions.

Blade server options¹

High-speed interconnect expansion cards
Myrinet, Cisco InfiniBand and NetXen 10Gb expansion card options provide a high-speed/low-latency interconnect on each blade.

Gigabit Ethernet Expansion Card

Allows expansion of the Ethernet sub-system to enable more bandwidth.

4Gb dual-port Fibre Channel (FC)

Expansion Cards

Adds dual-port FC HBAs for each blade server. These cards work with any of the SAN and FC Switch Modules listed here.

QLogic iSCSI Expansion Card

Acts as a hardware initiator to provide iSCSI communication from the blade server to an iSCSI storage device.

SCSI or SAS Hard Disk Drives (HDDs)

Achieve maximum blade density with Small Form Factor SCSI or SAS HDDs. Additional hot-swap HDDs are supported via the BladeCenter Storage Expansion Units.

BladeCenter Storage Expansion Units

These options provide integrated mirroring capabilities and use hot-swap Ultra320 SCSI or SAS HDDs, along with additional I/O content. The SAS version provides RAID-5 and battery-backed optional cache.

PCI Expansion Unit

Each unit connects to a blade server (model dependent), supporting up to two legacy 100-133 MHz PCI-X adapters.

Blade chassis options¹

Cisco Systems Intelligent Gigabit Ethernet Switch Modules

The Cisco Ethernet switch modules provide four external copper or fiber Gigabit Ethernet ports and 14 internal Gigabit Ethernet ports interfacing via the BladeCenter midplane to the blade servers.

Nortel Gigabit Ethernet Switch Modules

The Layer 2-7 and 2/3 switch modules integrate advanced Ethernet functionality into the chassis, reducing complexity and increasing manageability. A choice of 10Gb uplink or 10Gb full fabric switch modules is ideal to support the growing number of enterprise and telecom applications requiring greater bandwidth.

Server Connectivity Module

This low-cost, simple to configure switch is ideal for small and medium businesses.

Copper Pass-thru Module

Features a 1Gb unswitched, unblocked bidirectional copper Ethernet connection to each blade server.

Brocade 4Gb Switch Modules

These switch modules are ideal for integration into Brocade environments.

McDATA 4Gb SAN Switch Modules

The 2Gb and 4Gb switches are ideal for integration into McDATA environments.

QLogic 4Gb FC Switch Modules

These switches are interoperable in SCSW3-compliant SANs.

Optical Pass-thru Module

Features an unswitched, unblocked optical connection to each blade server bay.

Cisco InfiniBand Switch Modules

Integrates InfiniBand connectivity directly into the BladeCenter chassis, including options for 1X and 4X connectivity to the blade.

Redundant Management Modules

Enable system management resiliency and provide remote management and connectivity to the BladeCenter chassis for the most critical applications.²

Power Supply Modules

Provide both power and redundancy, bringing greater reliability and availability.

Acoustic Attenuation Module

Helps minimize audio emissions, an ideal solution for sound-sensitive customers.

BladeCenter options	Part number
Ethernet Switches	
Cisco Systems Intelligent Gigabit Ethernet Switch Module	32R1892
Cisco Systems Intelligent Gigabit Fiber Ethernet Switch Module	32R1888
Nortel Layer 2/3 10Gb Uplink Ethernet Switch Module	32R1783
Nortel Layer 2/3 Copper Gigabit Ethernet Switch Module	32R1860
Nortel Layer 2/3 Fiber Gigabit Ethernet Switch Module	32R1861
Nortel Layer 2-7 Gigabit Ethernet Switch Module	32R1859
Nortel 10Gb Ethernet Switch Module	39Y9267
NetXen 10Gb Ethernet Expansion Card	39Y9271
Gigabit Ethernet Expansion Card	73P9030
SFF Gigabit Ethernet Expansion Card	39R8624
Server Connectivity Module	39Y9324
Myrinet Cluster Expansion Card	73P6000
Copper Pass-thru Module	39Y9320
Optical Pass-thru Module	39Y9316
Optical Pass-thru Module SC Cable	39Y9171
Optical Pass-thru Module LC Cable	39Y9172

BladeCenter options	Part number
Fibre Channel Switches	
Brocade 20-port 4Gb SAN Switch Module	32R1812
Brocade 10-port 4Gb SAN Switch Module	32R1813
Brocade 10-port 4Gb SAN Switch upgrade	32R1822
McDATA 10-Port 4Gb FC Switch Module	32R1905
McDATA 20-Port 4Gb FC Switch Module	32R1833
QLogic 10-Port 4Gb FC Switch Module	32R1904
QLogic 20-Port 4Gb FC Switch Module	26R0881
QLogic/McDATA 10-Port Switch Upgrade	32R1912
QLogic 4Gb Standard FC Expansion Card	26R0884
QLogic 4Gb SFF FC Expansion Card	26R0890
SFF Fibre Channel Expansion Card (2Gb)	26K4841
QLogic iSCSI Expansion Card	32R1923
Cisco InfiniBand Switch Module	32R1900
Cisco HCA Expansion Card	32R1896

BladeCenter options	Part number
36GB SFF Non-Hot-Swap Ultra320 SCSI HDD	40K1037
73GB SFF Non-Hot-Swap Ultra320 SCSI HDD	40K1038
36GB 10,000rpm SAS non-hot-swap hard disk drive	26K5776
73GB 10,000rpm SAS non-hot-swap hard disk drive	26K5777
4GB Modular Flash Drive	39R8697
PCI Expansion Unit II	25K8373
BladeCenter Storage Expansion Unit 2	39R8625

Support for IBM System Storage solutions

BladeCenter supports high-performance SAN solutions and low-cost network attached storage solutions, delivering great flexibility and scalability for your storage needs. Connecting BladeCenter to the IBM System Storage™ DS™ family of products is an ideal solution.

For more information

World Wide Web

U.S.
Canada

ibm.com/systems/bladeCenter

ibm.com/systems/ca/en/bladeCenter

BladeCenter chassis at a glance

	BladeCenter	BladeCenter H	BladeCenter T	BladeCenter HT
Year introduced	2002	2006	2004	2007
Rack form factor	7U	9U	8U	12U
Blade bays	14	14	8	12
Standard media	DVD-ROM, floppy	DVD-ROM	DVD-ROM, floppy	USB externally attached
Number of switch fabrics	Up to 4	Up to 4 legacy, up to 4 high speed and up to 4 bridge modules	Up to 4	Up to 4 legacy, up to 4 high speed and up to 2 bridge modules
Power supply module	2000W AC	2900W AC	1300W AC or 1300W DC	3160W AC or 3160W DC
Thermal design	Two hot-swap blowers	Two hot-swap blowers plus up to 12 hot-swap fans	Four hot-swap blowers	Four hot-swap blowers plus up to 12 hot-swap fans
Systems management controller	Up to two Advanced Management Modules	Up to two Advanced Management Modules	Up to two BCT Advanced Management Modules	Up to two Advanced Management Modules
NEBS-/ETSI-compliant	No	No	Yes	Yes
4X InfiniBand or 10Gb Ethernet capability (internal)	No	Yes	No	Yes
External I/O ports	KVM, Ethernet, USB, Serial			
Systems management software	IBM Director with systems management and trial deployment tools			
Predictive Failure Analysis	Hard disk drives, processors, blowers, memory			
Light path diagnostics	Blade server, processor, memory, power supplies, blowers, switch module, management module, hard disk drives and expansion card			
Limited warranty³	3-year onsite limited warranty			
External storage	Support for IBM System Storage solutions			

BladeCenter servers

With the arrival of the scalable AMD Opteron LS41 and LS21 server blade solutions, customers can expand from 2-socket to 4-socket and back as their requirements change—providing on demand flexibility. In addition, BladeCenter supports the IBM BladeCenter HS21 and HS20,

blade servers with up to two high-performance dual-core or quad-core Intel Xeon® Processors; and the IBM BladeCenter JS20 and JS21, both IBM PowerPC® 970 processor-based blade servers.

The family of IBM blade servers is designed to support a wide variety of applications that customers demand in

today's business or telecommunications world. These blade servers are ideal for applications ranging from collaboration, Citrix, Linux clusters and compute-centric applications to commerce transactions, databases, ERP/CRM applications and next-generation network applications.

At a glance	IBM BladeCenter HS21	IBM BladeCenter HS20
Processor	Dual-Core Intel Xeon up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon X5355 up to 2.33 GHz and up to 1333 MHz front-side bus	Intel Xeon up to 3.8 GHz
Number of processors (std/max)	1/2	
Cache (max)	4MB L2 shared (dual-core) or 2x4MB L2 (quad-core)	2MB
Front-side bus	Up to 1333 MHz	Up to 800 MHz
Memory⁴	Up to 32GB Fully Buffered DIMMs	Up to 16GB PC2-3200 DDR II
Internal hard disk drives	Up to two Small Form Factor (2.5") 10,000rpm SAS HDDs installed on each blade (plus support for up to 3 hot-swap SAS drives with optional Storage and I/O blade)	Up to 2 Ultra320 SCSI HDDs installed on each blade
Maximum internal storage^{4,5}	734GB ⁶ with optional Storage and I/O blade	746.8GB (with optional BladeCenter Storage Expansion Unit 2)
RAID support	Integrated RAID-0 or -1 standard on blade server, integrated RAID-1E or RAID-5 optional with Storage and I/O blade	Integrated RAID-1 standard on blade server, integrated RAID-1E with BladeCenter Expansion Unit 2 option (on select blades)
Network	Dual Gigabit Ethernet (TOE-enabled)	Dual Gigabit Ethernet
I/O upgrade	1 PCI-X expansion card connection (traditional) and 1 PCI-Express (high speed)	1 expansion card connection
Systems management hardware	Integrated systems management processor	
Standards compliance	NEBS-3/ETSI	NEBS/ETSI

At a glance	AMD Opteron LS21 for IBM BladeCenter	AMD Opteron LS20 for IBM BladeCenter
Processor⁶	AMD Opteron Model 2210HE, 2212, 2212HE, 2216HE and 2218 and 2220	AMD Opteron Model 250, 252, 254, 270 and 275
Number of processors (std/max)	1/2	
Cache (max)	1MB L2 per processor core	
Memory⁴	Up to 32GB DDR II VLP memory	Up to 16GB DDR VLP memory
Internal hard disk drives	One SAS HDD	Up to two Ultra320 SCSI HDDs
Maximum internal storage^{4,5}	146.8GB ⁷ internally; up to 587.2GB ⁷ with Storage and I/O Expansion blade installed	146.8GB
Network	Dual Gigabit Ethernet controllers (TOE-enabled)	
I/O upgrade	1 PCI-X expansion connector (traditional) and 1 PCI-Express expansion connector (high speed)	1 expansion card connection
Systems management hardware	Integrated systems management processor	
Standards compliance	NEBS-3/ETSI	NEBS/ETSI



IBM BladeCenter JS21 at a glance

Processor⁶	PowerPC 970MP up to 2.7 GHz (64-bit)
Number of processors	Up to 2 single- or dual-core
Level 2 cache	1MB per core
Memory bus	1.1 GHz
Memory⁴	Up to 16GB DDR II SDRAM per blade
Internal hard disk drives	Up to two 73.4GB 2.5" SAS
Maximum internal storage^{4,5}	293.6GB ⁷
Network	2 integrated Gigabit Ethernet controllers
I/O upgrade	Integrated PCI-Express connector for high-speed daughter cards
Systems management hardware	Integrated system management processor
Standards compliance	NEBS-3/ETSI

AMD Opteron LS41 for IBM BladeCenter at a glance

Processor⁶	AMD Opteron Model 8210HE, 8212, 8212HE, 8216HE, 8218 and 8220
Number of processors (std/max)	2/4
Cache	1MB L2 per processor core
Memory⁴	Up to 64GB DDR II VLP memory
Internal hard disk drives	2 SAS HDDs
Maximum internal storage^{4,5}	293.6GB ⁷ internally; up to 734GB ⁷ with Storage and I/O blade installed
Network	4 integrated Gigabit Ethernet controllers (TOE-enabled)
I/O Upgrade	2 PCI-X expansion connectors and 1 PCI-Express expansion connector
Systems management hardware	Integrated systems management processor
Standards compliance	NEBS-3/ETSI

¹ Options support varies by server and chassis platform.

² KVM capability not available on JS20.

³ IBM hardware products are made from new parts, or new and serviceable used parts. Regardless, our warranty terms apply. For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12195, RTP, NC 27709, Attn: Dept. JDJA/B203. IBM makes no representation or warranty regarding third-party products or services including those designated as ServerProven® or ClusterProven®.

⁴ 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.

⁵ When referring to storage capacity, GB means 1,000,000,000 and TB means 1,000,000,000,000. Accessible capacity is less.

⁶ Some machines are designed with a power management capability to provide customers with the maximum uptime possible for their systems. In extended thermal conditions, rather than shut down completely, or fail, these machines automatically reduce the frequency of the processor to maintain acceptable thermal levels.

⁷ Supported with the availability of the 146.8GB hard disk drive.

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Produced in the United States of America
February 2007
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