Open, easy and green to fit your diverse business needs

IBM BladeCenter: The right choice

Highlights

- ***Realise innovation with a flexible architecture that lets you choose the right solution for business advantage***
- ***Manage complexity and growth with easy deployment using IBM BladeCenter Open Fabric Manager***
- ***Go green and save with energy-efficient features and fewer extras to buy***
- ***Start smart with IBM BladeCenter – the integrated system for small offices and distributed environments.***

Overview

Your priorities are clear: meet the challenges of today's dynamic world, contain costs, deal with IT skill shortages and take full advantage of new technologies. In short, manage your IT organisation and infrastructure for business success. You need to make the right choice for today and for tomorrow. With its industry-leading flexibility, BladeCenter is the right choice for your business.

By integrating servers, storage and networking, BladeCenter is helping companies in every industry sweep complexity aside. The blades contain all the necessities to run an application – processors, memory, input/output (I/O) and storage. The chassis contains shared redundant power, shared hot-swap cooling, DVD, integrated Ethernet, storage, switching and consolidated powerful management.

Its innovative, open design offers a true alternative to today's sprawling racks and overheated server rooms. So toss out your cables. You have nothing to lose but complexity.

Realise innovation

Your business needs continually change. IBM understands that there's no such thing as a one-size-fits-all solution. To meet your broad and diverse needs, you want your IT infrastructure to be flexible and modular, and you need a solution that best works for your business. BladeCenter offers a comprehensive portfolio of chassis, blade servers, switches and fabrics – all managed from a common infrastructure.

Like IBM System x servers, BladeCenter servers are built on IBM X-Architecture technology for enterprise-class reliability. X-Architecture is the IBM blueprint for bringing innovation to x86 systems – innovation that helps set you apart from the competition. The result is open, industry-standard servers on which you feel confident running your business-critical workloads. So you can innovate for your business advantage.

Manage complexity, growth and risk

You want a flexible business foundation that is both open and innovative. BladeCenter delivers. Choose from many offerings defined by Blade.org and created by other members of the most extensive organisation for blade solutions.

Match your data centre needs with the appropriate interconnect, selecting from multiple input/output fabrics. IBM BladeCenter Open Fabric is an integrated server I/O portfolio that provides a comprehensive set of interconnects and smart management tools. Its new pass-through capability not only improves and simplifies storage area network (SAN) interoperability and scalability, but it also helps you reduce cabling and its subsequent costs. Plus, it is supported by multiple vendors, so you can match the solution to your standards.

The new IBM BladeCenter Open Fabric Manager makes it even easier to deploy your blades with preconfigured connections and a simple graphic user interface (GUI). BladeCenter Open Fabric Manager automates blade deployment by intelligently managing the interaction between the blades and the storage and data networks. You define the connections just once and BladeCenter Open Fabric Manager takes care of them after that – so you can be ready in minutes, not days. BladeCenter Open Fabric Manager also helps reduce costly downtime with integrated failover capability.

And of course, there's no need to redo your network standards. BladeCenter Open Fabric Manager works across the BladeCenter family of chassis and switches. Its simple GUI checks network conflicts – helping you save even more time. Configure once. That's it.

BladeCenter is also designed with extensive redundancy to help reduce failures. Unlike some competitive products, BladeCenter servers provide dual I/O and dual power connections to the chassis for enterprise-class reliability to keep your business up and running.

Go green and save

You want to control your power and cooling environment and help minimise environmental impacts. BladeCenter offers energy-efficient designs and powerful IBM Cool Blue tools to help monitor, control and allocate power consumption. IBM Power Configuration lets you select systems and IT infrastructure that fit your business goals before you commit to buying the first server. IBM Systems Director Active Energy Manager for x86 and IBM PowerExecutive help optimise energy efficiency so you can be more responsive to energy needs and costs.

Introducing IBM BladeCenter S

With choices like the new IBM BladeCenter S that can be deployed in minutes and uses standard office power, you can be assured of finding the right solution for your diverse business needs. Built specifically for office and distributed-enterprise environments, BladeCenter S is an integrated business-in-a-box foundation with configurable shared storage that grows with your business.

Choose right

BladeCenter is the right choice, tailored to fit your diverse needs. Open and innovative for a flexible business foundation. Easy to deploy, integrate and manage. Green today for a better tomorrow.

Leverage storage technology

Efficiently handling the growing amounts of data is essential in a dynamic 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.

BladeCenter chassis at a glance

	BladeCenter S	BladeCenter E	BladeCenter H	BladeCenter T	BladeCenter HT
Benefits	Extending the benefits of BladeCenter outside the data centre	Maximum density and best energy efficiency	Blazing speed to run most demanding applications and simulations	Rugged servers to run under demanding conditions	High performance and durability–the ultimate combination
Best in class environments	Small offices and distributed environments, 110 or 220 volts	Energy-efficient, high density	High-performance density	Industrial, military, telecommunications and ruggedised	Ultimate combination of ruggedised and high performance
Rack form factor	7U	7U	9U	8U	12U
Blade bays	6	14	14	8	12
Standard media	DVD/CD-RW	DVD-ROM, floppy	DVD/CD-RW	DVD-ROM, floppy	Universal serial bus (USB) external
Number of switch fabrics	Up to 3	Up to 4	Up to: 4 legacy, 4 high- speed, 4 bridge	Up to 4	Up to: 4 legacy, 4 high- speed, 4 bridge
Power supply module	950W/1450W AC auto-sensing	2000W AC	2900W AC	1300W AC or 1300W DC	3160W AC or 3160W DC
Systems management controller	Advanced Management Module	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
Network equipment building system (NEBS)-/ -/ETSI-characteristics[1]	No	No	No	Yes	Yes
4X InfiniBand or 10 Gb Ethernet capability (internal)	No	No	Yes	No	Yes
Common external ports	KVM, Ethernet, USB, Serial				
Systems management software	IBM Director with systems management and trial deployment tools, Advanced Management Module, Management Module (BladeCenter T only), Storage Configuration Manager (BladeCenter S only)				
IBM Predictive Failure Analysis (PFA)	Hard disk drives (HDDs), processors, blowers, memory				
Light path diagnostics	Blade server, processor, memory, power supplies, blowers, switch module, management module, HDDs and expansion card				
Limited warranty[2]	Three year customer replaceable unit (CRU) and on-site limited warranty				
External storage	Support for IBM System Storage solutions				

BladeCenter Boot Disk System

Uptime and availability are key focus areas for BladeCenter and have been since its inception. The IBM BladeCenter Boot Disk System is a 2U enclosure that is specifically designed to provide operating system initialisation functionality for up to two fully loaded BladeCenter E or BladeCenter H chassis – helping you to increase your IT uptime and availability.

BladeCenter servers and workstations

The family of IBM blade servers is designed to support a wide variety of applications that customers demand in today's business and government settings. Together, these blade servers are ideal for a range of applications including collaboration, Citrix, Linux® clusters, compute-centric applications, commerce transactions, databases, Enterprise Resource Planning (ERP)/Customer Relationship Management (CRM) applications and next-generation network applications.

BladeCenter offers you a choice of server blades that are compatible with the various BladeCenter chassis. The IBM BladeCenter HS21 and HS21 XM have up to two high-performance dual-core or quad-core Intel® Xeon® Processors. Other popular server choices include scalable AMD Opteron LS21 and LS41 server blade solutions that allow you to expand from 2-socket to 4-socket and back as their requirements change – providing on demand flexibility. There are also the brand new IBM BladeCenter JS22 POWER6-based and JS21 IBM PowerPC 970 processor-based blade servers.

The IBM BladeCenter HC10, a workstation blade, is designed to support high-performance workstation applications as part of the server-based computing concept and is ideal for applications such as CAD engineering design, trading floor solutions, Geographic Information Systems (GIS) and hospital information systems.

With the recent arrival of the IBM BladeCenter QS21, your BladeCenter choices continue to expand. The QS21[3] is an advanced blade server based on the Cell Broadband Engine (Cell/B.E.) Processor. Cell/B.E. technology is built on IBM Power Architecture and often delivers more performance than conventional micro-processors while being more scalable and programmable than other technologies like graphics processing units (GPU), digital signal processors (DSP) or field-programmable gate arrays (FPGA). The QS21 blade is designed to complement systems based on traditional processors to accelerate parallel processing and streaming applications. Ideal applications include image processing, signal processing and graphics rendering applications in aerospace/defence, medical imaging, EDA, digital video surveillance, seismic computing and other industries.

At a glance	IBM BladeCenter HS21	IBM BladeCenter HS21 extended memory (XM)
Processor	Dual-Core Intel Xeon up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon X5460 up to 3.16 GHz and up to 1333 MHz front-side bus	Dual-Core Intel Xeon 5100 series up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon 5400 series up to 3.0 GHz and up to 1333 MHz front-side bus
Number of processors (std/max)	1/2	
Cache (max)	6 MB level 2 (L2) shared (dual-core) or 2x6 MB (12 MB) L2 (quad-core)	4 MB L2 shared (dual-core) or 2x6 MB (12 MB) L2 (quad-core)
Front-side bus	Up to 1333 MHz	Up to 1333 MHz
Memory[4]	Up to 16 GB Fully Buffered DIMMs (internal) and up to 32 GB with Memory and I/O Expansion Unit	Up to 32 GB with Fully Buffered DIMMs
Internal HDDs	Up to two Small Form Factor (SFF) (2.5") 10,000 revolutions per minute (rpm) Serial Advanced SCSI (SAS) HDDs installed on each blade (plus support for up to 3 hot-swap SAS drives with optional Storage and I/O (SIO) blade)	One SFF (2.5") 10,000 rpm SAS HDD installed on each blade and one or two optional internal 15.8 GB 2.5" Solid State Drives or one optional IBM 4 GB or 8 GB Modular Flash Drive (or support for up to 3 hot-swap SAS drives with optional SIO blade)
Maximum internal storage[4, 5]	734 GB[6] with optional SIO Expansion Unit	587.2 GB with optional SIO blade
Random Array of Independent Disks (RAID) support	Integrated RAID-0 or -1 standard on blade server, integrated RAID-1E or RAID-5 optional with SIO blade	Integrated RAID-0 or -1 standard on blade server, integrated RAID-1E or RAID-5 optional on drives in SIO Blade
Network	Dual Gigabit Ethernet (GbE) (TCP/IP Offload Engine (TOE-enabled), up to 8 ports optional	Dual GbE (TOE-enabled), up to 12 ports optional with SIO blade and MSIM card
I/O upgrade	1 PCI-X expansion card connection (traditional) and 1 PCI-Express (high speed)	1 PCI-X expansion card connection (traditional) and 1 PCI-Express (high speed)
Systems management hardware	Integrated systems management processor	
Standards	NEBS-3/ETSI characteristics	NEBS/ETSI characteristics
Limited warranty[2]	Three year CRU and on-site limited warranty	

At a glance	IBM BladeCenter LS21
Processor[7]	AMD Opteron Model 2210HE, 2210EE, 2212, 2212HE, 2216HE, 2218, 2218HE, 2220 and 2222
Number of processors (std/max)	1/2
Cache (max)	1 MB L2 per processor core
Memory[4]	Up to 32 GB double data rate (DDR) II VLP memory
Internal HDDs	One SAS HDD
Maximum internal storage[4, 5]	73.4 GB[6] internal; up to 293.6 GB[6] with SIO Expansion blade installed
Network	Dual integrated GbE controllers
I/O upgrade	1 PCI-X expansion connector and 1 PCI-Express expansion connector
Systems management hardware	Integrated systems management processor
Standards	NEBS-3/ETSI characteristics
Limited warranty[2]	Three year CRU and on-site limited warranty

IBM BladeCenter LS41	
Processor[7]	AMD Opteron Model 8212, 8212HE, 8214HE, 8216HE, 8218, 8218HE, 8220 and 8222
Number of processors (std/max)	2/4
Cache (max)	1 MB L2 per processor core
Memory[4]	Up to 64 GB DDR II VLP memory
Internal HDDs	2 SAS HDDs
Maximum internal storage[4, 5]	146.8 GB[6] internal; up to 367 GB[6] with SIO blade installed
Network	2 or 4 integrated GbE controllers
I/O upgrade	2 PCI-X expansion connectors and 1 PCI-Express expansion connector
Systems management hardware	Integrated systems management processor
Standards	NEBS-3/ETSI characteristics
Limited warranty[2]	Three year CRU and on-site limited warranty

The new HC10 blade ushers in revolutionary server-based computing technology for workstation applications by offering high security and manageability while delivering outstanding graphics performance.

IBM BladeCenter HC10 at a glance	
Processor[7]	Intel Core 2 Duo up to 2.66 GHz
Number of processors	1
L2 cache	Up to 4 MB
Front-side bus	1066 MHz
Memory[4]	Up to 8 GB DDR II (Non error checking and correction (ECC))
Internal HDDs	One 60 GB 5200 rpm Serial Advanced Technology Attachment (SATA) HDD
Graphics	NVIDIA® FX1600M Advanced 3D Graphics and NVIDIA NVS120M Professional 2D Graphics
Network	Single GbE (TOE-enabled)
I/O upgrade	N/A
Systems management hardware	Integrated systems management processor
Operating Systems	Microsoft® Windows® Vista Business Blade PC Edition preloaded, Microsoft XP Professional, Microsoft XP Professional x64 edition supported
Limited warranty[2]	One year CRU and on-site limited warranty

The JS22 blade server, the power of POWER in a blade server

IBM BladeCenter JS22 at a glance	
Processor[7]	64-bit IBM Power6 up to 4.0 GHz
Number of processors	Up to 2
L2 cache	4 MB per core
Memory bus	1.1 GHz
Memory[4]	Up to 32 GB maximum per blade, four DIMM slots, ECC Chipkill DDR II SDRAM running at 667 MHz
Internal HDDs	One 73 GB or 146 GB 2.5"SAS
Maximum internal storage[4, 5]	Up to 146.8 GB[6]
Network	Integrated P5IOC2 controller with two host Ethernet adapters
I/O upgrade	Integrated PCI-Express connector for high-speed daughter cards
Systems management hardware	Integrated system management processor
Standards	NEBS-3/ETSI characteristics
Limited warranty[2]	Three year on-site, next-business-day

IBM BladeCenter JS21 at a glance	
Processor[7]	64-bit IBM PowerPC 970MP with integrated AltiVec SIMD accelerator up to 2.7 GHz
Number of processors	Up to 2 single- or dual-core
L2 cache	1 MB per core
Memory bus	1.1 GHz
Memory[4]	Up to 16 GB ECC Chipkill DDR II SDRAM running at 533 MHz, 4 DIMM slots
Internal HDDs	Up to two 73.4 GB or 146.8 GB 2.5" SAS
Maximum internal storage[4, 5]	Up to 293.6 GB[6]
Network	2 integrated GbE controllers
I/O upgrade	Integrated PCI-Express connector for high-speed daughter cards
Systems management hardware	Integrated system management processor
Standards	NEBS-3/ETSI characteristics
Limited warranty[2]	Three year on-site, next-business-day

When used to complement systems based on traditional processors, the QS21 blade can yield application results faster and with more fidelity.

IBM BladeCenter QS21 at a glance	
Processor	3.2 GHz Cell/B.E. Processors
Number of processors	Two standard, each with one PPE core and eight SPE cores
L2 cache	512 KB per Cell/B.E. Processor, plus 256 KB of local store memory for each SPE
Memory	2 GB (1 GB per processor)
Internal disk storage	None
Networking	Dual GbE
I/O upgrade	SAS daughter card connected via PCI-X (CFFv)
Optional connectivity	Dual-port InfiniBand 4x HCA connected via PCI-Express (SFF)
Operating systems	Red Hat Enterprise Linux 5.1[8]
Warranty	One year

Blade server options[9]

BladeCenter options

IBM offers a range of options to help create customised solutions to meet your specific business needs. Here below is a partial list of key I/O options.

BladeCenter options	Part number
Ethernet Switches	
Cisco Systems Intelligent GbE Switch Module	32R1892
Cisco Systems Intelligent Gigabit Fibre Ethernet Switch Module	32R1888
Server Connectivity Module	39Y9324
Nortel Layer 2/3 Copper GbE Switch Module	32R1860
Nortel Layer 2/3 Fibre GbE Switch Module	32R1861
Nortel Layer 2-7 GbE Switch Module	32R1859
Nortel Layer 2/3 10 Gb Uplink Ethernet Switch Module	32R1783
Fibre Channel (FC) Switches	
Brocade 20-port 4 Gb SAN Switch Module	32R1812
Brocade 10-port 4 Gb SAN Switch Module	32R1813
QLogic 10-Port 4 Gb FC Switch Module	43W6724
QLogic 20-Port 4 Gb FC Switch Module	43W6725
QLogic 4 Gb Intelligent Pass-Thru Module	43W6723
InfiniBand Switches	
Cisco 4x InfiniBand Switch Module	32R1756
4x InfiniBand Pass-Thru Module	43W4419

BladeCenter options	Part number
Expansion Cards, SIO Options	
36 GB 10,000 rpm SAS non-hot-swap HDDs	26K5776
Multi-Switch Interconnect Module	39Y9314
PCI Expansion Unit II	25K8373
SIO Expansion Blade	39R7563
Memory and I/O Expansion Blade	42C1600
IBM BladeCenter Concurrent KVM Feature Card	26K5939
4 GB Modular Flash Drive	39R8697
73 GB 10,000 rpm SAS non-hot-swap HDD	26K5777
146 GB 10,000 rpm SAS non-hot-swap HDD	42D0421
73 GB 15,000 rpm SAS non-hot-swap HDD	43X0845
73 GB 10,000 rpm SAS hot-swap HDD for SIO	39R7389
146 GB 10,000 rpm SAS hot-swap HDD for SIO	43X0832
73 GB 15,000 rpm SAS hot-swap HDD for SIO	43X0853

BladeCenter options	Part number
Copper Pass-thru Module	39Y9320
Optical Pass-thru Module	39Y9316
Optical Pass-thru Module SC Cable	39Y9171
Optical Pass-thru Module LC Cable	39Y9172
GbE Expansion Card (SFF)	39R8624
Gb Ethernet Expansion Card (CFFv)	39Y9310
NetXen 10 GbE Expansion Card (CFFh)	39Y9271
QLogic 4 Gb SFF FC Expansion Card	26R0890
Emulex 4 Gb SFF FC Expansion Card	39Y9186
QLogic 4 Gb FC Expansion Card (CFFv)	41Y8527
QLogic Ethernet and 4 Gb FC Expansion Card (CFFh)	41Y8527
Myrinet Cluster Expansion Card	73P6000
Cisco 4x InfiniBand HCA Expansion Card	32R1760
QLogic SCSI over IP (iSCSI) Expansion Card	32R1923
BladeCenter Open Fabric Manager	44W3981
BladeCenter Open Fabric Manager-Advanced	46C3551
BladeCenter Open Fabric Manager-Advanced (Director Extension)	46C3552

For more information:

System x home	**ibm.com**/systems/uk/x/
Options	**ibm.com**/servers/eserver/serverproven/compat/us
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[1] For additional details, please refer to Underwriter's Laboratory (UL) certified NEBS Level 3 / ETSI test report.

[2] Warranty information: For a copy of applicable product warranties, contact your local IBM sales representative or visit: **ibm.com**/servers/support/machine_warranties

[3] IBM BladeCenter QS21 requires a separate chassis from other blade servers, and is supported only in the IBM BladeCenter H chassis.

[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] Supported with the availability of the 146.8 GB HDD.

[7] 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.

[8] Red Hat Enterprise Linux 5.1 is scheduled for availability in Q4 2007.

[9] Options support varies by server and chassis platform. Based on IBM internal testing.

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