

Innovative modular technology achieves outstanding performance density and affordable availability



IBM @server BladeCenter solutions



BladeCenter offers the high performance and manageability of IBM rack-optimised platforms. The result is an effectively managed infrastructure that helps maximise resource productivity and minimise IT and network administration costs. BladeCenter gives control back to the IT or network manager.

Highlights

- **IBM Director helps provide comprehensive systems management**
- **Flexible modular technology integrates both Intel® processor-based, IBM PowerPC processor-based and AMD Opteron processor-based blade servers into the IBM @server BladeCenter architecture**
- **BladeCenter T provides a platform for IP-based, next-generation networks.**

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 organisation or communications network so they contribute to business success in today's on demand world.

Take control of your infrastructure

Tackle your server management challenges with BladeCenter. Its design gathers computing resources into high-density enclosures that support hot-swappable, high-performance 2-way and 4-way Intel processor-based and 2-way PowerPC and AMD Opteron processor-based blade servers.

On demand ready

BladeCenter helps businesses be responsive to customers, focused on core competencies, variable to adapt to cost structures flexibly and resilient to face any challenge.

Models of the IBM @server BladeCenter HS20 support Intel Extended Memory 64 Technology (Intel EM64T), the JS20 blade and the LS20 blade provide a smooth transition to 64-bit applications without sacrificing the price/performance of the existing ecosystem.

Advanced manageability:

IBM Director

IBM Director unleashes the power of BladeCenter, giving you comprehensive remote management from a single

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to locate an IBM reseller or for more information

graphical console. IBM Director, which ships with BladeCenter, automates and simplifies IT and networking tasks, letting you deploy, configure, manage and maintain up to hundreds of blade servers.

Advanced management capabilities boost administrator productivity and reduce skill-level requirements, which can help reduce costs, improve overall productivity and make administration easier. IBM Director and BladeCenter deliver incredible control of 2-way and 4-way blade servers.

Tools such as IBM Deployment Wizard and functions such as Automatic Chassis Discovery and Event Action Plans, make infrastructure deployment easy. The Deployment Wizard allows you to save chassis configurations for easy replication. Another tool, Remote Deployment Manager (RDM), gives you the ability to create, maintain and deploy images from a single drag-and-drop user interface.¹

With the tight integration of storage, networking, servers and applications, and IBM Director's common interface for a rich portfolio of management tools, the BladeCenter design is both intelligent and simple. IBM has created an ideal environment to maintain your

data centre. Tools such as light path diagnostics and Predictive Failure Analysis can help reduce administration costs while increasing availability.

Powerful management tools

IBM Director delivers advanced, proactive management, providing rich and broad systems management capabilities. Some of the key optional enhancements in the IBM Director Server Plus Pack include:

- **Capacity Manager**

Helps predict future server bottlenecks and proactively alerts administrators, automating corrective actions to minimise downtime

- **Software Rejuvenation**

Helps predict pending software failures that could lead to costly downtime and automatically refreshes the software to enable optimal operation

- **System Availability**

Tracks and provides graphical views of system downtime or uptime for systems or groups of systems, helping save labour costs

- **Rack Manager**

Provides a graphical drag-and-drop interface that simplifies rack hardware management.

Visit: ibm.com/eserver/xseries/systems_management/xseries_sm.html for more information about IBM Director software.

Designed to solve real-world problems

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

BladeCenter collapses the complexity of the data centre by integrating functions such as Layer 2-7 Ethernet and your Storage Area Network (SAN) or your Infiniband fabric into a 7U enclosure that simplifies deployment and management.

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.

Open specifications

IBM has opened the design specifications for BladeCenter allowing partner 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 adding server modules quickly.

- **Outstanding blade density**
BladeCenter efficiently uses data centre floor space with up to 84 2-way blades or up to 42 4-way blades in a 42U rack. The design features innovative cooling technology and cutting edge processor technology
- **Affordable availability for mission-critical applications**
BladeCenter and BladeCenter T chassis features, such as high-availability midplanes and redundant hot-swap cooling and power, help reduce single points of failure. Tight integration of key components such as networking services, centralised management and applications help to enable high availability.

For rich telecom features and functionality, the BladeCenter T NEBS/ETSI compliant chassis is ideal for deployment of next-generation networks in central offices or data centre environments.

Application flexibility

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

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.

BladeCenter options

These options provide choices to help create customised solutions.

Blade server options²

High-speed interconnect expansion cards

Myrinet and Topspin IB expansion card options provide a high-speed/low-latency interconnect on each blade.

Gigabit Ethernet Expansion Card

Allows expansion of the Ethernet subsystem to enable more bandwidth.

Fibre Channel (FC) Expansion Card

Adds dual-port FC connectivity to each blade server. It works with any of the Brocade and FC Switch Modules.

QLogic iSCSI Expansion Card

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

SCSI or IDE Hard Disk Drives (HDDs)

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

SCSI Storage Expansion Unit

This option provides integrated mirroring capabilities and uses standard hot-swap Ultra320 SCSI HDDs. Also, it allows the addition of two I/O expansion cards to each blade.

PCI I/O Expansion Unit

Each unit connects to an HS20 (model dependent) or HS40 blade server, supporting up to two 100 MHz PCI-X adapters.

Blade chassis options²**Cisco Systems Intelligent Gigabit Ethernet Switch Module**

The Cisco Ethernet switch module provides four external copper Gigabit Ethernet ports and 14 internal Gigabit Ethernet ports interfacing via the BladeCenter midplane to the blade servers.

Brocade Entry and Enterprise Switch Modules

The entry switch module connects to fabrics that consist of two switches and is ideal for smaller Brocade SANs. The enterprise switch module connects to a full SAN of 239 switches and is ideal for larger Brocade SANs.

McDATA Switch Module

Helps reduce complexity and increases SAN manageability, and is designed for high performance with up to 2Gbps throughput on external ports.

QLogic 6-port Enterprise Fibre Channel Switch Module

Fibre Channel switching at an entry price point. It provides higher bandwidth connectivity (up to 24Gbps full duplex) between server blades and SANs.

Nortel Networks Gigabit Ethernet Switch Modules

The Layer 2-7 Switch Module integrates advanced Ethernet functionality into the chassis, decreasing complexity and increasing manageability. The Layer 2/3 switch module provides six copper or fibre uplinks and 14 internal ports.

Copper and Optical Pass-thru Modules

Features a 1GB unswitched, unblocked bidirectional copper or fibre Ethernet connection to each blade server.

Topspin IB Switch Module

Integrates Infiniband connectivity directly into the BladeCenter chassis with up to four 4X uplink connections.

Optical Pass-thru Module

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

Redundant KVM/Management Module

Enables system management resiliency and provides remote management and connectivity to the BladeCenter chassis for the most critical applications.³

Power Supply Modules

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

Acoustic Attenuation Module

Helps minimise audio emissions, a solution for sound-sensitive customers.

BladeCenter options	Part number
Cisco Systems Intelligent Gigabit Ethernet Switch Module	13N2281
Cisco Systems Intelligent Gigabit Fibre Ethernet Switch Module	26K6547
Nortel Networks Layer 2/3 Copper Gigabit Ethernet Switch Module	26K6530
Nortel Networks Layer 2/3 Fibre Gigabit Ethernet Switch Module	26K6531
Nortel Networks Layer 2-7 Gigabit Ethernet Switch Module	73P9057
Gigabit Ethernet Expansion Card	73P9030
SFF Gigabit Ethernet Expansion Card	26K4842
Copper Pass-thru Module	73P6100
Optical Pass-thru Module	02R9080
Optical Pass-thru Module SC Cable	73P5992
Optical Pass-thru Module LC Cable	73P6033

BladeCenter options	Part number
Brocade Entry Switch Module	26K5601
Brocade Enterprise Switch Module	90P0165
McDATA 6-port Fibre Channel Switch Module	32R1790
QLogic 6-port Enterprise Fibre Channel Switch Module	26K6477
Topspin IB Switch Module	26K6454
Fibre Channel Expansion Card	13N2203
Fibre Channel Expansion Card for JS20	73P6112
SFF Fibre Channel Expansion Card	26K4841
QLogic iSCSI Expansion Card	26K6487
Myrinet Cluster Expansion Card	73P6000
SCSI Storage Expansion Unit	26K4847
SCSI Storage Expansion Unit 2	26K4817
PCI I/O Expansion Unit	90P3721

BladeCenter options	Part number
36GB SFF Non-Hot-Swap Ultra320 SCSI HDD	90P1312
73GB SFF Non-Hot-Swap Ultra320 SCSI HDD	90P1313
60GB 5400rpm ATA-100 IDE Drive	25R6904
40GB 5400rpm ATA-100 Hard Disk Drive	25R6906
Redundant KVM/Management Module	48P7055
2000W Power Supply Module	26K4816
Acoustic Attenuation Module	49P2694

Support for IBM TotalStorage 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 TotalStorage DS family of products is an ideal solution.

For more information:

xSeries home

www-1.ibm.com/servers/uk/eserver/xseries

Options

www5.pc.ibm.com/uk/products.nsf/IBM+ESERVER+Brand+Navigator?

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IBM @server BladeCenter at a glance

Form factor	Rack/7U, high-availability midplane
Blade bays	Up to 14 2-way, and up to 7 4-way
Standard media	DVD-ROM and diskette drive accessible from each blade server
Switch modules	4 switch module bays
Power supply module	Up to 4 (hot-swap and redundant 2000W with load balancing and failover capabilities)
Cooling modules	2 hot-swap and redundant blowers standard
Systems management hardware	One management module standard, add an optional second module for redundancy
I/O ports	Keyboard, video, mouse, Ethernet, USB
Systems management software	IBM Director with systems management and trial deployment tools, IBM Director Server Plus Pack optional
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 warranty⁶ and support	3-year on-site limited warranty (the JS20 blades includes additional 3-year CRU ⁷)
External storage⁸	Support for IBM TotalStorage solutions (including DS and NAS family of products)
Operating systems supported	Microsoft Windows Server 2003, Microsoft Windows 2000 Server/Advanced Server, Red Hat Linux, SUSE LINUX, Novell NetWare ⁹ , AIX ¹⁰

BladeCenter servers

BladeCenter supports the IBM @server BladeCenter HS20, a blade server with up to two high-performance Intel Xeon Processors; the IBM @server BladeCenter HS40, a blade server with up to four high-performance Intel Xeon Processors MP; the IBM @server BladeCenter JS20, a PowerPC 970 processor-based blade server and the AMD Opteron LS20 for IBM @server BladeCenter, an AMD Opteron processor-based blade server.

The HS20 blade is ideal for applications such as collaboration, Citrix, Linux clusters and compute-centric applications, while the HS40 blade excels at commerce transactions, databases, ERP/CRM applications and next-generation network applications.

The LS20 blade is a high-performance blade that delivers performance, density and availability. It delivers new levels of flexibility and choice for High Performance Computing applications.

The JS20 delivers a new level of price/performance for the BladeCenter enterprise customer running 32- or 64-bit Linux or UNIX[®] applications. The JS20 is an economical solution for file and print serving, Web serving and collaboration workloads in both Linux and UNIX environments. Also, the processor is enhanced with 162 Single Instruction/Multiple Data (SIMD) instructions. Applications in bioinformatics, seismic processing, crash analysis, digital signal processing and financial services will often be able to effectively use these instructions. They may achieve 20 to 50 percent greater throughput because of increased parallelism in execution.

IBM @server BladeCenter HS20 at a glance

Processor	Intel Xeon Processor up to 3.6 GHz (most models support Intel EM64T)
Number of processors (std/max)	1/2
Cache (max)	1MB or 2MB (model dependent)
Front side bus	Up to 800 MHz
Memory⁴	Up to 8GB PC2-3200 DDR2
Internal hard disk drives	Up to 2 Ultra320 SCSI HDDs installed on each blade (plus support for up to 2 hot-swap Ultra320 SCSI drives with optional SCSI Storage Expansion Unit)
Maximum internal storage^{4,5}	746.8GB (with optional SCSI Storage Expansion Unit)
RAID support	Integrated RAID-1 standard on blade server, integrated RAID-1E with SCSI Expansion Unit 2 option (on select blades)
Network	Dual Gigabit Ethernet
I/O upgrade	1 expansion card connection
Systems management hardware	Integrated systems management processor

IBM @server BladeCenter HS40 at a glance

Processor	Intel Xeon Processor MP up to 3.0 GHz
Number of processors (std/max)	1/4
Level 3 cache	Up to 4MB
Front side bus	400 MHz
Memory⁴	Up to 16GB DDR ECC Chipkill
Internal hard disk drives	Up to 2 non-hot-swap IDE drives (plus support for up to 2 hot-swap Ultra320 SCSI drives with optional SCSI Storage Expansion Unit)
Maximum internal storage^{4,5}	600GB SCSI with optional Storage Expansion Unit and 120GB IDE
RAID support	Integrated RAID 0 and 1 supported
Network	4 integrated Gigabit Ethernet controllers
I/O Upgrade	2 expansion card connections
Systems management hardware	Integrated system management processor



BladeCenter T provides a solid foundation for next-generation networks and rugged environments.

IBM @server BladeCenter JS20 at a glance

Processor	PowerPC 970 at 2.2 GHz (64-bit)
Number of processors	2
Level 2 cache	512KB
Memory bus	1.1 GHz
Memory⁵	Up to 8GB DDR ECC SDRAM
Internal hard disk drives	Up to 2 IDE
Maximum internal storage^{5,6}	120GB
Network	2 integrated Gigabit Ethernet controllers
I/O upgrade	1 expansion card connection
Systems management hardware	Integrated system management processor



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AMD Opteron LS20 for IBM @server BladeCenter at a glance

Processor	AMD Opteron Model 246, 250, 252, 270, 275
Number of processors	2
Level 2 cache	1MB per processing core
Memory⁴	Up to 8GB DDR VLP memory
Internal hard disk drives	Up to 2 Ultra320 SCSI HDDs
Maximum internal storage^{4,5}	146.8GB
Network	Two integrated Gigabit Ethernet controllers
I/O Upgrade	Two expansion card connection
Systems management hardware	Integrated system management processor

¹ The Remote Deployment Manager Tool is not supported on the JS20 blade.

² Options support varies by server and chassis platform.

³ KVM capability not available on JS20.

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 Visit: ibm.com/pc/safecomputing periodically for the latest information on safe and effective computing. Warranty Information: For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12195, RTP, N.C. 27709, Attn: Dept. JDJA/B203. IBM makes no representation or warranty regarding third-party products or services. Telephone support may be subject to additional charges. For on-site labour, IBM will attempt to diagnose and resolve the problem remotely before sending a technician.

⁷ For a copy of the IBM Statement of Limited Warranty, call 1 800 426-7378. Telephone support may be subject to additional charges. For on-site service, IBM sends a technician after attempting to diagnose and resolve the problem remotely. If the problem can be resolved with customer replaceable unit (CRU), then IBM will ship CRU parts to you for your replacement.

⁸ Support for NEBS/ETSI-compliant Fibre Channel SAN via third party. Also, visit the ServerProven Web site at: ibm.com/servers/eserver/serverproven/ for information on tested third-party storage.

⁹ The Novell NetWare operating system is supported on the HS20, HS40 and LS20 blades.

¹⁰ The AIX operating system is supported on the JS20 blade only.