

*Innovative modular technology achieves outstanding performance density and affordable availability*



## IBM @server BladeCenter solutions



---

### Highlights

---

- ***IBM Director helps provide comprehensive systems management***
- ***Flexible modular technology integrates both Intel processor-based and IBM POWER 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 POWER processor-based blade servers.

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.

#### **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.

Now some models of the IBM @server BladeCenter HS20 support Intel Extended Memory 64 Technology (Intel® EM64T) providing investment protection by supporting 32-bit and 64-bit applications. And BladeCenter has expanded its hardware ecosystem by delivering new Cisco and Brocade switch modules to help clients lower the Total Cost of Ownership.

---

### Choose IBM today

---

Go to **[ibm.com/pc/europe/xseries](http://ibm.com/pc/europe/xseries)**

to locate an IBM reseller or for more information

## **Advanced manageability:**

### **IBM Director**

IBM Director unleashes the power of BladeCenter, giving you comprehensive remote management from a single 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 Intel processor-based and 2-way POWER processor-based 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<sup>1</sup>.

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](http://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 data centre by integrating functions such as Layer 2-7 Ethernet and your storage area network (SAN) 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.

The Standby Capacity on Demand offering features a customisable BladeCenter system with a mix of active and standby capacity blades. Pay for the standby blades only after they're activated<sup>2</sup> – helping deliver additional computing capacity when it's needed for a 'pay as you grow' approach.

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 center floor space with up to 84 2-way blades or up to 42 4-way blades in a 42U rack. The design features leading-edge cooling technology and Intel Xeon, Intel Xeon Processor MP and PowerPC 970 processors.*

- **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. This is part of the OnForever features – designed to deliver outstanding operation, helping to increase productivity. 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 20" deep 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 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 options<sup>3</sup>**

##### **Myrinet Cluster Expansion Card**

Provides a high-speed interconnect for high-performance computing applications.

##### **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 Fibre Channel Switch Modules.

### **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 or HS40 blade server, supporting up to two legacy 100MHz PCI-X adapters.

## ***Blade chassis options<sup>3</sup>***

### **Cisco Systems Intelligent Gigabit Ethernet Switch Module**

Integrates Cisco's Ethernet switching technology into the BladeCenter chassis. It 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**

Integrate Brocade technology into the BladeCenter architecture. 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.

### **QLogic 6-port Enterprise Fibre Channel Switch Module**

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

### **4-port Gigabit Ethernet Switch Modules**

Provides high-speed Ethernet connections between each blade server and the outside network environment.

### **Nortel Networks Layer 2-7 Gigabit Ethernet Switch Module**

Integrates advanced Ethernet functionality into the chassis, decreasing complexity and increasing manageability.

### **Copper Pass-thru Module**

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

### **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<sup>4</sup>.

### **Power Supply Modules**

Provide both power and redundancy, bringing greater reliability and availability to your BladeCenter solution.

### **Acoustic Attenuation Module**

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

BladeCenter options	Part number
Cisco Systems Intelligent Gigabit Ethernet Switch Module	13N2281
Nortel Networks Layer 2-7 Gigabit Ethernet Switch Module	73P9057
4-Port Gigabit Ethernet Switch Module	13N0568
Copper Pass-thru Module	73P6100
Gigabit Ethernet Expansion Card	73P9030
SFF Gigabit Ethernet Expansion Card	26K4842
Brocade Entry Switch Module	26K5601
Brocade Enterprise Switch Module	90P0165
QLogic 6-port Enterprise FC Switch Module	26K6477
2-Port FC Switch Module	48P7062
Optical Pass-thru Module	02R9080
Optical Pass-thru Module SC Cable	73P5992
Optical Pass-thru Module LC Cable	73P6033
FC Expansion Card	13N2203
SFF FC Expansion Card	26K4841
Myrinet Cluster Expansion Card	73P6000
SCSI Storage Expansion Unit	26K4847
SCSI Storage Expansion Unit 2	26K4817
PCI I/O Expansion Unit	90P3721
36GB SFF Non-Hot-Swap Ultra320 SCSI HDD	90P1312

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

### Support for IBM TotalStorage solutions network attached storage (NAS)

#### NAS

NAS is a low-cost, remote storage solution giving you great flexibility and scalability for storage needs. Connecting the Gigabit Ethernet switch module to IBM TotalStorage NAS products creates a solution that is easy to deploy and manage.

#### SAN

A SAN is a high-performance, highly flexible architecture for creating remote storage solutions, ideal for Microsoft Exchange configurations. The FC switch modules and FC expansion

cards enable connectivity to each blade server. Connecting to the IBM TotalStorage DS family of products is an ideal solution.

### Choose BladeCenter solutions

#### 1. Innovative technology

- High-performance solution with high reliability targeted at business-critical application workloads
- Integration reduces complexity
- Bringing servers, storage and networking into a single managed environment, BladeCenter simplifies IT management while helping reduce costs.

#### 2. On demand world

- BladeCenter gives businesses the flexibility to architect application solutions that meet business objectives.
- BladeCenter provides advanced systems management capabilities that help simplify operations and make your IT infrastructure more resilient.

#### 3. Solution flexibility

- BladeCenter's comprehensive ecosystem gives you the ability to integrate BladeCenter into the existing environment – so you can standardise data centres around existing infrastructures.

#### 4. A comprehensive solution

- IBM features interoperability between series to make BladeCenter work with midrange, mainframe and existing Intel systems.

### For more information:

**xSeries home**

**ibm.com/pc/europe/xseries**

**Options**

**ibm.com/pc/europe/accessories**

**Contact a Reseller**

**ibm.com/pc/europe/buyibm**

---

**IBM @server BladeCenter at a glance**

---

<b>Form factor</b>	Rack/7U, high-availability midplane
<b>Blade bays</b>	Up to 14 2-way, and up to 7 4-way
<b>Standard media</b>	DVD-ROM and diskette drive accessible from each blade server
<b>Switch modules</b>	4 switch module bays
<b>Power supply module</b>	Up to 4 (hot-swap and redundant 2000W with load balancing and failover capabilities)
<b>Cooling modules</b>	2 hot-swap and redundant blowers standard
<b>Systems management hardware</b>	1 management module standard, add an optional second module for redundancy
<b>I/O ports</b>	Keyboard, video, mouse, Ethernet, USB

---

**IBM @server BladeCenter HS20 at a glance**

---

<b>Processor</b>	Intel Xeon Processor up to 3.60GHz (some models support Intel EM64T)
<b>Number of processors (std/max)</b>	1/2 or 2/2
<b>Level 2 cache</b>	Up to 2MB L3 cache
<b>Front side bus</b>	Up to 800MHz
<b>Memory<sup>5</sup></b>	Up to 8GB <sup>7</sup> PC2-3200 DDR2
<b>Internal hard disk drives</b>	Up to 2 IDE or SCSI installed on each blade (or plus support for up to 2 hot-swap Ultra320 SCSI drives with optional SCSI Storage Expansion Unit)
<b>Maximum internal storage<sup>5,6</sup></b>	373.6GB SCSI
<b>RAID support</b>	Integrated RAID-1 standard on blade server, integrated RAID-1E with SCSI Expansion Unit 2 option (on select blades)
<b>Network</b>	Dual Gigabit Ethernet
<b>I/O upgrade</b>	1 expansion card connection
<b>Systems management hardware</b>	Integrated systems management processor
<b>Systems management software</b>	IBM Director with systems management and trial deployment tools, IBM Director Server Plus Pack optional
<b>Predictive Failure Analysis</b>	HDD, processors, blowers, memory
<b>Light path diagnostics</b>	Blade server, processor, memory, power supplies, blowers, switch module, management module, hard disk drives and expansion card
<b>Limited warranty<sup>8</sup> and support</b>	3-year on-site limited warranty
<b>External storage<sup>9</sup></b>	Support for IBM TotalStorage solutions (including DS and NAS family of products)
<b>Operating systems supported</b>	Microsoft Windows Server 2003, Microsoft Windows 2000 Server/Advanced Server, Red Hat Linux, SUSE Linux, Novell NetWare

---



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

## 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; and the IBM @server BladeCenter JS20, a PowerPC 970 processor-based blade server.

The HS20 blade (some models support 64-bit capability) 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 JS20 (see page 8) delivers a new level of price/performance for the BladeCenter enterprise customer

running 32- or 64-bit Linux or UNIX® applications. With the faster processor speed of 2.2GHz, 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.

Applications written for POWER4 and PowerPC processor-based systems using the SUSE Linux Enterprise Server 8 and 9, Red Hat Enterprise Linux v3 or AIX v5.2 can be executed without recompilation on same and newer models of that processor family with similar operating systems.

The JS20 provides 64-bit Linux and AIX support. This can help customers with data-intensive applications, enabling them to simplify programming and improve application performance.

### IBM @server BladeCenter HS40 at a glance

<b>Processor</b>	Intel Xeon Processor MP up to 3.00GHz
<b>Number of processors</b> (std/max)	1/4
<b>Level 3 cache</b>	Up to 4MB
<b>Front side bus</b>	400MHz
<b>Memory<sup>5</sup></b>	Up to 16GB DDR ECC Chipkill
<b>Internal hard disk drives</b>	Up to 2 hot-swap Ultra320 SCSI drives with optional SCSI storage expansion unit
<b>Maximum internal storage<sup>5,6</sup></b>	293.6GB SCSI
<b>RAID support</b>	Integrated RAID with SCSI storage expansion unit option
<b>Network</b>	4 integrated Gigabit Ethernet controllers
<b>I/O upgrade</b>	2 expansion card connections
<b>Systems management hardware</b>	Integrated system management processor
<b>Systems management software</b>	IBM Director with systems management and trial deployment tools, IBM Director Server Plus Pack optional
<b>Predictive Failure Analysis</b>	Hard disk drives, processors, blowers, memory
<b>Light path diagnostics</b>	Blade server, processor, memory, power supplies, blowers, switch module, management module, hard disk drives and expansion card
<b>Limited warranty<sup>8</sup> and support</b>	3-year on-site limited warranty
<b>External storage<sup>9</sup></b>	Support for IBM TotalStorage solutions (including DS and NAS family of products)
<b>Operating systems supported</b>	Microsoft Windows Server 2003, Microsoft Windows 2000 Server/Advanced Server, Red Hat Linux, SUSE Linux, Novell NetWare

## IBM @server BladeCenter JS20 at a glance



<b>Processor</b>	PowerPC 970 at 2.2GHz (64-bit)
<b>Number of processors</b>	2
<b>Level 2 cache</b>	512KB
<b>Memory bus</b>	1.1GHz
<b>Memory<sup>5</sup></b>	Up to 4GB DDR ECC SDRAM
<b>Internal hard disk drives</b>	Up to 2 IDE
<b>Maximum internal storage<sup>5,6</sup></b>	80GB
<b>Network</b>	2 integrated Gigabit Ethernet controllers
<b>I/O upgrade</b>	1 expansion card connection
<b>Systems management hardware</b>	Integrated system management processor
<b>Systems management software</b>	Cluster Systems Management and IBM Director
<b>Predictive Failure Analysis</b>	HDDs, processors, blowers, memory
<b>Light path diagnostics</b>	Blade server, processor, memory, power supplies, blowers, switch module, management module, hard disk drives and expansion card
<b>Limited warranty<sup>10</sup> and support</b>	3-year CRU and on-site limited warranty
<b>External storage</b>	Support for IBM TotalStorage solutions (including DS and NAS family of products)
<b>Operating systems supported</b>	SUSE LINUX Enterprise Server 8 and 9, Red Hat Enterprise Linux v3 and AIX 5L v5.2

### IBM United Kingdom Limited

emea marketing and publishing services  
(emaps)  
Normandy House  
PO Box 32  
Bunnian Place  
Basingstoke  
RG21 7EJ  
United Kingdom

The IBM home page can be found at **ibm.com**

IBM, the IBM logo, ibm.com, AIX, BladeCenter, Chipkill, @server, OnForever, POWER, POWER4, POWERPC, Predictive Failure Analysis and TotalStorage are trademarks of International Business Machines Corporation in the United States, other countries, or both.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries, or both.

Intel is a trademarks of Intel Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product and service names may be trademarks, or service marks of others.

References in this publication to IBM products, programs or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program or service is not intended to imply that only IBM products, programs or services may be used. Any functionally equivalent product, program or service may be used instead.

IBM hardware products are manufactured from new parts, or new and used parts. In some cases, the hardware product may not be new and may have been previously installed. Regardless, IBM warranty terms apply.

This publication is for general guidance only. Information is subject to change without notice. Please contact your local IBM sales office or reseller for latest information on IBM products and services.

Photographs may show design models.

© Copyright IBM Corporation 2004  
All Rights Reserved.

<sup>1</sup>The Remote Deployment Manager Tool is not supported on the JS20 blade.

<sup>2</sup>The Standby Capacity on Demand offering requires agreement to purchase all standby blades within six months of delivery.

<sup>3</sup>Options support varies by server and chassis platform.

<sup>4</sup>KVM capability not available on JS20.

<sup>5</sup>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.

<sup>6</sup>When referring to storage capacity, GB means 1,000,000,000 and TB means 1,000,000,000,000. Accessible capacity is less.

<sup>7</sup>When 2GB PC2-3200 DIMMs are available.

<sup>8</sup>Visit **ibm.com/servers/support/machine\_warranties** periodically for the latest information on safe and effective computing. Warranty Information: For a copy of applicable product warranties, contact your local IBM sales representative or visit **ibm.com/servers/support/machine\_warranties** 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.

<sup>9</sup>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.

<sup>10</sup>For a copy of the IBM Statement of Limited Warranty, call +44 (0) 1475 555 055. Telephone support may be subject to additional charges. For onsite 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.