

Open, easy and green to fit your diverse business needs



## IBM BladeCenter: The right choice



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## Highlights

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- ***Realize 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 organization 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, 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.

### Realize innovation

Your business needs continually change. IBM understands that there's no 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.

One of many BladeCenter innovations is the BladeCenter S chassis, which can be deployed in minutes and uses standard office power. 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. Delivering an integrated business system, the i Edition Express for BladeCenter S includes a JS12 Express blade server along with IBM i for 10 users combined with a BladeCenter S chassis, at an attractive starting price. The i Edition Express for BladeCenter S helps the small or mid-sized company

that seeks simplicity and value to avoid increased spending and staffing requirements while becoming more responsive to the demands of a growing business.

BladeCenter Start Now Advisor removes technical hurdles by providing all you need to get your BladeCenter S up and running. Simply insert a DVD, and Start Now Advisor will do the work of sorting out what your specific solution has and needs so you can spend time running your business.

Like IBM System x™ servers, many BladeCenter servers are built on IBM X-Architecture® 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 organization for blade solutions.

Match your data center needs with the appropriate interconnect, selecting from multiple I/O 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 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.

BladeCenter Open Fabric Manager makes it even easier to deploy your blades with preconfigured connections and a simple graphic user interface. 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 graphic user interface 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.

Virtualizing on BladeCenter allows you to create a highly flexible infrastructure that can quickly and easily adapt to business changes. BladeCenter, a comprehensive virtualization solution, is the only blade server solution in the industry that allows you to consolidate and simplify your Linux®, UNIX®, IBM i operating system and Windows® workloads on a single platform. When business transformation is your goal, BladeCenter and virtualization is the answer. Together, virtualization and BladeCenter help reduce costs, increase business agility and boost IT resiliency.

Take advantage of the industry's only click "n" scale blade with the IBM BladeCenter LS42. Simply purchase a lower-cost two-socket, singlewide blade and add a multi-processor expansion unit to scale to a four-socket double-wide blade, providing lower price of entry and investment protection.

### **Go green and save**

You want to control your power and cooling environment and help minimize 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™ helps optimize energy efficiency so you can be more responsive to energy needs and costs.

### **Choose right**

BladeCenter is the right choice, tailored to fit your diverse operational 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](http://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
<b>Benefits</b>	All-in-one chassis with integrated SAN, ideal for small offices and distributed environments	Energy-efficient, high-density chassis ideal for space and power- constrained data centers	High-performance and high-density chassis ideal for even the most demanding applications	Ruggedized NEBS-3/ETSI-compliant chassis ideal for harsh environments and demanding conditions	Ruggedized NEBS-3/ETSI-compliant chassis ideal for next-generation, high-performance applications.
<b>Best in class environments</b>	Small offices and distributed environments, 110 or 220 volts	Energy-efficient, high density	High-performance density	Industrial, military, telecommunications and ruggedized	Ultimate combination of ruggedized and high performance
<b>Rack form factor</b>	7U	7U	9U	8U	12U
<b>Blade bays</b>	6	14	14	8	12
<b>Standard media</b>	DVD-RW/CD-RW	DVD-ROM, floppy	DVD/CD-RW	DVD-ROM, floppy	USB external
<b>Number of switch fabrics</b>	Up to 4	Up to 4	Up to: 4 legacy, 4 high-speed, 4 bridge	Up to 4	Up to: 4 legacy, 4 high-speed, 4 bridge
<b>Power supply module</b>	Up to four hot-swap and redundant 950W/1450W AC	2000W AC	Up to four hot-swap and redundant 2900W AC	1300W AC or 1300W DC	3160W AC or 3160W DC
<b>Systems management controller</b>	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
<b>NEBS-/ETSI-characteristics<sup>1</sup></b>	No	No	No	Yes	Yes
<b>4X InfiniBand® or 10 Gb Ethernet capability (internal)</b>	No	No	Yes	No	Yes
<b>Common external ports</b>	KVM, Ethernet, USB, Serial				
<b>Systems management software</b>	IBM Systems Director with systems management and trial deployment tools, Advanced Management Module, Management Module (BladeCenter T only), Storage Configuration Manager (BladeCenter S only)				
<b>IBM 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>2</sup></b>	3-year customer replaceable unit and onsite limited warranty				
<b>External storage</b>	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 OS initialization 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 clients 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, ERP/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 IBM BladeCenter LS22, LS21, LS42 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 Power Architecture® technology-based blade servers, the JS22 POWER6™ processor-based and JS21 PowerPC® 970 processor-based blades.

With the JS22, the flexibility to use the leading-edge AIX® (industrial-strength UNIX from IBM), IBM i<sup>3</sup> and Linux operating systems—concurrently if desired—broadens the application offerings available and increases the ways clients can put this power to work.

BladeCenter offers a broad choice of operating systems that allows you to deploy a wide choice of applications. On the HS21, HS21 XM, LS21 and LS41 blade servers choose from Microsoft® Windows Server®, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Open Enterprise Server and Solaris 10. With the JS21 and JS22 blades, choose from AIX, IBM i operating system<sup>10</sup>, Red Hat Enterprise Server or SUSE Linux Enterprise Server.

The feature-rich HS12 and JS12 Express are the first uni-socket blade servers to bring significant benefits to clients who want a durable server solution for consolidating multiple applications and servers into a single BladeCenter chassis transitioning from traditional rack-mount or desk-side servers to highly efficient blades. The HS12 is a versatile, affordable blade server for Web-serving and file and print applications that does

not require a second processor. The JS12 Express blade server is a powerful new alternative to a traditional AIX, IBM i or Linux-based rack-mount and desk-side server. Combined with a BladeCenter S chassis, both the HS12 and the JS12 provide exceptional value and expandability in an attractively packaged and highly efficient design.

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 QS22, your BladeCenter choices continue to expand. The QS22 is based on the innovative multi-core IBM PowerXCell 8i processor, a new generation processor based on the Cell Broadband Engine (Cell/B.E.) Architecture. Offering extraordinary double precision floating-point processing power, the QS22

can yield application results faster and with more fidelity. This can enable organizations to get information faster to facilitate important business decisions.

And the new IBM BladeCenter PN41 performs Deep Packet Inspection and analysis of network traffic—a powerful approach that delivers network traffic insight and helps organizations stay competitive in the marketplace. The IBM BladeCenter PN41 delivers outstanding security to help protect a network infrastructure.

<b>At a glance</b>	<b>IBM BladeCenter HS12</b>	<b>IBM BladeCenter HS21</b>	<b>IBM BladeCenter HS21 extended memory (XM)</b>
<b>Processor</b>	Single- or Dual-Core Intel® Xeon® up to 3.0 GHz or Quad-Core Intel Xeon up to 2.83 GHz and up to 1333 MHz front-side bus	Dual-Core Intel Xeon up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon up to 3.33 GHz and up to 1333 MHz front-side bus	Dual-Core Intel Xeon up to 3.0 GHz and up to 1333 MHz front-side bus or Quad-Core Intel Xeon up to 3.0 GHz and up to 1333 MHz front-side bus
<b>Number of processors</b> (std/max)	1/1	1/2	
<b>Cache</b> (max)	Up to 6 MB L2 shared (dual-core) or 2x6 MB L2 (quad-core)	6 MB L2 shared (dual-core) or 2x6 MB (12 MB) L2 (quad-core)	
<b>Front-side bus</b>	Up to 1333 MHz		
<b>Memory</b> <sup>5</sup>	24 GB	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
<b>Internal hard disk drives</b>	Choice of hot-swap solid-state, hot-swap SAS or non-hot-swap SATA HDDs, (support for up to three hot-swap SAS drives with optional Storage and I/O blade)	Up to two Small Form Factor (2.5") 10,000rpm SAS HDDs installed on each blade (plus support for up to 3 additional hot-swap SAS drives with optional Storage and I/O blade)	One Small Form Factor (2.5") 10,000rpm SAS HDD installed on each blade and one or two optional internal 15.8 GB 2.5" Solid State Drives or one optional IBM 8 GB Modular Flash Drive (or support for up to 3 hot-swap SAS drives with optional Storage and I/O blade)
<b>Maximum internal storage</b> <sup>5,6</sup>	293.6 GB	734 GB with optional Storage and I/O Expansion Unit	587.2 GB with optional Storage and I/O blade
<b>RAID support</b>	Integrated RAID-0 or -1 standard on hot-swap models; optional hardware RAID-5 on SIO to protect critical data (select models)	Integrated RAID-0 or -1 standard on blade server, integrated RAID-1E or RAID-5 optional with Storage and I/O blade	Integrated RAID-0 or -1 standard on blade server, integrated RAID-1E or RAID-5 optional on drives in SIO Blade
<b>Network</b>	Dual Gigabit Ethernet, up to 8 ports optional	Dual Gigabit Ethernet (TOE-enabled), up to 8 ports optional	Dual Gigabit Ethernet (TOE-enabled), up to 12 ports optional with SIO blade and MSIM card
<b>I/O upgrade</b>	1 PCI-Express expansion card connection and 1 PCI-Express high-speed connection	1 PCI-X expansion card connection (traditional) and 1 PCI-Express (high speed)	
<b>Systems management hardware</b>	Integrated system management processor (iBMC); UpdateXpress, Remote Deployment Manager, IBM Systems Director, IBM Systems Director Active Energy Manager™, ServerGuide™ 7.x, Scripting Toolkit 1.x	Integrated systems management processor	
<b>OS support (available for purchase)</b> <sup>7</sup>	Microsoft Windows Server <sup>7</sup> , Red Hat Enterprise Linux <sup>7</sup> , SUSE Linux Enterprise Server <sup>7</sup> , VMware Infrastructure <sup>7</sup> , IBM OS 4690	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware Infrastructure, Solaris 10	
<b>Virtualization (available for purchase)</b> <sup>7</sup>	Red Hat Enterprise Linux (with Xen), SUSE Linux Enterprise Server (with Xen)	Red Hat Enterprise Linux (with Xen), SUSE Linux Enterprise Server (with Xen), VMware Infrastructure	
<b>Standards</b>	NEBS/ETSI characteristics	NEBS/ETSI characteristics	NEBS/ETSI characteristics
<b>Limited warranty</b> <sup>2</sup>	1-year or 3-year customer replaceable unit and onsite limited warranty	3-year customer replaceable unit and onsite limited warranty	



<b>At a glance</b>	<b>IBM BladeCenter LS22</b>	<b>IBM BladeCenter LS21</b>	<b>IBM BladeCenter LS42</b>	<b>IBM BladeCenter LS41</b>
<b>Processor<sup>8</sup></b>	Quad-core AMD Opteron models 2347 HE and 2356	AMD Opteron Model 2210EE, 2216HE, 2218HE, 2220 and 2222	Quad-core AMD Opteron processor 8347 HE and 8356	AMD Opteron Model 8214HE, 8216HE, 8218, 8220 and 8222
<b>Number of processors</b> (std/max)	1/2	1/2	1/4	1/4
<b>Cache</b> (max)	2 MB L2			
<b>Memory<sup>5</sup></b>	Up to 32 GB DDR II VLP (800 MHz)	Up to 32 GB DDR II VLP memory	Up to 64 GB DDR II VLP (800 MHz)	Up to 64 GB DDR II VLP memory
<b>Internal hard disk drives</b>	Up to 293.6 GB	One SAS HDD up to 146.8 GB; 16 GB or 32 GB solid state drive	Up to 293.6 GB	2 SAS HDDs up to 146.8 GB each; 16 GB or 32 GB solid state drive
<b>Maximum internal storage<sup>5, 6</sup></b>	293.6 GB internally; up to 62.8 GB using solid-state drives	146.8 GB internal; up to 587.2 GB with Storage and I/O Expansion blade installed; up to 32 GB solid state drive	293.6 GB internally; up to 62.8 GB using solid-state drives	293.6 GB internal; up to 734 GB with Storage and I/O blade installed; up to 64 GB using solid state drives
<b>Network</b>	2 integrated Gigabit Ethernet controllers	Dual integrated Gigabit Ethernet controllers	2 or 4 integrated Gigabit Ethernet controllers	2 or 4 integrated Gigabit Ethernet controllers
<b>I/O upgrade</b>	1 PCI-X expansion connector and 1 PCI-Express expansion connector	1 PCI-X expansion connector and 1 PCI-Express expansion connector	2 PCI-X expansion connectors and 1 PCI-Express expansion connector	2 PCI-X expansion connectors and 1 PCI-Express expansion connector
<b>Systems management hardware</b>	Integrated systems management processor			
<b>Operating system support (available for purchase)<sup>7</sup></b>	Microsoft Windows, Linux and VMware	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware Infrastructure, Solaris 10	Microsoft Windows, Linux, VMware and Sun Solaris	Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware Infrastructure
<b>Virtualization (available for purchase)<sup>7</sup></b>	Red Hat Enterprise Linux (with Xen), SUSE Linux Enterprise Server (with Xen), VMware Infrastructure			
<b>Standards</b>	not applicable	NEBS-3/ETSI characteristics	not applicable	NEBS-3/ETSI characteristics
<b>Limited warranty<sup>2</sup></b>	3-year customer replaceable unit and onsite limited warranty			

<b>At a glance</b>	<b>IBM BladeCenter JS12</b>	<b>IBM BladeCenter JS22</b>	<b>IBM BladeCenter JS21</b>
<b>Processor<sup>8</sup></b>	64-bit IBM POWER6 3.8 GHz with integrated AltiVec SIMD accelerator	64-bit IBM POWER6 up to 4.0 GHz with integrated AltiVec SIMD accelerator	64-bit IBM PowerPC 970MP with integrated AltiVec SIMD accelerator up to 2.7 GHz
<b>Number of processors</b>	Two	Four	Up to 2 single- or dual-core
<b>Level 2 cache</b>	4 MB per core		1 MB per core
<b>Memory bus</b>	1.1 GHz		
<b>Memory<sup>5</sup></b>	Up to 64 GB maximum per blade, eight DIMM slots, ECC Chipkill™ DDR II SDRAM running at 667 MHz	Up to 32 GB maximum per blade, four DIMM slots, ECC Chipkill™ DDR II SDRAM running at 667 MHz	Up to 16 GB ECC Chipkill DDR II SDRAM running at 533 MHz, 4 DIMM slots
<b>Internal hard disk drives</b>	Two 73 GB or 146 GB 2.5" Serial Attached SCSI (SAS)	One 73 GB or 146 GB 2.5" Serial Attached SCSI (SAS)	Up to two 73.4 GB or 146.8 GB 2.5" SAS
<b>Maximum internal storage<sup>5, 6</sup></b>	Up to 293.6 GB	Up to 146.8 GB	Up to 293.6 GB
<b>Network</b>	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual Gigabit Ethernet daughter card	Integrated P5IOC2 controller with two host Ethernet adapters	Two integrated Gigabit Ethernet controllers
<b>I/O upgrade</b>	Integrated PCI-Express connector for high-speed daughter cards, integrated connector for legacy daughter cards	Integrated PCI-Express connector for high-speed daughter cards	Integrated PCI-Express connector for high-speed daughter cards
<b>Systems management hardware</b>	Integrated system management processor		
<b>OS support (available for purchase)<sup>7</sup></b>	AIX V5.3 or later, IBM i V61 or later, SUSE Linux Enterprise Server 10 for POWER™ (SLES10 SP1) or later; Red Hat Enterprise Linux for POWER Version 4.6 (RHEL4.6) or later	AIX, Red Hat Enterprise Linux, SUSE Linux Enterprise Server	
<b>Virtualization (built-in feature)</b>	PowerVM Standard Edition	AIX	
<b>Standards</b>	NEBS-3/ETSI characteristics		
<b>Limited warranty<sup>2</sup></b>	3-year onsite, next-business-day		

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**IBM BladeCenter HC10 at a glance**

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<b>Processor<sup>8</sup></b>	Intel Core™ 2 Duo up to 2.66 GHz
<b>Number of processors</b>	1
<b>Level 2 cache</b>	Up to 4 MB
<b>Front-side bus</b>	1066 MHz
<b>Memory<sup>5</sup></b>	Up to 8 GB DDR II (Non ECC)
<b>Internal hard disk drives</b>	One 60 GB 5200rpm SATA HDD
<b>Graphics</b>	NVIDIA FX1600M Advanced 3D Graphics and NVIDIA NVS120M Professional 2D Graphics
<b>Network</b>	Single Gigabit Ethernet (TOE-enabled)
<b>I/O upgrade</b>	N/A
<b>Systems management hardware</b>	Integrated systems management processor
<b>Operating system support (may be available for purchase)</b>	Microsoft Windows Vista® Business Blade PC Edition <sup>7</sup> , Microsoft XP Professional, Microsoft XP Professional x64 edition
<b>Limited warranty<sup>2</sup></b>	1-year customer replaceable unit and onsite limited warranty

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<b>At a glance</b>	<b>IBM BladeCenter QS21<sup>4</sup></b>	<b>IBM BladeCenter QS22</b>
<b>Processor</b>	3.2 GHz Cell/B.E. Processors	3.2 GHz IBM PowerXCell 8i Processors
<b>Number of processors</b>	Two standard, each with one PPE core and eight SPE cores	Two standard, each with one PPE core and eight enhanced double precision (eDP) SPE cores
<b>L2 cache</b>	512 KB per Cell/B.E. Processor, plus 256 KB of local store memory for each SPE	512 KB per IBM PowerXCell 8i Processor, plus 256 KB of local store memory for each eDP SPE
<b>Memory</b>	2 GB (1 GB per processor)	Up to 32 GB (16 GB per processor)
<b>Internal disk storage</b>	None	Optional 8 GB modular flash drive
<b>Networking</b>	Dual Gigabit Ethernet	Dual Gigabit Ethernet
<b>I/O upgrade</b>	Serial Attached SCSI (SAS) daughter card connected via PCI-X (CFFv)	Serial Attached SCSI (SAS) daughter card connected via PCI-X (CFFv)
<b>Optional connectivity</b>	Dual-port InfiniBand 4x HCA connected via PCI-Express (SFF)	Dual-port InfiniBand 4x HCA connected via PCI-Express (SFF)
<b>Operating system support (available for purchase)<sup>7</sup></b>	Red Hat Enterprise Linux 5.1 <sup>7</sup>	Red Hat Enterprise Linux 5.2 (upon availability)
<b>Virtualization (available for purchase)<sup>7</sup></b>	Red Hat Enterprise Linux (with Xen)	Red Hat Enterprise Linux (with Xen)
<b>Warranty</b>	1-year	3-year

## IBM BladeCenter PN41 at a glance

<b>Processor</b>	Contains an Intel® IXP2805 network processor for use in handling packets
<b>Memory</b>	Contains multiple types of memory including TCAM, QDR and RDRAM. Note: Memory is dedicated to packet processing and is not expandable
<b>Drives</b>	Contains no disk or flash drives
<b>REGEX engine</b>	Contains a Regular Expression accelerator to speed up searches
<b>Front 10 Gb connector</b>	XFP connection to 10 Gb Ethernet (optical)
<b>Capture port</b>	Front SFP connector used for data capture and debugging
<b>Electrical input</b>	12 V dc
<b>Integrated functions</b>	Quad 1 Gb Ethernet controllers; quad 10 Gb Ethernet controllers used in promiscuous mode; local service processor: baseboard management controller (BMC) with Intelligent Platform Management Interface (IPMI) firmware; RS-485 interface for communication with the management module; Automatic server restart
<b>Environment</b>	<b>Air temperature:</b> <ul style="list-style-type: none"><li>• Security blade on: 10° to 35° C (50° to 95° F); altitude: 0 to 914 m (0 to 3,000 ft.)</li><li>• Security blade on: 10° to 32° C (50° to 90° F); altitude: 914 to 2,134 m (3,000 to 7,000 ft.)</li><li>• Security blade off: -40° to 60° C (-40° to 140° F)</li></ul> <b>Humidity:</b> <ul style="list-style-type: none"><li>• Security blade on: 8% to 80%; security blade off: 5% to 80%</li></ul>
<b>Size</b>	Height; 24.5 cm (9.7 inches), Depth; 44.6 cm (17.6 inches), Width; 2.9 cm (1.14 inches)

## BladeCenter options

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

## Blade server options<sup>9</sup>

BladeCenter options	Part number
<b>Ethernet Switches</b>	
Cisco Catalyst Switch Module 3012	43W4395
Cisco Catalyst Switch Module 3110x	41Y8522
Cisco Catalyst Switch Module 3110g	41Y8523
Intelligent Copper Pass-Thru Module	44W4483
Cisco Systems Intelligent Gigabit Ethernet Switch Module	32R1892
Cisco Systems Intelligent Gigabit Fiber Ethernet Switch Module	32R1888
Server Connectivity Module	39Y9324
Nortel 10 Gb Ethernet Switch Module	39Y9267
Nortel 1/10 Gb Uplink Ethernet Switch Module	44W4404
Nortel Layer 2/3 Copper Gigabit Ethernet Switch Module	32R1860
Nortel Layer 2/3 Fiber Gigabit Ethernet Switch Module	32R1861

BladeCenter options	Part number
Nortel Layer 2-7 Gigabit Ethernet Switch Module	32R1859
Nortel Layer 2/3 10 Gb Uplink Ethernet Switch Module	32R1783
<b>Fibre Channel Switches</b>	
Cisco 4 Gb 10-port Fibre Channel Switch Module	39Y9284
Cisco 4 Gb 20-port Fibre Channel Switch Module	39Y9280
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

BladeCenter options	Part number
<b>SAS Switches</b>	
BladeCenter S SAS Controller Module	43W3584
BladeCenter SAS Connectivity Module	39Y9195
<b>InfiniBand Switches</b>	
Cisco 4x InfiniBand Switch Module	32R1756
QLogic InfiniBand Fibre Channel Bridge Module	39Y9211
QLogic InfiniBand Ethernet Bridge Module	39Y9207
4x InfiniBand Pass-Thru Module	43W4419
<b>Expansion Cards, Storage and I/O Options</b>	
SAS Expansion Card (CFFv) for IBM BladeCenter	39Y9190
SAS Connectivity Card (CFFv) for IBM BladeCenter	43W3974
36 GB 10,000rpm SAS non-hot-swap hard disk drive	26K5776

BladeCenter options	Part number
Multi-Switch Interconnect Module	39Y9314
PCI Expansion Unit II	25K8373
Storage and I/O 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 10,000rpm SAS non-hot-swap hard disk drive	26K5777
146 GB 10,000rpm SAS non-hot-swap hard disk drive	42D0421
73 GB 15,000rpm SAS non-hot-swap hard disk drive	43X0845
73 GB 10,000rpm SAS hot-swap hard disk drive for SIO	39R7389

BladeCenter options	Part number
146 GB 10,000rpm SAS hot-swap hard disk drive for SIO	43X0832
73 GB 15,000rpm SAS hot-swap hard disk drive for SIO	43X0853
15.8 GB SSD SATA SFF NHS	43W7614
31.4 GB SSD SATA SFF NHS	43W7618
Copper Pass-thru Module	39Y9320
Optical Pass-thru Module	39Y9316
Optical Pass-thru Module SC Cable	39Y9171
Optical Pass-thru Module LC Cable	39Y9172
Gigabit Ethernet Expansion Card (SFF)	39R8624
Gb Ethernet Expansion Card (CFFv)	39Y9310
NetXen 10 Gb Ethernet Expansion Card (CFFh)	39Y9271
QLogic 4 Gb SFF Fibre Channel Expansion Card	26R0890

BladeCenter options	Part number
Emulex 4 Gb SFF Fibre Channel Expansion Card	39Y9186
QLogic 4 Gb Fibre Channel Expansion Card (CFFv)	41Y8527
QLogic Ethernet and 4 Gb Fibre Channel Expansion Card (CFFh)	41Y8527
Myrinet Cluster Expansion Card	73P6000
Cisco 4x InfiniBand HCA Expansion Card	32R1760
QLogic iSCSI Expansion Card	32R1923
BladeCenter Open Fabric Manager	44W3981
BladeCenter Open Fabric Manager-Advanced	46C3551
BladeCenter Open Fabric Manager-Advanced (Director Extension)	46C3552



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## For more information

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### World Wide Web

U.S. [ibm.com/systems/bladecenter](http://ibm.com/systems/bladecenter)  
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<sup>3</sup> The IBM i operating system is only supported on the BladeCenter H chassis. In addition, some of the IBM BladeCenter functions may not be supported by the i operating system. These are identified at [ibm.com/systems/bladecenter/js22e/index.html](http://ibm.com/systems/bladecenter/js22e/index.html)

<sup>4</sup> IBM BladeCenter QS21 requires a separate chassis from other blade servers and is supported only in the IBM BladeCenter H chassis.

<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> Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware Infrastructure, Solaris 10, and AIX are available for purchase with new hardware in most countries either directly from IBM or through IBM Business Partners.

<sup>8</sup> 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.

<sup>9</sup> Options support varies by server and chassis platform. Based on IBM internal testing.

<sup>10</sup> The IBM i operating system is available only on the JS12 and J22 blades.

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IBM Systems and Technology Group  
Route 100  
Somers, NY 10589

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