

# IBM BladeCenter: Build smarter IT

*Reduce costs. Improve service. Manage risk.*



## Highlights

- Realize innovation with a flexible, scalable architecture that lets you choose the right solution for your dynamic business
- Manage complexity and growth with easy deployment using IBM BladeCenter® Open Fabric Manager and IBM Systems Director
- Maximize performance and minimize costs; consolidate workloads and virtualize on an energy-efficient platform that supports the latest POWER7™ processor technology
- Stay up and running with an intelligent system design that includes multiple layers of redundancy and reliability combined with advanced availability tools
- Consolidate on BladeCenter servers and virtualize applications to better utilize resources and amplify the already-significant advantages of BladeCenter efficiencies
- Keep the network flexible by utilizing IBM Virtual Fabric, which can be multiple networking technologies as required

## 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. With its industry-leading flexibility, BladeCenter is the right choice for your dynamic business.

IBM Virtual Fabric, an innovative fabric can be multiple networking technologies at the same time, such as Ethernet, FCoE, or iSCSI, operating at speeds from 100 Mb to 10 Gb. By using the virtual fabric solution, you can quadruple the



number of virtual adapters by server, while at the same time reducing switch modules by up to 75 percent.

BladeCenter's 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. 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. The IBM 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.

### **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 or IBM Virtual Fabric, which can become multiple networking technologies. IBM BladeCenter Open Fabric is an integrated server I/O portfolio that provides a comprehensive set of interconnects and smart management tools. 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 automatic 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.

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.

In addition, many virtualized environments today have exceeded 1 Gb bandwidth. Adding multiple adapters and switches required for virtualization adds significant cost and complexity. With IBM Virtual Fabric solution, clients can select multiple networking technologies as needed, while also choosing the bandwidth per technology. This allows IT managers freedom from complex LAN vs. SAN capacity planning. Simply change Virtual Fabric via easy management tools to become any networking technology at any networking speed.

### **Reduce energy costs**

You want to control your power and cooling environment and help minimize environmental impacts. BladeCenter offers energy-efficient designs and powerful 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.

### **IBM Systems Director**

IBM Systems Director provides easy-to-use, powerful tools for managing both physical and virtual resources for System x and BladeCenter and other IBM and non-IBM systems. It provides simplified deployment, installation and update processes, and can be accessed from anywhere with a consistent, Web-based user interface. New tasks can be quickly learned with intuitive wizards, tutorials and integrated help. The broad portfolio of systems managed by a single tool can reduce staff training and operational expenses.

**BladeCenter chassis at a glance**

	<b>BladeCenter S</b>	<b>BladeCenter E</b>	<b>BladeCenter H</b>	<b>BladeCenter T</b>	<b>BladeCenter HT</b>
<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>	Standard office	Space- and power-constrained	High-performance density	Telco and ruggedized	Telco and ruggedized
<b>Rack form factor</b>	7U	7U	9U	8U	12U
<b>Blade bays</b>	6	14	14	8	12
<b>Number of switch fabrics</b>	Up to 4	Up to 4	Up to: 4 standard, 4 high-speed, 4 bridge	Up to 4	Up to: 4 standard, 4 high-speed, 4 bridge
<b>Power supply modules</b>	Up to four 950 W / 1450 W ac	Up to four 2000 W or 2320 W ac	Up to four 2900 W ac	1300 W ac or 1300 W dc	3160 W ac or 3160 W dc
<b>Systems management controller</b>	Advanced Management Module (aMM)	Up to two aMMs	Up to two aMMs	Up to two BCT aMMs	Up to two aMMs
<b>NEBS-/ETSI-characteristics'</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>	Front: 2x USB Rear: aMM; 4x USB, Video, Ethernet	Front: 1x USB Rear: aMM; 4x USB, Video, Ethernet	Front: 2x USB Rear: aMM; 4x USB, Video, Ethernet	Front: 2x USB Rear: PS/2 Mouse, PS/2 Keyboard, video, Ethernet, alarm panel	Front: 2x USB Rear: aMM; 4x USB, Video, Ethernet
<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>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 on-site limited warranty				
<b>External storage</b>	Support for IBM System Storage® solutions				

## IBM System Storage DS3000

Take an overburdened internal storage infrastructure to the next level by using the flexible and affordable DS3000 series of storage systems. The DS3000 series combines next-generation technology with time-proven designs for external storage and intuitive-management interface to create a fully featured, shared-storage system. The 2U rack-mount enclosures with 12 easily accessible disks supports both SAS and SATA drives and are expandable up to 48 drives by attaching up to three EXP3000s. Supported by all BladeCenter chassis, the DS3000 series can increase the capacity, management efficiency and availability of your storage.

## BladeCenter servers

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 HS22 and HS22V have up to two high-performance Intel® Xeon® processors. Other popular server choices include scalable IBM BladeCenter LS22 and LS42 server blade solutions. IBM brings the extraordinary value of BladeCenter to the UNIX, i and Linux market with its family of POWER7 processor-based blade servers. It is designed for virtualization and performance and features IBM's latest POWER7 processor technology—the world's fastest micro-processor. Couple that superior performance with Power Systems Software™ like IBM PowerVM™, and you now have the opportunity to consolidate your UNIX, i and Linux applications to Power blades like never before.

The new HS22 and HS22V blades are versatile, easy-to-use two-socket blade servers optimized for performance, virtualization and power. They offer outstanding performance in an energy-efficient design for a wide range of enterprise applications. Both systems offer an optional embedded hypervisor that enables instant virtualization.

BladeCenter offers a broad choice of operating systems that allows you to deploy a wide choice of applications. On the HS22, HS22V, LS22 and LS42 blade servers, choose from Microsoft® Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Open Enterprise Server and Solaris 10. With the POWER® processor-based JS12, JS22, JS23, JS43, PS700, PS701 and PS702 blades, choose from an array of blades and operating environments that simplifies your deployment with flexible configurations that make it easy to implement the right system and the ability to run AIX®, IBM i, and Linux operating systems simultaneously.

Built on the proven foundation of the BladeCenter family of products—easy-to-use, integrated platforms with a high degree of deployment flexibility, energy efficiency, scalability and manageability—the BladeCenter PS700, PS701 and PS702 Express are the premier blades for 64-bit applications. Minimize complexity, improve efficiency, automate processes, reduce energy consumption and scale easily: these are the benchmarks that matter on a smarter planet. The new POWER7 processor-based PS blades automatically optimize performance and capacity at either a system or virtual machine level and benefits from the new POWER7 processor, which contains innovative technologies that help maximize performance and optimizes energy efficiency. These blades represent one of the most flexible and cost-efficient solutions for UNIX, i and Linux deployments available in the market. Further enhanced by its ability to be installed in the same chassis with other BladeCenter blade servers, the PS blades can deliver the rapid return on investment that clients and businesses demand.

<b>At a glance</b>	<b>HX5</b>	<b>HS22</b>	<b>HS22V</b>	<b>HS12</b>
<b>Processor</b>	Intel Xeon 7500 and 6500 processors; 4/6/8 cores, up to 2.66 GHz	Choice of two Intel Xeon 5500 or 5600 series processors	Choice of two Intel Xeon 5500 or 5600 series processors	Single-Core Intel Celeron, Dual-Core Intel Core™2 Duo, and Dual- and Quad-Core Intel Xeon
<b>Number of processors</b> (std/max)	1/2 (scalable to 4)	1/2	1/2	1/1
<b>Cache</b> (max)	Up to 24 MB per processor (8 core)	Up to 12 MB L3	Up to 12 MB L3	Up to 6 MB L2 shared (dual-core) or 2x6 MB L2 (quad-core)
<b>Front-side bus</b>	1066 MHz memory access	Up to 1333 MHz		
<b>Memory</b>	Up to 128 GB, per singlewide HX5	Up to 96 GB of total memory capacity	Up to 144 GB of total memory capacity	Up to 24 GB with registered ECC DDR-2 DIMMs
<b>Internal hard disk drives</b>	Up to two hot-swap SAS.SATA or solid state HDDs installed on each blade	Up to two hot-swap SAS.SATA or solid state HDDs installed on each blade	Up to two 1.8" solid-state drives (fixed)	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 expansion blade)
<b>Maximum internal storage</b>	Up to 100 GB of solid-state storage per singlewide HX5	Up to 1.0 TB	Up to 100 GB	600 GB
<b>RAID support</b>	Optional RAID-0, -1, -1E	RAID-0, -1 and -1E (optional RAID-5 with battery-backed cache)	RAID-0, -1 and -1E (optional RAID-5 with battery-backed cache)	Integrated RAID-0 or -1 standard on hot-swap models; optional RAID-0, -1, -5, -6, -10 and 256 MB cache with 24-hour battery backup using ServeRAID-MR10ie card; integrated RAID-1E or RAID-5 optional with SIO blade
<b>Network</b>	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE	Dual Gigabit Ethernet, up to 8 ports optional, up to 12 ports optional with storage and I/O expansion blade and Multi Switch Interconnect Module

At a glance	HX5	HS22	HS22V	HS12
<b>I/O upgrade</b>	1 PCIe expansion card connection and 1 PCIe high-speed connection	1 PCIe expansion card connection and 1 PCIe high-speed connection	1 PCIe expansion card connection and 1 PCIe high-speed connection	1 PCI-X expansion card connection (traditional) and 1 PCIe (high-speed)
<b>Systems management hardware</b>	Integrated system management processor (BMC for HS12; IMM for HS22, HS22V and HX5); UpdateXpress, Remote Deployment Manager, IBM Systems Director, IBM Systems Director Active Energy Manager, ServerGuide 7.x, Scripting Toolkit 1.x			
<b>OS support (available for purchase)<sup>3</sup></b>	Microsoft Windows Server, Red Hat Linux, SUSE Linux, VMware, Sun Solaris	Microsoft Windows, Linux, Sun Solaris and VMware		Microsoft Windows, <sup>3</sup> Linux, <sup>3</sup> VMware, IBM OS 4690
<b>Standards</b>	Not applicable	Not applicable	NEBS/ETSI characteristics	Not applicable
<b>Limited warranty<sup>2</sup></b>	3-year customer replaceable unit and on-site limited warranty			1-year or 3-year customer replaceable unit and on-site limited warranty

At a glance	LS22	LS42
<b>Processor<sup>4</sup></b>	Latest Six-Core AMD Opteron	Latest Six-Core AMD Opteron
<b>Number of processors (std/max)</b>	1/2	1 or 2/4
<b>Cache (max)</b>	Up to 6 MB shared	
<b>Memory</b>	Up to 64 GB DDR II VLP (800 MHz)	Up to 128 GB DDR II VLP (800 MHz)
<b>Internal hard disk drives</b>	Up to two SAS or solid state HDDs installed on each blade	Up to two SAS or solid state HDDs installed on each blade
<b>Maximum internal storage</b>	1.5 TB with optional storage and I/O expansion blade	1.5 TB with optional storage and I/O expansion blade
<b>Network</b>	Two integrated Gigabit Ethernet controllers	Two or four integrated Gigabit Ethernet controllers
<b>I/O upgrade</b>	1 PCI-X expansion connector 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>3</sup></b>	Microsoft Windows, Linux, VMware and Solaris 10	
<b>Limited warranty<sup>2</sup></b>	3-year customer replaceable unit and on-site limited warranty	



<b>At a glance</b>	<b>JS12</b>	<b>JS22</b>	<b>JS23</b>	<b>JS43</b>
<b>Processor<sup>4</sup></b>	64-bit IBM POWER6® 3.8 GHz with Altivec™ SIMD and Hardware Decimal Floating-Point acceleration	64-bit IBM POWER6 up to 4.0 GHz with Altivec SIMD and Hardware Decimal Floating-Point acceleration	Four 64-bit 4.2 GHz POWER6 with Altivec SIMD and Hardware Decimal Floating-Point acceleration	Eight 64-bit 4.2 GHz POWER6 with Altivec SIMD and Hardware Decimal Floating-Point acceleration
<b>Number of processors</b>	Two	Four		Eight
<b>Level 2 cache</b>	4 MB per core; 4-way set associative			
<b>Level 3 cache</b>	Not applicable		Not applicable	
<b>Memory bus</b>	1.1 GHz		1.1 GHz	
<b>Memory</b>	Up to 64 GB maximum per blade, eight DIMM slots, ECC Chipkill™ DDR-2 SDRAM	Up to 32 GB maximum per blade, four DIMM slots, ECC Chipkill DDR-2 SDRAM	Up to 64 GB maximum per blade, eight DIMM slots, ECC IBM Chipkill DDR2 SDRAM	Up to 128 GB maximum per blade, eight DIMM slots, ECC IBM Chipkill DDR2 SDRAM
<b>Internal hard disk drives</b>	Two 146 GB, 300 GB or 600 GB 2.5" (SAS)	One 146 GB, 300 GB or 600 GB 2.5" SAS	One 146 GB, 300 GB or 600 GB 2.5" SAS	Two 146 GB, 300 GB or 600 GB 2.5" SAS
<b>Maximum internal storage</b>	Up to 1.2 TB	Up to 600 GB		Up to 1.2 TB
<b>Network</b>	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional Ethernet expansion card	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional Ethernet expansion card	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional Ethernet expansion card	Integrated Virtual Ethernet adapter (IVE) Quad Gigabit and support for optional Ethernet expansion card
<b>I/O upgrade</b>	One PCIe CIOv Expansion Card and one PCIe CFFh High-Speed Expansion Card	Integrated PCIe connector for high-speed expansion cards	One PCIe CIOv Expansion Card and one PCIe CFFh High Speed Expansion Card	

At a glance	JS12	JS22	JS23	JS43
<b>Systems management hardware</b>	Integrated system management processor, IBM Systems Director, IBM Systems Director Active Energy Manager			
<b>OS support (available for purchase)<sup>3</sup></b>	AIX V5.3 or later, AIX V6.1 or later IBM i 6.1 or later <sup>5</sup> SUSE Linux Enterprise Server 10 for POWER (SLES10 SP2) or later; Red Hat Enterprise Linux 4.6 for POWER <sup>®</sup> (RHEL4.6) or later; RHEL5.1 or later	AIX V5.3 or later, AIX V6.1 or later IBM i 6.1 or later <sup>5</sup> SUSE Linux Enterprise Server 10 for POWER (SLES10 SP2) or later; Red Hat Enterprise Linux 4.6 for POWER (RHEL4.6) or later; RHEL5.1 or later	AIX V5.3 or later, AIX V6.1 or later IBM i 6.1 or later <sup>5</sup> SUSE Linux Enterprise Server 10 for POWER (SLES10 SP2) or later; Red Hat Enterprise Linux 4.6 for POWER (RHEL4.6) or later; RHEL5.1 or later	
<b>Virtualization (built-in feature)</b>	PowerVM Standard Edition			
<b>Standards</b>	Not applicable		NEBS-3/ETSI characteristics	
<b>Limited warranty<sup>2</sup></b>	3-year on site, next business day			

### IBM BladeCenter PS700 Express at a glance

<b>Form factor</b>	Singlewide blade server for BladeCenter E, BladeCenter S, BladeCenter H, or BladeCenter HT chassis
<b>Processor cores</b>	Four 64-bit 3.0 GHz POWER7 cores with Altivec SIMD and Hardware Decimal Floating-Point acceleration
<b>Level 2 (L2) cache</b>	256 KB per processor core
<b>Level 3 (L3) cache</b>	4 MB per processor core
<b>Memory (std/max)</b>	8 GB up to 64 GB maximum per blade, eight DIMM slots, ECC IBM Chipkill DDR3 SDRAM
<b>Internal disk storage</b>	Two 300 or 600 GB 2.5" SAS 10,000 rpm non-hot-swappable disk drive; No disk drive required on base offering.
<b>Networking</b>	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual-gigabit Ethernet
<b>I/O upgrade</b>	One PCIe CIOv Expansion Card and one PCIe CFFh High Speed Expansion Card
<b>Optional connectivity</b>	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion

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**IBM BladeCenter PS700 Express at a glance**

<b>PowerVM</b>	PowerVM Express Edition: Includes Virtual I/O Server (VIOS) with Integrated Virtualization Manager and PowerVM Lx86 PowerVM Standard Edition: Adds shared processor pools and micropartitioning PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
<b>Systems management</b>	Integrated systems management processor, IBM Systems Director Active Energy Manager, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI compliant
<b>RAS features</b>	IBM Chipkill ECC detection and correction, Processor Instruction Retry, service processor with fault monitoring, hot-swappable disk bays (in BladeCenter S chassis), hot-plug power supplies and cooling fans (on chassis), Dynamic Processor Deallocation, Dynamic deallocation of logical partitions and PCI bus slots, extended error handling on PCIe slots, redundant power supplies and cooling fans (on chassis)
<b>Operating systems</b>	AIX V5.3 or later, AIX V6.1 or later, IBM i 6.1 or later, SUSE Linux Enterprise Server 10 for POWER (SLES10 SP3) or later; SLES11 SP1 or later, Red Hat Enterprise Linux 5.5 for POWER (RHEL5.5) or later; RHEL6 or later
<b>High availability</b>	IBM PowerHA™ family
<b>System dimensions</b>	PS700 Express blade: 9.65 in (245 mm) H x 1.14 in (29 mm) W x 17.55 in (445 mm) D; weight: 9.6 lb (4.35 kg) <sup>2</sup> BladeCenter H chassis: 15.75 in (400 mm) H x 17.5 in (444 mm) W x 28.0 in (711 mm) D; weight: 350 lb (159 kg) <sup>2</sup> BladeCenter S chassis: 12.0 in (306 mm) H x 17.5 in (444 mm) W x 28.3 in (733 mm) D; weight: 240 lb (108.9 kg) <sup>2</sup>
<b>Warranty (limited)</b>	9 hours per day, Monday through Friday (excluding holidays), next business day for three years at no additional cost; on site for selected components; CRU (customer replaceable unit) for all other units (varies by country). Warranty service upgrades and maintenance are available.

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**IBM BladeCenter PS701 Express at a glance**

<b>Form factor</b>	Singlewide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
<b>Processor cores</b>	Eight 64-bit 3.0 GHz POWER7 cores with Altivec SIMD and Hardware Decimal Floating-Point acceleration
<b>Level 2 (L2) cache</b>	256 KB per processor core
<b>Level 3 (L3) cache</b>	4 MB per processor core
<b>Memory (std/max)</b>	16 GB up to 128 GB maximum per blade, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM

**IBM BladeCenter PS701 Express at a glance**

<b>Internal disk storage</b>	One 300 or 600 GB 2.5" SAS 10,000 rpm non-hot-swappable disk drive; No disk drive required on base offering
<b>Networking</b>	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual-gigabit Ethernet
<b>I/O upgrade</b>	One PCIe CIOv Expansion Card and one PCIe CFFh High Speed Expansion Card
<b>Optional connectivity</b>	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
<b>PowerVM</b>	PowerVM Express Edition: Includes Virtual I/O Server (VIOS) with Integrated Virtualization Manager and PowerVM Lx86 PowerVM Standard Edition: Adds shared processor pools and micropartitioning, PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
<b>Systems management</b>	Integrated systems management processor, IBM Systems Director Active Energy Manager, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI compliant
<b>RAS features</b>	IBM Chipkill ECC detection and correction, Processor Instruction Retry, service processor with fault monitoring, hot-swappable disk bays (in BladeCenter S chassis), hot-plug power supplies and cooling fans (on chassis), Dynamic Processor Deallocation, dynamic deallocation of logical partitions and PCI bus slots, extended error handling on PCIe slots, redundant power supplies and cooling fans (on chassis)
<b>Operating systems</b>	AIX V5.3 or later, AIX V6.1 or later, IBM i 6.1 or later, SUSE Linux Enterprise Server 10 for POWER (SLES10 SP3) or later; SLES11 SP1 or later, Red Hat Enterprise Linux 5.5 for POWER (RHEL5.5) or later; RHEL6 or later
<b>High availability</b>	IBM PowerHA family
<b>System dimensions</b>	PS701 Express blade: 9.65 in (245 mm) H x 1.14 in (29 mm) W x 17.55 in (445 mm) D; weight: 9.6 lb (4.35 kg) BladeCenter H chassis: 15.75 in (400 mm) H x 17.5 in (444 mm) W x 28.0 in (711 mm) D; weight: 350 lb (159 kg) BladeCenter S chassis: 12.0 in (306 mm) H x 17.5 in (444 mm) W x 28.3 in (733 mm) D; weight: 240 lb (108.9 kg)
<b>Warranty (limited)</b>	9 hours per day, Monday through Friday (excluding holidays), next business day for three years at no additional cost; on site for selected components; CRU (customer replaceable unit) for all other units (varies by country). Warranty service upgrades and maintenance are available.

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**IBM BladeCenter PS702 Express at a glance**


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<b>Form factor</b>	Doublewide blade server for BladeCenter S, BladeCenter H, or BladeCenter HT chassis
<b>Processor cores</b>	Sixteen 64-bit 3.0 GHz POWER7 cores with Altivec SIMD and Hardware Decimal Floating-Point acceleration
<b>Level 2 (L2) cache</b>	256 KB per processor core
<b>Level 3 (L3) cache</b>	4 MB per processor core
<b>Memory (std/max)</b>	32 GB up to 128 GB maximum per blade, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM
<b>Internal disk storage</b>	Two 300 or 600 GB GB 2.5" SAS 10,000 rpm non-hot-swappable disk drive; No disk drive required on base offering.
<b>Networking</b>	Integrated Virtual Ethernet adapter (IVE) Dual Gigabit and support for optional dual-gigabit Ethernet
<b>I/O upgrade</b>	Two PCIe CIOv Expansion Card and two PCIe CFFh High Speed Expansion Card
<b>Optional connectivity</b>	1 and 10 Gbps Ethernet, 4 and 8 Gbps Fibre Channel, 4X InfiniBand, SAS Expansion
<b>PowerVM</b>	PowerVM Express Edition: Includes Virtual I/O Server (VIOS) with Integrated Virtualization Manager and PowerVM Lx86 PowerVM Standard Edition: Adds shared processor pools and micropartitioning, PowerVM Enterprise Edition: Adds active memory sharing and live partition mobility
<b>Systems management</b>	Integrated systems management processor, IBM Systems Director Active Energy Manager, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI compliant
<b>RAS features</b>	IBM Chipkill ECC detection and correction Processor Instruction Retry Service processor with fault monitoring Hot-swappable disk bays (in BladeCenter S chassis) Hot-plug power supplies and cooling fans (in chassis) Dynamic Processor Deallocation Dynamic deallocation of logical partitions and PCI bus slots Extended error handling on PCI-E slots Redundant power supplies and cooling fans (in chassis)
<b>Operating systems</b>	AIX V5.3 or later, AIX V6.1 or later, IBM i 6.1 or later, SUSE Linux Enterprise Server 10 for POWER (SLES10 SP3) or later; SLES11 SP1 or later, Red Hat Enterprise Linux 5.5 for POWER (RHEL5.5) or later; RHEL6 or later
<b>High availability</b>	IBM PowerHA family
<b>System dimensions</b>	PS702 Express blade: 9.65 in (245 mm) H x 2.32 in (59 mm) W x 17.55 in (445 mm) D; weight: 19.2 lb (8.7 kg) BladeCenter H chassis: 15.75 in (400 mm) H x 17.5 in (444 mm) W x 28.0 in (711 mm) D; weight: 350 lb (159 kg) BladeCenter S chassis: 12.0 in (306 mm) H x 17.5 in (444 mm) W x 28.3 in (733 mm) D; weight: 240 lb (108.9 kg)
<b>Warranty (limited)</b>	9 hours per day, Monday through Friday (excluding holidays), next business day for three years at no additional cost; on site for selected components; CRU (customer replaceable unit) for all other units (varies by country). Warranty service upgrades and maintenance are available.

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## 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>6</sup>

BladeCenter options	Part number
<b>Virtual Fabric Switch</b>	
BNT Virtual Fabric 10 Gb Switch Module for IBM BladeCenter	46C7191
<b>10 Gb Ethernet Switches</b>	
BNT Virtual Fabric 10 Gb Switch Module for IBM BladeCenter	46C7191
Cisco Nexus 4001I Switch Module for IBM BladeCenter	46M6071
10 Gb Ethernet Pass-Thru Module for IBM BladeCenter	46M6181
<b>Ethernet Switches</b>	
Cisco Catalyst Switch Module 3012	43W4395
Cisco Catalyst Switch Module 3110X	41Y8522
Cisco Catalyst Switch Module 3110G	41Y8523
Cisco Nexus 4001I Switch Module	46M6071
BNT Virtual Fabric 10 Gb Switch Module	46C7191
10 Gb Ethernet Pass-Thru Module	46M6181
Intelligent Copper Pass-Thru Module	44W4483
Server Connectivity Module	39Y9324
BNT 1/10 Gb Uplink Ethernet Switch Module	44W4404
BNT Layer 2/3 Copper GbE Switch Module	32R1860
BNT Layer 2/3 Fibre GbE Switch Module	32R1861
BNT Layer 2-7 GbE Switch Module	32R1859

BladeCenter options	Part number
<b>Fibre Channel (FC) Switches</b>	
Cisco 4 Gb 10 port FC Switch Module	39Y9284
Cisco 4 Gb 20 port FC Switch Module	39Y9280
Brocade 4 Gb 10 port FC Switch Module	32R1813
Brocade 4 Gb 20 port FC Switch Module	32R1812
Brocade 8 Gb 10 port FC Switch Module	44X1921
Brocade 8 Gb 20 port FC Switch Module	44X1920
QLogic 4 Gb 10 port FC Switch Module	43W6724
QLogic 4 Gb 20 port FC Switch Module	43W6725
QLogic 8 Gb 20 port FC Switch Module	44X1905
QLogic 4 Gb Intelligent FC Pass-Thru Module	43W6723
QLogic 8 Gb Intelligent FC Pass-Thru Module	44X1907
<b>SAS Switches</b>	
BladeCenter S SAS RAID Controller Module	43W3584
BladeCenter SAS Connectivity Module	39Y9195
<b>InfiniBand Switches</b>	
Voltaire 40 Gb Infiniband Switch Module	46M6005
<b>Expansion Cards, SIO Options</b>	
ServeRAID-MR10ie (CIOv) Controller for IBM BladeCenter	46C7167
SAS Expansion Card (CFFv) for IBM BladeCenter	39Y9190

<b>BladeCenter options</b>	<b>Part number</b>
SAS Connectivity Card (CFFv) for IBM BladeCenter	43W3974
SAS Connectivity Card for IBM BladeCenter (CIOv)	43W4068
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
146 GB 10,000 rpm SAS non-hot-swap HDD	42D0421
73 GB 15,000 rpm SAS non-hot-swap HDD	43X0845
146 GB 10,000 rpm SAS hot-swap HDD for SIO	43X0832
73 GB 15,000 rpm SAS hot-swap HDD for SIO	43X0853
15.8 GB SSD SATA SFF NHS	43W7614
31.4 GB SSD SATA SFF NHS	43W7618
Optical Pass-thru Module	39Y9316
Optical Pass-thru Module LC Cable	39Y9172
1 Gb Ethernet Expansion Card (CFFv)	39Y9310
Emulex Virtual Fabric Adapter for IBM BladeCenter	49Y4235
Ethernet Expansion Card (CIOv)	44W4475
Broadcom 2-port 10 Gb Ethernet Expansion Card for IBM BladeCenter	46M6168
Broadcom 4-port 10 Gb Ethernet Expansion Card for IBM BladeCenter	46M6164
2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter	44W4479
QLogic Ethernet and 8 Gb Fibre Channel Combo Expansion Card for IBM BladeCenter	44X1940
QLogic 8 Gb Fibre Channel Card (CIOv)	44X1945

<b>BladeCenter options</b>	<b>Part number</b>
Emulex 8 Gb Fibre Channel Card (CIOv)	46M6140
QLogic 4 Gb Fibre Channel Card (CIOv)	46M6065
QLogic 4 Gb SFF FC Expansion Card	26R0890
Emulex 4 Gb Fibre Channel Expansion Card (CFFv) for IBM BladeCenter	43W6859
4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter	43W4423
QLogic Ethernet and 4 Gb FC Expansion Card (CFFh)	41Y8527
QLogic iSCSI Expansion Card	32R1923
BladeCenter Open Fabric Manager	2019B1X
BladeCenter Open Fabric Manager for BCS	2019B2X
BladeCenter Open Fabric Manager-Advanced	4812S3X
BladeCenter Open Fabric Manager-Advanced (Director Extension)	4812S3D
<b>Fibre Channel Over Ethernet</b>	
10 Gb Ethernet Pass-Thru Module	46M6181
BNT Virtual Fabric Switch Module	46C7191
Cisco Nexus 4001I Switch Module	46M6071
FCoE Upgrade License for Nexus 4001I	49Y9983
QLogic Virtual Fabric extension Module	46M6172
QLogic Converged Network Adapter (CFFh)	42C1830

Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server and Solaris 10 are available at competitive prices when purchasing new blade servers from IBM or IBM Business Partners in most countries.

## For more information

### World Wide Web

U.S. [ibm.com/systems/bladecenter](http://ibm.com/systems/bladecenter)

Canada [ibm.com/systems/ca/en/bladecenter](http://ibm.com/systems/ca/en/bladecenter)

- <sup>1</sup> For additional details, please refer to Underwriter's Laboratory (UL) certified NEBS Level 3/ETSI test report.
- <sup>2</sup> IBM hardware products are made from new parts, or new and serviceable used parts. Regardless, our warranty terms apply. For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12195, RTP, NC 27709, Attn: Dept. JDJA/B203. IBM makes no representation or warranty regarding third-party products or services including those designated as ServerProven® or ClusterProven.
- <sup>3</sup> Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESX, Solaris 10, and AIX are available for purchase with new hardware in most countries either directly from IBM or through IBM Business Partners.
- <sup>4</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>5</sup> Some of the BladeCenter functions may not be supported by the IBM i operating system. These are identified at [ibm.com/systems/resources/systems\\_power\\_hardware\\_blades\\_supported\\_environments.pdf](http://ibm.com/systems/resources/systems_power_hardware_blades_supported_environments.pdf).
- <sup>6</sup> Options support varies by server and chassis platform. Based on IBM internal testing.



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IBM Systems and Technology Group  
Route 100  
Somers, NY 10589

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