IBM BladeCenter: Build smarter IT

Highlights

- Realize innovation with a flexible, scalable architecture that lets you choose the right solution for your dynamic business
- Consolidate on IBM® BladeCenter® servers and virtualize applications to better utilize resources and amplify the already-significant advantages of BladeCenter efficiencies
- Maximize performance and minimize costs through improved efficiency; consolidate workloads and virtualize on an energy-efficient platform that supports the latest Intel and POWER7® processor technology
- Stay up and running with an intelligent system design that includes open connectivity and multiple layers of redundancy and reliability combined with advanced management tools
- Manage complexity and growth with easy deployment using BladeCenter Open Fabric Manager and IBM Systems Director
- 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 that can support multiple networking technologies at the same time, such as Ethernet, iSCSI or Fibre Channel over Etherent (FCoE), and 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.

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, BladeCenter is built on IBM X-Architecture® for enterprise-class reliability. Enterprise X-Architecture is the IBM blueprint for bringing innovation to x86 systems—innovation that helps set you apart from the competition. The fifth generation of IBM X-Architecture (eX5) extends this leadership technology to BladeCenter with the HX5. The HX5 combined with MAX5 allows you to maximize memory, minimize cost and simplify deployment. The result is open, industry-standard servers optimized for today's demanding workloads. In addition, take advantage of unprecedented flexibility with FlexNode which enables you to dynamically transform a single system into two distinct systems, then back again. This gives you the opportunity to optimize your workloads and save on software licensing costs, giving your business a competitive edge.

Ideal for virtualization

Virtualization is a mainstream technology in today's x86 server-based environment, where approximately 30 percent of currently-deployed x86 servers are virtualized. This number is expected to grow to 69 percent by the end of 2013 according to IDC.[1] The key drivers of this growth are server consolidation, enhanced utilization, and improved manageability, since 90 percent of all virtual machines move across physical hardware, and management of data centers in virtualized environment is increasing its complexity.

Virtualizing on BladeCenter allows you to create a highly flexible infrastructure that can quickly and easily adapt to business change. BladeCenter 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 can help reduce costs, increase business agility and boost IT resiliency.

The 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. They are further enhanced by the ability to be installed in the same chassis with other BladeCenter blades.

In addition, many virtualized environments today have exceeded 1 Gigabit Ethernet (GbE) bandwidth. Adding multiple adapters and switches required for virtualization adds significant cost and complexity. With IBM Virtual Fabric, you 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 speed.

Open connectivity

You want a flexible business foundation that is both open and innovative. BladeCenter is the only choice for open connectivity. IBM has the broadest interconnect portfolio in the industry built on open standards. This enables you to integrate BladeCenter into the data center you own today in a truly seamless fashion. In addition, BladeCenter's interconnect portfolio gives you the headroom needed today with room to grow when needed.

As the deployment of server virtualization technologies becomes more prevalent within data centers, more dynamic performance is needed to provide sufficient network I/O bandwidth to satisfy these demands. With Virtual Fabric, IBM can help you break the I/O bottleneck by allowing you to allocate bandwidth where needed, delivering maximum application agility. Offering a full range of virtualization and convergence capabilities, the same network hardware can act as Ethernet, iSCSI, or FCoE, and bandwidth can be allocated in increments from 100 Mb to 1 Gb. Choose the Emulex adapter and IBM BNT switch for advanced virtualization capabilities, or combine the Broadcom adapter with either of our Brocade or Cisco 10 Gb switches for general-purpose virtual fabric capabilities.

Match your data center needs with the appropriate interconnect, selecting from multiple I/O fabrics or IBM Virtual Fabric. 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.

With the Brocade Converged 10 GbE Switch Module for IBM BladeCenter, IBM introduces the first integrated converged switch for BladeCenter that enables both Ethernet and Fibre Channel ports in a single package. This switch can be used as a low-cost 10 Gb Ethernet switch or as an FCoE switch when connected to a Converged Network Adapter (CNA), providing the flexibility you need with the reliability you demand—all at a very attractive price point. Get increased external bandwidth through greater port count, reduce hardware costs with fewer cables and components, and enable your IT infrastructure with a cost-effective entry into FCoE switching, without the significant initial investment typically associated with converged networking.

With the Cisco Nexus 4001I Switch Module for the BladeCenter H and HT chassis, the BladeCenter solution provides server I/O functionalities required for high-performance, scale-out, virtualized, and nonvirtualized x86 computing architectures. It is a line rate, extremely low-latency, nonblocking, Layer 2, 10 GbE blade switch that is fully compliant with Fibre Channel over Ethernet (FCoE) and IEEE Data Center Bridging standards.

Reduce energy costs, increase efficiency

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.

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.

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.

IBM FastSetup is a no-cost software tool that helps simplify the maintenance and deployment of select BladeCenter chassis, servers and components. The intuitive GUI initializes all phases of server setup, including discovery, update and configuration.

Features include templates that enable replication of settings across many servers and automation that reduces both hands-on time and user errors. Wizards and other default settings enable flexible customization capabilities. The low-touch, set-once and walk-away feature reduces the hands-on server setup time from days to minutes, particularly for larger deployments.

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 HS23E and HS23 have up to two high-performance Intel Xeon processors. 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 microprocessor. 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 HS23 is optimized for compute performance and scalable I/O. Based on the latest E5-2600 series processors from Intel, the HS23 offers balanced performance optimized to run a broad range of workloads. Onboard 10 GbE Virtual Fabric gives clients the ability to virtualize and utilize IO from the blade to eliminate potential network bottlenecks and flexibility to allocate bandwidth where needed, delivering maximum application agility.

BladeCenter offers a broad choice of operating systems that allows you to deploy a wide choice of applications. On the HS23E, HS23, HX5 and HX5 + MAX5 blade servers, choose from Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Open Enterprise Server and Oracle Solaris. With the POWER® processor-based PS700 through PS703 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 through PS703 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. They 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.

BladeCenter chassis at a glance

	BladeCenter S	BladeCenter E	BladeCenter H	BladeCenter HT
Benefits	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 next-generation, high-performance applications.
Best in class environments	Standard office	Space- and power-constrained	High-performance density	Telco and ruggedized
Rack form factor	7U	7U	9U	12U
Blade bays	6	14	14	12
Number of switch fabrics	Up to 4	Up to 4	Up to: 4 standard or 4 bridge and 4 high-speed	Up to: 4 standard or 4 bridge and 4 high-speed
Power supply modules	Up to four 950 W/1450 W ac	Up to four 2000 W or 2320 W ac	Up to four 2980 W ac	3160 W ac or 2535 W dc
Systems management controller	Advanced Management Module (aMM)	Up to two aMMs	Up to two aMMs	Up to two aMMs
NEBS-/ETSI-characteristics[*]	No	No	No	Yes
4X InfiniBand or 10 Gb Ethernet capability (internal)	No	No	Yes	Yes
Common external ports	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: aMM; 4x USB, Video, Ethernet
Systems management software	IBM Systems Director with systems management and trial deployment tools, Advanced Management Module, Management Module, Storage Configuration Manager (BladeCenter S only)			
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 warranty[†]	3-year customer replaceable unit and on-site limited warranty			
External storage	Support for IBM System Storage® solutions			

At a glance	HX5	HX5 + MAX5	HS23E	HS23
Processor	Intel Xeon E7 – 2800 and 4800 processors; 6/8/10 cores, up to 2.4 GHz	Intel Xeon E7 – 2800 and 4800 processors; 6/8/10 cores, up to 2.4 GHz	Intel Xeon E5-2400 processors; 2/4/6/8 cores up to 2.3 GHz	Intel Xeon E5-2600 processors; 4/6/8 cores up to 2.7 GHz
Number of processors (std/max)	1/2 (scalable to 4)	2/2	1/2	1/2
Cache (max)	Up to 30 MB per processor (10 core)	Up to 30 MB per processor (10 core)	Up to 20 MB per processor (8 core)	Up to 20 MB per processor (8 core)
Memory speed	1066 MHz memory access	1066 MHz memory access	1600 MHz memory access	1600 MHz memory access
Memory	Up to 256 GB, per singlewide HX5	Up to 640 GB	Up to 192GB	Up to 512 GB
Internal hard disk drives	Up to four 1.8 in. solid-state drives (fixed)	Up to two 1.8 in. solid-state drives (fixed)	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
Maximum internal storage	Up to 400 GB of solid-state storage per singlewide HX5	Up to 400 GB of solid-state storage per singlewide HX5	Up to 2.0 TB	Up to 2.0 TB
RAID support	Optional RAID-0, -1, -1E	Optional RAID-0, -1, -1E	SW SATA RAID 0,1 std HW SAS RAID 0,1 via upgrade	RAID-0, -1 and -1E
Network	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE	Broadcom 5709S onboard NIC with dual Gigabit Ethernet ports with TOE	Broadcom 5718 onboard NIC with dual Gigabit Ethernet ports with TOE	Emulex BE3 10 GbE onboard NIC with integrated Virtual Fabric
I/O upgrade	1 PCIe expansion card connection and 1 PCIe high-speed connection per node	1 PCIe expansion card connection and 1 PCIe high-speed connection per node	1 PCIe expansion card connection and 1 PCIe high-speed connection	1 PCIe expansion card connection and 1 PCIe high-speed connection
Systems management hardware	Integrated system management processor (IMM for HX5 and iMMV2 for HS23 and HS23E); UpdateXpress, Remote Deployment Manager, IBM Systems Director, IBM Systems Director Active Energy Manager, ServerGuide 7.x, Scripting Toolkit 1.x			
OS support (available for purchase)‡	Microsoft Windows Server, Red Hat Linux, SUSE Linux, VMware, Oracle Solaris	Microsoft Windows Server, Red Hat Linux, SUSE Linux, VMware, Oracle Solaris	Microsoft Windows, Linux, and VMware	Microsoft Windows, Linux, and VMware
Standards	Not applicable	N/A	NEBS/ETSI characteristics	NEBS/ETSI characteristics
Limited warranty†	3-year customer replaceable unit and on-site limited warranty			

IBM BladeCenter PS700 and PS701 Express at a glance

Processor cores	Four 64-bit 3.0 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration	Eight 64-bit 3.0 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration
Level 2 (L2) cache	256 KB per processor core	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core	4 MB per processor core
Memory (std/max)	8 GB up to 64 GB maximum per blade, eight DIMM slots, ECC IBM Chipkill DDR3 SDRAM	16 GB up to 128 GB maximum per blade, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM
Internal disk storage	Two 300 or 600 GB 2.5 in. SAS 10,000 rpm non hot-swappable disk drive; No disk drive required on base offering.	One 300 or 600 GB 2.5 in. SAS 10,000 rpm non hot-swappable disk drive; No disk drive required on base offering
I/O upgrade	One PCIe CIOv Expansion Card and one PCIe CFFh High Speed Expansion Card	One PCIe CIOv Expansion Card and one PCIe CFFh High Speed Expansion Card
Systems management	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	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
Operating systems	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	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
Warranty (limited)	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.	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.

IBM BladeCenter PS702 and PS703 Express at a glance

Processor cores	Sixteen 64-bit 3.0 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration	Sixteen 64-bit 2.4 GHz POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration
Level 2 (L2) cache	256 KB per processor core	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core	4 MB per processor core
Memory (std/max)	32 GB up to 128 GB maximum per blade, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM	Base offering: 16 GB (4 × 4 GB); Express offering: 32 GB (4 × 8 GB), up to 256 GB maximum per blade, sixteen DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz (4 GB DIMMs) 1066 MHz (8 GB DIMMs)
Internal disk storage	Two 300 or 600 GB 2.5 in. SAS 10,000 rpm non hot-swappable disk drive; No disk drive required on base offering.	One 300 or 600 GB 2.5 in. Serial Attached SCSI (SAS) 10K rpm non hot-swappable disk drive or two 1.8 in. 177GB Solid State Disks; No disk drive required on base offering
I/O upgrade	Two PCIe CIOv Expansion Card and two PCIe CFFh High Speed Expansion Card	One PCI-E CIOv Expansion Card and one PCI-E CFFh High Speed Expansion Card
Systems management	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	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
Operating systems	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	AIX V5.3, V6.1 or AIX 7.1, IBM i1 7.1 or 6.1.1, SUSE Linux Enterprise Server SLES11 SP1 or later, Red Hat Enterprise Linux 5.6 for POWER or later; RHEL6.0 or later
Warranty (limited)	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.	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.

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.

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

Blade server options††

BladeCenter options	Part number
Virtual Fabric Switch	
BNT Virtual Fabric 10 Gb Switch Module for IBM BladeCenter	46C7191
10 Gb Ethernet Switches	
Brocade Converged 10 GbE Switch Module for IBM BladeCenter	69Y1909
Brocade Converged 10 GbE Switch Port Upgrade for IBM BladeCenter	44E5686
BNT Virtual Fabric 10 Gb Switch Module for IBM BladeCenter	46C7191
Cisco Nexus 4001I Switch Module for IBM BladeCenter	46C9270
Ethernet Switches	
Cisco Catalyst Switch Module 3012	46C9272
Cisco Catalyst Switch Module 3110X	00Y3250
Cisco Catalyst Switch Module 3110G	00Y3254
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

Blade server options††

Brocade 2-port 10 GbE Converged Network Adapter for IBM BladeCenter	81Y1650
Fibre Channel (FC) Switches	
Cisco 4 Gb 10 port FC Switch Module	44E5692
Cisco 4 Gb 20 port FC Switch Module	44E5696
Brocade 8 Gb 10 port FC Switch Module	44X1921
Brocade 8 Gb 20 port FC Switch Module	44X1920
QLogic 8 Gb 20 port FC Switch Module	44X1905
QLogic 8 Gb Intelligent Pass-thru Module	44X1907
QLogic 4/8 Gb Intelligent Pass-Thru Module for IBM BladeCenter	88Y6410
QLogic 4/8 Gb 20-port Module for IBM BladeCenter	88Y6406
SAS Switches	
BladeCenter S SAS RAID Controller Module	43W3584
BladeCenter SAS Connectivity Module	39Y9195
InfiniBand Switches	
Voltaire 40 Gb Infiniband Switch Module	46M6005
Expansion Cards Options	
ServeRAID H1135 Controller for IBM Flex System and BladeCenter	90Y4750

Blade server options††

SAS Connectivity Card for IBM BladeCenter (CIOv)	43W4068
Emulex Virtual Fabric Adapter for IBM BladeCenter	49Y4235
Emulex Virtual Fabric Adapter Advanced for IBM BladeCenter	49Y4275
Emulex Virtual Fabric Advanced Upgrade for IBM BladeCenter	49Y4265
Emulex Virtual Fabric Adapter II for IBM BladeCenter	90Y3550
Emulex Virtual Fabric Adapter Advanced II for IBM BladeCenter	90Y3566
Emulex Virtual Fabric Advanced II Upgrade for IBM BladeCenter	49Y4265
Emulex Virtual Fabric Adapter II for HS23	81Y3120
Emulex Virtual Fabric Adapter Advanced II for HS23	90Y9332
Broadcom 4-port 10 Gb Ethernet Expansion Card for IBM BladeCenter	46M6164
Broadcom 2-port 10 Gb Virtual Fabric Adapter (CFFh) for IBM BladeCenter	81Y3133
QLogic Ethernet and 8 Gb Fibre Channel Combo Expansion Card for IBM BladeCenter	00Y3270
QLogic 8 Gb Fibre Channel Card (CIOv)	44X1945
Emulex 8 Gb Fibre Channel Card (CIOv)	46M6140
QLogic 4 Gb Fibre Channel Card (CIOv)	46M6065

Blade server options††

4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter	43W4423
Mellanox 2-port 10 Gb Ethernet Expansion Card (CFFh) for IBM BladeCenter	90Y3570
QLogic Ethernet and 4 Gb FC Expansion Card (CFFh)	00Y3276
Fibre Channel Over Ethernet	
10 Gb Ethernet Pass-Thru Module	46M6181
BNT Virtual Fabric Switch Module	46C7191
Cisco Nexus 4001I Switch Module	46C9270
FCoE Upgrade License for Nexus 4001I	49Y9983
QLogic Virtual Fabric extension Module	46M6172
QLogic Converged Network Adapter (CFFh)	00Y3280
Brocade 2-port 10 GbE Converged Network Adapter for IBM BladeCenter	81Y1650
Brocade Converged 10 GbE Switch Module for IBM BladeCenter	69Y1909
Brocade Converged 10 GbE Switch Port Upgrade for IBM BladeCenter	69Y1917
Brocade Enterprise 20-port 8 Gb SAN Switch Module for IBM BladeCenter	42C1828

For more information

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