



# IBM BladeCenter JS12 Express server combines excellent processing power with the scalability, reliability, and configuration flexibility of IBM BladeCenter architecture

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## At a glance

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The IBM BladeCenter JS12 Express features:

- Innovation with proven sixth generation POWER™ technology for enhanced performance, efficiency, and reliability
- Leadership PowerVM virtualization technology to help cut costs and consolidate workloads
- Innovative EnergyScale technology to help save energy costs
- Flexibility to manage growth complexity and risk
- Up to 64 GB memory for memory-intensive applications
- Integrated dual-Gigabit Ethernet
- Integrated systems management processor
- Integrated SAS controller
- Support for two 73 GB or 146 GB SAS disk drives
- Optional preinstall for AIX operating system or Virtual I/O Server (VIOS)

### For ordering, contact:

Your IBM representative, an IBM Business Partner, or the Americas Call Centers at

**800-IBM-CALL** Reference: YE001

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## Overview

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For the perfect alternative to a rack-mount or desktside server running the IBM AIX®, IBM i, or Linux™ operating system, the IBM BladeCenter® JS12 Express blade server combined with a BladeCenter S chassis provides exceptional value and expandability in an attractively packaged and highly efficient design. The JS12 is designed to be quiet and secure for office environments, providing an acoustic treatment for quiet operation, a set of security doors to protect vital data and servers, and an optional dust filter to expand IT into virtually any environment.

The JS12 Express blade has been preconfigured and tested by IBM, utilizing a 3.8 GHz 64-bit IBM POWER6™ processor core; it is available in a two-core configuration and is designed to deliver great performance at compelling prices. With faster and more reliable double data rate 2 (DDR2) memory options, including expandability up to 64 GB and a SAS disk subsystem supporting up to two on-board hard drives with a total capacity of 292 GB, the BladeCenter JS12 Express is designed for increased uptime and enhanced performance. Along with built-in support for IBM PowerVM virtualization capabilities, the BladeCenter JS12 Express offers an ideal blade server solution for a diverse range of needs.

For small database and application serving, the BladeCenter JS12 Express blade server delivers great performance, expandability, and capacity to satisfy the needs of clients looking for an easy-to-use, integrated platform with a high degree of deployment flexibility, scalability, and manageability.

For a complete integrated business system, the BladeCenter JS12 Express blade server combined with a BladeCenter chassis allows small or mid-sized companies seeking simplicity to avoid increased spending and staffing requirements; they become more responsive to their customers, improving their productivity and keeping their data highly secure. The JS12 Express integrates features to simplify an IT environment and deliver a complete, cost-effective business system that grows as the business grows.

Built on the promise of the IBM BladeCenter family of products — easy-to-use, integrated platforms with a high degree of deployment flexibility, scalability, and manageability — the BladeCenter JS12 Express is an extremely affordable blade server with the capability to run IBM AIX, IBM i, or Linux applications, concurrently if desired. The JS12 Express broadens the application offerings available and increases the ways you can put this power to work.

Powered by the latest IBM processor technology, POWER6, the JS12 Express provides outstanding price/performance in a commercial IT environment; superior reliability, availability, serviceability (RAS) characteristics; high energy efficiency; and outstanding built-in PowerVM virtualization to help achieve increased system utilization. The feature-rich, JS12 Express will bring significant benefits to businesses that require a durable server solution for consolidating multiple applications and servers into a single BladeCenter chassis; transitioning from traditional rack-mount or desktop servers to highly efficient blades; and implementing commercial applications.

The JS12 Express blade server features advanced, innovative IBM technologies including:

- Performance of POWER6 processors designed for reliability and speed
- IBM EnergyScale firmware and IBM Systems Director Active Energy Manager software tools to measure energy use and direct policies toward the energy-efficient operation of the server
- Built-in PowerVM virtualization allowing operational and infrastructure efficiencies
- Mainframe-inspired RAS features architected to avoid, detect, and recover from errors to achieve near-continuous availability
- Flexible packaging and operating system support to allow cost-effective and seamless growth
- Security and integrity functions built into the firmware and operating systems to protect critical applications and data

The IBM i operating system 6.1 (iV6R1) operating system is supported on the IBM BladeCenter JS12 (7998-60X) in the BladeCenter S Chassis (7779-BCS).

The i Edition of BladeCenter S will be available starting in second quarter 2008 and is a predefined offering including the BladeCenter JS12 Express blade, a BladeCenter S chassis with disk drives, and IBM i software. The total offering will have an optimized configuration and single price.

Previews provide insight into IBM plans and directions but they are subject to change or withdrawal. General availability, prices, ordering information, and terms and conditions will be provided when the product or offering is announced.

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## Key prerequisites

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- A BladeCenter chassis
- When used with Serial over LAN Console support, a network switch module
- A rack (7014-B42 recommended)
- An operating system (IBM AIX, IBM i operating system, Red Hat Linux, or Novell SUSE Linux)

### Planned availability date

May 30, 2008, except for features 2145, 2146, and 2147 on the 7998-61X, which are planned to be available on April 12, 2008.

### **POWER6 processor-based BladeCenter JS12 Express**

The IBM BladeCenter JS12 Express is the latest high-density blade server with POWER6 technology with EnergyScale technology. The JS12 is a single-wide, two-core, 1-socket with two cores per socket, 3.8 GHz POWER6 SCM processor. Each processor is directly mounted to the planar board and includes 64 KB I-cache and 64 KB D-cache L1 cache per core with 4 MB L2 cache per core. The integrated memory controller supports eight pluggable registered DIMMs, which must be installed in pairs. The minimum memory that can be installed is 2 GB (2 X 1 GB) and the maximum is 64 GB (4 x 16 GB). The JS12 supports Memory Scrubbing, ECC, Chipkill™, and Bit Steering.

As a heterogeneous infrastructure consolidation platform, the BladeCenter H, HT, and S Chassis also support running the JS12 alongside your Intel® processor-based HS blades, AMD Opteron processor-based LS blades, and Cell/B.E. processor-based QS21 blades in the same chassis with independent monitoring, security, power, and systems management. With several gigabit Ethernet, Fibre Channel, iSCSI, and InfiniBand high-performance expansion cards to choose from, the JS12 can be tailored to the demands of your datacenter network and application workloads.

The BladeCenter S Chassis supports a maximum of six JS12 blades, or a mix of JS12 blades and other blades. For the BladeCenter H Chassis, the maximum number of blades is 14; for the BladeCenter HT Chassis, the maximum number of blades is 12.

IBM POWER6 processors, designed with EnergyScale technology, provide features such as power trending, capping of maximum power, and thermal measurement. These features, enabled via the optional AEM V3.1 software under the IBM Director console, measure the energy use of the system and direct policies toward the energy-efficient operation of the server, while the underlying hardware adjusts to deliver the desired operating solution. The POWER6 chip is designed with additional techniques to conserve power and reduce heat generated by the server. Using a feature called "nap" mode, processor clocks can be dynamically turned off when there is no useful work to be done and turned back on when there are instructions to execute.

The JS12 has autonomic power and thermal controls designed to maintain operation in out-of-specification situations. If thermal or power conditions become unacceptable, it may reduce the processor or memory performance capability to maintain acceptable conditions. When the conditions are restored to an acceptable value, the blade will again automatically resume normal operation. Some applications may be sensitive to these capability changes. Contact your application vendors to determine any possible impacts.

Full keyboard, video, and mouse support can be used at installation instead of Serial over LAN (SOL), which requires a network switch module in the chassis. Multiple console connections are also supported by simultaneously using the BladeCenter keyboard, video, and mouse, and a SOL connection. The USB bus on the BladeCenter chassis is used for keyboard support on the JS12. The Advanced Management Module (aMM) on the chassis controls the routing of keyboard inputs to one of up to 14 blade servers. An embedded video controller is used to support 2D graphics on an SVGA video display. The JS12 has four USB ports; two interface with keyboard and mouse through the aMM and two with a removable media tray also through the aMM.

As a robust blade solution for 64-bit UNIX® applications, the JS12 also delivers leadership single instruction multiple-data (SIMD) capabilities with the Linux operating system for scientific research and HPC.

#### JS12 features and benefits

- Highly efficient and flexible design of IBM Blade
  - Densely pack more servers into a smaller space
  - Tailor system to meet varied business requirements with a choice of BladeCenter chassis
  - Lower acquisition cost and energy consumptions versus traditional 1U or 2U rack servers
  - Integrate networking switch infrastructure for improved cabling and data center maintenance
  - Deploy in virtually any office environment for quiet, secure, and contaminant-free operation
- Pioneering IBM EnergyScale technology and Systems Director Active Energy Manager software

- Generate less heat by managing application utilization and server energy consumption
- Use less energy to cool the system
- Industry-leading PowerVM virtualization technology
  - Reduce infrastructure costs by doing more with fewer servers
  - Simplify IT operations to leverage storage, network, and computing resources to control costs and be more responsive
- Innovative reliability features and systems management
  - Expedite hardware repairs and reduce service time
  - Enable scheduled maintenance with proactive monitoring of critical system components to help reduce unplanned failures
- Choice of IBM AIX, IBM i, or Linux operating environment
  - Standardize on a single platform that runs the large and varied portfolio of applications that support your business

### **PowerVM Editions (Advanced POWER Virtualization) (Optional)**

The JS12 has support for PowerVM technology built into the microprocessor. The JS12 is designed to make it more affordable to consolidate multiple independent applications on a single blade using the same proven virtualization technologies offered on IBM Power servers.

The JS12 supports two leading-edge virtualization technologies: PowerVM Standard Edition and PowerVM Enterprise Edition:

- PowerVM Standard Edition makes the JS12 an ideal platform for consolidation of AIX, Linux, and IBM i operating system applications, helping clients reduce infrastructure complexity and cost. Offering an intuitive, Web-based interface for managing virtualization within a single blade, the Integrated Virtualization Manager (IVM) component of Virtual I/O Server (VIOS) allows the small business IT manager to quickly and easily set up and manage logical partitions (LPARs). It also enables Virtual I/O and Virtual Ethernet so that storage and communications adapters can be shared among all the LPARs running on the JS12. Ultimately, IBM Micro-Partitioning™ technology allows each processor core to be subdivided into as many as 10 virtual servers. And since the JS12 is built with POWER6 technology, other advanced virtualization functions such as Shared Dedicated Capacity may be exploited.
- PowerVM Enterprise Edition includes all the features of PowerVM Standard Edition plus a new capability called Live Partition Mobility. Live Partition Mobility allows for the movement of a running AIX or Linux partition from one POWER6 processor-based server to another with no application downtime, resulting in better system utilization, improved application availability, and potential energy savings. With Live Partition Mobility, planned application downtime due to regular server maintenance can be a thing of the past. Software Maintenance for Virtual I/O Server (577x-PVE) must be purchased with VIOS (5765-PVE). PowerVM Enterprise Edition must be purchased separately.

**Note:** PowerVM Standard Edition and PowerVM Enterprise Edition are optional when running AIX or Linux. Power VM Standard or Enterprise Edition is required when running IBM i operating system on the JS12.

### **Systems management and administrative tools**

Integrated diagnostic and administrative tools like IBM Predictive Failure Analysis and light path diagnostics are designed to simplify administration to help lower costs and improve control of the IT environment. Remote management capabilities allow automating IT networking tasks. Proven technology like VIOS allows the sharing of disk drives, communications, and Fibre Channel adapters.

Systems management tools for the JS12:

- AIX 5.3 or AIX 6: IBM Director V5.2 and Cluster Systems Management (CSM) for AIX, V1.7
- SUSE Linux Enterprise Server 10 Service Pack 2 for POWER, or later; IBM Director V5.2 and CSM for Linux on POWER, V1.7
- Red Hat Enterprise Linux V4.6, for POWER, or later: IBM Director V5.2 and CSM for Linux on POWER, V1.7

- Red Hat Enterprise Linux V5.1, for POWER, or later: IBM Director V5.2 and CSM for Linux on POWER, V1.7
- iV6R1, or later: IBM Director V5.2

IBM Director V5.1 must be downloaded from

<http://www.ibm.com/systems/management/director/downloads.html>

CSM for Linux on POWER, V1.7 (5765-G16) and CSM for AIX, V1.7 (5765-F67) provide a full suite of systems management software for the JS12, including:

- Hardware control
- Installation and updating of software on nodes
- Distributed command execution
- File synchronization across a cluster
- Monitoring and automated response
- Automatic security configuration
- Management of node groups (static and dynamic)
- Diagnostics tools

More information on CSM can be found at

<http://www.ibm.com/systems/clusters/software/>

### **CSM/IBM Director positioning**

CSM is recommended for managing Linux or AIX clusters if you prefer a scripting interface to perform cluster management tasks. CSM provides full installation for Linux and a flexible command-line interface.

### **Business Partner information**

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If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld ID and password are required (use IBM ID).

BP Attachment for Announcement Letter 108-233

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=108-233>

### **Trademarks**

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Intel is a registered trademark of Intel Corporation.

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

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

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### **IBM BladeCenter® JS12 Express System at a glance**

- Form factor

Single-wide blade server for BladeCenter E, BladeCenter S, BladeCenter H, BladeCenter HT, or BladeCenter T chassis.

- Processor cores  
Two 64-bit 3.8 GHz POWER6™ with AltiVec SIMD and Hardware Decimal Floating-point acceleration.
- Level 2 (L2) cache  
4 MB per processor core; 4-way set associative.
- Memory (std/max)  
Base offering: 2 GB (2 x 1 GB); Express Offering: 4 GB (2 x 2 GB). Up to 64 GB maximum per blade, eight DIMM slots. ECC Chipkill™ DDR2 SDRAM running at 667 MHz (1, 2, 4 GB DIMMs) or 400 MHz (8 GB DIMMs).
- Internal disk storage  
Zero to two 73 or 146 GB 2.5-inch Serial Attached SCSI (SAS) 10,000 RPM drives. Integrated RAID-0 or RAID-1 standard on blade server with support for disk mirroring.
- Networking  
Integrated Virtual Ethernet (IVE) dual-Gigabit and support for optional dual-Gigabit Ethernet daughter card.
- I/O upgrade  
Integrated PCI Express connector for high-speed daughter cards; integrated connector for legacy daughter cards.
- Optional connectivity  
4 Gbps Fibre Channel, 4x Infiniband, iSCSI Expansion card.
- PowerVM Standard Edition  
Virtual LAN, POWER™ Hypervisor, Micro-Partitioning™, Virtual I/O Server with Integrated Virtualization Manager, Shared Dedicated Capacity, Shared Processor Pool, PowerVM Lx86.
- PowerVM Enterprise Edition  
All the feature of PowerVM Standard Edition plus Live Partition Mobility.
- 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.
- RAS features  
IBM Chipkill ECC, bit-steering memory and cache Processor Instruction Retry Service processor with fault monitoring Hot-swappable disk bays (in BladeCenter S chassis), Hot-plug PCI slots, 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 PCI-X slots, Redundant power supplies and cooling fans (on chassis).
- Operating environments  
AIX® V5.3, or later; AIX V6.1, or later; iV6R1, or later; Novell SUSE Linux™ Enterprise Server 10 for POWER, or later; Red Hat Enterprise Linux for POWER, V4.6, or later; Red Hat Enterprise Linux for POWER, V5.1, or later.
- High availability  
IBM High Availability Cluster Multiprocessing (HACMP™) for AIX/Linux V5.4.1.

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## Publications

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No publications are shipped with the announced product.

With the IBM Systems Information Center, users can use a single information center to access product documentation for IBM Systems hardware, operating systems, and server software. Through a consistent framework, users can efficiently find information and personalize their access to that information. The IBM Systems Information Center is at

<http://publib14.boulder.ibm.com/infocenter/systems>

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## Services

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### **Global Technology Services**

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IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an On Demand Business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

<http://www.ibm.com/services/>

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

<http://www.ibm.com/services/continuity>

For details on education offerings related to specific products, visit

<http://www.ibm.com/services/learning/index.html>

Select your country, and then select the product as the category.

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## Technical information

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### **Specified operating environment**

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#### **Physical specifications**

- Width: 29 mm (1.14 in)
- Depth: 445.8 mm (17.55 in)
- Height: 245.2 mm (9.65 in)
- Weight: 4.35 kg (9.5 lb)

To assure installability and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

#### **Operating environment**

- Temperature:
  - 10° to 35°C (50° to 95°F) at 0 to 914 m (0 to 3,000 ft)

- 10° to 32°C (50° to 90°F) at 914 to 2,133 m (3,000 to 7,000 ft)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,133 m (7,000 ft)
- Power consumption (@ +12 V supplied by BladeCenter chassis) 350 watts maximum

### EMC conformance

- U.S.: FCC — Verified to comply with Part 15 of the FCC Rules Class A
- Canada: ICES-004, issue 3 Class A
- EMEA: EN55022: 2006 Class A
- Australia and New Zealand: CISPR 22, Class A

### Safety certifications

- U.S.: (UL Mark) UL 60950-1 1st Edition
- CAN: (cUL Mark) CAN/CSA22.2 No.60950-1 1st Edition
- Europe: (CE Mark) EN60950-1, 1st Edition
- CB: IEC60950-1, 1st Edition
- Russia: (GOST Mark) IEC60950-1

### Hardware requirements

#### Standard JS12 blade configuration

	Processor	L2 Cache	Memory	Et hernet	HDD
7998- 60X					
#8442	1- socket 2- core, 3. 8 GHz POWER6	4 MB/ core	2 GB- 64 GB	Dual Gi gabi t	Open

Serial over LAN (SOL) function routes the console data stream over the standard two, 1 Gb Ethernet ports to the chassis aMM.

#### Minimum system configuration

Each 7998-60X configuration must contain a minimum of:

- One — IBM BladeCenter JS12 2-core, 3.8 GHz (#8442)
- One — Memory DIMMs (at least one of these):
  - 2 GB (2 x 1 GB DIMMS) DDR2 667 MHz (#8220)
  - 4 GB (2 x 2 GB DIMMS) DDR2 667 MHz (#8229)
  - 8 GB (2 x 4 GB DIMMS) DDR2 667 MHz (#8239)
  - 16 GB (2 x 8 GB DIMMS) DDR2 400 MHz (#8245)
- Two Processor Entitlements (one of these)
  - 2 x #8444
  - 1 x #8444 and 1 x #8443 (Express Product Offering)

**Note:** For IBM i operating system on the JS12, one SAS Expansion Card (#8250) is required.

**Note:** A minimum of one copy of the Service Warranty Publications (#8737) and one copy of the JS12 Installation and User's Guide (#8742-8752, #8756) is required at each customer installation.

#### Express Product Offerings

If you order a JS12 server Express Product Offering, as defined here, you may qualify for a



processor entitlement at no additional charge. A minimum of 4 GB of memory and one SAS 10 K SFF HDD is required to determine if a customer is entitled to a processor entitlement at no additional charge.

You can make changes to the standard features as needed and still qualify for processor entitlements at no additional charge. However, selection of total memory or DASD smaller than the totals defined as the minimums disqualifies the order as an Express Product Offering.

You must purchase PowerVM Standard Edition (#5406) or PowerVM Enterprise Edition (#5606) for each Express Product Offering.

- One — IBM BladeCenter JS12 2-core, 3.8 GHz (#8442)
- 4 GB memory DIMMs with at least 73 GB SAS HDD
- One of these:
  - Two — 2 GB (2 x 1 GB DIMMS) DDR2 667 MHz (#8220)
  - One — 4 GB (2 x 2 GB DIMMS) DDR2 667 MHz (#8229)
  - One — 8 GB (2 x 4 GB DIMMS) DDR2 667 MHz (#8239)
  - One — 16 GB (2 x 8 GB DIMMS) DDR2 400 MHz (#8245)

Additional memory DIMMs of any size may be added.

- One of these:
  - Two — PowerVM Standard Edition (#5406)
  - Two — PowerVM Enterprise Edition (#5606)
- One of these:
  - One — IBM 73 GB SAS 10K SFF HDD (#8237)
  - One — IBM 146 GB SAS 10K SFF HDD (#8236)
- One — Processor Entitlement (#8444)
- One — Zero-priced Processor Entitlement (#8443); Receive one processor entitlement (#8443) at no additional charge. Two processors are entitled.

**Note:** A minimum of one copy of the Service Warranty Publications (#8737) and one copy of the JS12 Installation and User's Guide (#8742-8752, #8756 is required at each customer installation.

### Optional and additional features

- Up to 64 GB of system memory
  - The JS12 system board contains eight RDIMM memory connections.
  - Memory must be installed in matched pairs with a minimum of 2 GB and maximum of 64 GB.
  - Memory sizes can be mixed.
  - JS12 supports Memory Scrubbing, ECC, Chipkill, and Bit Steering.
  - 2 GB (2 x 1 GB DIMMs), 4 GB (2 x 2 GB DIMMs), and 8 GB (2 x 4 GB DIMMS) memory features operate at 667 MHz while the 16 GB (2 x 8 GB DIMMS) memory feature operates at 400 MHz.
- SAS Controller, supporting up to 146 GB
  - Internal disk drive, SFF (2.5 in) 73 GB SAS (#8237)
  - Internal disk drive, SFF (2.5 in) 146 GB SAS (#8236)

### Expansion cards

**Note:** JS12 has two hard disk drive bays (one toward the front and one in rear — similar location as JS22)

The form factor of the expansion card determines whether an additional expansion card or SAS internal HDD can be installed in the rear drive bay in the JS12.

- The QLogic iSCSI Expansion Card for IBM BladeCenter (#8238) is a standard, or large, form

factor expansion card. The installation of this card precludes support for the SAS HDD in the rear drive bay. The maximum allowed is one.

- One small form factor high speed daughter card (HSDC) expansion card may be installed on the JS12 along with one SAS HDD in the rear drive bay. The Cisco Systems 4X InfiniBand HCA Expansion Card for IBM BladeCenter (#8256) is a small form factor HSDC expansion card.
- One combination form factor vertical (CFFv) may be installed with a combination form factor horizontal (CFFh) expansion card and one SAS HDD in the rear drive bay.

CFFv expansion cards include:

- QLogic 4 GB 2 Port Fibre Channel Expansion Card (CFFv) for IBM BladeCenter (#8248)
- Ethernet Expansion Card (CFFv) (#8249)
- SAS Expansion Card (CFFv) for IBM BladeCenter (#8250)
- Emulex 4 GB Fibre Channel Expansion Card (CFFv) (#8251)

CFFh expansion card:

- QLogic Ethernet and 4 GB Fibre Channel Expansion Card (CFFh) (#8252)

**Note:** Not supported in the BladeCenter S Chassis (7779-BCS)

- 4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter (#8258)
- Voltaire 4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter (#8298)

JS12 Daughter cards	Feat num.	i V6R1	VI OS 1. 5	AIX 5. 3	AIX 6. 1	SLES10 SP2(R)	RH 5. 1	RH 4. 6
SAS Dual port exp card, CFF/PCI X (LSI)	8250	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4 GB F/C dual port CFF/PCI X (Emul ex)	8251	No	Yes	Yes	Yes	Yes	Yes	Yes
Combo 4 GB F/C and 1GB e'net CFF/PCI E (Ql ogi c)	8252	No	Yes	Yes	Yes	Yes	Yes	Yes
4 GB Fibre Channel dual port CFF/PCI X (Ql ogi c)	8248	No	Yes	Yes	Yes	Yes	Yes	Yes
1 GB ethernet dual port CFF/PCI X (Broadcom)	8249	No	Yes	Yes	Yes	Yes	Yes	Yes
iSCSI dual b port LFF/PCI X (Ql ogi c)	8238	No	Yes	Yes	Yes	Yes	Yes	Yes
4X IB DDR + Voltaire SW li cense	8298	No	No	No	No	No	Yes	No
4X IB Dual Port DDR CFF/PCI E (Mell anox)	8258	No	No	Yes	Yes	No	Yes	No
4X IB Dual Port SFF/PCI E (Ci sco)	8256	No	No	Yes	Yes	No	Yes	Yes

**Note:** IBM i operating system only supports the SAS Expansion Card (CFFv) for IBM BladeCenter (#8250).

### Software requirements

The JS12 server supports the AIX, Linux, and IBM i operating systems, providing the flexibility of using applications written for any one of the three. IBM has qualified two popular Linux distributions for use with the JS12 server:

- Red Hat Enterprise Linux for POWER

- Novell SUSE Linux Enterprise Server for POWER

One or more of the following operating systems is required for an operational JS12:

- AIX V5.3 with the 5300-06 Technology Level with Service Pack 7, or later
- AIX V5.3 with the 5300-07 Technology Level with Service Pack 4, or later
- AIX V5.3 with the 5300-08 Technology Level, or later
- AIX V6.1 with the 6100-01 Technology Level, or later (Available 6/10/08)
- AIX V6.1 with the 6100-00 Technology Level with Service Pack 5, or later
- SUSE Linux Enterprise Server 10 Service Pack 2 for POWER, or later
- Red Hat Enterprise Linux V4.6 for POWER, or later
- Red Hat Enterprise Linux V5.1 for POWER, or later
- iV6R1, or later

**Note:** For systems ordered with the Linux operating system, IBM ships the most current versions available from the distributor. If your hardware requires a different version of a Linux OS than that shipped by IBM, you must obtain it via download from the Linux distributor's Web site. Information concerning access to a distributor's Web site is located on the product registration card delivered to you as part of your Linux OS order.

**Note:** iV6R1 is supported on the JS12 in the BladeCenter S chassis.

Disclaimer: Some information in this announcement addresses anticipated future capabilities and may be subject to change.

iSCSI boot is available through an iSCSI software initiator running on the embedded Ethernet controller or the iSCSI expansion card (#8238). The AIX operating system supports iSCSI boot through an iSCSI software initiator on any supported Ethernet controller including Ethernet expansion cards.

It is possible to place an order for a Linux operating system from Red Hat or Novell through IBM. Although IBM takes orders for these operating systems on behalf of Red Hat or Novell, such software is licensed and distributed by Red Hat or Novell. Orders placed through IBM will receive the appropriate minimum revision if media is requested or IBM will generate a message in eConfig that the required revision is only available through the distributor's download site

<http://www.redhat.com/>

<http://www.novell.com/>

**Note:** The Ethernet failover function is supported starting with SUSE Linux Enterprise Server 10 Service Pack 2 for POWER, Red Hat Enterprise Linux 4.7 for POWER, and Red Hat Enterprise Linux 5.2 for POWER

#### Supported software

AEM V3.1	5765-PEP
AIX V5.3	5765-G03
AIX V6.1	5765-G62
AIXLink/x.25 V2.1	5765-E85
CSM for AIX V1.7	5765-F67
CSM for Linux on POWER V1.7	5765-G16
ESSL for AIX, V4.2*	5765-F82
ESSL for AIX, V4.3*	5765-F82
ESSL for Linux on POWER, V4.2*	5765-G17
ESSL for Linux on POWER, V4.3*	5765-G17
Fast Connect V3.2	5765-E72
GPFS(TM) for AIX, V3.1*	5765-G66
GPFS for POWER, V3.2*	5765-G66
GPFS for AIX, V2.3*	5765-F64
GPFS for Linux on POWER V2.3*	5765-G20
HACMP V5	5765-F62
iV6R1	5761-SS1
IBM Director V5	5765-DR1
ITM V6.1	5765-ITM
ITUAM V6.1	5724-033

TWS LoadLeveler(R) V3.4*	5765-E69
TWS LoadLeveler for Linux V3.4*	5724-I23
Parallel Environment V4.3*	5765-F83
Parallel ESSL V3.3*	5765-F84
Parallel ESSL for Linux on POWER*	5765-G18
Performance AIDE V3.1	5765-E68
Performance Toolbox V3.1	5765-E74
Virtual I/O Server V1.5	5765-G34
GEORM V2.4	5765-E82
XL C/C++ Advanced Edition for Linux, V9.0	5724-S73
XL Fortran Advanced Edition for Linux, V11.1	5724-S74
XL C Enterprise Edition for AIX, V9.0	5724-S70
XL C/C++ Enterprise Edition for AIX, V9.0	5724-S71
XL Fortran Enterprise Edition for AIX, V11.1	5724-S72

\* Servers, either standalone or connected via an Ethernet LAN supporting IP, are supported.

Novell SUSE Linux Enterprise Server 10 (SLES 10) for POWER has a per-chassis license (BCC), which will allow you to run SLES 10 on each blade server in the IBM BladeCenter S Chassis (up to fourteen 7998-60X blade servers).

## Planning information

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**Cable orders:** No cables are required.

## Security, auditability, and control

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Security and auditability features include:

- A power-on password function provides control of who has access to the data and server setup program on the server.
- A selectable boot sequence can be used to prevent unauthorized installation of software or removal of data from the diskette drive.

**Limitations:** The BladeCenter and JS12 blade have no security-intrusion detection.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

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## IBM Electronic Services

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IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

<http://www.ibm.com/support/electronic>

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## Terms and conditions

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**Volume orders:** Contact your IBM representative.

**IBM credit corporation financing:** Yes

**Warranty period:** Three years

### **Warranty service**

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If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

Service levels are response-time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country-and location-specific information.

**Customer Replaceable Unit (CRU) Service:** IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Installation of a Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service specified below, On-site Service.

Based upon availability, CRUs will be shipped for next business day (NBD) delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

- DASD
- TOD battery
- PCI/Daughter cards
- Expansion cards
- Labels
- Bezels, trays, and covers
- External cables

**On-site Service:** This provides On-site Repair, 9 hours per day, Monday through Friday excluding holidays, NBD response.

IBM or your reseller will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. On-site service is not available in all countries, and some countries have kilometer or mileage limitations from an IBM Service Center. In those locations where On-site Service is not available, the normal in-country service delivery is used.

Call IBM at 800-IBM-SERV (426-7378) to assist with problem isolation for hardware to determine if warranty service is required. Telephone support may be subject to additional charges, even during the limited warranty period.

Calls must be received by 5:00 p.m. local time in order to qualify for NBD service.

**International Warranty Service:** International Warranty Service (IWS) is available in selected countries or regions.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased.

Under IWS, warranty service will be provided with the prevailing warranty service type and service level available for the IWS-eligible machine type in the servicing country and the warranty period observe will be that of the country in which the machine was purchased.

To determine the eligibility of your machine and to view a list of countries where service is available, visit

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/warrantyform?brandind=5000008>

For more information on IWS, refer to Services Announcement [601-034](#), dated September 25, 2001.

Programs included with this product are licensed under the terms and conditions of the License Agreements that are shipped with the system.

### **Maintenance services**

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**ServicePac®, ServiceSuite™, ServiceElect, and ServiceElite:** ServicePac, ServiceSuite, ServiceElect, and ServiceElite provide hardware warranty service upgrades, maintenance, and selected support services in one agreement.

### **Warranty service upgrades**

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During the warranty period, a warranty service upgrades provides an enhanced level of On-site Service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of On-site Service acquired by the customer. Service levels are response-time objectives and are not guaranteed. Refer to the Warranty service section for additional details.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

CRUs will be provided as part of the machine's standard warranty CRU Service except that you may install a Tier 1 CRU yourself or request IBM installation, at no additional charge, under one of the On-site Service levels specified below.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

Refer to the Prices section for specific offerings.

### **Maintenance services**

If required, IBM provides repair or exchange service depending on the types of maintenance service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response-time objectives and are not guaranteed.

**CRU Service:** If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request.

IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

**On-site Service:** IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

Refer to the Prices section for specific offerings.

### **Maintenance service (ICA)**

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Maintenance services are available for ICA legacy contracts.

**Alternative service (warranty service upgrades):** During the warranty period, a warranty service upgrade provides an enhanced level of On-site Service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of On-site Service acquired by the customer. Service levels are response-time objectives and are not guaranteed.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

A CRU will be provided as part of the machine's standard warranty CRU Service except that you may install a Tier 1 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service specified below, On-site Service.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

Refer to the Prices section for specific offerings.

**Maintenance service:** If required, IBM provides repair or exchange service depending on the type of maintenance service specified below for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response-time objectives and are not guaranteed.

**CRU Service:** If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive). IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request.

Based upon availability, CRUs will be shipped for next business day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, (1) return instructions and a container are shipped with the replacement CRU and (2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

Refer to the Prices section for specific offerings.

### **Non-IBM parts support**

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**Warranty service:** IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.

**Warranty service upgrades and maintenance services:** Under certain conditions, IBM Integrated Technology Services repairs selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

IBM Service provides hardware problem determination on non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, or memory) installed within IBM machines covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and

replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

**Usage plan machine:** No

**IBM hourly service rate classification:** One

**Field-installable features:** Yes

**Model conversions:** No

**Machine installation:** Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

**Graduated program license charges apply:** Yes

The applicable processor group is C5.

**Licensed Machine Code:** IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement or by contacting your IBM representative or visiting

[http://www-1.ibm.com/servers/support/machine\\_warranties/machine\\_code.html](http://www-1.ibm.com/servers/support/machine_warranties/machine_code.html)

**Machine using LMC Type Model 7998-60X:** IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM technical support Web site

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5069766&brandind=5000020>

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies. If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

**Educational allowance**

A reduced charge is available to qualified education customers. The educational allowance may not be added to any other discount or allowance.

The educational allowance is 5% for the products in this announcement.

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**Prices**

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**Product charges:** The following are newly announced features on the specific models of the BladeCenter 7998 machine type:

Description	Model	Feature number	Purchase price	Initial /	
				Both/ Support	RP CSU MES
7998- 60X	60X		\$ 200		Yes
IBM Express Seller Indicator	60X	0050	0	Both	Yes No
AIX Partition Specify	60X	0265	0	Both	Yes No
Linux Partition	60X	0266	0	Both	Yes No
Specify					
IBM i Partition	60X	0267	0	Both	Yes No



Specify U. S. TAA COMPLIANCE INDICATOR	60X	0983	NC	Initial	NA	No
Primary OS -- IBM i	60X	2145	0	Both	Yes	No
Primary OS -- AIX	60X	2146	0	Both	Yes	No
Primary OS -- Linux	60X	2147	0	Both	Yes	No
Integrate Blade Server in Chassis (BP)	60X	4645	20	Initial	NA	No
Integrate Blade Server in Chassis	60X	4646	25	Initial	NA	No

One and only one rack indicator features is required on all orders (#4650 to #4666).

Rack Indicator -- Not Factory Integrated	60X	4650	0	Initial	NA	No
Rack Indicator, Rack #1	60X	4651	0	Initial	NA	No
Rack Indicator, Rack #2	60X	4652	0	Initial	NA	No
Rack Indicator, Rack #3	60X	4653	0	Initial	NA	No
Rack Indicator, Rack #4	60X	4654	0	Initial	NA	No
Rack Indicator, Rack #5	60X	4655	0	Initial	NA	No
Rack Indicator, Rack #6	60X	4656	0	Initial	NA	No
Rack Indicator, Rack #7	60X	4657	0	Initial	NA	No
Rack Indicator, Rack #8	60X	4658	0	Initial	NA	No
Rack Indicator, Rack #9	60X	4659	0	Initial	NA	No
Rack Indicator, Rack #10	60X	4660	0	Initial	NA	No
Rack Indicator, Rack #11	60X	4661	0	Initial	NA	No
Rack Indicator, Rack #12	60X	4662	0	Initial	NA	No
Rack Indicator, Rack #13	60X	4663	0	Initial	NA	No
Rack Indicator, Rack #14	60X	4664	0	Initial	NA	No
Rack Indicator, Rack #15	60X	4665	0	Initial	NA	No
Rack Indicator, Rack #16	60X	4666	0	Initial	NA	No
Chassis indicator-Not Factory Integrated	60X	4680	0	Initial	NA	No
BladeCenter chassis specify, Chassis #1	60X	4681	0	Initial	NA	No
BladeCenter chassis specify, Chassis #2	60X	4682	0	Initial	NA	No
BladeCenter chassis specify, Chassis #3	60X	4683	0	Initial	NA	No
BladeCenter chassis specify, Chassis #4	60X	4684	0	Initial	NA	No
BladeCenter chassis specify, Chassis #5	60X	4685	0	Initial	NA	No
BladeCenter chassis specify, Chassis #6	60X	4686	0	Initial	NA	No
BladeCenter chassis specify, Chassis #7	60X	4687	0	Initial	NA	No
BladeCenter chassis specify, Chassis #8	60X	4688	0	Initial	NA	No
BladeCenter chassis specify, Chassis #9	60X	4689	0	Initial	NA	No
Custom Service Specify, Off-Site	60X	5001	0	Both	Yes	No
Software Preinstall	60X	5005	0	Initial	NA	No
Custom Service Specify, On-Site	60X	5039	0	Both	Yes	No

PowerVM Standard Edition	60X	5406	0	Both	Yes	No
PowerVM Enterprise Edition	60X	5606	0	Both	Yes	No
SDF Software Pre-Install Indicator	60X	7305	NC	Initial	NA	No
Software Preinstall	60X	8146	60	Initial	NA	No
2 GB (2 x 1 GB) DDR2 667MHz DIMMs	60X	8220	219	Both	Yes	No
4GB (2 x 2 GB) DDR2 667MHz DIMMs	60X	8229	459	Both	Yes	No
IBM 146GB SAS 10K SFF HDD	60X	8236	429	Both	Yes	No
IBM 73GB SAS 10K SFF HDD	60X	8237	329	Both	Yes	No
QLogic iSCSI Expansion Card for IBM BladeCenter	60X	8238	699	Both	Yes	No
8GB (2 x 4 GB) DDR2 667MHz DIMMs	60X	8239	1,699	Both	Yes	No
16GB (2 x 8 GB) DDR2 400 MHz DIMMs	60X	8245	6,999	Both	Yes	No
QLogic 4Gb 2 Port Fibre Channel Expansion Card (CFFv) for IBM BladeCenter	60X	8248	749	Both	Yes	No
Ethernet Expansion Card (CFFv)	60X	8249	299	Both	Yes	No
SAS Expansion Card (CFFv) for IBM BladeCenter	60X	8250	249	Both	Yes	No
Emulex 4Gb Fibre Channel Expansion Card (CFFv) for IBM BladeCenter	60X	8251	799	Both	Yes	No
QLogic Ethernet and 4 Gb Fibre Channel Expansion Card (CFFh)	60X	8252	999	Both	Yes	No
Cisco Systems 4x InfiniBand HCA Expansion Card for IBM BladeCenter	60X	8256	1,699	Both	Yes	No
4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter	60X	8258	1,199	Both	Yes	No
Voltaire 4x InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter	60X	8298	1,298	Both	Yes	No
IBM BladeCenter JS12 2-core 3.8 GHz Processor	60X	8442	3,140	Initial	NA	No
Zero-priced Processor Entitlement for #8442	60X	8443	0	Initial	NA	No
One Processor Entitlement for Processor Feature #8442	60X	8444	100	Initial	NA	No
IBM BladeCenter JS12 Service/Warranty Pubs	60X	8737	0	Both	Yes	No
IBM BladeCenter JS12 Installation/Users Guide (Eng)	60X	8742	0	Both	Yes	No
IBM BladeCenter JS12 Installation/Users Guide (UK Eng)	60X	8743	0	Both	Yes	No
IBM BladeCenter JS12	60X	8744	0	Both	Yes	No

Installation/Users Guide (Japanese Eng)	IBM BladeCenter JS12	60X	8745	0	Both	Yes	No
Installation/Users Guide (French)	IBM BladeCenter JS12	60X	8746	0	Both	Yes	No
Installation/Users Guide (German)	IBM BladeCenter JS12	60X	8747	0	Both	Yes	No
Installation/Users Guide (Spanish)	IBM BladeCenter JS12	60X	8748	0	Both	Yes	No
Installation/Users Guide (Italian)	IBM BladeCenter JS12	60X	8749	0	Both	Yes	No
Installation/Users Guide (Japanese)	IBM BladeCenter JS12	60X	8750	0	Both	Yes	No
Installation/Users Guide (Traditional Chinese)	IBM BladeCenter JS12	60X	8751	0	Both	Yes	No
Installation/Users Guide (Simplified Chinese)	IBM BladeCenter JS12	60X	8752	0	Both	Yes	No
Installation/Users Guide (Korean)	IBM BladeCenter JS12	60X	8756	0	Both	Yes	No
Installation/Users Guide (Brazilian Portuguese)	IBM BladeCenter JS12	60X	8756	0	Both	Yes	No
Order Routing Indicator -- System Plant		60X	9169	NC	Initial	NA	No
Month Indicator		60X	9461	NC	Initial	NA	No
Day Indicator		60X	9462	NC	Initial	NA	No
Hour Indicator		60X	9463	NC	Initial	NA	No
Minute Indicator		60X	9464	NC	Initial	NA	No
Qty Indicator		60X	9465	NC	Initial	NA	No
Countable Member Indicator		60X	9466	NC	Initial	NA	No

The following are newly announced features on the specific models of the BladeCenter 7998 machine type:

Description machine type 7998	Model	Feature number	Purchase price	Initial / MES / Support	RP CSU	MES
Primary OS -- IBM i	61X	2145	\$0	Initial	NA	No
Primary OS -- AIX	61X	2146	0	Initial	NA	No
Primary OS -- Linux	61X	2147	0	Initial	NA	No

## Feature conversions

### Feature conversions for 7998-60X Virtualization Engine™ features

From FC:	To FC:	Parts returned	Purchase price
5406 -- PowerVM Standard Edition	5606 -- PowerVM Enterprise Edition	No	\$0

### Feature conversion purchase price

Feature From	Feature To	Returned parts	Continuous maintenance	Feature conversion purchase price
5406	5606	N	N	\$0

## Annual minimum maintenance charges

Machine type-model	I08 9 x 5 4-hour	I0R 24 x 7 2-hour
7998-60X	\$216	\$342

For ServiceELECT (ESA) maintenance service charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

## IBM Global Financing

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IBM Global Financing offers competitive financing to credit-qualified customers to assist them in acquiring IT solutions. Offerings include financing for IT acquisition, including hardware, software, and services, from both IBM and other manufacturers or vendors. Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local IBM Global Financing organization or visit

<http://www.ibm.com/financing>

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Financing solutions from IBM Global Financing can help you stretch your budget and affordably acquire the new product. But beyond the initial acquisition, our end-to-end approach to IT management can also help keep your technologies current, reduce costs, minimize risk, and preserve your ability to make flexible equipment decisions throughout the entire technology life cycle. For more financing information, visit

<http://www.ibm.com/financing>

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## Order now

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To order, contact the Americas Call Centers, your local IBM representative, or your IBM Business Partner.

To identify your local IBM representative or IBM Business Partner, call 800-IBM-4YOU (426-4968).

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Internet: [callserv@ca.ibm.com](mailto:callserv@ca.ibm.com)  
Mail: IBM Teleweb Customer Support  
IBM Sales Execution Center, Americas North  
3500 Steeles Ave. East, Tower 3/4  
Markham, Ontario  
Canada  
L3R 2Z1

Reference: YE001

The Americas Call Centers, our national direct marketing organization, can add your name to the mailing list for catalogs of IBM products.

**Note:** Shipments will begin after the planned availability date.

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