

The IBM BladeCenter HS22V is a high-performance blade server optimized for virtualization and energy efficiency

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At a glance



The IBM® BladeCenter® HS22V is a high-performance blade server that offers outstanding performance for virtualization with new levels of memory capacity and CPU performance.

The new models include:

- Single-wide (30 mm), high-performance blade servers
- Two Intel® Xeon® processors with Intel Turbo Boost Technology and Intel HT Technology
- Eighteen high-performance double data rate (DDR3) very-low-profile memory DIMM slots

- High-speed PC3-10600 1333 MHz DDR3 ECC memory; maximum system memory 144 GB¹
- Broadcom 5709S dual Gigabit Ethernet connections with failover support
- Integrated dual Gigabit Ethernet connections
- Support for additional Ethernet, SAS, Fibre Channel, and InfiniBand expansion cards and a total of eight I/O ports per blade
- Support for up to two solid-state drives with RAID 0 and 1 standard
- Support for optional RAID 5 controller with battery-backed write-back cache for external drive support
- Internal standard USB 2.0 port for optional Embedded Hypervisor™
- Integrated Management Module for remote supervision with concurrent keyboard, video, and mouse (cKVM) standard
- Next-generation BIOS, Unified Extensible Firmware Interface (UEFI)
- Added security with a Trusted Platform Module chip standard

Overview

The IBM BladeCenter HS22V is a high-performance blade server that offers outstanding performance for virtualization with new levels of memory capacity and CPU performance.

Optimized for virtualization:

- The IBM BladeCenter HS22V has been designed for outstanding performance in virtualized environments.
- It offers 18 DIMM slots supporting up to 144 GB of DDR3 memory for more and larger virtual machines per blade.
- Durable solid-state drives and hardware RAID 0,1 provide outstanding reliability when virtualizing multiple workloads on a single blade.
- Combine the HS22V with Virtual Fabric from IBM BladeCenter for flexible, easy, fast, and reliable I/O.

Built for performance:

- Two high-performance Intel Xeon processors
- High memory capacity with 18 DDR3 VLP memory DIMM slots capable of running fast memory up to 1333 MHz
- High-speed I/O on the blade that supports up to 40 GbE to each blade and up to a total of eight ports of I/O per blade

Designed for energy efficiency:

- Optional low-power solid-state drives
- Support for the energy-efficient BladeCenter E chassis
- Support for IBM Systems Director Active Energy Manager™ to help monitor and cap power consumption

¹ Using 8 GB DIMMs

Key prerequisites

- BladeCenter chassis
- Monitor, keyboard, and mouse for setup
- Network switch module
- Boot device, such as on-board HDD or network storage device
- Advanced Management Module with latest-level firmware

- Rack and appropriate PDUs and main power distribution

Planned availability date

March 19, 2010

Description

IBM processor upgrades

- Additional Intel Xeon Processor E5540 4C 2.53 GHz 80w 5.86 Gbps 1066 MHz 8 MB Cache (49Y5163)
- Additional Intel Xeon Processor X5570 4C 2.93 GHz 95w 6.4 Gbps 1333 MHz 8 MB Cache (49Y5172)
- Additional Intel Xeon Processor E5506 4C 2.13 GHz 80w 6.4 Gbps 800 MHz 4 MB Cache (49Y5151)

BladeCenter HS22V

High-performance, blade server subsystem

The BladeCenter HS22V low-voltage blade servers are high-throughput, two-way, SMP-capable blade servers, and are highly scalable when you add memory.

The BladeCenter HS22V can have up to two Intel Xeon processors. The processor board has the following major components:

- Two Socket B (LGA 1366) sockets for two Intel Xeon 5500 processors (one or two processors may be shipped standard).
- Two Enterprise Voltage Regulator-Down (EVRD) regulators. The EVRD supplies both the processor core voltage and L2 cache voltage and must adhere to the Intel Voltage Regulator Module (VRM) and Enterprise Voltage Regulator-Down (EVRD) 11.1 Specification.
- One Intel I/O Hub (IOH): Host Bridge controller with PCI Express interface.
- Eighteen DDR3 VLP DIMM memory sockets.
- One Intel South Bridge (ICH10).
- One Broadcom BCM5709S Gigabit Ethernet Controller.
- One LSI 1064E SAS Controller.
- Two SAS connectors for two 1.8-inch SATA solid-state drives.
- 16 MB system uEFI BIOS ROM.
- One Maxim VSC452 Super baseboard Management Controller with Integrated VGA Controller.
- Two HDM midplane connectors.
- One blade expansion connector.
- One CIOv daughter card connector.
- One TPM 1.2 chip.
- One internal USB connector for bootable Flash key.

The Intel IOH provides the interface between the processors, and PCI Express buses that interface to the ICH10, the high-speed daughter card connector, and the blade expansion connector. The HS22V server uses the following features provided by the IOH:

- Dual independent processor Intel QuickPath Interconnect (Intel QPI) links (one processor per link)
- One x4 ESI bus to interface to the ICH10
- One x4 PCI Express bus to connect to the Broadcom Ethernet 5709S Controller

- Eight x4 PCI Express buses: one to the LSI 1064E SAS Controller, four to the Blade Expansion connector, and two to the CIOv daughter card connector

The Intel I/O Controller Hub 10 (ICH10) contains the following features:

- Interface to the IOH via the x4 ESI bus
- PCI-Express 1.0 compliance
- USB host interface with support for USB 2.0
- Low Pin Count (LPC) interface

On the HS22V, the ICH10 uses the x4 PCI Express bus and the LPC bus to interface with the Maxim VSC452 IMM. The USB buses are used to interface with the USB key, the MM for keyboard and mouse, and a Cypress USB hub that provides KVM USB and media tray support.

The HS22V server memory is contiguous and is shared by both processors when both processors are installed. It is Error Correction Code (ECC) protected and supports up to 144 GB using 1 GB, 2 GB, 4 GB, or 8 GB VLP DDR3 DIMMs on eighteen DIMM connectors. The processors have integrated DDR3 memory controllers and interface directly to their associated DDR3 DIMMs. For each CPU, a minimum of one DIMM must be installed. Additional DIMMs may be installed one at a time as needed.

The HS22V supports DDR3 speeds up to 1333 MHz, with the actual operating speed dictated by the CPU and DIMM combination that is installed. For the CPU, memory speed support is as follows:

- When 1333 MHz RDIMMs are installed:
 - If there is one RDIMM installed per memory channel, DDR3 speed is up to 1333 MHz.
 - If there are two RDIMMs installed per channel, DDR3 speed is up to 1066 MHz.
 - If there are three RDIMMs installed per memory channel, DDR3 speed is up to 800 MHz.
 - If any memory channel on the board has two RDIMMs installed, DDR3 speed is up to 1066 MHz for all memory channels.
- When 1066 MHz RDIMMs are installed:
 - DDR3 speed is up to 1066 MHz.
- When 800 MHz RDIMMs are installed:
 - DDR3 speed is up to 800 MHz.

The HS22V supports memory mirroring. Chipkill™ is supported in Independent mode when x4-based DIMMs are installed.

Additional features

- The BladeCenter HS22V system board contains 18 DIMM connectors (30 mm blade).
- Each DIMM connector supports 1 GB, 2 GB, 4 GB, or 8 GB DIMM options:
 - Chipkill is supported in Independent mode when x4-based DIMMs are installed.
- One or two non-hot-swap SATA 1.8-inch devices are supported in the base blade.
- Dual Gigabit Ethernet PCI connections are provided.

BladeCenter HS22V blade servers are designed for high throughput from processor to memory, and to bus I/O.

These features, combined with SMP capability and blade-thin density, make it an excellent choice for space- and power-constrained environments used for:

- Infrastructure applications
- Virtualization

- General enterprise applications

High-availability and serviceability features

- Hot-swap blades enable easy access to each blade server.
- The management module interfaces with each blade server for single systems management control.

The BladeCenter HS22V blade servers deliver reliability and serviceability.

Features include:

- High-performance ECC memory, combined with an integrated ECC memory controller, to help correct soft and hard single-bit memory errors, while reducing disruption of service to LAN clients.
- Chipkill memory correction for up to four bits per DIMM to help keep your blade server up and running.
- Memory hardware scrubbing, designed to correct many soft memory errors automatically without software intervention.
- ECC L2 cache processors to help improve data reliability and reduce downtime.
- CPU failure recovery in Symmetric Multi-Processing (SMP) configurations:
 - Forces failed processor offline
 - Automatically reboots server
 - Generates alerts
 - Continues operations with the working processor
- PFA on SAS HDD options, memory, and processors to help alert the system administrator of imminent component failures.
- Support for dual Gigabit Ethernet connections:
 - Failover, adapter fault tolerance
 - PXE 2.0 Boot Agent
 - Wake on LAN®
 - Load balancing or teaming
- Integrated management processor that supports diagnostic, reset, POST, and auto-recovery functions, and monitors temperature and voltage. Alerts are generated when certain thresholds are exceeded (refer to the [Limitations](#) section for restrictions).

IBM Systems Director

BladeCenter HS22V blade servers include IBM Systems Director. IBM Systems Director is an easy-to-use, point-and-click, platform management solution that streamlines the way physical and virtual systems are managed across a multisystem environment. Leveraging industry standards, IBM Systems Director supports multiple operating systems and virtualization technologies across IBM and non-IBM x86 platforms. Through a single user interface, IBM Systems Director provides consistent views for visualizing managed systems and determining how these systems relate to one another while identifying their individual status, thus helping to correlate technical resources with business needs.

IBM Systems Director utilizes a modular and extensible platform services foundation, providing a way to easily add advanced platform management capabilities to the base offering. The IBM Systems Director offering provides the base function needed for platform management. Advanced platform management functions can be seamlessly added as they are required. Systems Director is based on industry standards and can report results to certain other tools. IBM Systems Director is a strategic platform management tool that grows with the needs of a business.

Optional add-ons (available for an additional charge)

- Active Energy Manager (AEM) is positioned as a key component of IBM's energy-efficient technologies and services, which are part of IBM's Project Green that began May 2007. AEM measures, monitors, and manages the energy management components built into IBM servers and provides a cross-platform management solution. AEM also retrieves temperature and power information via wireless sensors (SynapSense) and collects alerts, events, and data from certain facility providers related to power and cooling equipment.
- BladeCenter Open Fabric Manager is designed to help you manage growth and complexity by making it easy to manage I/O and network interconnects for up to 100 BladeCenter chassis -- up to 1400 blade servers. BladeCenter Open Fabric Manager helps make blade deployment EASY: once installed, the utility is resident in the Advanced Management Module (AMM) so you can preconfigure LAN and SAN connections. Thus, I/O connections are made automatically when you plug in a blade. And no special tools or training is required; just manage with the easy-to-use GUI.

IBM ToolsCenter

The IBM System x® ToolsCenter is a collection of system management tools to help manage your HS22V blade server and blade server environment. ToolsCenter helps make managing your server environment less complicated, more productive, and more cost-effective.

These tools include:

- Deployment

IBM ServerGuide™ is a tool that simplifies the process of installing and configuring IBM System x and BladeCenter servers. ServerGuide automates installation of Microsoft® Windows® server operating systems, device drivers, and other system components, with minimal user intervention.

The ServerGuide Scripting Toolkit enables you to tailor and build custom hardware deployment solutions. It provides hardware configuration utilities and operating system (OS) installation examples for IBM System x and BladeCenter x86-based hardware. The ServerGuide Scripting Toolkit, Windows Edition enables you to create a bootable Windows Preinstallation Environment (Windows PE) 2.1 CD or DVD.

BladeCenter Start Now Advisor is a configuration tool that can help you quickly configure components of the BladeCenter chassis. It automatically updates the firmware for selected chassis components, and provides you with the option of saving your configuration. The Start Now Advisor guides you through the process of connecting your computer to the chassis, either over a network or through a direct attachment to the Ethernet port on the Advanced Management Module.

- Configuration

An Advanced Settings Utility (ASU) systems configuration utility provides a command line interface, unattended scripting capability, and support on multiple operating-system platforms like DOS, Linux®, Windows, and WinPE.

Storage Configuration Manager (SCM) is a scalable and integrated storage management tool for both internal and external storage subsystems for IBM System x and BladeCenter. Storage Configuration Manager is an open-standards-based management tool that provides a uniform and rich user interface that is easy to use.

- Updates

The UpdateXpress System Packs (UXSPs) contain a bundle of online firmware and device driver updates for your server. UXSPs facilitate the downloading and installation of drivers and firmware for a given system and verify that you are working with a complete set of updates which have been tested together.

Bootable Media Creator pulls current updates for firmware and drivers from an IBM Web site and creates custom bootable media to CD, DVD, or USB key.

- Diagnostics

Dynamic System Analysis (DSA) collects and analyzes system information to aid in diagnosing system problems. DSA creates a merged log that helps provide easy identification of cause-and-effect relationships from different log sources in the system.

BladeCenter Advanced Management Module

BladeCenter HS22V is supported on the Advanced Management Module.

Use the Advanced Management Module in the BladeCenter to manage the BladeCenter and obtain vital system information about your installed BladeCenter HS22V servers. The management module communicates with the blade servers within the BladeCenter via an RS-485 intermanagement network. This network relays vital information about individual blade servers, such as:

- Voltages
- Power supply status
- Memory status
- Fan status
- HDD status
- Error and status log

You receive status and control of all blade servers within the BladeCenter. You can shut down and restart any blade server from anywhere on the network to help save time and costs associated with travel to the actual installation.

These manageability functions are provided through a self-contained Web page, creating an easy and familiar way to help administrators monitor, control, and maintain high availability.

BladeCenter HS22V model configurations

Model	Processor	L2 cache	Memory	HDD iface	HDD	Power supply		
7871-B4G	1 x 2.53 GHz	8 MB total	3x2 GB	SAS	Open bay	² Intel Xeon E5540 4c 80w		RAID
7871-C4G	1 x 2.93 GHz	8 MB total	3x2 GB	SAS	Open bay	² Intel Xeon X5570 4c 95w		RAID

² Power supplied through BladeCenter chassis

Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www-03.ibm.com/able/product_accessibility/index.html

Product positioning

The BladeCenter HS22V offerings are positioned as high-density, compute-oriented blade servers offering lower-power-usage Intel Xeon processors.

The BladeCenter and BladeCenter HS22V blades can require less space and power resources than traditional rack offerings because of their high-density design, reduced power requirements, and single environment systems management. This is an extremely important consideration for:

- Large enterprises
- Application service providers
- Scientific and technical computing businesses

They are an excellent fit for applications such as:

- Lotus Notes®
- Microsoft Exchange
- Linux clusters

Product number

MTM Starting Point Models

Description	Machine	Model	Part number
BladeCenter HS22V	7871	FT1	7871FT1
BladeCenter HS22V	7871	B4G	7871B4G
	7871	C4G	7871C4G

Options

Description	Part number
Intel Xeon Processor E5506 4C 2.13 GHZ 80w 6.4 Gbps 800 MHz 4 MB Cache	49Y5151
Intel Xeon Processor E5540 4C 2.53 GHZ 80w 5.86 Gbps 1066 MHz 8 MB Cache	49Y5163
Intel Xeon Processor X5570 4C 2.93 GHZ 95w 6.4 Gbps 1333 MHz 8 MB Cache	49Y5172
IBM 50GB SATA 1.8-inch NHS SSD	43W7734

Pseudo part numbers

Description	Part number
Intel Xeon Processor E5506 4C 2.13 GHZ 4 MB Cache 800 MHz	49Y8031
Intel Xeon Processor E5540 4C 2.53 GHZ 8 MB Cache 1066 MHz	49Y8038
Intel Xeon Processor X5570 4C 2.93 GHZ 8 MB Cache 1333 MHz	49Y8041
Dummy DIMM for improved airflow	59Y8015
Front Bezel Assembly	49Y8058
CPU Heat Sink Filler	49Y8059
Labels for HS22V Blade Base	49Y8060
Blade Cover	49Y8061
System Code Group BOM	69Y4634
Description	Part number
System Documentation and Software-UK English	49Y8045
System Documentation and Software-French	49Y8050
System Documentation and Software-Spanish	49Y8052

Publications

An installation and user's guide, and safety and warranty publications are shipped with each BladeCenter HS22V blade. The following publications are available immediately:

Title	Order number
BladeCenter Solutions	GM13-0127
System x Family Brochure	GM13-0128

The publication *BladeCenter HS22V Installation and User's Guide and Hardware Maintenance Manual*, in U.S. English, are available from

<http://www-304.ibm.com/jct01004c/systems/support/>

The IBM Systems Information Center provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The IBM Systems Information Center is at

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

IBM Publications Center Portal

<http://www.ibm.com/shop/publications/order>

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

Services

Global Technology Services

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.

Technical information

Specified operating environment

Physical specifications

BladeCenter HS22

7871-B4G

Processor	Intel Xeon E5540
	4 core
Int. speed	2.53 GHz
Max. mem. speed	1066 MHz
Interconnect speed	5.86 GT/s
Number standard	1
Maximum	2
L2 cache (full speed)	8 MB
Memory (VLP ECC DDR3)	6 GB
DIMMs (Standard)	3 x 2 GB
DIMM sockets	18
Capacity	144 GB ³
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	1
Connector int.	2
Connector ext.	0
ServerRAID-MR10ie (CIOv)	
Controller w/battery	Optional ⁴
HDD	0
Connectors	2
Internal capacity	100 GB ⁵
Total HDD bays	2
PCI Slots	0
Management proc.	Standard
Ethernet controller	Dual GB
FC card	Optional
DVD-ROM (IDE)	0
Diskette drive	0
Power supply	0

7871-C4G

Processor	Intel Xeon X5570
	4 core
Int. speed	2.93 GHz
Max. mem. speed	1333 MHz
Interconnect speed	6.4 GT/s
Number standard	1
Maximum	2
L2 cache (full speed)	8 MB
Memory (VLP ECC DDR3)	6 GB
DIMMs (Standard)	3 x 2 GB
DIMM sockets	18
Capacity	144 GB ³
Video	SVGA
Memory	16 MB
Disk controller	SAS
Channels	1
Connector int.	2
Connector ext.	0
ServerRAID-MR10ie (CIOv)	
Controller w/battery	Optional ⁴
HDD	0
Connectors	2
Internal capacity	100 GB ⁵
Total HDD bays	2
PCI Slots	0

Management proc.	Standard
Ethernet controller	Dual GB
FC card	Optional
DVD-ROM (IDE)	0
Diskette drive	0
Power supply	0

³ Total system memory capacity is based on using 8 GB memory DIMMs.

⁴ Installation of optional battery-backed RAID adapter is for connection to external storage, not for internal SSD drives.

⁵ Capacities are based on installation of two 50 GB SSDs.

For the latest information on supported HDD options, visit

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

Video subsystem

- Matrox video core
- Integrated on the blade

Supported BladeCenter HS22V video resolutions

Resolution	Maximum refresh rate supported	CRT support	CRT ISO 9241.3 compliance	Flat panel support
640 x 480	85 Hz	Yes	Yes	Yes
800 x 600	85 Hz	Yes	Yes	Yes
1024 x 768	75 Hz	Yes	Yes	Yes

Note: For resolutions supported by different operating systems, refer to the operating system documentation.

Dimensions - BladeCenter HS22V

- Height: 24.5 cm (9.7 in)
- Depth: 44.6 cm (17.6 in)
- Width: 2.9 cm (1.14 in)
- Maximum weight: 5.4 kg (12 lb) (depending on the configuration when options are added)

Electrical

- BladeCenter chassis: 200 to 240 (nominal) V ac; 50 Hz or 60 Hz
- BladeCenter HS22V: 12.2 (nominal) V dc

Standards

This system supports or complies with the following standards:

- Multiprocessor Specification (MPS) 1.4
- Hardware-enabled to meet the International Organization for Standardization (ISO) 9241, Part 3

Equipment approvals and safety

- CE Mark (EN55022:1998 Class A, EN60950, EN55024:1998, EN61000-3-2 and EN61000-3-3)
- CISPR 22, Class A
- FCC - Verified to comply with Part 15 of the FCC Rules (Class A) prior to product delivery

- IEC 60950-1 CB Certificate and CB Test Report indicating compliance to Group Differences

Operating environment

Temperature:

- 10.0 to 35.0 degrees C (50 to 95 degrees F) at 0 to 914 m (0 to 3,000 ft)
- 10.0 to 32.0 degrees C (50 to 90 degrees 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)

Hardware requirements

For attended installation of an operating system, this server requires a compatible:

- Keyboard
- Mouse
- Display

Unattended or remote installation may be performed without requiring some or all of these components. Review your unattended software installation program information for specific hardware configuration requirements.

For service, the server requires a compatible:

- Keyboard
- Mouse
- Display

When having the unit serviced, plan to have these components attached to your server either directly or indirectly via a console switch.

Software requirements

The following network operating systems have been tested for compatibility with the BladeCenter HS22V:

- Microsoft:
 - Microsoft Windows Server 2008 R2
 - Microsoft Windows Server 2008, Datacenter x64 Edition
 - Microsoft Windows Server 2008, Enterprise x64 Edition
 - Microsoft Windows Server 2008, Standard x64 Edition
 - Microsoft Windows Server 2008, Web x64 Edition
 - Windows Essential Business Server 2008 Premium Edition
 - Windows Essential Business Server 2008 Standard Edition
 - Windows Small Business Server 2008 Premium Edition
 - Windows Small Business Server 2008 Standard Edition
- Linux:
 - SUSE Linux Enterprise Real Time 10 AMD64/EM64T
 - SUSE Linux Enterprise Server 10 with Xen for AMD64/EM64T
 - SUSE Linux Enterprise Server 11 for AMD64/EM64T
 - SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T
 - Red Hat Enterprise Linux 4 AS for AMD64/EM64T
 - Red Hat Enterprise Linux 4 ES for AMD64/EM64T

- Red Hat Enterprise Linux 4 WS/HPC for AMD64/EM64T
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise MRG 1.0 Realtime (x64)
- VMware:
 - VMware ESX 3.5
 - VMware ESX 4.0
 - VMware ESXi 4.0
 - VMware ESXi 3.5

For additional information, support, certification, and versions of network operating systems, access

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

Compatibility

The BladeCenter HS22V contains licensed system programs that include set configuration, set features, and test programs. IBM system BIOS is loaded from a "flash" EEPROM into system memory. This BIOS provides instructions and interfaces designed to support the standard features of the BladeCenter HS22V and to maintain compatibility with many current software programs.

For detailed information about IBM and non-IBM devices, adapters, software, and network operating systems supported with System x servers, visit

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

Contact your IBM representative or IBM Business Partner, or refer to the *IBM Sales Manual* for information on the compatibility of hardware and software for System x servers. The *Sales Manual* is updated periodically as new features and options are announced that support these servers.

Limitations

- The BladeCenter HS22V blades contain 18 DIMM sockets. A maximum of 144 GB of system memory is supported by using an 8 GB DIMM of ECC DDR memory in each of the DIMM sockets. A minimum of one DIMM per CPU must be installed; DIMMs may be added singly after that. DIMMs must be installed in matched pairs for Mirror Mode.

Refer to the [Planning information](#) section or the System x server Web page for memory options.

- Microprocessors must be of the same type, power level, and clock speed on each BladeCenter HS22V. Mixing microprocessors of different speeds, power levels, or cache sizes or upgrading the base processors is not supported. The latest BladeCenter hardware and software compatibility is available via the Web

<http://www.ibm.com/servers/eserver/serverproven/compat/us/>

- The BladeCenter HS22V is supported in the BladeCenter H chassis (8852), the BladeCenter HT chassis (8740, 8750), the BladeCenter S chassis (8886), and the BladeCenter E chassis (8677). For supported configurations, refer to the latest BladeCenter hardware configuration tools via the Web

<http://www-03.ibm.com/systems/x/hardware/configtools.html>

- The ServeRAID-MR10ie (CIOv) Controller for IBM BladeCenter (46C7167) does not support the use of SATA or SSD drives on the blade.

Refer to the [Software requirements](#) section for operating system limitations.

Planning information

Customer responsibilities

This product is designated as customer setup. Customer setup instructions are shipped with the product.

Configuration information

BladeCenter HS22V blades must be installed in a BladeCenter chassis.

BladeCenter configuration

The BladeCenter contains 14 blade server bays supporting up to 14 hot-swap BladeCenter HS22V blades. A control panel, located at the top left of the unit, contains the following LEDs:

- Power good
- Blade location
- Over temperature
- Information
- General fault

The system comes standard with two Intel Xeon processors.

Memory support

The following memory options are supported with BladeCenter HS22V:

Option description	Option
1 GB (1x1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP Low Power RDIMM	44T1485
2 GB (1x2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM	44T1487
2 GB (1x2GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333 VLP LP RDIMM	44T1486
4 GB (1x4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM	44T1488
8GB (1x8GB, Dual Rankx4) PC3-10600 CL9 ECC DDR3 1333 MHZ VLP RDIMM	46C7451

Power considerations

BladeCenter HS22V is supported in the BladeCenter chassis.

Note: Consult specific chassis announcements for more information on setup and redundancy.

Cable orders

Each BladeCenter HS22V blade contains two Gigabit Ethernet connections. An optional BladeCenter Gigabit Ethernet Switch Module must be installed in the BladeCenter to support external Ethernet connections.

Cabling is not included with the server. Consult the Ethernet Switch module documentation for external cabling requirements.

Installations using the BladeCenter Fibre Channel Switch Module require short- or long-wave small form factor pluggable (SFP) options and appropriate Fibre Channel cabling.

Installability

Each BladeCenter HS22V requires approximately 10 minutes for installation. Installation includes unpacking, setting up, and powering on the system. Additional time is required to install an operating system, additional options, or features.

Packaging

BladeCenter HS22V

Product	Package description	Boxes
BladeCenter HS22V	BladeCenter HS22V Carton	1
	Contents:	
	BladeCenter HS22V	1
	Publications/CD Package	1
BladeCenter HS22V	Publications Package	1
	Contents:	
	Documentation CD-ROM (softcopy of publications)	
	Safety flyer	

The BladeCenter HS22V blades are shipped in a single package. The approximate shipping dimensions and weight are:

- Single pack dimensions: 60.32 x 33.4 x 15.57 cm (23.75 x 13.13 x 6.13 in)
- Single pack weight: 4.2 kg (9.2 lb)

Related options

Processor upgrades

- Intel Xeon Processor E5540 4C 2.53 GHz 80w 5.86 Gbps 1066 MHz 8 MB Cache (49Y5163)
- Intel Xeon Processor X5570 4C 2.93 GHz 95w 6.4 Gbps 1333 MHz 8 MB Cache (49Y5172)
- Intel Xeon Processor E5506 4C 2.13 GHz 80w 6.4 Gbps 800 MHz 4 MB Cache (49Y5151)

Security, auditability, and control

Security and auditability features include:

- A power-on password function helps provide control of who has access to the data and server setup program on the server.
- A set unattended boot mode allows the system keyboard to be locked to all entries except the password and at the same time allows other computers on the network to access the system disk drive.
- A selectable boot sequence can be used to help prevent unauthorized installation of software or removal of data from the diskette drive.

The BladeCenter HS22V blades have no security intrusion detection. Therefore, they should be installed in a rack environment that provides security through lockable doors or other security measures. It is the client's responsibility to ensure that the server is secure to protect sensitive data.

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

Global Technology Services

Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, and/or integration of this product.

IBM Electronic Services

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>

Terms and conditions

Warranty period

- Three years
- Optional features - One year

Optional IBM features initially installed in an IBM machine carry the same warranty period as the machine. If installed after the initial machine installation, they carry the balance of the machine warranty or the optional feature warranty, whichever is greater.

The following have been designated as consumables or supply items and are, therefore, not covered by this warranty:

- Battery

Warranty service

If required, IBM provides repair or exchange service, depending on the type of warranty 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. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem

determination, if IBM determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. 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.

The type of service is Customer Replaceable Unit (for example, keyboard, mouse, speaker, memory, or hard disk drive) Service and On-site Service.

Customer Replaceable Unit (CRU) Service

IBM provides a replacement 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. A CRU is designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU. Installation of Tier 1 CRUs, as specified in this announcement, 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, a CRU 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:

- Blank filler
- Cable-management arm
- Hard disk drive
- Lift handle kit
- Memory DIMM
- Memory expansion card
- PCI adapter
- PCI divider
- Service label
- Service processor
- System label
- Top cover
- Voltage regulator module

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.

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 observed 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 [ZS01-0168](#), dated September 25, 2001.

Licensing

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

IBM hourly service rate classification

Two

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.

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 by contacting your IBM representative or visiting

http://www.ibm.com/servers/support/machine_warranties/machine_code.html

IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM System x technical support Web site

<http://www-304.ibm.com/systems/support/>

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.

Pricing

For all local charges, contact your IBM representative.

ServicePac service upgrades

The announced products are also eligible for ServicePac® warranty upgrades. ServicePacs provide a higher level of service than that provided under the base IBM Machine Warranty.

ServicePacs can be purchased from your IBM Business Partner and are specific to the machines and products listed.

ServicePac offering	PC number	Ordering part number
3yr On-site Repair 9hr x 5 days 4hr Resp Target	PC1080 e-ServicePac	- 65Y5227 (2)
3yr On-site Repair 24hr x 7 days 4hr Resp Target	PC1081 e-ServicePac	- 65Y5228 (2)
3yr On-site Repair 24hr x 7 days 6hr Committed Service	PC502 e-ServicePac	- 41W9356 (4)
3yr On-site Repair 24hr x 7 days 6hr Committed Service	PC935 e-ServicePac	- 54Y4501 (UK only)
3yr On-site Repair 24hr x 7 days 8hr Committed Service	PC834 e-ServicePac	- 51J9369 (5)
3yr On-site Repair 24hr x 7 days 24hr Committed Service	PC831 e-ServicePac	- 51J9366 (6)
3yr On-site Repair 24hr x 7 days 24hr Committed Service	PC516 e-ServicePac	- 41W9370 (7)
4yr On-site Repair 9hr x 5 days 4hr Resp Target	PC1082 e-ServicePac	- 65Y5229 (2)
4yr On-site Repair 24hr x 7 days 4hr Resp Target	PC1083 e-ServicePac	- 65Y5230 (2)
5yr On-site Repair 9hr x 5 days 4hr Resp Target	PC1084 e-ServicePac	- 65Y5231 (2)
5yr On-site Repair 24hr x 7 days 4hr Resp Target	PC1085 e-ServicePac	- 65Y5226 (2)
3yr On-site Repair 9hr x 5 days NBD Comm Parts	PC1020 e-ServicePac	- 65Y0986 (Russia only)

Announcement countries for ServicePacs

Announcement is restricted to the following countries:

e-ServicePac

Austria Belgium Bulgaria Croatia Czech Rep
Denmark Egypt Estonia(8) Finland France (1) Germany Greece
Hungary Ireland Israel Italy Latvia(8) Lithuania(8)
Netherlands Norway Pakistan Poland Portugal Romania

Russia (2) S.Africa Serbia Slovakia Slovenia Spain
Sweden Switzerland Turkey UK(3) Ukraine

- (1) Except overseas Territories
- (2) Except Russia
- (3) UK mainland Only
- (4) Austria, Germany and Turkey Only
- (5) Czech Republic, Hungary, Poland, Slovakia, Slovenia, Switzerland, Romania, Russia, Bulgaria and Croatia only.
- (6) Austria, Germany and Switzerland only.
- (7) Czech Republic, Hungary, Poland, Slovakia, Slovenia, Turkey, Romania, Russia, Bulgaria and Croatia only.
- (8) Order and registration via Finland

Maintenance

The products in this document are also covered by Maintenance Agreements and ServiceSuite™ contracts.

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

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Announcement countries

All European, Middle Eastern, and African countries.

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