IBM BladeCenter HS22 is a versatile, easy-to-use blade server optimized for performance, power, and cooling

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At a glance

BladeCenter® HS22 blade servers revolutionize the economics of application server deployment with versatility, ease of use, performance, and energy efficiency.

These new server models include:

- Single-wide (30 mm), high-performance blade servers
- Up to two Intel® Xeon® 5500 series processors with Intel Turbo Boost Technology and Intel HT Technology
- Up to 12 DDR-3 very low-profile memory DIMM slots
- Standard models with high-speed PC3-10600 1333 MHz high-performance double data rate (DDR3) ECC memory; maximum system memory 96 GB[1]
- Broadcom 5709S dual Gigabit Ethernet connections with failover support
- Models with integrated dual 10 Gigabit Ethernet connections also available
- 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 hot-swap SFF SAS, SATA or solid state drives with RAID 0 and 1 standard
- Support for optional RAID 5 controller with battery-backed write-back cache
- Internal standard USB 2.0 port for future optional embedded hypervisor

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- 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

[1] Using 8 GB DIMMs.

For ordering, contact your IBM® representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: SE001).

Overview

The IBM BladeCenter HS22 offers great performance balanced with flexible configuration options and simple management in an efficient server designed to run a broad range of workloads exceptionally well.

Versatile:

- Feature-rich design enables HS22 to run to a broad range of workloads including infrastructure, virtualization, and enterprise applications
- Extensive choice of processors, memory, internal storage and I/O options allows flexible configurations
- Supported across all BladeCenter enterprise and office chassis

Easy to use:

- Two hot-swap storage bays support SAS, SATA, and solid state drives, enabling drives to be removed easily for quick replacement
- Future optional embedded hypervisor enables "instant virtualization"
- Integrated Management Module provides remote supervision and cKVM functions as standard
- Light Path Diagnostic and Predictive Failure Analysis® enables quick serviceability and maintenance

Performance optimized:

- Up to two next-generation Intel Xeon 5500 series processors
- High memory capacity with 12 DDR-3 VLP memory DIMM slots capable of running fast memory up to 1333 MHz
- High speed I/O on the blade supports up to 40 GbE to each blade and up to a total of eight ports of I/O per blade

Power and cooling optimized:

- Optional low-power processor, solid-state drives, and low power memory DIMMs
- Support for the energy-efficient BladeCenter E chassis
- Support for IBM System Director Active Energy Manager to monitor and cap power consumption
- Innovative component layout and blade design helps keep the blade up and running even under demanding conditions

Feature exchange

Not applicable.

Key prerequisites

- BladeCenter chassis
- Monitor, keyboard, and mouse for setup
- Network switch module

- Boot device, such as on-board HDD or network storage device
- Advance Management Module with latest-level firmware
- Rack and appropriate PDUs and main power distribution

Planned availability dates

March 31, 2009: HS22 BladeCenter models and options

```
IBM BladeCenter HS22 7870D2x
IBM BladeCenter HS22 7870A2x
IBM BladeCenter HS22 7870CCx
IBM BladeCenter HS22 7870B3x
IBM BladeCenter HS22 7870B4x
IBM BladeCenter HS22 7870C3x
IBM BladeCenter HS22 7870C4x
IBM BladeCenter HS22 7870L2x
IBM BladeCenter HS22 78701MU
IBM BladeCenter HS22 78702MU
IBM BladeCenter HS22 78703MU
IBM BladeCenter HS22 78705MU
IBM BladeCenter HS22 78706MUIBM BladeCenter HS22 7870EDU
IBM BladeCenter HS22 7870EBU
Intel Xeon Processor E5502 2c                     43W5986
Intel Xeon Processor E5504 4c                     44T1712
Intel Xeon Processor E5506 4c                     43W5987
Intel Xeon Processor E5520 4c                     44T1736
Intel Xeon Processor E5530 4c                     44T1883
Intel Xeon Processor E5540 4c                     44T1884
Intel Xeon Processor X5550 4c                     44T1885
Intel Xeon Processor X5560 4c                     44T1886
Intel Xeon Processor X5570 4c                     44T1887
Intel Xeon Processor L5520 4c                     46M0697
1 GB (1X1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333   44T1485
 VLP Low Power RDIMM
2 GB (1X2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333   44T1487
 VLP RDIMM
4 GB (1X4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333    44T1488
 VLP RDIMM
SAS Connectivity Card (CIOv) for IBM BladeCenter   43W4068
Ethernet Expansion Card (CIOv) for IBM BladeCenter  44W4475
QLogic 4Gb Fibre Channel Expansion Card (CIOv)     46M6065
 for IBM BladeCenter
```

June 30, 2009: HS22 BladeCenter option

```
8 GB (1X8GB) Dual Rank PC3-8500 CL7 ECC DDR3-1066   44T1579
VLP RDIMM
```

Description

Related options

IBM processor upgrades

```
Addl Intel Xeon Processor E5502                   43W5986
 2c 1.86 GHz 4 MB Cache 800 MHz
Addl Intel Xeon Processor E5504                   44T1712
 4c 2.00 GHz 4 MB Cache 800 MHz
Addl Intel Xeon Processor E5506                   43W5987
 4c 2.13 GHz 4 MB Cache 800 MHz
Addl Intel Xeon Processor E5520                   44T1736
 4c 2.26 GHz 8 MB Cache 1066 MHz
Addl Intel Xeon Processor E5530                   44T1883
 4c 2.40 GHz 8 MB Cache 1066 MHz
Addl Intel Xeon Processor E5540                   44T1884
 4c 2.53 GHz 8 MB Cache 1066 MHz
Addl Intel Xeon Processor X5550                   44T1885
```

```
                   4c 2.66 GHz 8 MB Cache 1333 MHz
Addl Intel Xeon Processor X5560                          44T1886
 4c 2.66 GHz 8 MB Cache 1333 MHz
Addl Intel Xeon Processor X5570                          44T1887
 4c 2.93 GHz 8 MB Cache 1333 MHz
Addl Intel Xeon Processor L5520                          46M0697
 4c 2.26 GHz 8 MB Cache 1066 MHz


IBM memory upgrades

1 GB (1X1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333    44T1485
 VLP Low Power RDIMM
2 GB (1X2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333    44T1487
 VLP RDIMM
4 GB (1X4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333      44T1488
 VLP RDIMM
8 GB (1X8GB) Dual Rank PC3-8500 CL7 ECC DDR3-1066       44T1579
 VLP RDIMM
```

Other upgrades

SAS Connectivity Card (CIOv) for IBM BladeCenter (43W4068)

This adapter offers the ideal way to connect the HS22 server to a wide variety of SAS storage devices. Built on up to 3 gigabit per second, full-duplex, SAS technology, the adapter can connect to the IBM System Storage^{tm} DS3200 from the BladeCenter E or H chassis, and to multiple Disk Storage Module in the BladeCenter S. The adapter's innovative Combination Form Factor design allows usage of other IO technologies simultaneously from the same blade server, such as additional Ethernet or Fibre Channel adapters.

2-port Ethernet Expansion Card (CIOv) for IBM BladeCenter (44W4475)

This is a 2-port 1 Gb Ethernet adapter with PCI-e interface designed specifically for HS22 and follow on blades. It is based off up to Broadcom 5709S ASIC and offers value-added features like TCP Offload (TOE) and SW iSCSI support for high performance. The adapter's innovative Combination Form Factor design allows usage of other IO technologies (in CFFh form factor) simultaneously from the same blade server, such as additional Ethernet or Fibre Channel adapters.

QLogic 4 Gb Fibre Channel Expansion Card (CIOv) for IBM BladeCenter (46M6065)

This adapter enables you to quickly and simply connect the HS22 server to a Fibre Channel SAN. Simply pick any Fibre Channel storage solution from IBM System Storage DS3000, DS4000^{tm}, DS5000, or DS8000^{tm} series, and begin accessing data over a high-speed interconnect. The adapter's innovative Combination Form Factor design allows usage of other IO technologies (in CFFh form factor) simultaneously from the same blade server, such as additional Ethernet or Fibre Channel adapters.

BladeCenter HS22

High-performance, blade server subsystems

The BladeCenter HS22 low-voltage blade servers are high-throughput, two-way, SMP-capable blade servers, and are highly scalable when you add memory.

The BladeCenter HS22 server supports up to two Intel Xeon 5500 Series processors. The processor board has the following major components:

- Two Socket B (LGA 1366) sockets for up to two Intel Xeon 5500 Series processors (a single processor is 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 Intel Voltage Regulator Module (VRM) and Enterprise Voltage Regulator-Down (EVRD) 11.0 Specification
- One Intel IO Hub (IOH): Host Bridge controller with PCI Express interface
- Twelve 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 2.5-inch SAS Hard 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 HS22 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 Compliant
- USB host interface with support for USB 2.0
- Low Pin Count (LPC) interface

On the HS22, 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 HS22 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 96 GB using 1 GB, 2 GB, 4 GB, or 8 GB VLP DDR3 DIMMs on twelve DIMM connectors. The processors have integrated DDR3 memory controllers and interface directly to it's six associated DDR3 DIMMs. For each CPU, a minimum of two DIMMs must be installed. Additional DIMMs may be installed one at a time as needed.

The HS22 server supports DDR3 speeds up to 1333 MHz, with the actual operating speed dictated by the CPU and DIMM combination which is installed. For the CPU, memory speed support is as follows:

- When 1333 MHz RDIMMs are installed **and** a 1333 MHz Intel Xeon 5500 Series processor is 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 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 **or** a 1066 MHz Intel Xeon 5500 Series processor is installed.
  - DDR3 speed is always up to 1066 MHz.
- When 800 MHz RDIMMs are installed **or** an 800 MHz Intel Xeon 5500 Series processor is installed.
  - DDR3 speed is always up to 800 MHz.

The HS22 supports memory mirroring. Chipkill[tm] is supported in Independent mode when x4-based DIMMs are installed.

Standard BladeCenter HS22 configuration

Information by model

```
Intel
   Model     Xeon      CPU       CPU      FSB       CPU
             name      speed     power    speed     cache

   7870D2x   E5502     1.86 GHz  80W       800 MHz  4MB
   7870A2x   E5504     2.00 GHz  80W       800 MHz  4MB
   7870CCx   E5504     2.00 GHz  80W       800 MHz  4MB
   7870B3x   E5530     2.40 GHz  80W      1066 MHz  8MB
   7870B4x   E5540     2.53 GHz  80W      1066 MHz  8MB
   7870C3x   X5560     2.80 GHz  95W      1333 MHz  8MB
   7870C4x   X5570     2.93 GHz  95W      1333 MHz  8MB
   7870L2x   L5520     2.26 GHz  60W      1066 MHz  8MB

   7870EDU   E5502     1.86 GHz  80W       800 MHz  4MB
   7870EBU   E5530     2.40 GHz  80W      1066 MHz  8MB
   78701MU   X5560     2.80 GHz  95W      1333 MHz  8MB
   78702MU   L5520     2.26 GHz  60W      1066 MHz  8MB
   78703MU   X5570     2.93 GHz  95W      1333 MHz  8MB
   78705MU   X5560     2.80 GHz  95W      1333 MHz  8MB
   78706MU   L5520     2.26 GHz  60W      1066 MHz  8MB    Model configurationsIntel
   Model     Xeon CPUs  Standard  DIMM   HDDs   Blade
             name       memory    slots         width  Chassis

   7870D2x   E5502 1    2x 1 GB   12    Open   30 mm See Below
   7870A2x   E5504 1    2x 1 GB   12    Open   30 mm
   7870CCx   E5504 1    2x 1 GB   12    Open   30 mm
   7870B3x   E5530 1    2x 2 GB   12    Open   30 mm
   7870B4x   E5540 1    2x 2 GB   12    Open   30 mm
   7870C3x   X5560 1    2x 2 GB   12    Open   30 mm
   7870C4x   X5570 1    2x 2 GB   12    Open   30 mm
   7870L2x   L5520 1    2x 2 GB   12    Open   30 mm
   7870EDU   E5502 1    3x 2 GB   12    Open   30 mm
   7870EBU   E5530 2    4x 2 GB   12    Open  30 mm             78701MU   X5560   2   6 x 4GB  12   Open
   78702MU   L5520 2    12 x 4GB  12    2 x 146GB SAS  30 mm
   78703MU   X5570 2    12 x 4GB  12    2 x 146GB SAS  30 mm
   78705MU   X5560 2    6 x 4GB   12    2 x 300GB SATA 30 mm
   78706MU   L5520 1    2 x 4GB   12    Open           30 mm

   All models support the following chassis:
    BCE, BCH, BCS

EMEA    x = G
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Additional features

- The BladeCenter HS22 system board contains 12 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 hot-swap SATA, SAS or solid-state HDDs (up to 300 GB each) are supported in the base blade
- Dual Gigabit Ethernet PCI connections

BladeCenter HS22 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 HS22 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 an imminent component failure.
- 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 HS22 blade servers include IBM 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, 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 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 will measure, monitor, and manage 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 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 1,400 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 pre-configure 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 collection system management tools to help manage your HS22 blade server and BladeServer environment. ToolsCenter makes managing your server environment less complicated, more productive, and cost-effective.

These tools include:

- Deployment

  IBM ServerGuide^tm is a tool that simplifies the process of installing and configuring IBM System x and BladeCenter servers. ServerGuide automates installation of 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 S chassis. Automatically updates the firmware for selected chassis components, and provides you with the option of saving your configuration. 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

  Advanced Settings Utility (ASU) systems configuration utility that provides command line interface, unattended scripting capability, and is supported in multiple operating-system platforms like DOS, Linux®, Solaris, Windows, and WinPE.

  Storage Configuration Manager (SCM) is a scalable and integrated storage management tool for both internal and external storage subsystem 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 an integration-tested bundle of online firmware and device driver updates for your server. UXSPs facilitate the download and install of all 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 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 allows for easy identification of cause-and-effect relationships from different log sources in the system.

BladeCenter advanced management module

BladeCenter HS22 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 HS22 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 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 for administrators to monitor, control, and maintain high availability.

Standard BladeCenter HS22 configurations

```
 Model      Processor     L2 Cache   Memory HDD    HDD      Power
                                             Iface           Supply

 7870-D2x  1 x 1.86 GHz   4 MB total 2x1 GB  SAS  Open bay   **
           Intel Xeon E5502 2c                   RAID
 7870-A2x  1 x 2.00 GHz   4 MB total 2x1 GB  SAS  Open bay   **
           Intel Xeon E5504 4c                   RAID
 7870-CCx  1 x 2.00 GHz   4 MB total 2x1 GB  SAS  Open bay   **
           Intel Xeon E5504 4c                   RAID
             Broadcom 2-Port 10Gbit CFFh Exp Card Standard
 7870-B3x  1 x 2.40 GHz   8 MB total 2x2 GB  SAS  Open bay   **
           Intel Xeon E5530 4c                   RAID
 7870-B4x  1 x 2.53 GHz   8 MB total 2x2 GB  SAS  Open bay   **
           Intel Xeon E5540 4c                   RAID
 7870-C3x  1 x 2.80 GHz   8 MB total 2x2 GB  SAS  Open bay   **
           Intel Xeon X5560 4c                   RAID
 7870-C4x  1 x 2.93 GHz   8 MB total 2x2 GB  SAS  Open bay   **
           Intel Xeon X5570 4c                   RAID
 7870-L2x  1 x 2.26 GHz   8 MB total 2x2 GB  SAS  Open bay   **
           Intel Xeon L5502 4c                   RAID
```

```
    **   Power supplied through BladeCenter chassis
```

IBM BladeCenter HS22 Express Models

```
   Model     Processor     L2 Cache    Memory  HDD    HDD     Power
                                               Iface          Supply

   7870-EDU  1 x 1.86 GHz  4 MB total 3x2 GB  SAS   Open bay  **
             Intel Xeon E5502 2c               RAID
   7870-EBU  2 x 2.40 GHz  8 MB total 4x2 GB  SAS   Open bay  **
             Intel Xeon E5530 4c               RAID

   **   Power supplied through BladeCenter chassis

   Model     Processor     L2 Cache    Memory  HDD    HDD     Power
                                               Iface          Supply
                                                                **

   7870-1MU  2 x 2.80GHz   16MB total 6 x 4GB  SAS   Open bay
             Intel Xeon X5560 2c
   7870-2MU  2 x 2.26GHz   16MB total 12 x 4GB SAS   2 x 146GB SAS
             Intel Xeon L5520 4c
             QLogic 4GB Fibre Channel Exp Card (CIOv)
   7870-3MU  2 x 2.93GHz   16MB total 12 x 4GB  SAS 2 x 146GB SAS
             Intel Xeon X5570 4c
             QLogic 4GB Fibre Channel Exp Card (CIOv)
   7870-5MU  2 x 2.80GHz   16MB total  6 x 4GB  SAS  2 x 300GB SATA
             Intel Xeon X5560 4c
   7870-6MU  1 x 2.26GHz   8MB total   2 x 4GB  SAS     Open bay
             Intel Xeon L5520 4c

   **   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 HS22 offerings are positioned as high-density, compute-oriented blade servers offering lower power usage Intel Xeon processors.

The BladeCenter and BladeCenter HS22 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

The following are newly announced features on the specified models of the IBM xSeries® 7870 machine type:

Description	MT	Model	Feature
7870-AC1	7870	AC1	
7870-MC1	7870	MC1	
Integrated SATA Mirroring - 2 identical HDDs required	7870	AC1 MC1	0030
Integrated SATA Striping - 2 identical HDDs required	7870	AC1 MC1	0031
Addl Intel Xeon Processor E5504 4c 2.00GHz 4MB Cache 800MHz	7870	AC1 MC1	1026
Addl Intel Xeon Processor E5506 4c 2.13GHz 4MB Cache 800MHz	7870	AC1 MC1	1027
Addl Intel Xeon Processor E5520 4c 2.26GHz 8MB Cache 1066MHz	7870	AC1 MC1	1028
Addl Intel Xeon Processor E5530 4c 2.40GHz 8MB Cache 1066MHz	7870	AC1 MC1	1029
Addl Intel Xeon Processor E5540 4c 2.53GHz 8MB Cache 1066MHz	7870	AC1 MC1	1030
Addl Intel Xeon Processor X5550 4c 2.66GHz 8MB Cache 1333MHz	7870	AC1 MC1	1031
Addl Intel Xeon Processor X5560 4c 2.80GHz 8MB Cache 1333MHz	7870	AC1 MC1	1032
Addl Intel Xeon Processor X5570 4c 2.93GHz 8MB Cache 1333MHz	7870	AC1 MC1	1033
Base	7870	AC1 MC1	1034
Voltaire 4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter	7870	AC1 MC1	1036
4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter	7870	AC1 MC1	1038
Ethernet Expansion Card (CIOv) for IBM BladeCenter	7870	AC1 MC1	1039
SAS Connectivity Card (CIOv) for IBM BladeCenter	7870	AC1 MC1	1041
Blade Cover	7870	AC1 MC1	1043
Labels for HS22 Blade Base	7870	AC1 MC1	1044
Dummy DIMM for improved airflow	7870	AC1 MC1	1045
2.5" HDD Filler Bezel	7870	AC1 MC1	1046
CPU Heat Sink Filler	7870	AC1 MC1	1047
IBM 73 GB 10K SAS 2.5" SFF Slim-HS HDD	7870	AC1 MC1	1048
IBM 146 GB 10K SAS 2.5" SFF Slim-HS HDD	7870	AC1 MC1	1049
IBM 73 GB 15K SAS 2.5" SFF Slim-HS HDD	7870	AC1 MC1	1050
IBM 31.4 GB SATA 2.5" SFF Slim-HS SSD	7870	AC1 MC1	1051
System Documentation and Software-US English	7870	AC1 MC1	1052
Packaging - 1U Blade WW	7870	AC1 MC1	1069
Packaging - 2U Blade WW	7870	AC1 MC1	1070
1GB (1x1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP LP RDIMM	7870	AC1 MC1	1072

Description			
2GB (1x2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM	7870	AC1 MC1	1073
4GB (1x4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM	7870	AC1 MC1	1074
Broadcom 10Gb 4-port Ethernet Exp Card (CFFh) for IBM BladeCenter	7870	AC1 MC1	1076
2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter	7870	AC1 MC1	1077
QLogic Eth and 8Gb Fibre Channel Exp Card (CFFh) for IBM BladeCenter	7870	AC1 MC1	1078
EMEA Long Leadtime Configurations	7870	AC1 MC1	1763
Hungary CHW plant 9SH	7870	AC1 MC1	1764
Guad CHW plant 9KQ	7870	AC1 MC1	1765
ISTC CHW 9K2	7870	AC1 MC1	1766
RTP CHW 9NR	7870	AC1 MC1	1767
Offload Manufacturing to Guadalajara HVEC	7870	AC1 MC1	1768
Offload Manufacturing to RTP HVEC	7870	AC1 MC1	1769
Offload Manufacturing to ISTC	7870	AC1 MC1	1770
Capacity Scheduling Service	7870	AC1 MC1	1772
Custom SLA Scheduling Service	7870	AC1 MC1	1796
8GB Dual Rank PC3-8500 CL7 ECC DDR3-1066 VLP RDIMM	7870	AC1 MC1	1911
Custom Asset Tagging - Standard	7870	AC1 MC1	2200
Custom Asset Tagging - Enhanced	7870	AC1 MC1	2201
Custom Image Load - Server	7870	AC1 MC1	2204
Custom Media Shipgroup	7870	AC1 MC1	2206
Request for Global Trade Number (UPC or EAN)	7870	AC1 MC1	2207
Custom Software/Firmware Setting - Standard	7870	AC1 MC1	2208
Custom Software/Firmware Setting - Enhanced	7870	AC1 MC1	2209
Custom RAID Configuration	7870	AC1 MC1	2212
Custom Labeling	7870	AC1 MC1	2220
Custom Palletization	7870	AC1 MC1	2221
Request for a new Vendor Logo Hardware	7870	AC1 MC1	2247
Request for an existing IBM Feature	7870	AC1 MC1	2248
Request for an existing Public RPQ	7870	AC1 MC1	2249
RAID Configuration	7870	AC1 MC1	2302
Install in Rack 01	7870	AC1 MC1	3101
Install in Rack 02	7870	AC1 MC1	3102
Install in Rack 03	7870	AC1 MC1	3103
Install in Rack 04	7870	AC1 MC1	3104

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Install in Rack 05                                  7870  AC1   3105
                                                          MC1
Install in Rack 06                                  7870  AC1   3106
                                                          MC1
Install in Rack 07                                  7870  AC1   3107
                                                          MC1
Install in Rack 08                                  7870  AC1   3108
                                                          MC1
Install in Rack 09                                  7870  AC1   3109
                                                          MC1
Install in Rack 10                                  7870  AC1   3110
                                                          MC1
Install in Rack 11                                  7870  AC1   3111
                                                          MC1
Install in Rack 12                                  7870  AC1   3112
                                                          MC1
Install in Rack 13                                  7870  AC1   3113
                                                          MC1
Install in Rack 14                                  7870  AC1   3114
                                                          MC1
Install in Rack 15                                  7870  AC1   3115
                                                          MC1
Install in Rack 16                                  7870  AC1   3116
                                                          MC1
Install in Rack 17                                  7870  AC1   3117
                                                          MC1
Install in Rack 18                                  7870  AC1   3118
                                                          MC1
Install in Rack 19                                  7870  AC1   3119
                                                          MC1
Install in Rack 20                                  7870  AC1   3120
                                                          MC1
Install in Rack 21                                  7870  AC1   3121
                                                          MC1
Install in Rack 22                                  7870  AC1   3122
                                                          MC1
Install in Rack 23                                  7870  AC1   3123
                                                          MC1
Install in Rack 24                                  7870  AC1   3124
                                                          MC1
Install in Rack 25                                  7870  AC1   3125
                                                          MC1
Install in Rack 26                                  7870  AC1   3126
                                                          MC1
Install in Rack 27                                  7870  AC1   3127
                                                          MC1
Install in Rack 28                                  7870  AC1   3128
                                                          MC1
Install in Rack 29                                  7870  AC1   3129
                                                          MC1
Install in Rack 30                                  7870  AC1   3130
                                                          MC1
Install in Rack 31                                  7870  AC1   3131
                                                          MC1
Install in Rack 32                                  7870  AC1   3132
                                                          MC1
Install in Rack 33                                  7870  AC1   3133
                                                          MC1
Install in Rack 34                                  7870  AC1   3134
                                                          MC1
Install in Rack 35                                  7870  AC1   3135
                                                          MC1
Install in Rack 36                                  7870  AC1   3136
                                                          MC1
Install in Rack 37                                  7870  AC1   3137
                                                          MC1
Install in Rack 38                                  7870  AC1   3138
                                                          MC1
Install in Rack 39                                  7870  AC1   3139
                                                          MC1
Install in Rack 40                                  7870  AC1   3140
                                                          MC1
Install in Rack 41                                  7870  AC1   3141
                                                          MC1
```

```
Install in Rack 42                                          7870   AC1    3142
                                                                   MC1
Install in Rack 43                                          7870   AC1    3143
                                                                   MC1
Install in Rack 44                                          7870   AC1    3144
                                                                   MC1
Install in Rack 45                                          7870   AC1    3145
                                                                   MC1
Install in Rack 46                                          7870   AC1    3146
                                                                   MC1
Install in Rack 47                                          7870   AC1    3147
                                                                   MC1
Install in Rack 48                                          7870   AC1    3148
                                                                   MC1
Install in Rack 49                                          7870   AC1    3149
                                                                   MC1
Install in Rack 50                                          7870   AC1    3150
                                                                   MC1
Install in Rack 51                                          7870   AC1    3151
                                                                   MC1
Install in Rack 52                                          7870   AC1    3152
                                                                   MC1
Install in Rack 53                                          7870   AC1    3153
                                                                   MC1
Install in Rack 54                                          7870   AC1    3154
                                                                   MC1
Install in Rack 55                                          7870   AC1    3155
                                                                   MC1
Install in Rack 56                                          7870   AC1    3156
                                                                   MC1
Install in Rack 57                                          7870   AC1    3157
                                                                   MC1
Install in Rack 58                                          7870   AC1    3158
                                                                   MC1
Install in Rack 59                                          7870   AC1    3159
                                                                   MC1
Install in Rack 60                                          7870   AC1    3160
                                                                   MC1
Install in Rack 61                                          7870   AC1    3161
                                                                   MC1
Install in Rack 62                                          7870   AC1    3162
                                                                   MC1
Install in Rack 63                                          7870   AC1    3163
                                                                   MC1
Install in Rack 64                                          7870   AC1    3164
                                                                   MC1
BladeCenter 01                                              7870   AC1    3301
                                                                   MC1
BladeCenter 02                                              7870   AC1    3302
                                                                   MC1
BladeCenter 03                                              7870   AC1    3303
                                                                   MC1
BladeCenter 04                                              7870   AC1    3304
                                                                   MC1
BladeCenter 05                                              7870   AC1    3305
                                                                   MC1
BladeCenter 06                                              7870   AC1    3306
                                                                   MC1
BladeCenter 07                                              7870   AC1    3307
                                                                   MC1
BladeCenter 08                                              7870   AC1    3308
                                                                   MC1
BladeCenter 09                                              7870   AC1    3309
                                                                   MC1
BladeCenter 10                                              7870   AC1    3310
                                                                   MC1
BladeCenter 11                                              7870   AC1    3311
                                                                   MC1
BladeCenter 12                                              7870   AC1    3312
                                                                   MC1
BladeCenter 13                                              7870   AC1    3313
                                                                   MC1
BladeCenter 14                                              7870   AC1    3314
                                                                   MC1
```

BladeCenter 15	7870	AC1 MC1	3315
BladeCenter 16	7870	AC1 MC1	3316
BladeCenter 17	7870	AC1 MC1	3317
BladeCenter 18	7870	AC1 MC1	3318
BladeCenter 19	7870	AC1 MC1	3319
BladeCenter 20	7870	AC1 MC1	3320
BladeCenter 21	7870	AC1 MC1	3321
BladeCenter 22	7870	AC1 MC1	3322
BladeCenter 23	7870	AC1 MC1	3323
BladeCenter 24	7870	AC1 MC1	3324
BladeCenter 25	7870	AC1 MC1	3325
BladeCenter 26	7870	AC1 MC1	3326
BladeCenter 27	7870	AC1 MC1	3327
BladeCenter 28	7870	AC1 MC1	3328
BladeCenter 29	7870	AC1 MC1	3329
BladeCenter 30	7870	AC1 MC1	3330
BladeCenter 31	7870	AC1 MC1	3331
BladeCenter 32	7870	AC1 MC1	3332
BladeCenter 33	7870	AC1 MC1	3333
BladeCenter 34	7870	AC1 MC1	3334
BladeCenter 35	7870	AC1 MC1	3335
BladeCenter 36	7870	AC1 MC1	3336
BladeCenter 37	7870	AC1 MC1	3337
BladeCenter 38	7870	AC1 MC1	3338
BladeCenter 39	7870	AC1 MC1	3339
BladeCenter 40	7870	AC1 MC1	3340
BladeCenter location 01	7870	AC1 MC1	3401
BladeCenter location 02	7870	AC1 MC1	3402
BladeCenter location 03	7870	AC1 MC1	3403
BladeCenter location 04	7870	AC1 MC1	3404
BladeCenter location 05	7870	AC1 MC1	3405
BladeCenter location 06	7870	AC1 MC1	3406
BladeCenter location 07	7870	AC1 MC1	3407
BladeCenter location 08	7870	AC1 MC1	3408
BladeCenter location 09	7870	AC1 MC1	3409
BladeCenter location 10	7870	AC1 MC1	3410
BladeCenter location 11	7870	AC1 MC1	3411

BladeCenter location 12	7870	AC1 MC1	3412
BladeCenter location 13	7870	AC1 MC1	3413
BladeCenter location 14	7870	AC1 MC1	3414
QLogic 4Gb Fibre Channel Expansion Card (CIOv) for IBM BladeCenter	7870	AC1 MC1	3594
Intel Xeon Processor L5520 4c 2.26GHz 8MB Cache 1066MHz	7870	AC1 MC1	4537
Intel Xeon Processor E5502 2c 1.86GHz 4MB Cache 800MHz	7870	AC1 MC1	5360
Intel Xeon Processor E5504 4c 2.00GHz 4MB Cache 800MHz	7870	AC1 MC1	5361
Intel Xeon Processor E5506 4c 2.13GHz 4MB Cache 800MHz	7870	AC1 MC1	5362
Intel Xeon Processor E5520 4c 2.26GHz 8MB Cache 1066MHz	7870	AC1 MC1	5363
Intel Xeon Processor E5530 4c 2.40GHz 8MB Cache 1066MHz	7870	AC1 MC1	5364
Intel Xeon Processor E5540 4c 2.53GHz 8MB Cache 1066MHz	7870	AC1 MC1	5365
Intel Xeon Processor X5550 4c 2.66GHz 8MB Cache 1333MHz	7870	AC1 MC1	5366
Intel Xeon Processor X5560 4c 2.80GHz 8MB Cache 1333MHz	7870	AC1 MC1	5367
Intel Xeon Processor X5570 4c 2.93GHz 8MB Cache 1333MHz	7870	AC1 MC1	5368
Addl Intel Xeon Processor E5502 2c 1.86GHz 4MB Cache 800MHz	7870	AC1 MC1	5369
Broadcom 10Gb 2-port Ethernet Exp Card (CFFh) for IBM BladeCenter	7870	AC1 MC1	5489
IBM 73GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	7870	AC1 MC1	5522
IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	7870	AC1 MC1	5536
IBM 146GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	7870	AC1 MC1	5537
300GB 10K SATA 2.5" Slim-HS HDD	7870	AC1 MC1	5595
IBM 300GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	7870	AC1 MC1	5599
BladeCenter Office Solution	7870	AC1 MC1	7019
Addl Intel Xeon Processor L5520 4c 2.26GHz 8MB Cache 1066MHz	7870	AC1 MC1	7793
Customer Solution Center Services	7870	AC1 MC1	7831
Integrated Solid State Mirroring	7870	AC1 MC1	7859
Integrated Solid State Striping	7870	AC1 MC1	7860
No HDD Selected	7870	AC1 MC1	8026
No Processor Selected	7870	AC1 MC1	8028
No Memory Selected	7870	AC1 MC1	8029
Consolidate Shipment	7870	AC1 MC1	8031

e1350 Solution Component	7870	AC1 MC1	8034
Compute Node	7870	AC1 MC1	8036
Management Node	7870	AC1 MC1	8037
Storage Node	7870	AC1 MC1	8038
Integrated SAS Mirroring - 2 identical HDDs required	7870	AC1 MC1	8039
Integrated SAS Striping - 2 identical HDDs required	7870	AC1 MC1	8040
TAA Compliant Order	7870	AC1 MC1	8067
General Racking Solution	7870	AC1 MC1	8072
Integrate BladeCenter in Manufacturing	7870	AC1 MC1	8077
No 2.5" SAS HDD Selected	7870	AC1 MC1	8081
No Publications Selected	7870	AC1 MC1	8086
No Internal RAID	7870	AC1 MC1	9012
Enable Memory Mirroring	7870	AC1 MC1	9017
Storage Subsystem ID 01	7870	AC1 MC1	9170
Storage Subsystem ID 02	7870	AC1 MC1	9171
Storage Subsystem ID 03	7870	AC1 MC1	9172
Storage Subsystem ID 04	7870	AC1 MC1	9173
Storage Subsystem ID 05	7870	AC1 MC1	9174
Storage Subsystem ID 06	7870	AC1 MC1	9175
Storage Subsystem ID 07	7870	AC1 MC1	9176
Storage Subsystem ID 08	7870	AC1 MC1	9177
Storage Subsystem ID 09	7870	AC1 MC1	9178
Storage Subsystem ID 10	7870	AC1 MC1	9179
Storage Subsystem ID 11	7870	AC1 MC1	9180
Storage Subsystem ID 12	7870	AC1 MC1	9181
Storage Subsystem ID 13	7870	AC1 MC1	9182
Storage Subsystem ID 14	7870	AC1 MC1	9183
Storage Subsystem ID 15	7870	AC1 MC1	9184
Storage Subsystem ID 16	7870	AC1 MC1	9185
Storage Subsystem ID 17	7870	AC1 MC1	9186
Storage Subsystem ID 18	7870	AC1 MC1	9187
Storage Subsystem ID 19	7870	AC1 MC1	9188
Storage Subsystem ID 20	7870	AC1 MC1	9189
Preload Specify	7870	AC1 MC1	9200
Windows Specify	7870	MC1	9201
Red Hat Specify	7870	AC1	9202
SuSE Specify	7870	AC1	9203
Drop-in-the-Box Specify	7870	AC1	9205

```
                                                   MC1
No Preload Specify                           7870  AC1   9206
                                                   MC1
VMware Specify                               7870  AC1   9207
Solaris Specify                              7870  AC1   9208
```

The following feature numbers are automatically added to the 5372-SWX HIPO order whenever one of the hardware system units are configured in an order.

```
    HIPO
    feature
    number       Description

    4184         7870-AC1 Routing Code
    4185         7870-MC1 Routing Code
```

The following are newly announced features on the specified models of the BladeCenter 7870 machine types:

The Single Entity Offerings (SEO)

```
SEO
Description                                   Number

 BladeCenter HS22                             7870D2U
                                              7870A2U
                                              7870CCU
                                              7870B3U
                                              7870B4U
                                              7870C3U
                                              7870C4U
                                              7870L2U

BladeCenter HS22                              7870EDU
 Express Models                               7870EBU

BladeCenter HS22                              78701MU
                                              78702MU
                                              78703MU
                                              78705MU
                                              78706MU
```

Options SEOs

```
                                                 SEO
    Description                                  Number

Intel Xeon Processor E5502                       43W5986
 2c 1.86 GHz 4 MB Cache 800 MHz
Intel Xeon Processor E5504                       44T1712
 4c 2.00 GHz 4 MB Cache 800 MHz
Intel Xeon Processor E5506                       43W5987
 4c 2.13 GHz 4 MB Cache 800 MHz
Intel Xeon Processor E5520                       44T1736
 4c 2.26 GHz 8 MB Cache 1066 MHz
Intel Xeon Processor E5530                       44T1883
 4c 2.40 GHz 8 MB Cache 1066 MHz
Intel Xeon Processor E5540                       44T1884
 4c 2.53 GHz 8 MB Cache 1066 MHz
Intel Xeon Processor X5550                       44T1885
 4c 2.66 GHz 8 MB Cache 1333 MHz
Intel Xeon Processor X5560                       44T1886
 4c 2.66 GHz 8 MB Cache 1333 MHz
Intel Xeon Processor X5570                       44T1887
 4c 2.93 GHz 8 MB Cache 1333 MHz
Intel Xeon Processor L5520                       46M0697
 4c 2.26 GHz 8 MB Cache 1066 MHz


1 GB (1X1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333     44T1485
 VLP Low Power RDIMM
2 GB (1X2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333     44T1487
 VLP RDIMM
4 GB (1X4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333       44T1488
```

```
 VLP RDIMM
8 GB (1X8GB) Dual Rank PC3-8500 CL7 ECC DDR3-1066         44T1579
 VLP RDIMM

SAS Connectivity Card (CIOv) for IBM BladeCenter          43W4068

Ethernet Expansion Card (CIOv) for IBM BladeCenter        44W4475

QLogic 4Gb Fibre Channel Expansion Card (CIOv)            46M6065
 for IBM BladeCenter
```

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https://www.ibm.com/partnerworld/mem/sla.jsp?num=109-101

Publications

An installation and user's guide, and safety and warranty publications are shipped with each BladeCenter HS22 blade. The following publications are available immediately:

```
                                  Order
           Title                  Number

   BladeCenter Solutions          GM13-0127
   System x Family Brochure       GM13-0128
```

The publication *BladeCenter HS22 Installation and User's Guide* and *Hardware Maintenance Manual* , in U.S. English, are available from

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

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

System X and BladeCenter support services

Recommended core technical support

When you buy IBM System x technology, include the support services you need - to help keep both your hardware and software working for you, day after day, at peak performance. It's your first step toward helping to protect your investment and sustain high levels of system availability. We offer service-level and response-time options to fit your business needs. And we'll help you get started with a core support package that includes:

- **Continuous system monitoring**

  Electronic monitoring that helps speed up problem-solving with automated, early detection of potential problems and system errors.

- **Hardware maintenance**

  World-class remote and on-site hardware problem determination and repair services.

- **Software technical support**

  Access to help line calls for fast, accurate answers to your questions during installation and throughout ongoing operations.

For more information, visit

http://www.ibm.com/servers/eserver/xseries/services.html

Technical information

Specified operating environment

Physical specifications

BladeCenter HS22

	7870-D2x	7870-A2x
Processor	Intel Xeon E5502	Intel Xeon E5504
	2 core	4 core
Int. speed	1.86 GHz	2.00 GHz
Max. mem. speed	800 MHz	800 MHz
Interconnect speed	4.8 GT/s	4.8 GT/s
Number standard	1	1
Maximum	2	2
L2 cache (full speed)	4 MB	4 MB
Memory (VLP ECC DDR3)	2 GB	2 GB
DIMMs (Standard)	2x 1 GB	2x 1 GB
DIMM sockets	12	12
Capacity	96 GB^2	96 GB^2
Video	SVGA	SVGA
Memory	16 MB	16 MB
Disk controller	SAS	SAS
Channels	1	1
Connector int.	2	2
Connector ext.	0	0
RAID	Yes	Yes
HDD	0	0
Connectors	2	2
Internal capacity	600 GB^3	600 GB^3
Total HDD bays	2	2
PCI Slots	0	0
Management proc.	Standard	Standard
Ethernet controller	Dual GB	Dual GB
FC card	Optional	Optional
DVD-ROM (IDE)	0	0
Diskette drive	0	0
Power supply	0	0

	7870-CCx	7870-B3x
Processor	Intel Xeon E5504	Intel Xeon E5530
	4 core	4 core
Int. speed	2.00 GHz	2.40 GHz
Max. mem. speed	800 MHz	1066 MHz
Interconnect speed	4.8 GT/s	5.86 GT/s
Number standard	1	1
Maximum	2	2
L2 cache (full speed)	4 MB	8 MB
Memory (VLP ECC DDR3)	2 GB	4 GB
DIMMs (Standard)	2x 1 GB	2x 2 GB
DIMM sockets	12	12
Capacity	96 GB^2	96 GB^2
Video	SVGA	SVGA
Memory	16 MB	16 MB
Disk controller	SAS	SAS
Channels	1	1
Connector int.	2	2
Connector ext.	0	0
RAID	Yes	Yes
HDD	0	0
Connectors	2	2
Internal capacity	600 GB^3	600 GB^3
Total HDD bays	2	2
PCI Slots	0	0
Management proc.	Standard	Standard
Ethernet controller	Dual GB	Dual GB
Broadcom 2-Port 10Gbit CFFh	Standard	Optional

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FC card	Optional	Optional
DVD-ROM (IDE)	0	0
Diskette drive	0	0
Power supply	0	0

7870-B4x   7870-C3x

Processor	Intel Xeon E5540 4 core	Intel Xeon X5560 4 core
Int. speed	2.53 GHz	2.80 GHz
Max. mem. speed	1066 MHz	1333 MHz
Interconnect speed	5.86 GT/s	6.4 GT/s
Number standard	1	1
Maximum	2	2
L2 cache (full speed)	8 MB	8 MB
Memory (VLP ECC DDR3)	4 GB	4 GB
DIMMs (Standard)	2x 2 GB	2x 2 GB
DIMM sockets	12	12
Capacity	96 GB^2	96 GB^2
Video	SVGA	SVGA
Memory	16 MB	16 MB
Disk controller	SAS	SAS
Channels	1	1
Connector int.	2	2
Connector ext.	0	0
RAID	Yes	Yes
HDD	0	0
Connectors	2	2
Internal capacity	600 GB^3	600 GB^3
Total HDD bays	2	2
PCI Slots	0	0
Management proc.	Standard	Standard
Ethernet controller	Dual GB	Dual GB
FC card	Optional	Optional
DVD-ROM (IDE)	0	0
Diskette drive	0	0
Power supply	0	0

7870-C4x   7870-L2x

Processor	Intel Xeon X5570 4 core	Intel Xeon L5520 4 core
Int. speed	2.93 GHz	2.26 GHz
Max. mem. speed	1333 MHz	1066 MHz
Interconnect speed	6.4 GT/s	5.86 GT/s
Number standard	1	1
Maximum	2	2
L2 cache (full speed)	8 MB	8 MB
Memory (VLP ECC DDR3)	4 GB	4 GB
DIMMs (Standard)	2x 2 GB	2x 2 GB
DIMM sockets	12	12
Capacity	96 GB^2	96 GB^2
Video	SVGA	SVGA
Memory	16 MB	16 MB
Disk controller	SAS	SAS
Channels	1	1
Connector int.	2	2
Connector ext.	0	0
RAID	Yes	Yes
HDD	0	0
Connectors	2	2
Internal capacity	600 GB^3	600 GB^3
Total HDD bays	2	2
PCI Slots	0	0
Management proc.	Standard	Standard
Ethernet controller	Dual GB	Dual GB
FC card	Optional	Optional
DVD-ROM (IDE)	0	0
Diskette drive	0	0
Power supply	0	0

IBM BladeCenter Express Models

	7870-EDU	7870-EBU
Processor	Intel Xeon E5502	Intel Xeon E5530
	2 core	4 core
Int. speed	1.86 GHz	2.40 GHz
Max. mem. speed	800 MHz	1066 MHz
Interconnect speed	4.8 GT/s	5.86 GT/s
Number standard	1	2
Maximum	2	2
L2 cache (full speed)	4 MB	8 MB
Memory (VLP ECC DDR3)	6 GB	8 GB
DIMMs (Standard)	3 x 2 GB	4 x 2 GB
DIMM sockets	12	12
Capacity	96 GB^2	96 GB^2
Video	SVGA	SVGA
Memory	16 MB	16 MB
Disk controller	SAS	SAS
Channels	1	1
Connector int.	2	2
Connector ext.	0	0
RAID	Yes	Yes
HDD	0	0
Connectors	2	2
Internal capacity	600 GB^3	600 GB^3
Total HDD bays	2	2
PCI Slots	0	0
Management proc.	Standard	Standard
Ethernet controller	Dual GB	Dual GB
FC card	Optional	Optional
DVD-ROM (IDE)	0	0
Diskette drive	0	0
Power supply	0	0

	7870-1MU	7870-2MU
Processor	Intel Xeon X5560	Intel Xeon L5520
	4 core	4 core
Int. speed	2.8 GHz	2.26 GHz
Max. mem. speed	1333 MHz	1066 MHz
Interconnect speed	6.4 GT/s	5.86 GT/s
Number standard	2	2
Maximum	2	2
L2 cache (full speed)	16 MB	16 MB
Memory (VLP ECC DDR3)	24GB	48GB
DIMMs (Standard)	6 x 4 GB	12 x 4GB
DIMM sockets	12	12
Capacity	96 GB^2	96 GB^2
Video	SVGA	SVGA
Memory	16 MB	16 MB
HDD	0	2 x 146GB SAS
Connectors	2	2
Internal capacity	600 GB^3	600 GB^3
Total HDD bays	2	2
PCI Slots	0	0
Management proc.	Standard	Standard
Ethernet controller	Dual GB	Dual GB
FC card	Optional	Standard *
DVD-ROM (IDE)	0	0
Diskette drive	0	0
Power supply	0	0

	7870-3MU
Processor	Intel Xeon X5570
	4 core
Int. speed	2.93 GHz
Max. mem. speed	1333 MHz
Interconnect speed	6.4 GT/s

```
 Number standard          2
 Maximum                  2
L2 cache (full speed)     16 MB
Memory (VLP ECC DDR3)     48GB
 DIMMs (Standard)         12 x 4 GB
 DIMM sockets             12

 Capacity                 96 GB$^2$
Video                     SVGA
 Memory                   16 MB
 Disk controller          SAS
 Channels                 1
 Connector int.           2
Connector ext.            0
 RAID                     Yes
HDD                       2 x 146GB SAS
 Connectors               2

 Internal capacity        600 GB$^3$
Total HDD bays            2
PCI Slots                 0
 Management proc.         Standard
 Ethernet controller      Dual GB
 FC card                  Standard *
 DVD-ROM (IDE)            0
 Diskette drive           0
 Power supply             0


                          7870-5MU


   Processor              Intel Xeon X5560
                          4 core
 Int. speed               2.80 GHz
 Max. mem. speed          1333 MHz
 Interconnect speed       6.4 GT/s
  Number standard         2
  Maximum                 2
 L2 cache (full speed)    16 MB
 Memory (VLP ECC DDR3)    24GB
  DIMMs (Standard)        6 x 4 GB
  DIMM sockets            12

  Capacity                96 GB$^2$
 Video                    SVGA
  Memory                  16 MB
 Disk controller          SAS
  Channels                1
  Connector int.          2
  Connector ext.          0
  RAID                    Yes
 HDD                      2 x 300GB SATA
  Connectors              2

  Internal capacity       600 GB$^3$
 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


                          7870-6MU


   Processor              Intel Xeon L5520
                          4 core
  Int. speed              2.26 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)   8GB
```

```
DIMMs (Standard)          2 x 4 GB
DIMM sockets              12

 Capacity                 96 GB2
Video                     SVGA
 Memory                   16 MB
Disk controller           SAS
 Channels                 1
 Connector int.           2
 Connector ext.           0
HDD
 Connectors               2

 Internal capacity        600 GB3
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
```

[2] Total system memory capacity is based on using 8 GB memory DIMMs.

[3] Capacities are based on installation of two 300 GB SAS HDDs.

Note: Model CCx includes a Broadcom 10 Gb 2-port Ethernet Expansion Card standard installed.

* 7870-2MU; 7870-3MU QLogic 4GB Fibre Channel Expansion Card (CIOv) standard installed.

For 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 HS22 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 HS22

- 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 HS22: 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

- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 3, Class A
- UL 60950 Safety of Information Technology Equipment
- CSA C22.2 No.60950 Safety of Information Technology Equipment 60950
- NOM-019 Seguridad de Equipto de Procesamiento de Datos within 30 days of planned availability

Operating environment

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

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

Programming requirements

The following network operating systems have been tested for compatibility with the BladeCenter HS22:

- Microsoft:
  - Windows Server 2008 Datacenter (32-bit)
  - Windows Server 2008 Datacenter (64-bit)
  - Windows Server 2008 Enterprise (32-bit)
  - Windows Server 2008 Enterprise (64-bit)
  - Windows Server 2008 Standard (32-bit)
  - Windows Server 2008 Standard (64-bit)
  - Windows Server 2008 Web (32-bit)
  - Windows Server 2008 Web (64-bit)
  - Windows Small Business Server 2008 Premium (64-bit)
  - Windows Small Business Server 2008 Standard (64-bit)
  - Windows Essential Business Server 2008 Premium (64-bit)
  - Windows Essential Business Server 2008 Standard (64-bit)
  - Windows Server 2008 HPC Edition (64-bit)
  - Windows HPC Server 2008 (64-bit)
  - Windows Datacenter 2003 R2 UV (32-bit)
  - Windows Datacenter 2003 R2 UV (64-bit)
  - Windows Server 2003 R2 Enterprise (32-bit)
  - Windows Server 2003 R2 Enterprise (64-bit)
  - Windows Server 2003 R2 Standard (32-bit)
  - Windows Server 2003 R2 Standard (64-bit)
  - Windows Server 2003 R2 Web (32-bit)
  - Windows Compute Cluster Server (64-bit)
  - Windows Compute Cluster Edition (64-bit)
  - Windows Small Business Server 2003 R2 Premium
  - Windows Small Business Server 2003 R2 Standard
- Linux:
  - Red Hat EL 5 (Server) 32-bit
  - Red Hat EL 5 (Server) 64-bit
  - Red Hat EL 5 (Server) 64-bit w/ Xen
  - SUSE Linux ES 10 32-bit

- – SUSE Linux ES 10 32-bit w/ Xen
- – SUSE Linux ES 10 64-bit
- – SUSE Linux ES 10 64-bit w/ Xen

Support for VMware ESX 3.5 update 4 is expected June 30, 2009.

Note: Preview announcements provide insight into IBM plans and directions. General availability, prices, ordering information, and terms and conditions will be provided when the support is announced.

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

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

Compatibility

The BladeCenter HS22 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 HS22 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 HS22 blades contain 12 DIMM sockets. A maximum of 96 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 two DIMMs 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 HS22. 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 HS22 is supported in the BladeCenter H chassis (8852), 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

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 HS22 blades must be installed in a BladeCenter chassis.

BladeCenter configuration

The BladeCenter contains 14 blade server bays supporting up to 14 hot-swap BladeCenter HS22 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

Processor upgrades

The system comes standard with one Intel Xeon processor.

** An additional processor may be added by purchasing a supported processor option. The optional processor must match the initial processor in each system.

Note: ** Models 7870-1MU, 2MU, 3MU, 5MU, and Express Model EBU have 2 x processors standard.

Note: ** Express Model EBU has 2 x processors standard.

Memory support

The following memory options are supported with BladeCenter HS22:

```
Option Description                                        Option

1 GB (1X1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333      44T1485
 VLP Low Power RDIMM
2 GB (1X2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333      44T1487
 VLP RDIMM
4 GB (1X4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333        44T1488
 VLP RDIMM
8 GB (1X8GB) Dual Rank PC3-8500 CL7 ECC DDR3-1066         44T1579
 VLP RDIMM
```

Power considerations

BladeCenter HS22 is supported in the BladeCenter chassis.

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

Cable orders

Each BladeCenter HS22 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 HS22 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 HS22

```
Product                Package Description             Boxes

BladeCenter HS22       BladeCenter HS22 Carton           1

                        Contents:

                       BladeCenter HS22                   1
                       Publications/CD Package            1

BladeCenter HS22       Publications Package               1

                        Contents:

      Documentation CD-ROM (softcopy of publications)
      Safety flyer
      Standard form factor I/O Expansion card tray kit
```

The BladeCenter HS22 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 upgrade

```
Intel Xeon Processor E5502                     43W5986
 2c 1.86 GHz 4 MB Cache 800 MHz
Intel Xeon Processor E5504                     44T1712
 4c 2.00 GHz 4 MB Cache 800 MHz
Intel Xeon Processor E5506                     43W5987
 4c 2.13 GHz 4 MB Cache 800 MHz
Intel Xeon Processor E5520                     44T1736
 4c 2.26 GHz 8 MB Cache 1066 MHz
Intel Xeon Processor E5530                     44T1883
 4c 2.40 GHz 8 MB Cache 1066 MHz
Intel Xeon Processor E5540                     44T1884
 4c 2.53 GHz 8 MB Cache 1066 MHz
Intel Xeon Processor X5550                     44T1885
 4c 2.66 GHz 8 MB Cache 1333 MHz
Intel Xeon Processor X5560                     44T1886
 4c 2.66 GHz 8 MB Cache 1333 MHz
Intel Xeon Processor X5570                     44T1887
 4c 2.93 GHz 8 MB Cache 1333 MHz
Intel Xeon Processor L5520                     46M0697
 4c 2.26 GHz 8 MB Cache 1066 MHz
```

- Intel Xeon processor
- Heat sink
- Installation publications and warranty

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 HS22 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.

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[tm] 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

IBM Global Financing

Yes

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

In the United States, call 800-IBM-SERV (426-7378), or write to:

Warranty Information
P.O. Box 12195
Research Triangle Park, NC 27709
Attn: Dept JDJA/B203

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
- Hot-swap fan
- Hot-swap power supply
- Lift handle kit
- Memory DIMM
- Memory expansion card
- Optical drive
- PCI adapter
- PCI divider
- Power cord
- 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.

Call IBM at 1-800-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 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 601-034, 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.

Maintenance services

ServicePac , ServiceSuite , ServiceElect, and ServiceElite

ServicePac®, ServiceSuite[tm], ServiceElect, and ServiceElite provide hardware warranty service upgrades, maintenance, and selected support services in one agreement.

Warranty service upgrade

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. 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.

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.

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. 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.

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.

Maintenance service (ICA)

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. 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.

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.

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. 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.

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.

Non-IBM parts support

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 its 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.

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

No

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-1.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 current prices, contact IBM at 888-Shop-IBM (746-7426) or visit

http://www-03.ibm.com/systems/x/

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

Product charges

The following are newly announced features on the specified models of the IBM xSeries 7870 machine type:

```
                                           Initial/
                                           MES/
Description                 Model   Feature  Both/
                            Number  Numbers  Support

IBM BladeCenter HS22
                             AC1
IBM BladeCenter HS22
                             MC1


Integrated SATA Mirroring - 2 identical HDDs
required
                             AC1     0030    Initial
                             MC1             Initial
```

```
Integrated SATA Striping - 2 identical HDDs
required
                              AC1    0031         Initial
                              MC1                 Initial
Addl Intel Xeon Processor E5504 4c 2.00GHz
4MB Cache 800MHz              AC1    1026         Initial
                              MC1
Addl Intel Xeon Processor E5506 4c 2.13GHz
4MB Cache 800MHz        7870  AC1    1027         Initial
                              MC1
Addl Intel Xeon Processor E5520 4c 2.26GHz
8MB Cache 1066MHz       7870  AC1    1028         Initial
                              MC1
Addl Intel Xeon Processor E5530 4c 2.40GHz
8MB Cache 1066MHz       7870  AC1    1029         Initial
                              MC1
Addl Intel Xeon Processor E5540 4c 2.53GHz
8MB Cache 1066MHz       7870  AC1    1030         Initial
                              MC1
Addl Intel Xeon Processor X5550 4c 2.66GHz
8MB Cache 1333MHz       7870  AC1    1031         Initial
                              MC1
Addl Intel Xeon Processor X5560 4c 2.80GHz
8MB Cache 1333MHz       7870  AC1    1032         Initial
                              MC1
Addl Intel Xeon Processor X5570 4c 2.93GHz
8MB Cache 1333MHz       7870  AC1    1033         Initial
                              MC1
Base
                              AC1    1034         Initial
                              MC1                 Initial
Voltaire 4X InfiniBand DDR Expansion Card (CFFh)
for IBM BladeCenter
                              AC1    1036         Initial
                              MC1                 Initial
4X InfiniBand DDR Expansion Card (CFFh) for IBM
BladeCenter
                              AC1    1038         Initial
                              MC1                 Initial
Ethernet Expansion Card (CIOv) for IBM BladeCenter
                              AC1    1039         Initial
                              MC1                 Initial
SAS Connectivity Card (CIOv) for IBM BladeCenter
                              AC1    1041         Initial
                              MC1                 Initial
Blade Cover
                              AC1    1043         Initial
                              MC1                 Initial
Labels for HS22 Blade Base
                              AC1    1044         Initial
                              MC1                 Initial
Dummy DIMM for improved airflow
                              AC1    1045         Initial
                              MC1                 Initial
2.5" HDD Filler Bezel
                              AC1    1046         Initial
                              MC1                 Initial
CPU Heat Sink Filler
                              AC1    1047         Initial
                              MC1                 Initial
IBM 73 GB 10K SAS 2.5" SFF Slim-HS HDD
                              AC1    1048         Initial
                              MC1                 Initial
IBM 146 GB 10K SAS 2.5" SFF Slim-HS HDD
                              AC1    1049         Initial
                              MC1                 Initial
IBM 73 GB 15K SAS 2.5" SFF Slim-HS HDD
                              AC1    1050         Initial
                              MC1                 Initial
IBM 31.4 GB SATA 2.5" SFF Slim-HS  SSD
                              AC1    1051         Initial
                              MC1                 Initial
System Documentation and Software-US English
                              AC1    1052         Initial
```

	MC1		Initial
Packaging - 1U Blade WW			
	AC1	1069	Initial
	MC1		Initial
Packaging - 2U Blade WW			
	AC1	1070	Initial
	MC1		Initial
1GB (1x1GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP LP RDIMM			
	AC1	1072	Initial
	MC1		Initial
2GB (1x2GB) Single Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM			
	AC1	1073	Initial
	MC1		Initial
4GB (1x4GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333 VLP RDIMM			
	AC1	1074	Initial
	MC1		Initial
Broadcom 10Gb 4-port Ethernet Exp Card (CFFh) for IBM BladeCenter			
	AC1	1076	Initial
	MC1		Initial
2/4 Port Ethernet Expansion Card (CFFh) for IBM BladeCenter			
	AC1	1077	Initial
	MC1		Initial
QLogic Eth and 8Gb Fibre Channel Exp Card (CFFh) for IBM BladeCenter	AC1	1078	Initial
	MC1		
EMEA Long Leadtime Configurations			
	AC1	1763	Initial
	MC1		Initial
Hungary CHW plant 9SH			
	AC1	1764	Initial
	MC1		Initial
Guad CHW plant 9KQ			
	AC1	1765	Initial
	MC1		Initial
ISTC CHW 9K2			
	AC1	1766	Initial
	MC1		Initial
RTP CHW 9NR			
	AC1	1767	Initial
	MC1		Initial
Offload Manufacturing to Guadalajara HVEC			
	AC1	1768	Initial
	MC1		Initial
Offload Manufacturing to RTP HVEC			
	AC1	1769	Initial
	MC1		Initial
Offload Manufacturing to ISTC			
	AC1	1770	Initial
	MC1		Initial
Capacity Scheduling Service			
	AC1	1772	Initial
	MC1		Initial
Custom SLA Scheduling Service			
	AC1	1796	Initial
	MC1		Initial
8GB Dual Rank PC3-8500 CL7 ECC DDR3-1066 VLP RDIMM	AC1	1911	Initial
	MC1		
Custom Asset Tagging - Standard			
	AC1	2200	Initial
	MC1		Initial
Custom Asset Tagging - Enhanced			
	AC1	2201	Initial
	MC1		Initial
Custom Image Load - Server			
	AC1	2204	Initial
	MC1		Initial
Custom Media Shipgroup			
	AC1	2206	Initial

```
                                    MC1                       Initial
Request for Global Trade Number (UPC or EAN)
                                    AC1        2207           Initial
                                    MC1                       Initial
Custom Software/Firmware Setting - Standard
                                    AC1        2208           Initial
                                    MC1                       Initial
Custom Software/Firmware Setting - Enhanced
                                    AC1        2209           Initial
                                    MC1                       Initial
Custom RAID Configuration
                                    AC1        2212           Initial
                                    MC1                       Initial
Custom Labeling
                                    AC1        2220           Initial
                                    MC1                       Initial
Custom Palletization
                                    AC1        2221           Initial
                                    MC1                       Initial
Request for a new Vendor Logo Hardware
                                    AC1        2247           Initial
                                    MC1                       Initial
Request for an existing IBM Feature
                                    AC1        2248           Initial
                                    MC1                       Initial
Request for an existing Public RPQ
                                    AC1        2249           Initial
                                    MC1                       Initial
RAID Configuration
                                    AC1        2302           Initial
                                    MC1                       Initial
Install in Rack 01
                                    AC1        3101           Initial
                                    MC1                       Initial
Install in Rack 02
                                    AC1        3102           Initial
                                    MC1                       Initial
Install in Rack 03
                                    AC1        3103           Initial
                                    MC1                       Initial
Install in Rack 04
                                    AC1        3104           Initial
                                    MC1                       Initial
Install in Rack 05
                                    AC1        3105           Initial
                                    MC1                       Initial
Install in Rack 06
                                    AC1        3106           Initial
                                    MC1                       Initial
Install in Rack 07
                                    AC1        3107           Initial
                                    MC1                       Initial
Install in Rack 08
                                    AC1        3108           Initial
                                    MC1                       Initial
Install in Rack 09
                                    AC1        3109           Initial
                                    MC1                       Initial
Install in Rack 10
                                    AC1        3110           Initial
                                    MC1                       Initial
Install in Rack 11
                                    AC1        3111           Initial
                                    MC1                       Initial
Install in Rack 12
                                    AC1        3112           Initial
                                    MC1                       Initial
Install in Rack 13
                                    AC1        3113           Initial
                                    MC1                       Initial
Install in Rack 14
                                    AC1        3114           Initial
                                    MC1                       Initial
Install in Rack 15
```

```
                                AC1      3115          Initial
                                MC1                    Initial
Install in Rack 16
                                AC1      3116          Initial
                                MC1                    Initial
Install in Rack 17
                                AC1      3117          Initial
                                MC1                    Initial
Install in Rack 18
                                AC1      3118          Initial
                                MC1                    Initial
Install in Rack 19
                                AC1      3119          Initial
                                MC1                    Initial
Install in Rack 20
                                AC1      3120          Initial
                                MC1                    Initial
Install in Rack 21
                                AC1      3121          Initial
                                MC1                    Initial
Install in Rack 22
                                AC1      3122          Initial
                                MC1                    Initial
Install in Rack 23
                                AC1      3123          Initial
                                MC1                    Initial
Install in Rack 24
                                AC1      3124          Initial
                                MC1                    Initial
Install in Rack 25
                                AC1      3125          Initial
                                MC1                    Initial
Install in Rack 26
                                AC1      3126          Initial
                                MC1                    Initial
Install in Rack 27
                                AC1      3127          Initial
                                MC1                    Initial
Install in Rack 28
                                AC1      3128          Initial
                                MC1                    Initial
Install in Rack 29
                                AC1      3129          Initial
                                MC1                    Initial
Install in Rack 30
                                AC1      3130          Initial
                                MC1                    Initial
Install in Rack 31
                                AC1      3131          Initial
                                MC1                    Initial
Install in Rack 32
                                AC1      3132          Initial
                                MC1                    Initial
Install in Rack 33
                                AC1      3133          Initial
                                MC1                    Initial
Install in Rack 34
                                AC1      3134          Initial
                                MC1                    Initial
Install in Rack 35
                                AC1      3135          Initial
                                MC1                    Initial
Install in Rack 36
                                AC1      3136          Initial
                                MC1                    Initial
Install in Rack 37
                                AC1      3137          Initial
                                MC1                    Initial
Install in Rack 38
                                AC1      3138          Initial
                                MC1                    Initial
Install in Rack 39
                                AC1      3139          Initial
                                MC1                    Initial
```

```
Install in Rack 40
                        AC1     3140        Initial
                        MC1                 Initial
Install in Rack 41
                        AC1     3141        Initial
                        MC1                 Initial
Install in Rack 42
                        AC1     3142        Initial
                        MC1                 Initial
Install in Rack 43
                        AC1     3143        Initial
                        MC1                 Initial
Install in Rack 44
                        AC1     3144        Initial
                        MC1                 Initial
Install in Rack 45
                        AC1     3145        Initial
                        MC1                 Initial
Install in Rack 46
                        AC1     3146        Initial
                        MC1                 Initial
Install in Rack 47
                        AC1     3147        Initial
                        MC1                 Initial
Install in Rack 48
                        AC1     3148        Initial
                        MC1                 Initial
Install in Rack 49
                        AC1     3149        Initial
                        MC1                 Initial
Install in Rack 50
                        AC1     3150        Initial
                        MC1                 Initial
Install in Rack 51
                        AC1     3151        Initial
                        MC1                 Initial
Install in Rack 52
                        AC1     3152        Initial
                        MC1                 Initial
Install in Rack 53
                        AC1     3153        Initial
                        MC1                 Initial
Install in Rack 54
                        AC1     3154        Initial
                        MC1                 Initial
Install in Rack 55
                        AC1     3155        Initial
                        MC1                 Initial
Install in Rack 56
                        AC1     3156        Initial
                        MC1                 Initial
Install in Rack 57
                        AC1     3157        Initial
                        MC1                 Initial
Install in Rack 58
                        AC1     3158        Initial
                        MC1                 Initial
Install in Rack 59
                        AC1     3159        Initial
                        MC1                 Initial
Install in Rack 60
                        AC1     3160        Initial
                        MC1                 Initial
Install in Rack 61
                        AC1     3161        Initial
                        MC1                 Initial
Install in Rack 62
                        AC1     3162        Initial
                        MC1                 Initial
Install in Rack 63
                        AC1     3163        Initial
                        MC1                 Initial
Install in Rack 64
                        AC1     3164        Initial
```

	MC1		Initial
BladeCenter 01			
	AC1	3301	Initial
	MC1		Initial
BladeCenter 02			
	AC1	3302	Initial
	MC1		Initial
BladeCenter 03			
	AC1	3303	Initial
	MC1		Initial
BladeCenter 04			
	AC1	3304	Initial
	MC1		Initial
BladeCenter 05			
	AC1	3305	Initial
	MC1		Initial
BladeCenter 06			
	AC1	3306	Initial
	MC1		Initial
BladeCenter 07			
	AC1	3307	Initial
	MC1		Initial
BladeCenter 08			
	AC1	3308	Initial
	MC1		Initial
BladeCenter 09			
	AC1	3309	Initial
	MC1		Initial
BladeCenter 10			
	AC1	3310	Initial
	MC1		Initial
BladeCenter 11			
	AC1	3311	Initial
	MC1		Initial
BladeCenter 12			
	AC1	3312	Initial
	MC1		Initial
BladeCenter 13			
	AC1	3313	Initial
	MC1		Initial
BladeCenter 14			
	AC1	3314	Initial
	MC1		Initial
BladeCenter 15			
	AC1	3315	Initial
	MC1		Initial
BladeCenter 16			
	AC1	3316	Initial
	MC1		Initial
BladeCenter 17			
	AC1	3317	Initial
	MC1		Initial
BladeCenter 18			
	AC1	3318	Initial
	MC1		Initial
BladeCenter 19			
	AC1	3319	Initial
	MC1		Initial
BladeCenter 20			
	AC1	3320	Initial
	MC1		Initial
BladeCenter 21			
	AC1	3321	Initial
	MC1		Initial
BladeCenter 22			
	AC1	3322	Initial
	MC1		Initial
BladeCenter 23			
	AC1	3323	Initial
	MC1		Initial
BladeCenter 24			
	AC1	3324	Initial
	MC1		Initial
BladeCenter 25			

```
                              AC1    3325        Initial
                              MC1                Initial
BladeCenter 26
                              AC1    3326        Initial
                              MC1                Initial
BladeCenter 27
                              AC1    3327        Initial
                              MC1                Initial
BladeCenter 28
                              AC1    3328        Initial
                              MC1                Initial
BladeCenter 29
                              AC1    3329        Initial
                              MC1                Initial
BladeCenter 30
                              AC1    3330        Initial
                              MC1                Initial
BladeCenter 31
                              AC1    3331        Initial
                              MC1                Initial
BladeCenter 32
                              AC1    3332        Initial
                              MC1                Initial
BladeCenter 33
                              AC1    3333        Initial
                              MC1                Initial
BladeCenter 34
                              AC1    3334        Initial
                              MC1                Initial
BladeCenter 35
                              AC1    3335        Initial
                              MC1                Initial
BladeCenter 36
                              AC1    3336        Initial
                              MC1                Initial
BladeCenter 37
                              AC1    3337        Initial
                              MC1                Initial
BladeCenter 38
                              AC1    3338        Initial
                              MC1                Initial
BladeCenter 39
                              AC1    3339        Initial
                              MC1                Initial
BladeCenter 40
                              AC1    3340        Initial
                              MC1                Initial
BladeCenter location 01
                              AC1    3401        Initial
                              MC1                Initial
BladeCenter location 02
                              AC1    3402        Initial
                              MC1                Initial
BladeCenter location 03
                              AC1    3403        Initial
                              MC1                Initial
BladeCenter location 04
                              AC1    3404        Initial
                              MC1                Initial
BladeCenter location 05
                              AC1    3405        Initial
                              MC1                Initial
BladeCenter location 06
                              AC1    3406        Initial
                              MC1                Initial
BladeCenter location 07
                              AC1    3407        Initial
                              MC1                Initial
BladeCenter location 08
                              AC1    3408        Initial
                              MC1                Initial
BladeCenter location 09
                              AC1    3409        Initial
                              MC1                Initial
```

```
BladeCenter location 10
                              AC1     3410          Initial
                              MC1                   Initial
BladeCenter location 11
                              AC1     3411          Initial
                              MC1                   Initial
BladeCenter location 12
                              AC1     3412          Initial
                              MC1                   Initial
BladeCenter location 13
                              AC1     3413          Initial
                              MC1                   Initial
BladeCenter location 14
                              AC1     3414          Initial
                              MC1                   Initial
QLogic 4Gb Fibre Channel Expansion Card (CIOv) for
IBM BladeCenter
                              AC1     3594          Initial
                              MC1                   Initial
Intel Xeon Processor L5520 4c 2.26GHz 8MB
Cache 1066MHz
                              AC1     4537          Initial
                              MC1                   Initial
Intel Xeon Processor E5502 2c 1.86GHz 4MB
Cache 800MHz                  AC1     5360          Initial
                              MC1
Intel Xeon Processor E5504 4c 2.00GHz 4MB
Cache 800MHz                  AC1     5361          Initial
                              MC1
Intel Xeon Processor E5506 4c 2.13GHz 4MB
Cache 800MHz                  AC1     5362          Initial
                              MC1
Intel Xeon Processor E5520 4c 2.26GHz 8MB
Cache 1066MHz                 AC1     5363          Initial
                              MC1
Intel Xeon Processor E5530 4c 2.40GHz 8MB
Cache 1066MHz                 AC1     5364          Initial
                              MC1
Intel Xeon Processor E5540 4c 2.53GHz 8MB
Cache 1066MHz                 AC1     5365          Initial
                              MC1
Intel Xeon Processor X5550 4c 2.66GHz 8MB
Cache 1333MHz                 AC1     5366          Initial
                              MC1
Intel Xeon Processor X5560 4c 2.80GHz 8MB
Cache 1333MHz                 AC1     5367          Initial
                              MC1
Intel Xeon Processor X5570 4c 2.93GHz 8MB
Cache 1333MHz                 AC1     5368          Initial
                              MC1
Addl Intel Xeon Processor E5502 2c 1.86GHz
4MB Cache 800MHz              AC1     5369          Initial
                              MC1


Broadcom 10Gb 2-port Ethernet Exp Card (CFFh) for
IBM BladeCenter
                              AC1     5489          Initial
                              MC1                   Initial
IBM 73GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD
                              AC1     5522          Initial
                              MC1                   Initial
IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD
                              AC1     5536          Initial
                              MC1                   Initial
IBM 146GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD
                              AC1     5537          Initial
                              MC1                   Initial
300GB 10K SATA 2.5" Slim-HS HDD
                              AC1     5595          Initial
                              MC1                   Initial
IBM 300GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD
                              AC1     5599          Initial
                              MC1                   Initial
BladeCenter Office Solution
```

```
                              AC1      7019         Initial
                              MC1                   Initial
Addl Intel Xeon Processor L5520 4c 2.26GHz
8MB Cache 1066MHz
                              AC1      7793         Initial
                              MC1                   Initial
Customer Solution Center Services
                              AC1      7831         Initial
                              MC1                   Initial
Integrated Solid State Mirroring
                              AC1      7859         Initial
                              MC1                   Initial
Integrated Solid State Striping
                              AC1      7860         Initial
                              MC1                   Initial
No HDD Selected
                              AC1      8026         Initial
                              MC1                   Initial
No Processor Selected
                              AC1      8028         Initial
                              MC1                   Initial
No Memory Selected
                              AC1      8029         Initial
                              MC1                   Initial
Consolidate Shipment
                              AC1      8031         Initial
                              MC1                   Initial
e1350 Solution Component
                              AC1      8034         Initial
                              MC1                   Initial
Compute Node
                              AC1      8036         Initial
                              MC1                   Initial
Management Node
                              AC1      8037         Initial
                              MC1                   Initial
Storage Node
                              AC1      8038         Initial
                              MC1                   Initial
Integrated SAS Mirroring - 2 identical HDDs
required
                              AC1      8039         Initial
                              MC1                   Initial
Integrated SAS Striping - 2 identical HDDs required
                              AC1      8040         Initial
                              MC1                   Initial
TAA Compliant Order
                              AC1      8067         Initial
                              MC1                   Initial
General Racking Solution
                              AC1      8072         Initial
                              MC1                   Initial
Integrate BladeCenter in Manufacturing
                              AC1      8077         Initial
                              MC1                   Initial
No 2.5" SAS HDD Selected
                              AC1      8081         Initial
                              MC1                   Initial
No Publications Selected
                              AC1      8086         Initial
                              MC1                   Initial
No Internal RAID
                              AC1      9012         Initial
                              MC1                   Initial
Enable Memory Mirroring
                              AC1      9017         Initial
                              MC1                   Initial
Storage Subsystem ID 01
                              AC1      9170         Initial
                              MC1                   Initial
Storage Subsystem ID 02
                              AC1      9171         Initial
                              MC1                   Initial
Storage Subsystem ID 03
```

	AC1	9172	Initial
	MC1		Initial
Storage Subsystem ID 04			
	AC1	9173	Initial
	MC1		Initial
Storage Subsystem ID 05			
	AC1	9174	Initial
	MC1		Initial
Storage Subsystem ID 06			
	AC1	9175	Initial
	MC1		Initial
Storage Subsystem ID 07			
	AC1	9176	Initial
	MC1		Initial
Storage Subsystem ID 08			
	AC1	9177	Initial
	MC1		Initial
Storage Subsystem ID 09			
	AC1	9178	Initial
	MC1		Initial
Storage Subsystem ID 10			
	AC1	9179	Initial
	MC1		Initial
Storage Subsystem ID 11			
	AC1	9180	Initial
	MC1		Initial
Storage Subsystem ID 12			
	AC1	9181	Initial
	MC1		Initial
Storage Subsystem ID 13			
	AC1	9182	Initial
	MC1		Initial
Storage Subsystem ID 14			
	AC1	9183	Initial
	MC1		Initial
Storage Subsystem ID 15			
	AC1	9184	Initial
	MC1		Initial
Storage Subsystem ID 16			
	AC1	9185	Initial
	MC1		Initial
Storage Subsystem ID 17			
	AC1	9186	Initial
	MC1		Initial
Storage Subsystem ID 18			
	AC1	9187	Initial
	MC1		Initial
Storage Subsystem ID 19			
	AC1	9188	Initial
	MC1		Initial
Storage Subsystem ID 20			
	AC1	9189	Initial
	MC1		Initial
Preload Specify			
	AC1	9200	Initial
	MC1		Initial
Windows Specify			
	MC1	9201	Initial
Red Hat Specify			
	AC1	9202	Initial
SuSE Specify			
	AC1	9203	Initial
Drop-in-the-Box Specify			
	AC1	9205	Initial
	MC1		Initial
No Preload Specify			
	AC1	9206	Initial
	MC1		Initial
VMware Specify			
	AC1	9207	Initial
Solaris Specify			
	AC1	9208	Initial
			Initial/

Description	SEO Numbers	MES/ Both/ Support	CSU
1 x 1.86GHz, Intel Xeon E5502, 2c, 4 MB Cache, 800 MHz, 2 x 1 GB Memory	7870-D2U	Both	Yes
1 x 2.00GHz, Intel Xeon E5504, 4c, 4 MB Cache, 800 MHz, 2 x 1 GB Memory	7870-A2U	Both	Yes
1 x 2.00GHz, Intel Xeon E5504, 4c, 4 MB Cache, 800 MHz, 2 x 1 GB Memory Broadcom 2-Port 10Gbit (CFFh)	7870-CCU	Both	Yes
1 x 2.40GHz, Intel Xeon E5530, 4c, 8 MB Cache, 1066 MHz, 2 x 2 GB Memory	7870-B3U	Both	Yes
1 x 2.53GHz, Intel Xeon E5540, 4c, 8 MB Cache, 1066 MHz, 2 x 2 GB Memory	7870-B4U	Both	Yes
1 x 2.80GHz, Intel Xeon X5560, 4c, 8 MB Cache, 1333 MHz, 2 x 2 GB Memory	7870-C3U	Both	Yes
1 x 2.93GHz, Intel Xeon X5570, 4c, 8 MB Cache, 1333 MHz, 2 x 2 GB Memory	7870-C4U	Both	Yes
1 x 2.26GHz, Intel Xeon L5520, 4c, 8 MB Cache, 1066 MHz, 2 x 2 GB Memory	7870-L2U	Both	Yes
1 x 1.86 GHz, Intel Xeon E5502, 2c, 8 MB Cache, 800 MHz, 3 x 2 GB Memory	7870-EDU	Both	Yes
2 x 2.40 GHz, Intel Xeon E5530, 4c, 8 MB Cache, 1066 MHz, 4 x 2 GB Memory	7870-EBU	Both	Yes

Description	SEO Numbers	Initial/ MES/ Both/ Support	CSU
2 x 2.80 GHz, Intel Xeon X5560, 4c, 16 MB Cache, 1333 MHz, 6 x 4 GB Memory	7870-1MU	Both	Yes
2 x 2.26 GHz, Intel Xeon L5520, 4c, 16 MB Cache, 1066 MHz, 12 x 4 GB Memory 2 x 146 GB SAS HDD QLogic 4 GB Fibre Channel Exp Cd (CIOv)	7870-2MU	Both	Yes
2 x 2. 93GHz, Intel Xeon X5570, 4c, 16 MB Cache, 1333 MHz, 12 x 4 GB Memory 2 x 146 GB SAS HDD QLogic 4 GB Fibre Channel Exp Cd (CIOv)	7870-3MU	Both	Yes
2 x 2.80GHz, Intel Xeon X5560, 4c, 16 MB Cache, 1333 MHz, 6 x 4 GB Memory 2 x 300 GB SATA HDD	7870-5MU	Both	Yes
1 x 2.26GHz, Intel Xeon L5520, 4c, 8 MB Cache, 1066 MHz, 2 x 4 GB Memory	7870-6MU	Both	Yes

```
                                                    Initial/
                                                    MES/
   Description                          SEO         Both/
                                        Numbers     Support    CSU

   Option SEOs

   Intel Xeon Processor E5502           43W5986     Both       Yes
    2c 1.86 GHz 4 MB Cache 800 MHz
   Intel Xeon Processor E5504           44T1712     Both       Yes
    4c 2.00 GHz 4 MB Cache 800 MHz
   Intel Xeon Processor E5506           43W5987     Both       Yes
    4c 2.13 GHz 4 MB Cache 800 MHz
   Intel Xeon Processor E5520           44T1736     Both       Yes
    4c 2.26 GHz 8 MB Cache 1066 MHz
   Intel Xeon Processor E5530           44T1883     Both       Yes
    4c 2.40 GHz 8 MB Cache 1066 MHz
   Intel Xeon Processor E5540           44T1884     Both       Yes
    4c 2.53 GHz 8 MB Cache 1066 MHz
   Intel Xeon Processor X5550           44T1885     Both       Yes
    4c 2.66 GHz 8 MB Cache 1333 MHz
   Intel Xeon Processor X5560           44T1886     Both       Yes
    4c 2.66 GHz 8 MB Cache 1333 MHz
   Intel Xeon Processor X5570           44T1887     Both       Yes
    4c 2.93 GHz 8 MB Cache 1333 MHz
   Intel Xeon Processor L5520           46M0697     Both       Yes
    4c 2.26 GHz 8 MB Cache 1066 MHz

   1 GB (1X1GB) Single Rank PC3-10600 CL9 ECC  44T1485  Both    Yes
    DDR3-1333 VLP Low Power RDIMM
   2 GB (1X2GB) Single Rank PC3-10600 CL9 ECC  44T1487  Both    Yes
    DDR3-1333 VLP RDIMM
   4 GB (1X4GB) Dual Rank PC3-10600 CL9 ECC    44T1488  Both    Yes
    DDR3-1333 VLP RDIMM
   8 GB (1X8GB) Dual Rank PC3-8500 CL7 ECC     44T1579  Both    Yes
    DDR3-1066 VLP RDIMM

   SAS Connectivity Card (CIOv)         43W4068     Both       Yes
    for IBM BladeCenter
   Ethernet Expansion Card (CIOv)       44W4475     Both       Yes
    for IBM BladeCenter
   QLogic 4Gb Fibre Channel Expansion   46M6065     Both       Yes
    Card (CIOv) for IBM BladeCenter
```

ServicePac for Warranty Service Upgrade (WSU) and Maintenance Charges

```
                                                    ServicePac
   Machine                              ServicePac  TMF
   Type/Model  Description              Part Number Part Number

   Warranty Option Upgrade:

     7870      3-year WSU, IOR 24 x 7   69P9519     6756137
               2-hour average response

     7870      3-year WSU, IOR 24 x 7   69P9518     6756136
               4-hour average response

     7870      3-year WSU, IOR 9 x 5    69P9517     6756135
               4-hour average response

     7870      4-year IOR 24 x 7        69P9523     6756141
               2-hour average response

     7870      5-year IOR 24 x 7        69P9527     6756145
               2-hour average response

     7870      4-year IOR 24 x 7        69P9522     6756140
               4-hour average response

     7870      5-year IOR 24 x 7        69P9526     6756144
```

```
                  4-hour average response

    7870          4-year IOR 9 x 5           69P9521        6756139
                  4-hour average response

    7870          5-year IOR 9 x 5           69P9525        6756143
                  4-hour average response

    7870          4-year IOR 9 x 5           69P9520        6756138
                  NBD response

    7870          5-year IOR 9 x 5           69P9524        6756142
                  NBD response

Maintenance:

    7870          1-year IOR 24 x 7          69P9516        6756D55
                  2-hour average response

    7870          2-year IOR 24 x 7          96P2132        6756D75
                  2-hour average response

    7870          1-year IOR 24 x 7          69P9515        6756D54
                  4-hour average response

    7870          2-year IOR 24 x 7          96P2131        6756D74
                  4-hour average response

    7870          1-year IOR 9 x 5           69P9514        6756D53
                  4-hour average response

    7870          2-year IOR 9 x 5           96P2130        6756D73
                  4-hour average response

    7870          1-year IOR 9 x 5           69P9513        6756D52
                  NBD response

    7870          2-year IOR 9 x 5           96P2129        6756D72
                  NBD response
```

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