The clustering solutions have been renamed as the IBM® Intelligent Cluster portfolio and enhanced with new Ethernet switches.

- The IBM Intelligent Cluster offering solutions are built on:
  - Rack-optimized servers from IBM
  - Industry-leading interconnects
  - IBM service options: Three-year on-site limited warranty
- Easy-to-order, robust factory-built configurations are supported by IBM.

Overview

IBM Intelligent Cluster solutions are holistic solutions based on leading-edge technology, that deliver high-performance with award-winning energy and space efficiencies.

Our comprehensive solutions can help simplify and expedite deployment of a Linux® or Microsoft® Windows® HPC cluster. IBM combines all hardware, software, services, and support into a single integrated product offering, providing you the benefit of a single point-of-contact for the entire cluster and eliminating the need to deal with multiple vendors for individual components.

The Intelligent Cluster is an outstanding choice for any organization that recognizes the economic advantages of a reduced time to deployment of an HPC cluster but has concerns about the time and technical resources required for the end-to-end implementation.

New offerings for Intelligent Cluster portfolio

IBM Data Center Networking Solutions

IBM’s view of networking is an integral component of our dynamic infrastructure initiative, which helps you manage the convergence of business and IT infrastructures. This offering includes easy network scalable Top-of-Rack Switches and End-of-Row Modular Director/Backbone switches for 1 Gb Ethernet (GbE) and 10 GbE connectivity.
IBM BNT RackSwitch G8264

The IBM BNT RackSwitch G8264 is a 10 GbE and 40 GbE switch specifically designed for the data center, providing speed, intelligence, and interoperability on a proven platform. The RackSwitch G8264 offers up to 64x10 GbE, or 48x10 GbE and up to four 40 GbE ports (1.28 Tbps of switching capability) in a 1U footprint. Designed with top performance in mind, the RackSwitch G8264 provides line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data. It also provides all the functions for Fiber Channel transmission over Converged Enhanced Ethernet (FCoCEE). Redundant power and fans along with numerous high availability features enable the RackSwitch G8264 to be available for business-sensitive traffic.

IBM BNT RackSwitch G8052

The IBM BNT RackSwitch G8052 is an Ethernet switch specifically designed for the data center. The IBM BNT RackSwitch G8052 has a virtual switching fabric providing rack-level virtualization of networking interfaces for a rack full of server and storage systems decoupling the scaling of networking and computing capacity via on-switch VMready software. VMready enables the movement of virtual machines providing matching movement of VLAN assignments and port characteristics as the VMs are moved to different physical ports on any G8052 switch. The RackSwitch G8052 offers 48x1 Gigabit Ethernet ports and four standard (no uplink module necessary) 10 GbE ports in a 1U footprint. Designed with top performance in mind, the G8052 provides line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data, and large data-center-grade buffers to keep traffic moving in a busy traffic environment. Redundant power and fans along with numerous high availability features mean that the G8052 is always available for business-sensitive traffic.

Chelsio 10 GbE Unified Wire adapters (PCI Gen2 x8)

Chelsio 10 Gigabit Ethernet Unified Wire adapters with PCI Express® 2.0 host bus interface are optimized for cloud computing, HPC, virtualization, storage, and other data center applications. The fourth-generation (T4) technology from Chelsio provides high 10 GbE performance with low latency and dramatically lowers host-system CPU communications overhead with on-board hardware that offloads TCP/IP, iSCSI, FCoE, and iWARP RDMA processing from its host system. Support for EVB, VEPA, Flex10, VNTag, and PCI-SIG SR-IOV makes T4 a feature rich and high-performance 10 GbE connectivity solution for virtualization.

Cisco Catalyst switches

Cisco Catalyst 4948E (4670-050)

The Cisco Catalyst 4948E is a wire-speed, low-latency, Layer 2-4, one rack unit (1 RU), fixed-configuration switch for rack-optimized server switching. The Cisco Catalyst 4948E has double uplink capacity as previous generation of switches with up to four 10 Gbps Ethernet uplinks and supports IPv6 in hardware. In addition the Cisco Catalyst 4948E has air flow that is Port to Opposite Port Side Exhaust (P2oPSE) typically utilized in the iDataPlex Rack.

Cisco Catalyst 3750-X (4670-051)

The Cisco Catalyst 3750-X Series Switch is an enterprise-class stackable and stand-alone switch. This switch provides high availability, scalability, security, energy efficiency, and ease of operation with innovative features, optional network modules, redundant power supplies, and Media Access Control Security (MACsec) features. The Cisco Catalyst 3750-X Series with StackWise Plus technology provides scalability, ease of management, and investment protection for the evolving business needs. In addition the Cisco Catalyst 3750-X has air flow that is Port to Opposite Port Side Exhaust (P2oPSE) typically utilized in the iDataPlex Rack.

Force10 Exascale 4-Port 40 GbE Line Card (4667-046)

The Force10 ExaScale 40 GbE line card provides up to four ports of 40 GbE connectivity with 100 GbE of capacity per line card. Tested by IBM with all Intelligent
Cluster BOM components, the Force10 line card provides an excellent core connection to the IBM G8264 switch, via the four 40 GbE ports on the BNT switch. This allows for maximum throughput from the BNT Top of Rack to a Force10 core chassis. Both copper cable connection and 40 Gbps optical transceivers provide connections between the high-speed ports.

**LG-Ericsson ES Series Ethernet switches**

**ES-4550G (4668-022)**

The LG-Ericsson ES-4550G Switch delivers high scalability, wirespeed Gigabit performance combined with high availability in a 1U rack space. This switch offers one Gigabit Ethernet edge ports, 10 Gigabit Ethernet uplinks, and redundant power options to allow numerous installation options based on application requirements. The 4550G offers stacking of up to eight units of 48-port switches providing up to 384 1 GbE and 16 10 GbE ports. It provides 48 built-in copper Gigabit ports, including four Combo SFP ports supporting either copper links or SFP transceivers for easy, flexible connection to fiber-based Gigabit media and a switching capacity of up to 186 Gbps.

**ES-5048XG (4668-020)**

The ES-5048XG provides a high-capacity, wire-speed, low-latency Layer 2 enabled multi-port 10 GbE platform for the Data Center. It enables the aggregation of high density 1U rack servers, as the data center transitions from 1 GbE to 10 GbE. The ES-5048XG provides up to 48 ports of 10 GbE network connectivity and enables a seamless migration path from existing Gigabit Ethernet-based servers to 10 Gigabit Ethernet high-performance servers while further enabling the transition to virtualized environments.

**Voltaire Grid Director 4036E (4669-044) and 4036-LM (4669-045) InfiniBand Switches**

The Voltaire Grid Director 4036E is a high-performance, low-latency, and fully nonblocking InfiniBand switch, which includes a built-in low-latency Ethernet gateway for bridging traffic to and from Ethernet-based networks or storage. This self-contained solution combines an InfiniBand switch, an embedded subnet manager, and a built-in, hardware-based low-latency Ethernet gateway in a compact 1U device.

With thirty-four 40 Gb/s InfiniBand ports and two 1/10 Gb Ethernet ports bridging traffic, I/O bottlenecks are removed making applications operate efficiently, while its design makes it easily useful for both small and large clusters. The primary difference between the Grid Director 4046e and 4036e-LM is as follows:

- The Grid Director 4036e-LM offering has fewer multicast and VLAN partitions and limited IB-ETH gateway internal memory.
- The Grid Director 4036e has additional memory providing full function IB-ETH gateway silicon with greater multicast capabilities and greater VLAN partitions (3,000 and 64 respectively).

**Intelligent Cluster 42U 1200 mm Deep Primary and Expansion Racks**

IBM 42U 1200 mm Deep Rack offerings are industry-standard 19-inch server cabinets that are designed for high availability IBM System x® and BladeCenter® environments. They are optimized to help maximize floor space, expedite installation, simplify cable management, and increase accessibility for improved serviceability. With a depth of 1200 mm (approximately 47 inches), these racks offer expansive rear channels with tool-less button mounts for virtually effortless installation of up to six IBM 0U vertical rack strip power distribution units (PDU), can easily accommodate vertical cable organizers, or mounting other equipment.

**Note:** Some products may not be available in your country.

1 You may be asked certain diagnostic questions before a technician is sent.
For information on IBM’s Statement of Limited Warranty, contact your IBM representative or reseller. Copies are available upon request.

**Note:** The information in IBM Announcement letters is subject to change without notice, consult the *IBM Sales Manual*, or your IBM marketing representative or reseller. Copies are available upon request.

### Key prerequisites

Device drivers, as required.

### Planned availability date

May 19, 2011

### Description

#### IBM Intelligent Cluster description

Computing applications or environments often have more requirements than an individual computer or server can address. These requirements may be best addressed by several computers working together. A cluster is a group of interconnected individual computers, working together on a single problem, or consolidating workloads from multiple servers. Although these computers can operate individually, they are managed from a single point of control using cluster management software.

The IBM Intelligent Cluster offering, a high-performance scalable cluster, is built on:

- Intel® Xeon® processors
- IBM Cell Broadband Engine™
- AMD Opteron processor-based, rack-optimized, and blade-based servers

The IBM Intelligent Cluster supports Microsoft HPC Server 2008, SUSE Linux Enterprise Server (SLES) 11 (64 bit) service pack 1, and Red Hat Enterprise Linux 5 (64 bit). All hardware components are configured and integrated into racks in the factory prior to shipment. You must obtain the prerequisite version of the Linux operating system and device drivers as specified by IBM.

- Either you or a qualified IBM Business Partner can install the required software.
- You can use the optional installation services to have IBM install the operating system, device drivers, and General Parallel File System™ (GPFS™).

IBM provides a service for all cluster hardware components and IBM software during the applicable warranty period. The IBM Intelligent Cluster warranty support does not include support for the software. Software service and support can be purchased separately through an optional IBM Support Line service.

#### System x iDataPlex description

**Flex nodes**

Technology for flexible node configurations enables the servers for iDataPlex to be configured in numerous ways. In addition to compute-oriented configurations, the iDataPlex solution offers a storage-rich configuration.

**System x iDataPlex 2U Flex chassis**

- One or two server nodes
- Support for both high-performance SAS and low-cost, high-capacity SATA HDDs
- High-density storage offering
- Shared high-efficiency power supply
- Shared low-power-consuming fans
- Choice of SAS, Ethernet, or iSCSI host interface

**System x iDataPlex 3U chassis (1410):** For intensive storage applications.

IBM provides a service for all announced cluster hardware components and IBM software during the applicable warranty period. The IBM Intelligent Cluster warranty support does not include support for the software. Software service and support can be purchased separately through an optional IBM Support Line service.

**Additional enhancements**

For a listing of hardware components, refer to the Overview section.

The IBM Intelligent Cluster offerings include an expanded array of hardware from other vendors along with new features to help boost productivity for data centers.

**New offerings for Intelligent Cluster Portfolio**

**Switch Descriptions**

**Note:** A new switch description nomenclature is being introduced to help provide key information about the switch regarding airflow. PSE, oPSE, and SE are being added to the end of 1U switch descriptions.

- PSE=port-side exhaust airflow which would typically be installed in an Enterprise rack such as the IBM 1410 rack family.
- oPSE=opposite port-side exhaust airflow and would typically be installed in an iDataPlex rack.
- SE=side exhaust and would typically be installed in an iDataPlex rack but depending on the switch may also be installed in an Enterprise rack.

The suffixes do not necessarily determine rack support. Each switch is evaluated on its own merit for rack support.

**IBM Data Center Networking Portfolio**

IBM’s view of networking is an integral component of our dynamic infrastructure initiative, which helps you manage the convergence of business and IT infrastructures. This offering includes easy network scalable Top-of-Rack Switches and End-of-Row Modular Director/Backbone switches for 1 Gb and 10 Gb Ethernet connectivity.

**IBM BNT RackSwitch G8264**

The IBM BNT RackSwitch G8264 is a 10 and 40 Gigabit Ethernet (GbE) switch specifically designed for the data center, providing speed, intelligence and interoperability on a proven platform. The RackSwitch G8264 offers up to 64x10 GbE and up to four 40 GbE ports 1.28 Tbps in a 1U footprint. Designed with top performance in mind, the RackSwitch G8264 provides line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data. Large data-center grade buffers keep traffic moving. Redundant power and fans along with numerous high availability features enable the RackSwitch G8264 to be available for business-sensitive traffic. The low latency offered by the RackSwitch G8264 makes it ideal for latency-sensitive applications such as high performance computing clusters and financial applications. The G8264 supports the newest protocols including Data Center Bridging/Converged Enhanced Ethernet (DCB/CEE) for support of Fibre Channel over Converged Enhanced Ethernet (FCoCEE).
Highlights

- Optimized for applications requiring high bandwidth and low latency
- Up to 64 1 Gb/10 Gb SFP+ ports in a 1U form factor
- Future-proofed with four 40 Gb QSFP+ ports
- 1.28 Tbps nonblocking throughput

**IBM BNT RackSwitch G8052**

The IBM BNT RackSwitch G8052 is an Ethernet switch specifically designed for the data center, providing a virtual, cool and easy network solution. The BNT RackSwitch G8052 is virtual providing rack-level virtualization of networking interfaces for a rack full of server and storage systems decoupling the scaling of networking and computing capacity via on-switch VMready software. VMready enables the movement of virtual machines providing matching movement of VLAN assignments, ACLs, and other networking and security settings. VMready works with all leading VM providers (VMware, Citrix Xen, Microsoft, and so on). The RackSwitch G8052 operates efficiently cool implementing a choice of directional cooling to maximize data center layout and provisioning. Its superior airflow design complements the hot-aisle and cold-aisle data center cooling model. The RackSwitch G8052 is easy with server-oriented provisioning via point-and-click management interfaces, along with the optional BLADEHarmony Manager software package for updating large groups of switches. The RackSwitch G8052 offers 48x1 Gigabit Ethernet ports and four standard (no uplink module necessary) 10 Gigabit Ethernet ports in a 1U footprint. Designed with top performance in mind, the G8052 provides line-rate, high-bandwidth switching, filtering, and traffic queuing without delaying data, and large data-center-grade buffers to keep traffic moving. Redundant power and fans along with numerous high availability features mean that the G8052 is always available for business-sensitive traffic.

Highlights

- 48 x 1 GbE RJ45 ports and four standard 10 GbE SFP+ ports
- Choice of airflow direction, allowing for significant savings in cooling costs
- Low 130 W power rating and variable speed fans help reduce power consumption
- Network virtualization VMready automatically detects virtual machine movement from one physical server to another

**Chelsio Wire adapters**

**Chelsio 10 GbE Unified Wire adapters (PCI Gen2 x8)**

Chelsio’s 10 Gigabit Ethernet Unified Wire low-latency adapters with PCI Express 2.0 host bus interface are optimized for cloud computing, HPC, virtualization, storage, and other data center applications. The fourth-generation (T4) technology from Chelsio provides high 10 GbE performance and dramatically lowers host-system CPU communications overhead with on-board hardware that offloads TCP/IP, iSCSI, FCoE, and iWARP RDMA processing from its host system. Support for EVB, VEPA, Flex10, VNTag, and PCI-SIG SR-IOV makes T4 a feature rich and high performance 10 GbE connectivity solution for virtualization.

**Chelsio T440-CR. High Performance, Quad Port 10GbE Unified Wire adapter (46M2241, FC 3026)**

Chelsio’s T440-CR is a quad port 10 Gigabit Ethernet Unified Wire adapter with PCI Express 2.0 host bus interface, optimized for cloud computing, HPC, virtualization, storage, and other data center applications. The fourth-generation (T4) technology from Chelsio provides the highest 10 GbE performance available and dramatically lowers host-system CPU communications overhead with on-board hardware that offloads TCP/IP, iSCSI, FCoE, and iWARP RDMA processing from its host system. T440-CR frees up host CPU cycles for useful applications. The system achieves increased bandwidth, lower latency, and lower power.
Chelsio T420-CR High Performance, Dual Port 10 GbE Unified Wire adapter
(46M2237 FC 3025)

Chelsio’s T420-CR is a dual port 10 Gigabit Ethernet Unified Wire adapter with PCI Express 2.0 host bus interface, optimized for cloud computing, HPC, virtualization, storage, and other data center applications. The fourth-generation (T4) technology from Chelsio provides the highest 10 GbE performance available and dramatically lowers host-system CPU communications overhead with on-board hardware that off-loads TCP/IP, iSCSI, FCoE, and iWARP RDMA processing from its host system. T420-CR frees up host CPU cycles for useful applications. The system achieves increased bandwidth, lower latency, and lower power.

Chelsio T420-SO High Performance, Dual Port 10 GbE Unified Wire adapter
(81Y8021, FC A0R2)

Chelsio’s T420-SO-CR is a memory free dual port 10 Gigabit Ethernet Unified Wire adapter with PCI Express 2.0 host bus interface, optimized for cloud computing, HPC, virtualization, storage, and other data center applications. The fourth-generation (T4) technology from Chelsio provides the highest 10GbE performance available and dramatically lowers host-system CPU communications overhead with on-board hardware that off-loads TCP/IP, iSCSI, FCoE, and iWARP RDMA processing from its host system. T420-SO-CR frees up host CPU cycles for useful applications. The system achieves increased bandwidth, lower latency, and lower power.

Highlights
- PCI Express Gen2 x8
- Low Latency
- Supports Up to 1M connections
- Full TCP and UDP offload
- TCP Chimney
- Full iSCSI, FCoE offload
- Full iWARP RDMA offload
- EVB, VEPA, Flex10, VNTag
- PCI-SIG SR-IOV
- Integrated media streaming offload
- HW based firewall in the cloud
- Traffic filtering and management

IBM Europe, Middle East, and Africa Hardware
Announcement ZG11-0148
IBM is a registered trademark of International Business Machines Corporation
• Low latency
• Memory free and up to 1K connections for offload functionalities
• Full TCP and UDP offload
• TCP Chimney
• Full iSCSI, FCoE offload
• Full iWARP RDMA offload
• EVB, VEPA, Flex10, VNTag
• PCI-SIG SR-IOV
• Integrated media streaming offload
• HW based firewall in the cloud
• Traffic filtering and management

**Chelsio T420-BCH Chelsio 10 GbE Unified Wire adapter** (46M2245, FC 3070)

Chelsio's T420-BCH is a dual port 10 Gigabit Ethernet Unified Wire adapter with PCI Express 2.0 host bus interface for IBM BladeCenter, optimized for cloud computing, HPC, virtualization, storage, and other data center applications.

The fourth-generation (T4) technology from Chelsio provides the highest 10 GbE performance available and dramatically lowers host-system CPU communications overhead with on-board hardware that off-loads TCP/IP, iSCSI, FCoE, and iWARP RDMA processing from its host system. T420-BCH frees up host CPU cycles for useful applications. The system achieves increased bandwidth, lower latency, and lower power.

**Highlights**

• PCI Express Gen2 x8
• Low latency
• Supports up to 1M connections
• Full TCP and UDP offload
• TCP Chimney
• Full iSCSI, FCoE offload
• Full iWARP RDMA offload
• EVB, VEPA, Flex10, VNTag
• PCI-SIG SR-IOV
• Integrated media streaming offload
• HW based firewall in the cloud
• Traffic filtering and management

**Cisco Catalyst Switches**

**Cisco Catalyst 4948E** (4670-050, FC A1M5)

The Cisco Catalyst 4948E is a wire-speed, low-latency, Layer 2-4, 1 Rack unit (1 RU), fixed-configuration switch for rack-optimized server switching. The Cisco Catalyst 4948E has double uplink capacity to four 10 Gb Ethernet uplinks and supports IPv6 in hardware. In addition the Cisco Catalyst 4948E has air flow that is P2oPSE (Port to Opposite Port Side Exhaust) typically utilized in the iDataPlex Rack.

**Highlights**

• Front-to-back and back-to-front cooling respectively for deployment flexibility.
• Exceptional performance and reliability for high-density, multilayer aggregation of high-performance, rack optimized servers and workstations
• Forty-eight ports of wire-speed 10/100/1000BASE-T with four alternative wired ports that can accommodate optional 1000BASE-X,
• Small Form-Factor Pluggable (SFP+) optics
• Optional internal AC or DC 1 + 1 hot-swappable power supplies and a hot-swappable fan tray with redundant fans for exceptional reliability and serviceability.

**Cisco Catalyst 3750-X** (4670-051, FC A1M6)

The Cisco Catalyst 3750-X Series Switch is an enterprise-class stackable and stand-alone switch. This switch provides high availability, scalability, security, energy efficiency, and ease of operation with innovative features, optional network modules, redundant power supplies, and Media Access Control Security (MACsec) features. The Cisco Catalyst 3750-X Series with StackWise Plus technology provides scalability, ease of management, and investment protection for the evolving business needs.

**Highlights**

• Forty-eight 10/100/1000
• One rack unit (RU)
• Optional four 1 Gb Ethernet SFP (Small Form-Factor Pluggable) or two 10 Gb Ethernet SFP+ uplink network modules
• Cisco StackPower: Innovative, industry-first feature for sharing power among stack members
• Cisco StackWise Plus for ease of use and resiliency with 64 Gbps throughput
• Dual redundant, modular power supplies and fans
• Backward compatibility with Catalyst 3750 Series
• MAC security hardware-based encryption
• Multicast routing, IPv6 routing, and access control list in hardware

**Force10 Exascale 4-Port 40 GbE Line Card** (4667-046, FC A1C0)

The Force10 ExaScale 40 GbE line card provides up to four ports of 40 GbE connectivity with 100 GbE of capacity per line card. Tested by IBM with all Intelligent Cluster BOM components, the Force10 card provides an excellent core connection to the IBM G8264 switch, via the four 40 GbE ports on the BNT switch. This allows for maximum throughput from the BNT Top of Rack to a Force10 core chassis.

**Highlights**

• Installs in a Force10 E1200i and E600i
• Available 100 Gbps of throughput with up to four ports of connectivity four QSFP ports and two CFP ports
• As part of an ExaScale chassis, provides up to 56 ports of 40 GbE connectivity within one switch

**LG-Ericsson ES Series Ethernet Switches**

**ES-4550G Stackable 48-Port Managed Layer 3 Switch with 2X 10G Uplink Slots** (4668-022, FC A1J7)

The LG-Ericsson ES-4550G Switch delivers high scalability, wirespeed Gigabit performance combined with high availability. This switch offers Gigabit Ethernet edge ports, 10 Gigabit Ethernet uplinks to allow numerous installation options based on application requirements. The 4550G offers stacking of up to eight units of 48-port switches providing up to 384 ports of 1 Gb each and 16 ports of 10 Gb each. It provides 48 built-in copper Gigabit ports, including four Combo SFP ports supporting SFP transceivers for easy, flexible connection to fiber-based Gigabit media and a switching capacity of up to 186 Gbps.

The ES-4550G offers stacking of up to eight units of 48-port switches providing up to 384 ports of 1 Gb each and 16 ports of 10 Gb each. It provides 48 built-in copper Gigabit ports, including four Combo SFP ports supporting SFP transceivers for easy,
flexible connection to fiber-based Gigabit media and a switching capacity of up to 186 Gbps.

The two 10 GbE module slots on the rear of the switch provide support for 10 GbE uplink connections providing one XFP port without impacting front panel performance. These provide high-bandwidth connections to the core of a network or high-capacity servers and are in addition to the two stacking connectors, giving high-capacity connections to the other units in the stack.

**ES-5048XG (4668-020, FC A1J5)**

The ES-5048XG provides a high-capacity, wire-speed, low-latency L2 enabled multi-port 10 GbE platform for the data center. It enables the aggregation of high density 1U rack servers, as the data center transitions from 1 GbE to 10 GbE. The ES-5048XG provides up to 48 ports of 10 GbE network connectivity and enables a seamless migration path from existing Gigabit Ethernet-based servers to 10 Gigabit Ethernet high performance servers, while further enabling the transition to virtualized environments.

Targets support of the Converged Enhanced Ethernet market segment. In addition to congestion and traffic management features required by the data center, the device supports the emerging Fiber Channel over Ethernet (FCoE) solutions for LAN, SAN, and IPC networks.

**Highlights**

- 48x10G switch nonblocking design
- Embedded buffer size 4 MB
- Redundant power supplies
- Hot swap fan trays
- Support hot aisle design
- Front-to-back
- Simplify rack cabling
- Network ports on front, PSUs/fans on back
- Low power consumption for 48x10G total system
- Variable speed fans

**Voltaire and Infiniband Switches**

**Voltaire Grid Director 4036E (4669-042,043 FC A1J8, A1J9) and 4036E-LM (4669-044,045 FC A1JA, A1JB) Infiniband Switches**

The Voltaire Grid Director 4036E is a high performance, low-latency and fully nonblocking InfiniBand switch, which includes a built-in low-latency Ethernet gateway for bridging traffic to and from Ethernet-based networks or storage. This self-contained solution combines an InfiniBand switch, an embedded subnet manager, and a built-in, hardware-based, low-latency Ethernet gateway in a compact 1U device.

With thirty-four 40 Gb/s InfiniBand ports and two 1/10 Gb Ethernet ports bridging traffic, I/O bottlenecks are removed making applications operate efficiently, while its smart design makes it easily useful for both small and large clusters. The primary delta between the Grid Director 4046e and 4036e-LM is as follows:

- The Grid Director 4036E-LM offering has fewer multicast and VLAN partitions and limited IB-ETH gateway internal memory.
- The Grid Director 4036E has full function IB-ETH gateway silicon and has greater multicast capabilities and greater VLAN partitions (3,000 and 64 respectively).

**Highlights**

- Low-latency, hardware-based bridging between InfiniBand and Ethernet
• Provides high performance connectivity to Ethernet-based services and resources
• Reduce switching and adapter costs by consolidating network and I/O infrastructure
• Thirty-four QDR (40 Gb/s) ports and two 1/10 GbE ports in a 1U switch
• Ultra-low latency with less than 100 nanoseconds between InfiniBand ports and less than two microseconds between InfiniBand and Ethernet
• Plug and play, standards-based protocol bridging with zero configuration required on the 4036E itself or on the servers
• Embedded subnet manager

IBM Intelligent Cluster ecosystem

Intelligent Cluster 42U 1200 mm Deep Primary and Expansion Racks (1410-PRA, FC A1MP and 1410-ERA FC A1MQ)

IBM 42U 1200 mm Deep Rack offerings are industry-standard 19-inch server cabinets that are designed for high availability IBM System x and BladeCenter environments. They are optimized to help maximize floor space, expedite installation, simplify cable management, and increase accessibility for improved serviceability. With a depth of 1200 mm (approximately 47 inches), these racks offer expansive rear channels with tool-less button mounts for virtually effortless installation of up to six IBM 0U vertical rack strip power distribution units (PDU) or can easily accommodate vertical cable organizers or mounting other equipment.

IBM Dynamic Racks enable you to receive your System x and BladeCenter solutions fully integrated in the rack and ready to instantly deploy into your data center. Dynamic Racks are designed to affordably, safely, and securely handle shipping fully loaded configurations up to 950 kg (2,100 lbs), which can help to increase your efficiency by reducing the time and cost that is associated with typical server deployments. However, if you do not need to ship the rack fully loaded, IBM offers cost-effective Static offerings that are ideal when doing on-site integration.

The racks contain the following items:

• One rack
• Rear and front doors
• Side panels (EX Expansion racks ship without side panels)
• Shipping pallet and ramp
• Removable outriggers
• Keys for the rack doors and side panels
• One front stabilizer bracket
• Two bolt down brackets/side stabilizers
• Hardware kit containing miscellaneous rack components
• Hardware kit for attaching the expansion rack to a rack suite (EX Expansion racks only)

Features

The features of the IBM 42U 1200 mm Deep Racks include:

42U 600 mm x 1200 mm Designs

• Cost-effective 42U static (non-ship loadable) and dynamic (fully ship loadable) models static models
• Designed for high availability IBM System x and BladeCenter environments
• 600 mm standard single floor tile width to complement current raised floor data center designs
• 1200 mm depth for improved cable management and air circulation
• Compliance with the EIA-310-D industry standard for 19-inch, type A rack cabinets
Rear cable management

- Features expansive rear channels with tool-less button mounts for virtually effortless installation of up to six IBM 0U vertical rack strip power distribution units (PDU), or can easily accommodate vertical cable organizers or mounting other equipment.
- Zero U mounting design conserves valuable EIA space for IT equipment simplifies cable management, reduces installation time and increases accessibility.

Side pockets

- Six sidewall compartments to support installation of 1U PDUs and switches without unnecessarily taking up valuable rack space

Overhead cable access

- Front cable access portals and a large rear adjustable opening provide improved overhead cable management

Standard stabilizers

- Standard front and side stabilizers for static rack stability when equipment is routinely installed, removed, or accessed

Adjustable leveling pads

- Four easily adjustable leveling pads ensure stability and prevent rolling on casters

U Markings

- Clear U markings on mounting rails to aide in space planning and installation

42U Cabinets are less than 2 m height on casters

- Fixed front and rear swivel heavy duty casters that can easily accommodate the maximum load capacity, while still being less than 2 m in height to allow the 42U rack models to fit under most doorways

Perforated doors

- Perforated front and rear doors for maximum airflow

Split rear door

- Split rear door design for improved access and serviceability

Secure doors and panels

- Lockable doors and side panels provide a more secure environment for equipment and data

Quick release hinges

- Quick release hinge design allows the front door to easily be mounted on either side of the cabinet, which provides for flexible placement alternatives by allowing the door to open in either direction

42U Dynamic ship load offerings

- Affordable 42U dynamic rack models that support shipping ready for instant deployment fully integrated solutions up to 2,100 lbs
- Robust frame, mounting rails, and shock reusable packaging to help protect the heaviest loads in transit
- Integrated outriggers for dynamic tilt stability and safety at maximum loads
Expansion cabinets

- All the primary IBM 1200 mm Deep Rack offerings have corresponding expansion cabinets. These models ship without side panels and include baying kits for seamless creation of a suite of racks.

42U Enterprise Rack (1410-4RX)

This specially designed 42U rack is one of two racks that can be used in IBM Intelligent Cluster configurations.

This rack features base stabilizers to enable shipment from the factory with IBM Intelligent Cluster components, such as power units, nodes, switches, cables, and consoles, mounted in position and with intrarack cabling installed according to applicable IBM Intelligent Cluster racking rules.

The Enterprise Rack is designated as IBM-installed for easy on-site installation. This designation, coupled with the factory integration services and optional on-site installation and verification of software, results in a ready-to-run cluster system. The cost of the hardware installation is included in the price of the rack. The cost of software installation by IBM or a qualified IBM Business Partner is not included.

25U Standard Rack (1410-2RX)

This 25U rack addresses the requirements of smaller departmental cluster configurations.

It is shipped from the factory with IBM Intelligent Cluster components, such as power units, nodes, switches, cables, and consoles mounted in position and with intrarack cabling installed according to applicable IBM Intelligent Cluster racking rules.

The 1410-2RX rack is designated as IBM-installed for easy on-site installation. This designation, coupled with the factory integration services and optional on-site installation and verification of software, results in a ready-to-run cluster system. The cost of the hardware installation is included in the price of the rack. The cost of software installation by IBM or a qualified IBM Business Partner is not included.

Power and cooling advantages for IBM Intelligent Cluster

The IBM energy management portfolio tackles the challenge to increase power and thermal efficiency and help reduce costs on many levels. Inside the system, all IBM System x and BladeCenter servers start with Calibrated Vectored Cooling™ technology. This feature allows dual paths of air to each component, helping to improve uptime and longevity, and reducing wasteful air movement and heat generation. It can be coupled with power supplies that are more energy-efficient.

For clusters within a rack, System x servers are designed to work at full density in a well-planned rack solution. They can also operate at extended temperature ranges to keep the system up and running, even in some cases in extreme temperature and many potential failure conditions. IBM rack-based cluster solutions are engineered to optimize air flow and prevent undesirable recirculation within the rack, so servers can run in optimal temperature conditions.

IBM blade-based clusters enable you to pack more processors into the same power and cooling envelope, as well as better utilize floor space and "right size" data center design. With BladeCenter servers, less power per processor means more processing capacity per kilowatt. The BladeCenter runs cooler to deliver greater reliability.

For dense data center environments, IBM delivers smart rack-level heat solutions, such as the super-efficient IBM Rear Door Heat eXchanger. The water-cooled door can dissipate heat generated from the back of the rack to reduce the overall room temperature. With this combination of benefits at the server and data center level, IBM systems can offer strong power and cooling benefits to IBM Intelligent Cluster clients.
IBM Rear Door Heat eXchanger (32R0712)

The Rear Door Heat eXchanger for IBM Enterprise Racks helps keep your growing data center at a safer temperature without adding air conditioning units. This unobtrusive solution brings more cooling capacity to areas where the heat is greatest, around racks of servers with multiple, more powerful processors.

Design simplicity delivers efficient cooling

The size and appearance of the Rear Door Heat eXchanger are similar to those of a standard rack acoustical 66 cm (26 in) wide door. It adds a mere 10 cm (4 in) to the depth of a rack, yet a single door may remove up to 50,000 Btu of heat (or approximately 15 kW). The door is designed to attach to a 42U-high IBM Enterprise Rack and swings wide to provide unrestricted access to electrical components. Sealed coils, filled with above-dewpoint, chilled water, passively remove a significant amount of the heat generated in a fully populated rack. This cooling efficiency may help eliminate the need for additional ac power and the associated construction cost.

Cluster Enablement Consulting for IBM Intelligent Cluster

Cluster Enablement Consulting is available at a flat rate price per day that includes resource, travel, and expenses for predefined engagements.

The fee covers expenses for cluster enablement engagements of the following type:

- Staging and integration of cluster hardware and software components at the manufacturing site or another location
- Cluster integration into an existing cluster or cluster upgrades
- Customer acceptance testing
- Software installation and integration, including operating system, management software, file system, compilers, or customer applications
- Instructor-led on-site training

Factory integration -- product customization services for IBM Intelligent Cluster

The IBM Intelligent Cluster features several hardware validation and test services collectively referred to as product customization services. These services include the integration of hardware and software on AMD and System x servers in innovative manufacturing facilities. You can deploy systems in almost any IT environment. This means your IT resources can be better used elsewhere.

This statement is especially true for Linux cluster solutions. Given the complexity of a Linux cluster, you want the confidence that the solution arrives properly configured and ready to integrate in your data center. These options are integrated into the servers. The System x also offers a Blade Integration Service, which, for a flat fee, includes installation of:

- Hardware options on the blades
- Options in the BladeCenter chassis
- Blades in the chassis

IBM can install the chassis in an Enterprise Rack and have it shipped to you. Performing the same services on-site would take hours or even days.

In addition, IBM Intelligent Cluster manufacturing offers specific services for the IBM Intelligent Cluster called Cluster Systems Validation and Test to confirm that all system settings are enabled and tested to enable smooth on-site deployment:

- Enable BIOS management
- Configure BIOS on each node
- Set up ASM and RSA
• Create disk partitioning
• Configure network, firewall, language, and time zone
• Configure services
• Set up storage
• Install terminal server
• Set up DNS
• Test, debug, and confirm that cluster is ready for operation

IBM has the skills and technology to offer this type of service. The IBM Intelligent Cluster manufacturing product customization portfolio offers a tremendous value, especially for customers interested in complex offerings such as Linux cluster.

Installation and deployment services

The IBM Intelligent Cluster solutions deployed in the 1410-4RX and 1410-2RX rack enclosures include on-site hardware installation and basic installation planning services for announced content.

System x iDataPlex ecosystem

IBM System x iDataPlex Rack (7825)

This specially designed rack is used in iDataPlex configurations.

The iDataPlex Rack is designated as IBM-installed for easy on-site installation. This designation, coupled with the factory integration services and optional on-site installation and verification of software, results in a ready-to-run cluster system.

The iDataPlex solution offers increased density in a holistic rack design. For ease of serviceability, all hard drive, planar, and I/O access is from the front of the rack.

Power and cooling advantages

iDataPlex servers help pack more processors into the same power and cooling envelope, better utilize floor space, and "right size" data center design. With the iDataPlex solution, less power per processor means more processing capacity per kilowatt. The iDataPlex can run cooler to deliver greater reliability.

System x iDataPlex Rear Door Heat eXchanger (43V6048)

For dense data center environments, IBM offers smart rack-level heat management solutions like the super-efficient IBM Rear Door Heat eXchanger. The water-cooled door is designed to dissipate heat generated from the back of the rack to help reduce the overall room temperature. With this combination of benefits at the server and data center level, IBM systems deliver strong power and cooling benefits to iDataPlex clients.

The iDataPlex Rear Door Heat eXchanger for iDataPlex racks helps reduce the air temperature in your growing data center to approximately the same air temperature as that entering the rack, alleviating the need to add air conditioning units. This unobtrusive solution brings more cooling capacity to areas where the heat is greatest, around racks of servers with multiple, more powerful processors.

Design simplicity delivers cooling efficiency that can help alleviate or even eliminate the need for additional air conditioning power and the associated construction cost.

IBM High Density Plus PDU

The new PDUs make it quick and simple to deploy, protect, and manage your high-density System x iDataPlex rack environment. IBM iDataPlex Enterprise PDU+ models combine receptacle density with advanced intelligent power management.
capabilities that seamlessly integrate with IBM Systems Director Active Energy Manager™.

**Solution Enablement Consulting**

Solution Enablement Consulting is available at a flat-rate price per day that includes resource, travel, and expenses for predefined engagements.

The fee covers expenses for solution enablement engagements of the following type:

- Staging and integration of hardware and software components at the manufacture site or another location
- Solution integration into an existing cluster or cluster upgrades
- Solution acceptance testing
- Software installation and integration, including operating system, management software, file system, compilers, or customer applications
- Instructor-led on-site training

**Factory integration -- product customization services**

The iDataPlex offering features several hardware validation and test services collectively referred to as product customization services. These services include the integration of hardware and software on Intel processor-based System x servers in technologically advanced manufacturing facilities. You can deploy systems in almost any IT environment. This means your IT resources can be better used elsewhere.

These options are integrated into the servers. IBM can install the chassis in an iDataPlex Rack and have it shipped to you. Performing the same services on-site could take hours or even days.

In addition, iDataPlex manufacturing offers specific services for the iDataPlex called Cluster Systems Validation and Test to confirm that all system settings are enabled and tested to enable smooth on-site deployment:

- Enable BIOS management
- Configure BIOS on each node
- Set up ASM and RSA
- Create disk partitioning
- Configure network, firewall, language, and time zone
- Configure services
- Set up storage
- Install terminal server
- Set up DNS
- Test, debug, and confirm that cluster is ready for operation

IBM has the skills and technology to offer this type of service. The iDataPlex product customization portfolio delivers tremendous value, especially for clients interested in complex offerings such as Linux cluster.

**Services**

**Installation and deployment services**

The System x iDataPlex solutions deployed in the iDataPlex rack enclosures include on-site installation of hardware.

Additional optional on-site software installation and customization services include Linux and Windows customization and skills transfer for system administration personnel.
Lab services

iDataPlex installation planning

Features:

- Assess client's air conditioning and air distribution in support of iDataPlex systems
- Evaluate the need for any Rear Door Heat eXchanger installations and offer necessary guidance
- Review the iDataPlex power specifications based on the client's hardware configurations and offer necessary guidance

Typical benefits:

- Offers accurate environmental information as required for supporting iDataPlex systems most reliably
- Identifies the most efficient approach to the iDataPlex system cooling and ventilation needs
- Reduces potential installation shortfalls with open and ongoing communication with the client surrounding their specific iDataPlex system requirements

On-site post installation services

Cluster setup and configuration:

- Configure and verify console switches
- Configure management node:
  - Verify and update BIOS
  - Verify and configure RAID
  - Install and configure operating system
  - Install and configure cluster manager
- Configure and verify Ethernet networking equipment:
  - Configure switch
  - Test and validate Gb Ethernet network operation
- Configure storage subsystem
- Verify and configure storage node RAID
- Load and validate operating system on compute nodes and storage nodes
- Check and update node BIOS and firmware
- Configure and verify InfiniBand networking equipment (depending on configuration)
  - Configure InfiniBand switch
  - Test and validate InfiniBand network
- Implement and verify:
  - File system
  - Default configurations of resource manager, scheduler resource manager, and scheduler
  - Miscellaneous cluster software and functions, including compilers, MPI, and SSH

Testing and validate cluster operation:

- Perform power-down and power-up test
- Perform testing (stream, ping-pong) to place load on the cluster
- Analyze results for anomalies and address problems
Skills transfer

**Quarterly health check**

One-year support agreement includes:

- 8 x 5 support (except weekends and holidays) with 24-hour response time
- Remote monitoring and alerting of the systems and monitoring the operating system
- Maintaining patch and firmware releases (Red Hat, SUSE Linux, and Storage Manager) as validated by IBM on ongoing basis
- Four site visits per year (one per quarter):
  - Health check assessment
  - Software update (firmware, device drivers, and patches for other software if applicable)
  - Skills transfer on best practices, such as TREX administration and updates and Storage Manager (if applicable)
  - Performance tuning (if applicable)

For more information on these services, visit

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

**iDataPlex systems management**

The System x iDataPlex product family offers systems management support for large scale-out compute environments via standards-based, scriptable interfaces. This support starts with the embedded Intelligent Platform Management Interface (IPMI) baseboard management controller (BMC).

For rapid diagnosis of problems, iDataPlex supports IBM Dynamic System Analysis (DSA) preboot diagnostics as well as online data collection for problem determination in supported Windows and Linux environments. Refer to the Dynamic System Analysis product documentation for additional detail on DSA features.

iDataPlex compute nodes support IBM Systems Director with limited function. Refer to IBM Systems Director product documentation for specific details on supported functions on iDataPlex hardware.

The compute nodes have been tested with the Extreme Cloud Administration Toolkit (xCAT), an open source community-based cluster administration tool set tailored to scale-out compute environments. You can download xCAT from SourceForge at

http://sourceforge.net/projects/xcat/

For additional information on xCAT, contact your IBM Sales and Support Team, or visit

http://www.xcat.org/

**System x iDataPlex - Product customization services**

The following product customization services are included with iDataPlex.

For information, refer to the following and contact your IBM representative.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>iDataPlex Rack Assembly (100U)</td>
<td>44R9980</td>
</tr>
<tr>
<td>Rack Installation of 1U Component in iDataPlex</td>
<td>44R9981</td>
</tr>
<tr>
<td>Rack Installation greater than 1U Component in iDataPlex</td>
<td>44R9982</td>
</tr>
<tr>
<td>iDataPlex Hardware / Configuration Verification</td>
<td>44R9983</td>
</tr>
<tr>
<td>Cluster Enablement Consulting - 1 Day</td>
<td>49Y3780</td>
</tr>
</tbody>
</table>
Applicable quantities are configuration-dependent and will be determined in the configuration process.

**IBM Intelligent Cluster - Product customization services**

The following product customization services are included with IBM Intelligent Cluster.

For information, refer to the following and contact your IBM representative.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack Assembly - 25U Rack</td>
<td>41Y4570</td>
</tr>
<tr>
<td>Rack Assembly - 42U Rack</td>
<td>25R4167</td>
</tr>
<tr>
<td>Rack Installation of 1U Component</td>
<td>25R4168</td>
</tr>
<tr>
<td>Rack Installation greater than 1U Component</td>
<td>25R4169</td>
</tr>
<tr>
<td>BladeCenter Chassis Configuration</td>
<td>58P8676</td>
</tr>
<tr>
<td>Cluster Hardware and Fabric Verification - 42U Rack</td>
<td>25R4170</td>
</tr>
<tr>
<td>Cluster Hardware and Fabric Verification - 25U Rack</td>
<td>40K9802</td>
</tr>
<tr>
<td>Cluster Enablement Consulting - 1 Day</td>
<td>26K7785</td>
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</tbody>
</table>

Applicable quantities are configuration-dependent and will be determined in the configuration process.

**Product positioning**

**IBM Intelligent Cluster**

The IBM Intelligent Cluster is positioned within the IBM System x family of offerings as the platform of choice for high-value and high-performance scalable Linux cluster solutions.

**System x iDataPlex**

IBM delivers innovations that meet your specific needs. The right choice depends on your business requirements, target applications, and operating environment. iDataPlex focuses on:

- Price/performance per watt
- Fast, large scale-out deployments
- Compute density
- Customization
- Targeted workloads
- Data center model for rip-and-replace IT resources

The iDataPlex hardware platform is positioned for cost-conscious large enterprises that rely on recovery-oriented architecture that enables redundancy through the software layer instead of redundant hardware.

**Reference information**

Refer to Software Announcement ZP08-0383, dated September 09, 2008.
Product number

**Note:** The following are only available on the IBM Intelligent Cluster and System x iDataPlex.

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine Type</th>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Catalyst 4948E Switch (oPSE)</td>
<td>4670</td>
<td>050</td>
<td>4670050</td>
</tr>
<tr>
<td>Cisco Catalyst 3750-X Switch (oPSE)</td>
<td>4670</td>
<td>051</td>
<td>4670051</td>
</tr>
<tr>
<td>Force10 ExaScale 4-port 40GbE Line Card</td>
<td>4667</td>
<td>046</td>
<td>4667046</td>
</tr>
<tr>
<td>LG-Ericsson ES-5048XG Switch (PSE)</td>
<td>4668</td>
<td>020</td>
<td>4668020</td>
</tr>
<tr>
<td>LG-Ericsson ES-4550G Switch (SE)</td>
<td>4668</td>
<td>022</td>
<td>4668022</td>
</tr>
<tr>
<td>Voltaire Grid Director 4036E Switch (PSE)</td>
<td>4669</td>
<td>042</td>
<td>4669042</td>
</tr>
<tr>
<td>Voltaire Grid Director 4036E Switch (oPSE)</td>
<td>4669</td>
<td>043</td>
<td>4669043</td>
</tr>
<tr>
<td>Voltaire Grid Director 4036E-LM Switch (PSE)</td>
<td>4669</td>
<td>044</td>
<td>4669044</td>
</tr>
<tr>
<td>Voltaire Grid Director 4036E-LM Switch (oPSE)</td>
<td>4669</td>
<td>045</td>
<td>4669045</td>
</tr>
<tr>
<td>Intelligent Cluster 42U 1200mm Deep Prim Rack</td>
<td>1410</td>
<td>PRA</td>
<td>1410PRA</td>
</tr>
<tr>
<td>Intelligent Cluster 42U 1200mm Deep Exp Rack</td>
<td>1410</td>
<td>ERA</td>
<td>1410ERA</td>
</tr>
</tbody>
</table>

**Note:** A new switch description nomenclature is being introduced to help provide key information about the switch regarding airflow. PSE, oPSE, and SE are being added to the end of 1U switch descriptions.

- **PSE=** port-side exhaust airflow which would typically be installed in an Enterprise rack such as the IBM 1410 rack family.
- **oPSE=** opposite port-side exhaust airflow and would typically be installed in an iDataPlex rack.
- **SE=** side exhaust and would typically be installed in an iDataPlex rack but depending on the switch may also be installed in an Enterprise rack.

The suffixes do not necessarily determine rack support. Each switch is evaluated on its own merit for rack support.

<table>
<thead>
<tr>
<th>Description</th>
<th>Option part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chelsio T420-CR DP (SFP+) 10GbE Adpt</td>
<td>46M2237</td>
</tr>
<tr>
<td>Chelsio T420-SO-CR DP (SFP+) 10GbE Adpt</td>
<td>81Y8021</td>
</tr>
<tr>
<td>Chelsio T440-CR OP (SFP+) 10GbE Adpt</td>
<td>46M2241</td>
</tr>
<tr>
<td>Chelsio T420-BCH DP 10GbE CFFh Exp Card</td>
<td>46M2245</td>
</tr>
<tr>
<td>Cisco C49e 300W Exhaust AC PS for 4948E</td>
<td>81Y8185</td>
</tr>
<tr>
<td>Cisco C3K-X-350w AC PS for 3750-X</td>
<td>81Y8187</td>
</tr>
<tr>
<td>Cisco C3K-X 10GbE (SFP+) Uplink Mod for 3750-X</td>
<td>81Y8189</td>
</tr>
<tr>
<td>1m Cisco Stackwise Cable for 3750-x</td>
<td>81Y1643</td>
</tr>
<tr>
<td>3m Cisco Stackwise Cable for 3750-x</td>
<td>81Y1647</td>
</tr>
<tr>
<td>LG-Ericsson 350w PS w/Intake Fan for 5048XG</td>
<td>81Y8137</td>
</tr>
<tr>
<td>LG-Ericsson Ent. Rack Mount Kit 3 for 4550G</td>
<td>81Y8141</td>
</tr>
<tr>
<td>LG-Ericsson Ent. Rack Mount Kit 9 for 5048XG</td>
<td>81Y8143</td>
</tr>
<tr>
<td>Intrarack CAT6 Cable Service</td>
<td>90Y3713</td>
</tr>
<tr>
<td>10m CAT6 Yellow Cable</td>
<td>90Y3715</td>
</tr>
<tr>
<td>10m CAT6 Green Cable</td>
<td>90Y3718</td>
</tr>
<tr>
<td>10m CAT6 Blue Cable</td>
<td>90Y3721</td>
</tr>
<tr>
<td>25m CAT6 Yellow Cable</td>
<td>90Y3724</td>
</tr>
<tr>
<td>25m CAT6 Green Cable</td>
<td>90Y3727</td>
</tr>
<tr>
<td>25m CAT6 Blue Cable</td>
<td>90Y3730</td>
</tr>
</tbody>
</table>

Additional part numbers announced previously are also supported by the Intelligent Cluster and iDataPlex. They are listed in the Options section. These parts, along with the newly announced parts, are only supported with the Intelligent Cluster and iDataPlex and are not validated or supported in other configurations unless specifically announced with those solutions. The only exception to this is the 0563-022. When purchased separately there is no solution level support provided by IBM.
Pseudo part numbers

Note: The following Pseudo part numbers cannot be ordered as stand-alone parts and can only be ordered via configurator.

<table>
<thead>
<tr>
<th>Pseudo part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>81Y1616</td>
<td>DS Storage Rack Shipping Bracket</td>
</tr>
<tr>
<td>81Y1590</td>
<td>Simplified iDPx Bracket and Filler Kit 1</td>
</tr>
<tr>
<td>81Y1591</td>
<td>Simplified iDPx Bracket and Filler Kit 2</td>
</tr>
</tbody>
</table>

Education support

Online training for Intelligent Cluster is available at


Publications

No national language support documents will be available for this product.

Services

Global Technology Services

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

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

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

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

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

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

For details on education offerings related to specific products, visit


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

Technical information

Specified operating environment

EMC compliance strategy
Typical configurations of the Linux cluster will be tested under the Class A requirement plus jurisdictional regulations for offer of sale in all markets.

- Title 47 CFR Part 15 Subpart B: US
- EN 55022; EN 55024: Europe
- AS/NZS CISPR 22: Australia/New Zealand
- VCCI: Japan
- ICES-003: Canada
- GB9254-2008: China
- MIC Notice No. 2000-79 and MIC Notice No. 200-80: Korea
- CISPR 22
- CISPR 24
- CNS 13438: Taiwan
- GOST: Russia

**Product safety regulatory compliance strategy**

The Intelligent Cluster will meet the jurisdictional regulations for offer of sale in all traditional and targeted markets.

- Canada: Certification to CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03
- U.K., Germany, France, Australia, New Zealand, Japan, Italy, Spain, Switzerland, Austria, Netherlands, Sweden, Norway, Belgium, and Korea: Certification to EN 60950-1:2006 + A11:2009
- Eastern Europe: CB scheme report and certification to EN 60950-1:2006 + A11:2009
- Russia and the CIS: GOST certification

Linux will also meet the NEC and regional code requirements identified in N-B2-4700-037, Power Systems™ National Requirements.

**Operating environment**

- Temperature: 16° C to 32° C (60.8° F to 89.6° F)
- Relative humidity: 8% to 80%
- Maximum wet bulb: 23° C
- Sound power: 7.5 bels LwAd (operating), Category 1A (with four BladeCenters and an acoustics module) (for more configurations, refer to the BladeCenter Planning and Installation Guide)
- Sound pressure: No operator position
- Maximum altitude: 2,133.6 m (7,000 ft)

If Option M/T 4671-001 is selected, sound power is 8.3 bels.

**Power requirements (per rack)**

- Operating voltage: 200 - 240 V at 50/60 Hz
- Electrical output: 36 kW (maximum)
- Power source loading: 22 kVA (maximum)
- Thermal output: 20.9 kJ/s (71,400 Btu/hr) (maximum configuration)

When deploying the following Network switches:

- Voltaire 4200 Switch Bundle 4669-041
- IBM Ethernet Switch J08 (EX8208) Bundle 0719-012
• IBM Ethernet Switch J16 (EX8216) Bundle 0719-013
• Mellanox IS5100 0724-014
• Mellanox IS5300 0724-015

The following Noise Hazard Notice notification applies:

**Note:** Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. This IBM system is available with an optional acoustical door feature that can help reduce the sound emitted from this system. The actual sound pressure levels in your installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room; the noise levels from other equipment; the room ambient temperature, and employees' location in relation to the equipment. Further, compliance with such government regulations also depends upon a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. IBM recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations.

**Hardware requirements**

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

• USB keyboard
• USB mouse
• HDD
• 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:

• USB keyboard
• USB mouse
• HDD
• Display

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

**Lift specifications**

The following require a lift tool.

• IBM Ethernet Switch J08E and J16E
  - 0719-012, -013
  - 0719-HC4, -HC5
• Voltaire
  - 4669-041
  - 4669-HCX
• Mellanox
  - 0724-014, -015
  - 0724-HC7, -HC8

**Note:** Any chassis above 54.89 kg (121 lb) requires a lift tool.
For high weight switches, plan to provide a lift for installation, remove, and replacement services. Lift specifications should meet the following:

- **Height**
  - Stowed: 5 feet 7.5 inch
  - Maximum forks down: 8 feet 3 inch
  - Maximum forks up: 10 feet 0.5 inch
  - Minimum forks down: 3.5 inch

- **Load Capacity**
  - Up to 400 lbs

### Software requirements

#### Supported operating systems

- Red Hat Enterprise Linux 5.5 (x86_64 and PPC64)
- SLES 11 Service Pack 1 (x86_64 and PPC64)

#### IBM software that runs on the IBM Intelligent Cluster

**GPFS Multiplatform and GPFS for POWER**

GPFS is a high-performance cluster file system for AIX®, Linux, and mixed clusters that gives users shared access to files spanning multiple disk drives. By dividing individual files into blocks and reading/writing these blocks in parallel across multiple disks, GPFS enables very high bandwidth. In addition, multiple data paths can also help eliminate single points of failure, making GPFS highly available for mission-critical applications.

GPFS is based on a shared disk model, enabling lower overhead access to disks not directly attached to the application nodes. It uses a distributed protocol data coherence for access from any node. GPFS also incorporates a powerful ILM policy engine. This engine allows complex, policy-based placement and file-based migration (without path changes) between multiple tiers of storage, including tape, which can scale to billions of files and multiple petabytes of data. Additionally, GPFS includes hardware-neutral snapshots and mirroring functions, enabling users to better virtualize storage hardware.

GPFS is ideal for several different roles in clustered computing and shared storage:

- A multicluster file system for parallel processing on compute clusters, featuring extreme scalability and throughput optimized for streaming workloads such as those common in Web 2.0, digital media, scientific, and engineering applications.
- An information life cycle management file system that enables multiple tiers of storage, including tape, with powerful policy-driven file placement, migration, archival, and deletion. The unique GPFS policy engine delivers file migration scalable to billions of files and multiple petabytes of data.
- A scalable, shared storage file system for storage consolidation and virtualization. This includes clustered NFS support and a scalable, shared namespace that enables horizontally scalable file serving. Additionally, GPFS includes many data and SAN management features, including storage hardware-neutral snapshots/mirroring.
- A high availability file system for any business application or database that can benefit from very rapid failover of a consistent application data environment.
- A distributed file system that offers a global, cross-platform, coherent namespace across an enterprise for around-the-world, around-the-clock operations.

GPFS delivers fast, reliable data access from all nodes in a homogeneous or heterogeneous cluster of servers running the Linux operating system. GPFS allows applications simultaneous access to a set of files (even a single file) from any node that has the GPFS file system mounted, while providing a high level of control over
all file system operations. Additionally, GPFS offers extreme scaling across numerous metrics, including I/O performance, file or file system size, numbers of files, number of nodes, and execution of complex ILM policies.

For more information on GPFS, and supported servers and operating system levels, visit the GPFS web page at


GPFS frequently asked questions at


GPFS documentation at


**Software**

The following IBM software is provided through the IBM Passport Advantage® program and shipped directly to you. For information about Passport Advantage, visit


For information about Passport Advantage enrollment, visit

http://www.lotus.com/services/passport.nsf/WebDocs/Passport_Advantage_Home

For information about Passport Advantage by country, visit

http://www.lotus.com/lotus/country.nsf/wdocs/homepage

<table>
<thead>
<tr>
<th>Software description</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>IBM General Parallel File System for Linux</td>
<td>BH031EN</td>
</tr>
<tr>
<td>Multiplatform V3.3 English CD Media Pack</td>
<td>BH03KEN</td>
</tr>
<tr>
<td>IBM General Parallel File System for Windows</td>
<td></td>
</tr>
<tr>
<td>V3.2.1 English Media Pack</td>
<td></td>
</tr>
<tr>
<td>GPFS Server 10 Processor Value Unit Lic + Software Service and support 12 Mo</td>
<td>D091MLL</td>
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<tr>
<td>GPFS Server 10 Processor Value Unit Annual Software Service and support Rnw1</td>
<td>E06VULL</td>
</tr>
<tr>
<td>GPFS Server 10 Processor Value Unit Software Service and support Reinstate 12 Mo</td>
<td>D091NLL</td>
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<tr>
<td>IBM General Parallel File System Server Proc Day OOCoD Temp Use Chrg</td>
<td>D091ULL</td>
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<td>GPFS Client 10 Processor Value Unit Lic + Software Service and support 12 Mo</td>
<td>D091RLL</td>
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<tr>
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<td>E06VWLL</td>
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<td>GPFS Client 10 Processor Value Unit Software Service and support Reinstate 12 Mo</td>
<td>D091SLL</td>
</tr>
<tr>
<td>IBM General Parallel File System Client Proc Day OOCoD Temp Use Chrg</td>
<td>D091TLL</td>
</tr>
<tr>
<td>IBM General Parallel File System V3.3 Linux Media Pack</td>
<td>BH03REN</td>
</tr>
<tr>
<td>IBM General Parallel File System V3.3 Windows Media Pack</td>
<td>BH03QEN</td>
</tr>
</tbody>
</table>

Additionally, the following GPFS Part Numbers have been released into the System x ordering systems.
Server: per 10 PVU w/ 1yr Service and Support 5641-N94: 0112 & 6005
Server: qty 250 per 10 PVU w/ 1yr 5641-N94: 0113 & 6005
Service and Support
Client: per 10 PVU w/ 1yr Service and Support 5641-N94: 0110 & 6004
Client: qty 250 per 10 PVU w/ 1yr 5641-N94: 0111 & 6004
Service and Support

Service is required for GPFS and is available from


For BladeCenter JS21 servers, CSM and GPFS are not available via Passport Advantage. They must be ordered through the AAS/CHW fulfillment system. The licensed products to be ordered are:

- CSM for Linux on POWER (5765-G16)
- GPFS for POWER (5765-G66)

**xCat for IBM Intelligent Cluster**

xCAT is a scalable distributed computing management and provisioning tool that provides a unified interface for hardware control, discovery, and OS diskful or diskfree deployment. xCAT has been deploying and managing large Linux systems for a number of years. xCAT is an open source management tool available from SourceForge.net that offers a powerful customizable architecture licensed under the Eclipse Public License, one of the more flexible licenses available for open source software.

IBM Support for xCAT provides world-class technical support for Extreme Cloud Administration Toolkit (xCAT) 2, the open source cluster management tool available from SourceForge. IBM Support for xCAT delivers the technical support clients need to confidently manage their large systems. IBM Support for xCAT enables you to optimize the value you get from the open source community and IBM, through unparalleled choice on software and choice on support. IBM Support for xCAT offers two tiers of IBM support:

- IBM Enhanced Support for xCAT
- IBM Elite Support for xCAT

IBM Support for xCAT offers clients who are interested in using pure open source technology the comfort of having IBM support available when they need it.

**Passport Advantage**

<table>
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<th>Program number</th>
<th>VRM</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5724-V63</td>
<td>2.0.0</td>
<td>IBM Enhanced Support for xCAT</td>
</tr>
<tr>
<td>5724-V64</td>
<td>2.0.0</td>
<td>IBM Elite Support for xCAT</td>
</tr>
</tbody>
</table>

**Compatibility**

All components of the IBM Intelligent Cluster are compatible when purchased as a supported IBM Intelligent Cluster solution.

**Note:** If the BladeCenter JS21 or System p5® is included in your Intelligent Cluster, you need to order CSM for POWER (5765-G16) and GPFS on POWER (5765-G66) from the AAS/CHW fulfillment system.
Limitations

IBM Intelligent Cluster

- IBM Intelligent Cluster options are supported only when deployed in an IBM Intelligent Cluster solution. They will not be supported when installed outside a 1410 Rack.
- Use of the 1410-4RX or 1410-2RX Linux Cluster Rack outside of the IBM Intelligent Cluster offering is prohibited.
- When the heat exchange door is part of the IBM Intelligent Cluster Solution, IBM will attach the door to the rack. You are responsible for filling the heat exchange door with fluid and hooking up all plumbing connections. You are also responsible for draining the heat exchange door and disconnecting all plumbing connections prior to an IBM servicer’s arrival on-site for replacement of the door assembly. After the servicer has replaced the heat exchange door assembly on the rack, it is your responsibility to refill the heat exchange door and reconnect all plumbing connections. All preventative maintenance on the rack is the sole responsibility of the client.
- Only one Voltaire 4700 Switch Chassis can be deployed in a 1410 rack because of weight restrictions. If a second chassis is required, the following considerations can be utilized:
  - Deploy the second chassis in its own 1410 rack.
  - Request a special bid for deployments where two chassis need to coexist in a single rack. Special lift equipment will be required to facilitate a MES installation or removal upon failure.
  - Due to the weight of some switch chassis, the customer may have to provide lifts for installation and repair if switches are installed in the upper portion of the rack.
  - The LG-Ericsson ES-5048XG Switch (PSE) (4668-020, HC9) - Is only support in the 1410 enterprise racks because of length of the switch.

System x iDataPlex

- System x iDataPlex options are supported only when ordered and deployed in an iDataPlex solution. They will not be supported when ordered without a corresponding order for an iDataPlex Rack configuration.
- The 4369 Rack Management Appliance is supported only when deployed in an iDataPlex configuration and with iDataPlex-supported BOM content.
- Rear Door Heat eXchanger:
  - The Rear Door Heat eXchanger is shipped separately from the iDataPlex rack for delivery and installation to the rack by an IBM authorized supplier.
  - When the Rear Door Heat eXchanger is part of the iDataPlex solution, an IBM authorized supplier will attach the door to the rack. (Refer to the Rear Door Heat eXchanger service pamphlet shipped with Rear Door Heat eXchanger for warranty service information.) The client is responsible for filling the heat exchange door with fluid and hooking up all plumbing connections. The client is also responsible for draining the heat exchange door and disconnecting all plumbing connections prior to an IBM authorized supplier's arrival on-site for replacement of the door assembly. After the servicer has replaced the heat exchange door assembly on the rack, it is the client's responsibility to refill the heat exchange door and reconnect all plumbing connections. All preventative maintenance on the rack is the sole responsibility of the client.
  - Use of the iDataPlex Rack outside of the iDataPlex offering is not supported.
- Cisco 3750-X (oPSE) (4670-051, HD2):
  - Is only supported in iDataPlex racks due to airflow.
  - iDataPlex Y cable with T shaped C13 plug end can not plug into PS requires jumper cable with standard IEC-320 C-13 plug into PS.
- The Cisco 4948E Switch (oPSE) (4670-050, HD1) - Supported only in iDataPlex due to Airflow
Planning information

Customer responsibilities
Installation of hardware components is provided by IBM on the 1410 and 7825 machine types. Installation of hardware options within specific server nodes is a customer responsibility if not purchased as part of a manufacturing install service. Customers are responsible for preparing their site for installation.

IBM offers warranty support or service for the IBM and non-IBM products and options announced as part of the offering. To obtain solution-level support, contact IBM using the solution rack machine type and serial. IBM machine types supported as part of the IBM Intelligent Cluster solution carry their own warranty terms for on-site and CRU.

You must obtain the prerequisite version of the Linux operating system and device drivers as specified by IBM. You can install the required Linux operating system, device drivers, and GPFS, and CSM software, use optional Linux cluster installation services to have IBM install it, or have a qualified IBM Business Partner perform the service.

You are expected to review the *Installation Planning Guide* before the delivery of your IBM Intelligent Cluster. The customer's responsibilities must be verified as complete before scheduling an IBM installer to come on-site.

Visit  
http://publib.boulder.ibm.com/cluster/

Cable orders
All cables are supplied with the IBM Intelligent Cluster. Depending on the applications, the cables may be fully installed, partially installed (plugged at one end and packaged for shipping), or included as part of a shipment group.

Installability
Setup and installation of the IBM Intelligent Cluster hardware are provided by IBM on the 1410 machine type.

When the heat exchange door is part of the IBM Intelligent Cluster Solution, IBM will only attach the door to the rack.

Packaging
IBM Intelligent Cluster Shipping Contents
- CD/Pubs Pack
  - IBM Intelligent Cluster information
  - IBM International License Agreement for Non-Warranted Programs
  - IBM Statement of Limited Warranty
  - IBM Warranty Information Sheet for IBM Intelligent Cluster
  - IBM International Program License Agreement
- Poly bag - generic
- Installation Information Flyer
- Safety manual
System x iDataPlex Shipping Contents

iDataPlex CD, which contains the following documentation in portable document format (PDF):

- IBM Safety Information (multilingual)
- IBM Rack Safety Information (multilingual)
- IBM iDataPlex Rack Type 7825 Installation and User's Guide
- IBM Rear Door Heat eXchanger for the iDataPlex Rack Installation and Maintenance Guide
- IBM System x iDataPlex dx340 User's Guide for Types 7831, 7832, and 7834
- IBM System x iDataPlex dx340 Problem Determination and Service Guide for Types 7831, 7832, and 7834
- IBM System x iDataPlex dx360 User's Guide for Types 7831 and 7833
- IBM System x iDataPlex dx360 Problem Determination and Service Guide for Types 7831 and 7833
- IBM System x iDataPlex dx360 M2 User's Guide for Type 7321, 7323
- IBM System x iDataPlex dx360 M2 Problem Determination and Service Guide for Type 7321, 7323
- IBM System x iDataPlex dx360 M3 User's Guide for Type 6391
- IBM System x iDataPlex dx360 M3 Problem Determination and Service Guide for Type 6391
- IBM DPI® C13 PDU+, DPI C13 3-phase PDU+ DPI C19 PDU+, and DPI C19 3-phase PDU+ Installation and Maintenance Guide
- IBM License Agreement for Machine Code
- IBM Types 7825, 6313, 6385, 6386, 6391, and Rear Door Heat eXchanger Warranty and Support Information is in printed format

Important Notices multilingual document that contains all of the legal, safety, emissions, and environmental statements in printed format.

Supplies

None

Security, auditability, and control

This offering uses the security and auditability features from standard IBM offerings and supported Linux distributions.

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

Global Technology Services

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

IBM Electronic Services

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

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

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

To learn how Electronic Services can work for you, visit

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

Terms and conditions

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

Warranty period

- Machine type 4670 - Three years
- Machine type 4667 - Three years
- Machine type 4668 - Three years
- Machine type 4669 - Three years
- Machine type 1410 - Three years
- Optional features - One year

Extended Warranty Service

An IBM part or feature installed during the initial installation of an IBM machine is subject to a full warranty effective on the date of installation of the machine. An IBM part or feature which replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty effective on its date of installation. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature is the same as the machine it is installed.

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

- None

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 website. 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 designated for your Machine.

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 or features have been designated as Tier 1 CRUs:

- Switch Chassis
- Power Supplies
- SFP Transceivers
- Intake Fan Options and Fan Modules
- Rack Mount Kits
- Cables
- Line cards
- Adapters

**On-site Service**

At IBM's discretion you will receive CRU service or IBM or your reseller will repair the failing machine at your location and verify its operation. If required, On-site Repair is provided, 9 hours per day, Monday through Friday excluding holidays, NBD response. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. On-site Service is not available in all countries, and some countries have kilometer or mileage limitations from an IBM service center. In those locations where On-site Service is not available, the normal in-country service delivery is used.

**International Warranty Service (IWS)**

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


For more information on IWS, refer to Services Announcement ZS01-0168, dated September 25, 2001.

**Licensing**

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

**IBM hourly service rate classification**

Two

**Field-installable features**

Yes

**Model conversions**

No

**Machine installation**

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

**Licensed Machine Code**

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


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 website

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.

**Prices**

For all local charges, contact your IBM representative.

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http://www.ibm.com/financing

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Announcement countries

All European, Middle Eastern, and African countries.

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