IBM Power System E880 server, an IBM POWER8 technology-based system, addresses the requirements of an industry-leading enterprise class system

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At a glance

The IBM® Power® System E880 server is designed as an industry-leading enterprise class system with outstanding price/performance, mainframe-inspired reliability and availability features, flexible capacity upgrades, and innovative virtualization technologies. The new Power E880 model MHE features the following:

- System with processor, memory, and base I/O
  - Up to one hundred twenty-eight 4.35 GHz POWER8™ processor cores (up to 64 cores in 2014)
  - Up to 16 TB of 1600 MHz DDR3 CDIMM memory (up to 8 TB in 2014)
  - Eight PCIe Gen3 x16 slots per system node enclosure, a maximum of 32 in a 4-node enclosure (up to 16 per 2-node system in 2014)
- System control unit, providing redundant system master clock and redundant system master Flexible Service Processor (FSP) and support for the Op Panel, the system VPD, and a DVD
- Optional 19-inch PCIe Gen3 4U I/O Expansion Drawers, each providing 12 PCIe slots
- EXP24S SFF Gen2-bay Drawer with twenty-four 2.5-inch form-factor (SFF) SAS bays
- Dynamic logical partition (LPAR) support for adjusting workload placement of processor and memory resources
- Active Memory™ Expansion for AIX® that is optimized onto the processor chip
- No-charge elastic processor and memory days with initial system order
- 90-day temporary elastic CoD processor and memory enablement features
- Power Enterprise Pools, supporting unsurpassed enterprise flexibility for workload balancing and system maintenance

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: YE001).

Overview

The IBM Power System E880 with POWER8 system node uses 8-core symmetric multiprocessing (SMP) processor chips with 512 KB of L2 and 8 MB of L3 cache per core, DDR3 CDIMM memory, dual memory controllers, and an industry-standard Gen3 PCIe I/O bus designed to use 32 lanes organized in two sets of x16. The peak memory and I/O bandwidths per system node have increased over 300% compared

to POWER7+™ servers. The two primary system building blocks are one system control unit and one or more system nodes. Additional I/O support is provided with a 19-inch PCIe Gen3 I/O expansion drawer and an EXP24S SFF Gen2 expansion drawer. The processors, memory, and base I/O are packaged within the system nodes. The system nodes are rack based.

New POWER8 processor single chip modules (SCM) are provided in each system node. Processors are interconnected by two sets of system buses. Each SCM contains two memory controllers per processor module. Four 4.35 GHz 8-core SCMs are used in each system node, providing 32 cores (#EPBB). As few as eight cores in the system can be activated or up to 100% of the cores in the system can be activated. Incrementing one core at a time is available through built-in capacity on demand (CoD) functions to the full capacity of the system.

The Power E880 can have up to four system nodes per system. With 32-core nodes, the maximum is a 128-core system. In 2014, up to two system nodes per server are supported or a maximum of 64 cores.

The system control unit provides redundant system master clocks and redundant system master service processors (FSPs). Additionally, it contains the Operator Panel, the System VPD, and the Base DVD.

The 1600 MHz memory CDIMMs are available as 64 GB (#EM8J), 128 GB (#EM8K), 256 GB (#EM8L), and 512 GB (#EM8M) memory features. Each memory feature provides four CDIMMs. CDIMMs are custom DIMMs that enhance memory performance and memory reliability. Each system node has 32 CDIMM slots that support a maximum of eight memory features. Using 512 GB CDIMM features yields a maximum of 4 TB per node. A two-node system has a maximum of 16 memory features and 8 TB. A four-node system has a maximum of 16 TB Capacity. Memory activations of 50% of the installed capacity are required.

The 19-inch PCIe Gen3 4U I/O Expansion Drawer (#EMX0) provides slots to hold PCIe adapters that cannot be placed into a system node. In 2014, either zero or two PCIe I/O expansion drawers can be attached per system node. Two PCIe I/O drawers provide 24 PCIe Gen3 adapter slots. Thus a two-node system has a maximum of 48 PCIe Gen3 slots in I/O drawers plus PCIe slots in the system node.

Direct attached storage is supported with the EXP24S SFF Gen2-bay Drawer (#5887), an expansion drawer with twenty-four 2.5-inch form-factor SAS bays.

As part of the IBM commitment to delivering the most flexible and resilient Power high-end systems, all initial shipments of Power E880 systems come with a specific number of no-charge elastic processor and memory days. The number of days depends on the configuration of the system. For every new Power E880, 15 elastic CoD processor days for every processor core (inactive or active) installed on the system and 240 GB of elastic CoD memory days for every processor core (inactive or active) are included. These elastic CoD processor and memory days must be used in accordance with the temporary capacity on demand terms and conditions. Also available are 90-day temporary elastic CoD processor and memory enablement features. These features enable a system to temporarily activate all inactive processor and memory CoD resources for a maximum of 90 days before you must order another temporary elastic enablement feature number.

With Power Enterprise Pools, IBM continues to enhance the ability to freely move processor and memory activations from one system to another system in the same pool, without the need for IBM involvement. This capability now allows the movement of resources not only between like systems, but also between generations of Power Systems™, and thus delivers unsurpassed flexibility for workload balancing and system maintenance. Power Enterprise Pools deliver the support to meet clients' business goals when it comes to the following:

- Providing organizations with a dynamic infrastructure, reduced cost of performance management, improved service levels, and controlled risk management
- Improving the flexibility, load balancing, and disaster recovery planning and operations of your Power Systems infrastructure

- Enhanced reliability, availability, and serviceability (RAS) to handle the requirements to accommodate a global economy

Power Enterprise Pools mobile activations are available for use on the Power 770, 780, and 795 systems and now on the Power E870 and E880 systems. Two types of Power Enterprise Pools can be created: a mid-range pool that can consist of Power 770s (9117-MMD) and Power E870s (9119-MME) and High End Pools that consist of Power 780s (9179-MHD), Power 795s (9119-FHB), and Power E880s (9119-MHE).

Key prerequisites

The IBM Power System E880 server requires an IBM AIX, Linux™, or IBM i operating system. Refer to the Hardware requirements section and Software requirements section for detailed requirements.

Planned availability date

November 18, 2014, except June 5, 2015, for:

- System Node to System Control Unit Cable Set for Drawer 3 (#ECCC)
- System Node to System Control Unit Cable Set for Drawer 4 (#ECCD)

MES planned availability is November 18, 2014.

- Manufacturing integrated model upgrade MES planned availability is December 12, 2014. Shipments will begin on this date.
- Field-integrated model upgrade MES planned availability is February 27, 2015. Shipments will begin on this date.
- Schedule dates for MES orders will be based on sequence, parts availability, and customer-requested arrival date. Shipments will begin on these dates.
- o MES orders for machines not yet shipped will be assigned a calculated arrival date within 30 days of the machine's calculated arrival date.

Description

Summary of features

The following features are available on the Power E880:

- One or two 5U 19-inch rack-mount system nodes in 2014 and one to four 5U system nodes in 2015
- One 2U 19-inch rack-mount system control unit drawer
- Only 12U for a system with two system nodes or 22U for a four-node system
- One processor feature per system node:
  - 4.35 GHz, (4 x 0/8W) 32-core POWER8 processor (#EPBB)
- Static or mobile processor activation features available on a per core basis
- 32 CDIMM slots per system node, a minimum of 16 populated per node
- POWER8 DDR3 memory CDIMMs (32 CDIMM slots per system node, 16 sites populated per system node as base):
  - 0/64 GB (4 X 16 GB), 1600 MHz (#EM8J)
  - 0/128 GB (4 X 32 GB), 1600 MHz (#EM8K)
  - 0/256 GB (4 X 64 GB), 1600 MHz (#EM8L)
  - 0/512 GB (4 x 128 GB), 1600 MHz (#EM8M)
- Active Memory Expansion -- optimized onto the processor chip (#EM82)

- 90 Days Elastic CoD Temporary Processor Enablement (#EP9T)
- Eight PCIe Gen3 x16 I/O low profile expansion slots per system node (maximum 16 with 2-node system or 32 in a 4-node system)
- One slim-line, SATA media bay per system control unit enclosure (DVD drive defaulted on order, option to de-select)
- Redundant hot-swap ac power supplies in each system node drawer
- Two Hardware Management Console (HMC) ports per service processor (FSP) in system control unit enclosure service processor (FSP) (maximum of one #5550 and one #5557)
- Dynamic logical partition (LPAR) support and processor and memory CUoD
- PowerVM® Virtualization built:
  - Micro-Partitioning®
  - Dynamic logical partitioning
  - Shared processor pools
  - Shared storage pools
  - Live Partition Mobility
  - Active Memory Sharing
  - Active Memory Deduplication
  - NPIV support
  - PowerVP™ Performance Monitor
- Optional PowerHA® for AIX, IBM i, and Linux
- Optional PCIe Gen3 I/O Expansion Drawer with PCIe Gen3 slots:
  - Zero or two PCIe Gen3 Drawers per system node drawer (#EMX0)
  - Zero or two or four PCIe Gen3 drawers per 2-node system
  - Each Gen3 I/O drawer holds two 6-slot PCIe3 Fan-out Modules (#EMXF)
  - Each Gen3 I/O drawer attaches to the system node through two PCIe3 Optical Cable Adapters (#EJ07)

Processor cores and memory

- Each system must have a minimum of eight active processor cores. Each processor feature (#EPBB) will deliver a set of four identical single chip modules (SCMs). All processor features in the system must be identical.
- Cable features are required to connect system node drawers to the system control unit and to other system nodes.
  - For a single system node configuration, feature ECCA is required.
  - For a dual system node configuration, features ECCA and ECCB are required.
- Each system node drawer has 32 memory CDIMM slots holding up to eight DDR3 memory features.
- Each system node drawer must have a minimum of four memory features or 16 DDR3 CDIMMs. Select from features EM8J (64 GB), EM8K (128 GB), EM8L (256 GB), or EM8M (512 GB) (four CDIMMs per feature).
- The minimum activations ordered with all initial orders of memory features EM8J, EM8K, and EM8L must be 50% of their installed capacity.
- The minimum activations ordered with MES orders of memory features EM8J, EM8K, EM8L, and EM8M will depend on the total installed capacity of features EM8J, EM8K, EM8L, and EM8M. This enables you to purchase newly ordered memory with less than 50% activations when the currently installed capacity exceeds 50% of the existing features EM8J, EM8K, EM8L, and EM8M capacity.
- The minimum activations installed for all memory must be 50% of their installed capacity.
- DDR3 memory features EM8J, EM8K, and EM8L can be mixed on the same POWER8 system node drawer. If placing two memory features on the same SCM, they must be identical.
- It is recommended that memory be installed evenly across all system node drawers and all SCMs in the system. Balancing memory across the installed

system planar cards allows memory access in a consistent manner and typically results in better performance for your configuration.
- Though maximum memory bandwidth is achieved by filling up all the memory slots, plans for future memory additions should be taken into account when deciding which memory feature size to use at the time of initial system order.

System node PCIe slots

- Each Power E880 system node enclosure provides excellent configuration flexibility and expandability with eight half-length, half-high (low profile) x16 PCIe Gen3 slots. The slots are labeled C1 through C8.
- These PCIe slots can be used for either low-profile PCIe adapters or for attaching a PCIe I/O drawer.
- A new form factor blind swap cassette (BSC) is used to house the low-profile adapters that go into these slots. The server is shipped with a full set of BSC, even if the BSC is empty. A feature code to order additional low-profile BSC is not required or announced.
- If additional Gen3 PCIe slots beyond the system node slots are required, a system node x16 slot is used to attach a six-slot expansion module in the I/O drawer. An I/O drawer holds two expansion modules that are attached to any two x16 PCIe slots in the same system node or in different system nodes.
- PCIe Gen1, Gen2, and Gen3 adapter cards are supported in these Gen3 slots. The set of PCIe adapters that are supported is found in the Sales Manual, identified by feature code number.
- Concurrent repair and add/removal of PCIe adapter cards is done by HMC guided menus or by operating system support utilities.
- The system nodes sense which IBM PCIe adapters are installed in their PCIe slots; and if an adapter requires higher levels of cooling, they automatically speed up the fans to increase airflow across the PCIe adapters.
- Each system node supports up to four CAPI adapters, which can be located in slots C2, C4, C6, or C8.

PCIe Gen3 I/O Expansion Drawer

- The 19-inch 4 EIA (4U) PCIe Gen3 I/O Expansion Drawer (#EMX0) and two PCIe FanOut Modules (#EMXF) provide 12 PCIe I/O full-length, full-height slots. One FanOut Module provides six PCIe slots labeled C1 through C6. C1 and C4 are x16 slots and C2, C3, C5, and C6 are x8 slots.
- PCIe Gen1, Gen2, and Gen3 full-high adapter cards are supported. The set of full-high PCIe adapters that are supported is found in the Sales Manual, identified by feature code number. See the PCI Adapter Placement manual for the 9119-MHE or 9119-MME for details and rules associated with specific adapters supported and their supported placement in x8 or x16 slots.
- A PCIe X16 to Optical CXP converter adapter (#EJ07) and 2.0 M (#ECC6) or 10.0 M (#ECC8) CXP 16X Active Optical cables (AOC) connect the system node to a PCIe FanOut module in the I/O expansion drawer. One feature ECC6 or one ECC8 ships two AOC cables from IBM.
- The two AOC cables connect to two CXP ports on the fan-out module and to two CXP ports on the EJ07 adapter. The top port of the fan-out module must be cabled to the top port of the EJ07 port. Likewise, the bottom two ports must be cabled together.
- It is recommended but not required that one I/O drawer be attached to two different system nodes in the same server (one drawer module attached to one system node and the other drawer module attached to a different system node). This can help provide cabling for higher availability configurations.
- It is recommended that any attached PCIe Gen3 I/O Expansion Drawer be located in the same rack as the POWER8 server for ease of service, but they can be installed in separate racks if the application or other rack content requires it.
- Concurrent repair and add/removal of PCIe adapter cards is done by HMC guided menus or by operating system support utilities.
- A blind swap cassette (BSC) is used to house the full-high adapters that go into these slots. The BSC is the same BSC as used with the previous generation server's 12X attached I/O drawers (#5802, #5803, #5877, #5873). The drawer

is shipped with a full set of BSC, even if the BSC is empty. A feature code to order additional full-high BSC is not required or announced.

EXP24S Disk/SSD Drawer

- The EXP24S SFF Gen2-bay Drawer (#5887) is an expansion drawer with twenty-four 2.5-inch form-factor SAS bays. Slot filler panels are included for empty bays when initially shipped. The EXP24S supports up to 24 hot-swap SFF-2 SAS hard disk drives (HDDs) or solid-state drives (SSDs). It uses only 2 EIA of space in a 19-inch rack. The EXP24S includes redundant ac power supplies and uses two power cords.
- With AIX, Linux, and VIOS, you can order the EXP24S with four sets of six bays, two sets of 12 bays, or one set of 24 bays (mode 4, 2, or 1). With IBM i, you can order the EXP24S as one set of 24 bays (mode 1). Mode setting is done by IBM Manufacturing and there is no option provided to change the mode after it is shipped from IBM.
- The EXP24S SAS ports are attached to a SAS PCIe adapter or pair of adapters using SAS YO or X cables.
- To maximize configuration flexibility and space utilization, the system node does not have integrated SAS bays or integrated SAS controllers. PCIe adapters and the EXP24S can be used to provide direct access storage.
- To further reduce possible single points of failure, EXP24S configuration rules consistent with previous Power Systems are used. IBM i configurations require the drives to be protected (RAID or mirroring). Protecting the drives is highly recommended, but not required for other operating systems. All Power operating system environments that are using SAS adapters with write cache require the cache to be protected by using pairs of adapters.
- It is recommended for SAS cabling ease that the EXP24S drawer be located in the same rack in which the PCIe adapter is located. Note, however, it is often a good availability practice to split a SAS adapter pair across two PCIe drawers/ nodes for availability and that may make the SAS cabling ease recommendation difficult or impossible to implement.
- HDDs and SSDs that were previously located in POWER7® system units or in feature 5802 or 5803 12X-attached I/O drawers (SFF-1 bays) can be "re-trayed" and placed in EXP24S drawers. See feature conversions previously announced on the POWER7 servers. Ordering a conversion ships an SFF-2 tray or carriage onto which the client can place their existing drive after removing it from the existing SFF-1 tray/carriage. The order also changes the feature code so that IBM configuration tools can better understand what is required.

DVD and boot devices

- A device capable of reading a DVD must be attached to the system and available to perform operating system installation, maintenance, problem determination, and service actions such as maintaining system firmware and I/O microcode at their latest levels. Alternatively, the system must be attached to a network with software such as AIX NIM server or Linux Install Manager configured to perform these functions.
- System boot is supported through three options:
  a. Disk or SSD located in an EXP24S drawer attached to a PCIe adapter
  b. A network through LAN adapters
  c. A SAN attached to Fibre Channel or FCoE adapters and indicated to the server by the 0837 specify code
- Assuming option 1 above, the minimum system configuration requires at least one SAS disk drive in the system for AIX and Linux and two for IBM i. If you are using option 3 above, a disk or SSD drive is not required.
- Each system control unit enclosure can have one slim-line bay that can support one DVD drive (#EU13). The feature EU13 DVD is cabled to a USB PCIe adapter located in either the system node or in a PCIe Gen3 I/O drawer. A USB to SATA converter is included in the configuration without a separate feature code.
- For IBM i, a DVD drive must be available on the server when required. The DVD can be in the system control unit or it can be located in an external enclosure such as a 7226-1U3 Multimedia drawer.

Racks

The Power E880 is designed to fit a standard 19-inch rack. IBM Development has tested and certified the system in the IBM Enterprise rack (7014-T42, 7014-T00, #0551, or #0553). The client can choose to place the server in other racks if they are confident those racks have the strength, rigidity, depth, and hole pattern characteristics that are needed. The client should work with IBM Service to determine other racks' appropriateness.

It is highly recommended that the Power E880 be ordered with an IBM 42U enterprise rack (7014-T42 or #0553). An initial system order is placed in a 7014-T42 rack. A same serial-number model upgrade MES is placed in a feature 0553 rack. This is done to ease and speed client installation, provide a more complete and higher quality environment for IBM Manufacturing system assembly and testing, and provide a more complete shipping package. The 7014-T42 or feature 0553 is a 2-meter enterprise rack, providing 42U or 42 EIA of space. Clients who don't want this rack can remove it from the order, and IBM Manufacturing will then remove the server from the rack after testing and ship the server in separate packages without a rack. Use the factory-deracking code ER21 on the order to do this.

Additional E880 PCIe Gen3 I/O drawers (#EMX0) for an already installed server can be MES ordered with or without a rack. When clients want IBM Manufacturing to place these MES I/O drawers into a rack and ship them together (factory integration), then the racks should be ordered as feature codes on the same order as the I/O drawers. Use feature 0553 (42U enterprise rack) for this order.

Three rack front door options are supported with Power E880 system nodes for the 42U enterprise rack (7014-T42 or #0553), the acoustic door (#6249), the attractive geometrically accented door (#ERG7) and the cost-effective plain front door (#6069). The front trim kit is also supported (#6272). The Power 880 logo rack door (#6250) is not supported.

It is strongly recommended that the bottom 2U of the rack be left open for cable management when below-floor cabling is used. Likewise, if overhead cabling is used, it is strongly recommended the top 2U be left open for cable management. If clients are using both overhead and below-floor cabling, leaving 2U open on both the top and bottom of the rack is a good practice. Rack configurations placing equipment in these 2U locations can be more difficult to service if there are a lot of cables running by them in the rack.

The system node and system control unit must be immediately physically adjacent to each other in a contiguous space. The cables connecting the system control unit and the system node are built to very specific lengths. In a two-node configuration, system node 1 is on top, and then the system control unit in the middle and system node 2 is on the bottom. Use specify feature ER16 to reserve 5U space in the rack for a future system node and avoid the work of shifting equipment in the rack in the future. On a four-node configuration system node 4 is on the top, then node 1 is below it, then the system control unit, then node 2 and finally node 3 is on the bottom.

With the 2 meter 7014-T42 or feature 0553, a rear rack extension of 8 inches or 20.3 cm (#ERG0) provides space to hold cables on the side of the rack and keep the center area clear for cooling and service access. Including this extension is very, very strongly recommended where large numbers of thicker I/O cables are present or may be added in the future. The definition of a "large number" depends on the type of I/O cables used. Probably around 64 short-length SAS cables per side of a rack or around 50 longer-length (thicker) SAS cables per side of a rack is a good rule of thumb. Generally, other I/O cables are thinner and easier to fit in the sides of the rack and the number of cables can be higher. SAS cables are most commonly found with multiple EXP24S SAS drawers (#5887) driven by multiple PCIe SAS adapters. For this reason, it can be a very good practice to keep multiple EXP24S drawers in the same rack as the PCIe Gen3 I/O drawer or in a separate rack close to the PCIe Gen3 I/O drawer, using shorter, thinner SAS cables. The feature ERG0 extension can be good to use even with a smaller numbers of cables as it enhances the ease of cable management with the extra space it provides.

Multiple service personnel are required to manually remove or insert a system node drawer into a rack, given its dimensions and weight and content. To avoid any delay in service it is very strongly recommended that the client obtain an optional lift tool (#EB2Z). One EB2Z lift tool can be shared among many servers and I/O drawers. The EB2Z lift tool provides a hand crank to lift and position up to 159 kg (350 lb). The EB2Z lift tool is 1.12 meters x 0.62 meters (44 in. x 24.5 in.). Note that a single system node can weigh up to 75.7 kg (167 lb).

System node power

- Four ac power supplies provide 2 + 2 redundant power for enhanced system availability. A system node is designed to continue functioning with just two working power supplies. A failed power supply can be hot swapped but must remain in the system until the replacement power supply is available for exchange.
- Four ac power cords are used for each system node (one per power supply) and are ordered using the AC Power Chunnel feature (#EBAA). The chunnel carries power from the rear of the system node to the hot swap power supplies located in the front of the system node where they are more accessible for service.

System control unit power

- The system control unit is powered from the system nodes. UPIC cables provide redundant power to the system control unit. Two UPIC cables attach to system node drawer 1 and two UPIC cables attach to system node drawer 2. They are ordered with features ECCA and ECCB. Just one UPIC cord is enough to power the system control unit and the rest are in place for redundancy.

Power distribution units (PDU)

- The Power E880 server factory integrated into an IBM rack uses horizontal PDUs located in the EIA drawer space of the rack instead of the typical vertical PDUs found in the side pockets of a rack. This is done to aid cable routing. Each horizontal PDU occupies 1U. Vertically mounting the PDUs to save rack space can cause cable routing challenges and interfere with optimal service access.
- When mounting the horizontal PDUs, it is a good practice to place them almost at the top or almost at the bottom of the rack, leaving 2U or more of space at the very top or very bottom of the open for cable management. Mounting a horizontal PDU in the middle of the rack is generally not optimal for cable management.
- Two possible PDU ratings are supported: 60A/63A (orderable in most countries) and 30A/32A.
  - The 60A/63A PDU supports four system node power supplies and one I/O expansion drawer or eight I/O expansion drawers.
  - The 30A/32A PDU supports two system node power supplies and one I/O expansion drawer or four I/O expansion drawers.
- Rack-integrated system orders require two of either feature 7109 or 7188.
  - Feature 7109 -- Intelligent PDU with Universal UTG0247 Connector is for an intelligent ac power distribution unit (PDU+) that will allow the user to monitor the amount of power being used by the devices that are plugged in to this PDU+. This ac power distribution unit provides twelve C13 power outlets. It receives power through a UTG0247 connector. It can be used for many different countries and applications by varying the PDU to Wall Power Cord, which must be ordered separately. Each PDU requires one PDU to Wall Power Cord. Supported power cords include the following features: 6489, 6491, 6492, 6653, 6654, 6655, 6656, 6657, and 6658.
  - Feature 7188 -- Power Distribution Unit mounts in a 19-inch rack and provides twelve C13 power outlets. Feature 7188 has six 16A circuit breakers, with two power outlets per circuit breaker. System units and expansion units must use a power cord with a C14 plug to connect to the feature 7188. One of the following line cords must be used to distribute power from a wall outlet to the feature 7188: feature 6489, 6491, 6492, 6653, 6654, 6655, 6656, 6657, or 6658.

Hot-plug options

The following options are hot-plug capable:

- PCIe I/O adapters.
- System node ac power supplies: Two functional power supplies must remain installed at all times while the system is operating.
- System node fans.
- System control unit fans.
- System control unit Op Panel.
- System control unit DVD drive.
- UPIC power cables from system node to system control unit.

If the system boot device or system console is attached using an I/O adapter feature, that adapter may not be hot-plugged if a nonredundant topology has been implemented.

You can access hot-plug procedures in the product documentation at

http://www.ibm.com/support/knowledgecenter/POWER8

PowerVM

PowerVM Enterprise virtualization is built into the Power E880 system and provides the complete set of PowerVM virtualization functionality needed for Power enterprise servers with POWER8 technology. This enables efficient resource sharing through virtualization, which allows workload consolidation and secure workload isolation as well as the flexibility to redeploy resources dynamically.

Other PowerVM technologies include the following:

- Migrate from older generation Power servers to the Power E880 system.
- System Planning Tool simplifies the process of planning and deploying Power Systems LPARs and virtual I/O.
- Virtual I/O Server (VIOS) is a single-function appliance that resides in an IBM Power processor-based partition. It facilitates the sharing of physical I/O resources between client partitions AIX, Linux, or IBM i within the server.
- With Live Partition Mobility, you can move a running AIX, Linux, or IBM i LPAR from one physical server to another with no downtime. Use this capability to do the following:
  - Evacuate workloads from a system before performing scheduled maintenance.
  - Move workloads across a pool of different physical resources as business needs shift.
  - Move workloads away from under-utilized machines so that they can be powered off to save on energy and cooling costs. Active Memory Sharing allows memory to be dynamically moved between running partitions for optimal resource usage.
  - PowerVP Virtualization Performance monitor provides real-time monitoring of a virtualized system showing the mapping of VMs to physical hardware.

Note: Alternative configuration options are available on a special bid basis from your IBM representative or Business Partner.

Active Memory Expansion

Active Memory Expansion is an innovative POWER7, POWER7+, and POWER8 technology supporting the AIX operating system that allows the effective maximum memory capacity to be much larger than the true physical memory maximum. Sophisticated compression/decompression of memory content can allow memory expansion up to 100% or more. This can allow a partition to do significantly more work or support more users with the same physical amount of memory. Similarly, it

can allow a server to run more partitions and do more work for the same physical amount of memory.

Active Memory Expansion uses CPU resource to compress/decompress the memory contents. The trade-off of memory capacity for processor cycles can be an excellent choice, but the degree of expansion varies on how compressible the memory content is. It also depends on having adequate spare CPU capacity available for this compression/decompression. Tests in IBM laboratories using sample workloads showed excellent results for many workloads in terms of memory expansion per additional CPU utilized. Other test workloads had more modest results. Feedback from many POWER7 and POWER7+ clients using the function has been very positive.

POWER7+ and POWER8 chips include a hardware accelerator designed to boost Active Memory Expansion efficiency and use less POWER® core resource. The POWER8 accelerator includes some minor enhancements and also leverages POWER8 higher bandwidth and lower latency characteristics.

You have a great deal of control over Active Memory Expansion usage. Each individual AIX partition can turn on or turn off Active Memory Expansion. Control parameters set the amount of expansion desired in each partition to help control the amount of CPU used by the Active Memory Expansion function. An IPL is required for the specific partition that is turning memory expansion. Once turned on, monitoring capabilities are available in standard AIX performance tools such as lparstat, vmstat, topas, and svmon.

A planning tool is included with AIX, allowing you to sample actual workloads and estimate both how expandable the partition's memory is and how much CPU resource is needed. Any Power Systems model can run the planning tool. In addition, a one-time, 60-day trial of Active Memory Expansion is available to enable more exact memory expansion and CPU measurements. You can request the trial using the Capacity on Demand web page

http://www.ibm.com/systems/power/hardware/cod/

Active Memory Expansion is enabled by chargeable hardware feature EM82, which can be ordered with the initial order of the system node or as an MES order. A software key is provided when the enablement feature is ordered, which is applied to the system node. An IPL is not required to enable the system node. The key is specific to an individual system node and is permanent. It cannot be moved to a different server.

The additional CPU resource used to expand memory is part of the CPU resource assigned to the AIX partition running Active Memory Expansion. Normal licensing requirements apply.

IBM i operating system

For clients loading the IBM i operating system, the four-digit numeric QPRCFEAT value used on the 9119-MME or 9119-MHE is the same as the four-digit numeric feature number for the processors used in the system. For example, if the processor feature number in a system is EPBA, the QPRCFEAT value for the system would be EPBA.

- The QPRCFEAT value does not change with the addition of system node enclosures.

Capacity backup offering (applies to IBM i only)

The Power System 880 Capacity Backup (CBU) designation can help meet your requirements for a second system to use for backup, high availability, and disaster recovery. It enables you to temporarily transfer IBM i processor license entitlements and 5250 Enterprise Enablement entitlements purchased for a primary machine to a secondary CBU-designated system. Temporarily transferring these resources instead of purchasing them for your secondary system may result in significant savings. Processor activations cannot be transferred as part of this CBU offering, but programs such as Power Enterprise Pools are available for the function.

The CBU specify feature number 4891 is available only as part of a new server purchase or during an MES upgrade from an existing system to a 9119-MHE. Certain system prerequisites must be met, and system registration and approval are required before the CBU specify feature can be applied on a new server. A used system that has an existing CBU feature cannot be registered. The only way to attain a CBU feature that can be registered is with a plant order.

Standard IBM i terms and conditions do not allow either IBM i processor license entitlements or 5250 OLTP (Enterprise Enablement) entitlements to be transferred permanently or temporarily. These entitlements remain with the machine they were ordered for. When you register the association between your primary and on-order CBU system, you must agree to certain terms and conditions regarding the temporary transfer.

After a CBU system designation is approved and the system is installed, you can temporarily move your optional IBM i processor license entitlement and 5250 Enterprise Enablement entitlements from the primary system to the CBU system when the primary system is down or while the primary system processor cores are inactive. The CBU system can then better support fail-over and role swapping for a full range of test, disaster recovery, and high availability scenarios. Temporary entitlement transfer means that the entitlement is a property transferred from the primary system to the CBU system and may remain in use on the CBU system as long as the registered primary and CBU system are in deployment for the high availability or disaster recovery operation.

The primary system for a E880 server can be any of the following:

- 9119-FHB
- 9119-MHE
- 9117-MMB
- 9117-MMC
- 9117-MMD
- 9179-MHB
- 9179-MHC
- 9179-MHD

These systems have IBM i software licenses with an IBM i P30 software tier, or higher. The primary machine must be in the same enterprise as the CBU system.

Before you can temporarily transfer IBM i processor license entitlements from the registered primary system, you must have more than one IBM i processor license on the primary machine and at least one IBM i processor license on the CBU server. An activated processor must be available on the CBU server to use the transferred entitlement. You may then transfer any IBM i processor entitlements above the minimum one, assuming the total IBM i workload on the primary system does not require the IBM i entitlement you would like to transfer during the time of the transfer. During this temporary transfer, the CBU system's internal records of its total number of IBM i processor license entitlements are not updated, and you may see IBM i license noncompliance warning messages from the CBU system. Such messages that arise in this situation do not mean you are not in compliance.

Before you can temporarily transfer 5250 entitlements, you must have more than one 5250 Enterprise Enablement entitlement on the primary server and at least one 5250 Enterprise Enablement entitlement on the CBU system. You may then transfer the entitlements that are not required on the primary server during the time of transfer and that are above the minimum of one entitlement. Note that if you are using software replication (versus PowerHA), you may well need more than a minimum of one entitlement on the CBU to support the replication workload.

For example, if you have a 64-core Power 780 as your primary system with twenty IBM i processor license entitlements (nineteen above the minimum) and two 5250 Enterprise Enablement entitlements (one above the minimum), you can temporarily transfer up to nineteen IBM i entitlements and one 5250 Enterprise Enablement

entitlement. During the temporary transfer, the CBU system's internal records of its total number of IBM i processor entitlements is not updated, and you may see IBM i license noncompliance warning messages from the CBU system.

If your primary or CBU machine is sold or discontinued from use, any temporary entitlement transfers must be returned to the machine on which they were originally acquired.

For CBU registration and further information, visit

http://www.ibm.com/systems/power/hardware/cbu

Power Enterprise Pools

Power Enterprise Pools provide a level of flexibility and value for systems that operate together as a pool of resources. Power Enterprise Pools mobile activations are available for use on the Power 770, 780, and 795 systems and now on the new Power E870 and E880 systems. They can be assigned to any system in a predefined pool by the user with simple HMC commands. IBM does not need to be notified when these resources are reassigned within a pool. The simplicity of operations offers new flexibility when managing large workloads in a pool of systems. This capability is especially appealing to aid in providing continuous application availability during maintenance windows. Not only can workloads easily move to alternate systems, but now the activations can move as well.

Now with the availability of the new Power E870 and E880 systems, IBM continues to enhance the ability to freely move processor and memory activations from one system to another system in the same pool, without the need for IBM involvement. This capability now allows the movement of resources not only between like systems but also between generations of Power Systems, and thus delivering unsurpassed flexibility for workload balancing and system maintenance.

Now, more than ever, Power Enterprise Pools delivers the support to meet client's business goals when it comes to the following:

- Providing organizations with a dynamic infrastructure, reduced cost of performance management, improved service levels, and controlled risk management
- Improving the flexibility, load balancing, and disaster recovery planning and operations of your Power Systems infrastructure
- Enhanced reliability, availability, and serviceability (RAS) to handle the requirements to accommodate a global economy

Prerequisites for Power Enterprise Pools:

- All systems in a pool must be attached to the same HMC (or redundant set of HMCs).
- Systems must be one of the following models: 9117-MMD, 9179-MHD, 9119-FHB, 9119-MME, or 9119-MHE.
- Systems must be within one country.

Two types of pools are available. One that enables Power 770 (9117-MMD) or Power E870 (9119-MME) class systems to run in the same pool and the other that enables Power 780 (9179-MHD), Power 795 (9119-FHB), and Power E890 (9119-MHE) class systems to run in the same pool. Both pools allow both processor and memory activations to move between servers within the pool. Systems with different clock speeds are supported, co-existing within the same pool. All systems in the pool must be attached to the same HMC.

Power Systems users now have the satisfaction of knowing that as their requirements change, so can their systems. A simple movement of activations from one system to another helps users rebalance resources and respond to business needs. Maintenance windows now open up more easily as both workloads and activations move transparently across systems. Even disaster recovery planning becomes more manageable with the ability to move activations where and when

they are needed. Power Enterprise Pools are just one more reason why enterprise class servers from Power Systems deliver value for your ever-changing business.

Mobile and static activations

A new, more flexible activation type is employed for Power Enterprise Pools. Historically, only "static" activations that could not move from server to server were available. These static activations remain available on the Power 770, 780, and 795, and are announced on the E870 and E880 and a certain number are required per server. But mobile activation features can be moved in the Power Enterprise Pool. Mobile activations apply to both processor core activations and memory activations.

The new Power E870 and E880 must have at least eight cores activated in static capability. All remaining processor core activations on these systems can optionally be mobile activations, be static activations, or be a mixture. Static and mobile core activations can co-reside in the same system and in the same partition.

A minimum of 50% of the memory on the system must be active. A maximum of 75% of all physically installed memory can have mobile activations. A minimum of 25% of all memory activations on a server must have static activations. Static and mobile memory activations can coreside in the same system and in the same partition. Mobile activation feature codes are in 100 GB increments.

Existing static activation features can be converted to mobile activations for memory and cores. To provide administrative and pricing advantages, there are "regular" static core activations and "mobile-enabled" static core activations. The price of a mobile-enabled core activation is priced the same as a mobile core activation. However, there is no-charge for converting a mobile-enabled activation to a mobile activation. This allows the client to avoid the additional conversion premium charge when converting an existing static core activation to a mobile core activation.

The new mobile activation features are as follows:

For the Power E870 and E880	100 GB Mobile Memory Activation (#EMA7)
For the Power E870 and E880	100 GB Mobile Enabled Memory Activation (#EMA9)
For the Power E870	1-core Mobile Activation for EPBA (#EPBJ)
For the Power E870	1-core Mobile Activation for EPBC (#EPBL)
For the Power E870	1-core Mobile-Enabled Activation for EPBA (#EPBN)
For the Power E870	1-core Mobile-Enabled Activation for EPBC (#EPBQ)
For the Power E880	1-core Mobile Activation for EPBC (#EPBK)
For the Power E880	1-core Mobile-Enabled Activation for EPBB (#EPBP)

The Power Enterprise Pools mobile activation feature codes continue to exist for the Power 770, 780, and 795 servers and can co-exist in the same pool as the new Power E870 and E880 feature codes. The Power 770, 780, and 795 mobile activations feature codes are as follows:

For Power 770, 780, 795	100 GB Mobile Memory Activation (#EMA4)
For Power 770	1-Core Mobile Activation (#EP22)
For Power 770	1-core Mobile-enabled activation (#EPMC, #EPMD)
For Power 780, 795	1-Core Mobile Activation (#EP23)
For Power 780	1-core Mobile-enabled activation (#EPHL, #EPHM)
For Power 795	1-core Mobile-enabled activation (#4715, #4725)

Power Enterprise Pools and the HMC

Each Power Enterprise Pool is managed by a single master HMC. The HMC that was used to create a Power Enterprise Pool is set as the master HMC of that pool. After a Power Enterprise Pool is created, a redundant HMC can be configured as a backup. All Power Enterprise Pool resource assignments must be performed by the master HMC. When powering on or restarting a server, ensure that the server is

connected to the master HMC. This ensures that the required Mobile CoD resources are assigned to the server.

The maximum number of systems in a Power Enterprise Pool is 32 high-end or 48 mid-range systems. An HMC can manage multiple Power Enterprise Pools but is limited to 1000 total partitions. The HMC can also manage systems that are not part of the Power Enterprise Pool. Powering down an HMC does not limit the assigned resources of participating systems in a pool but does limit the ability to perform pool change operations.

After a Power Enterprise Pool is created, the HMC can be used to perform the following functions:

- Mobile CoD processor and memory resources can be assigned to systems with inactive resources. Mobile CoD resources remain on the system to which they are assigned until they are removed from the system.
- New systems can be added to the pool and existing systems can be removed from the pool.
- New resources can be added to the pool or existing resources can be removed from the pool.
- Pool information can be viewed, including pool resource assignments, compliance, and history logs.

Power Enterprise Pools qualifying machines

To qualify for use of the Power Enterprise Pool offering, a participating system must be one of the following:

- IBM Power E880 with POWER8 processors, designated as 9119-MHE
- IBM Power E870 with POWER8 processors, designated as 9119-MME
- IBM Power 795 with POWER7 processors, designated as 9119-FHB
- IBM Power 780 with POWER7+ processors, designated as 9179-MHD
- IBM Power 770 with POWER7+ processors, designated as 9117-MMD

Each system must have installed Machine Code release level 7.8.0, or later, and be configured with at least the minimum amount of permanently active processor cores (listed below). Processor and memory activations that are enabled for movement within the pool will be in addition to these base minimum configurations.

Ordering Power Enterprise Pools

Ordering and enabling mobile activations for enterprise class systems is accomplished by following these steps:

1. Complete and submit the Power Enterprise Pools contract and addendum (Z126-6228 and Z126-6229), specifying all system serial numbers to be included in the pool. To generate a pool ID number, send a copy to the Power Systems CoD Project Office at pcod@us.ibm.com. This IBM License Supplement for Power Enterprise Pools (Z126-6228) is required prior to ordering mobile resources but is only required once per client. The IBM License Supplement for Power Enterprise Pools Addendum (Z126-6229) is used to assign or remove systems to or from a pool.
2. Order mobile enablement, processor, and memory activation features for participating systems. Every system in the pool must have feature EB35 as an identifier.
3. Ensure all participating systems and controlling HMCs have the proper level of supporting software (eFW 7.8, or later, for systems; V7.8, or later, for HMCs)
4. When the order is fulfilled, a configuration file will be generated that contains a Power Enterprise Pool membership activation code for each of the systems in the pool along with the mobile processor and memory activations. This file will be made available on the IBM COD website at

   http://www-912.ibm.com/pod/pod

Download the client-specific configuration file with mobile activations to the controlling HMC for the pool. The file will work only for the specified system serial numbers. A new file will be generated when systems or mobile resources are added or removed from the pool.

Adding or removing systems from Power Enterprise Pools

Adding or removing a system from an established Power Enterprise Pool requires notification to IBM. An updated addendum must be submitted to the Power Systems CoD Project Office (pcod@us.ibm.com) to make this change. When the update is processed, a new pool configuration file will be posted on the CoD website and must be downloaded to the controlling HMC.

Before removal from a pool, all assets (including mobile resources) that were originally purchased with the system must be returned to that same system serial number. Mobile assets belonging to a system may qualify for transfer to another system serial number, depending on specific qualifying guidelines, and will require additional administrative action.

Systems removed from a pool can join another pool and contribute mobile activation resources to the new pool or use another system's mobile activation resources. Mobile activations require a pool ID to be recognized.

Capacity on demand

Several types of capacity on demand (CoD) processors are optionally available for the Power E880 system node. They help meet changing resource requirements in an on demand environment by using resources installed on the system but not activated.

Capacity upgrade on demand (CUOD) enables you to purchase additional permanent processor or memory capacity and dynamically activate it when needed.

Elastic capacity on demand (elastic CoD) enables processors or memory to be temporarily activated in full-day increments as needed. Charges are based on usage reporting collected monthly. Processors and memory can be activated and turned off an unlimited number of times, whenever you want additional processing resources. With this offering, system administrators have an interface at the HMC to manage the activation and deactivation of resources. A monitor that resides on the server logs the usage activity. You must send this usage data to IBM monthly. A bill is then generated based on the total amount of processor and memory resources utilized, in increments of processor and memory (1 GB) days. Before using temporary capacity on your server, you must enable your server. To do this, order an enablement feature (MES only) and sign the required contracts.

If a Power E880 system node uses the IBM i operating system and the temporarily activated cores were used for IBM i partitions, you must inform the sales team placing the billing feature order which operating system caused the temporary elastic CoD processor use so that the correct feature can be used for billing.

Use the following features to order enablement features and support billing charges on the Power E880:

Model	Processor feature	Elastic CoD processor enablement feature	Elastic CoD AIX/Linux processor billing feature	Elastic CoD IBM i processor billing feature
MHE	EPBB	EP9T	EPJC	EPJD : 1 Proc-Day
MHE	EPBB	EP9T	EPJE	EPJF : 100 Proc-Days

Model	Memory feature	Elastic CoD memory enablement feature	Elastic CoD memory billing feature
MHE	EM8J	EM9T	EMA5, EMA6
MHE	EM8K	EM9T	EMA5, EMA6
MHE	EM8L	EM9T	EMA5, EMA6
MHE	EM8M	EM9T	EMA5, EMA6

Note: Feature EMA5 is for 1 GB Memory activation and feature EMA6 is for 100 of feature EMA5 Memory activations.

All initial shipments of Power E880 system nodes come with a specific number of no-charge elastic processor and memory days. The number of days depends on the configuration of the system. For every new Power E880, 15 elastic CoD processor days for every processor core (inactive or active) installed on the system and 240 GB of elastic CoD memory days for every processor core (inactive or active) are included. MES orders do not include the no-charge elastic processor and memory days.

The following features provide no-charge elastic processor and memory days:

- 48 Proc-Days of Elastic CoD Temporary Processor Resources (#EPJ3)
- 72 Proc-Days of Elastic CoD Temporary Processor Resources (#EPJ5)
- 384 GB-Days of Elastic CoD Memory Resources (#EMJ8)
- 576 GB-Days of On/Off CoD Temporary Memory Resources (#EMJ9)

The Elastic CoD process consists of three steps: enablement, activation, and billing

- Elastic CoD enablement: Description

  Before requesting temporary capacity on a server, you must "enable" it for elastic CoD. To do this, order a no-charge enablement feature (MES only) and sign the required contracts. IBM will generate an enablement code, mail it to you, and post it on the web for you to retrieve and enter on your server. A processor enablement code lets you request up to 90 processor days of temporary unused CoD processor capacity for all your processor cores that have not been permanently activated. For example, if you have 20 processor cores that are not permanently activated, the processor enablement code allows up to 1,800 processor days (20 x 90). If you have reached or are about to reach the limit of 90 processor days per unactivated processor core, place an order for another processor enablement code to reset the number of days you can request. Similarly, a memory enablement code lets you request up to 90 days of temporary unused CoD memory capacity for all your gigabytes of memory that have not been permanently activated. For example, if you had 100 GB of memory that was not permanently activated, the memory enablement code allows up to 9000 GB memory days (100 x 90). If you have reached the limit of 90 memory days per unactivated memory, place an order for another memory enablement code to reset the number of days you can request. Before ordering a new enablement code for either memory or processor temporary CoD, you must

first process an MES delete order, deleting the current enablement code installed in the server configuration file.

Elastic CoD enablement: Step-by-step

Prerequisite 1: The sales channel (IBM Business Partner) must sign one of the following contracts, if applicable:

- IBM Business Partner Agreement, Distributor Attachment for Elastic Capacity On Demand
- IBM Business Partner Agreement for Solution Providers -- Attachment for Elastic Capacity On Demand
- IBM Business Partner Agreement -- Attachment for Elastic Capacity On Demand

Prerequisite 2: The sales channel (IBM Business Partner or IBM Direct) must register at

http://www.ibm.com/servers/eserver/iseries/ondemand/cod

- Step 1: The client initiates the request for elastic CoD use by asking the sales channel to enable the machine for temporary capacity.
- Step 2: The client must complete and sign the following contracts. It is the sales channel's responsibility to return the signed contract to the responsible CSO organization and fax a copy to IBM at 507-253-4553 or email a copy to tcod@us.ibm.com.
  - -- Required: IBM Customer Agreement, Attachment for Elastic Capacity On Demand; IBM Supplement for On/Off Capacity On Demand
  - -- Optional: IBM Addendum for Elastic Capacity On Demand Alternative Reporting
- Step 3: The sales channel places an order for processor or memory enablement features.
- Step 4: The sales channel updates the website registration data (see prerequisite 2 above) with information about the client machine being enabled for temporary capacity.

  Note: The order for an enablement feature will not be fulfilled until this step is completed.
- Step 5: IBM generates an enablement code, mails it, and posts it.
- Step 6: The client retrieves the enablement code and applies it to the system node.

- Elastic activation requests: Description

  When Elastic CoD temporary capacity is needed, simply use the HMC menu for elastic CoD and specify how many of the inactive processors or how many gigabytes of memory you would like temporarily activated for some number of days. You will be billed for the days requested, whether the capacity is assigned to partitions or left in the shared processor pool. At the end of the temporary period (days you requested), you must ensure the temporarily activated capacity is available to be reclaimed by the server (not assigned to partitions) or you will be billed for any processor days not returned (per the contract you signed).

  Elastic CoD activation requests: Step-by-step

  When you need temporary capacity, use the Elastic CoD temporary capacity HMC menu for the server and specify how many of the inactive processors or how many gigabytes of memory you would like temporarily activated for some number of days. The user must assign the temporary capacity to a partition (whether or not the machine is configured for LPAR) to begin using temporary capacity.

- Elastic CoD billing: Description

  The contract, signed by the client before receiving the enablement feature, requires the elastic CoD user to report billing data at least once a month (whether there is activity or not). This data is used to determine the proper

amount to bill at the end of each billing period (calendar quarter). Failure to report billing data for use of temporary processor or memory capacity during a billing quarter will result in default billing equivalent to 90 processor days of temporary capacity. The sales channel will be notified of client requests for temporary capacity. As a result, the sales channel must order a quantity of billing features (using the appropriate billing features EPJ3, EPJ5, EPJC, EPJD, EPJE, EPJF, EPJQ, EPJR, EPJS, or EPJT for each billable processor and memory day reported less any outstanding credit balance of processor and memory days).

Elastic CoD billing: Step-by-step

The client must report billing data (requested and unreturned processor and memory days) at a minimum of once per month either electronically or by fax (stated requirement in the signed contract). At the end of each billing period (calendar quarter), IBM will process the accumulated data reported and notify the sales channel for proper billing. The sales channel places an order for the appropriate quantity of billing features (one processor billing feature ordered for each processor day used, or one memory day for each memory day utilized). IBM will ship a billing notice (notifies client of billing actions) to the ship-to address on the order as part of the fulfilment process. The client pays the sales channel and the sales channel pays IBM for the fulfillment of the billing features.

For more information regarding registration, enablement, and usage of elastic CoD, visit

http://www.ibm.com/systems/power/hardware/cod

Utility COD

Utility CoD provides additional processor performance on a temporary basis within the shared processor pool. Utility CoD enables you to place a quantity of inactive processors into the system node's shared processor pool, which then becomes available to the pool's resource manager. When the system node recognizes that the combined processor utilization within the shared pool exceeds 100% of the level of base (purchased/active) processors assigned across uncapped partitions, then a Utility CoD Processor Minute is charged and this level of performance is available for the next minute of use. If additional workload requires a higher level of performance, the system will automatically enable the additional Utility CoD processors to be used. The system continuously monitors and charges for the performance needed above the base (permanent) level. Registration and usage reporting for Utility CoD is made using a public website and payment is based on reported usage. Utility CoD requires PowerVM Enterprise Edition to be active on the 9119-MHE.

If a Power E880 system node uses the IBM i operating system and the temporarily activated cores were used for IBM i partitions, the client must inform the sales team placing the billing feature order which operating system caused the temporary Utility CoD processor use so that the correct feature can be used for billing.

Model	Utility billing processor feature	Utility CoD feature description
MHE	EPJG	100 Processor minutes for #EPBB
MHE	EPJH	100 Processor minutes for #EPBB, IBM i

For more information regarding registration, enablement, and use of Utility CoD, visit

http://www-947.ibm.com/systems/support/planning/capacity/index.html

Trial Capacity on Demand (Trial CoD)

You can request either a standard or an exception trial by visiting

https://www-912.ibm.com/tcod_reg.nsf/TrialCod?OpenForm

Software licensing

For software licensing considerations with the various CoD offerings, refer to the latest revision of the Capacity on Demand Planning Guide at

http://www.ibm.com/systems/power/hardware/cod

Accessibility by people with disabilities

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

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

Section 508 of the US Rehabilitation Act

IBM Power System E880 is capable as of November 18, 2014, when used in accordance with associated IBM documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A US Section 508 Voluntary Product Accessibility Template (VPAT) can be requested at

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

Reliability, Availability, and Serviceability

Reliability, fault tolerance, and data correction

The reliability of systems starts with components, devices, and subsystems that are designed to be highly reliable. During the design and development process, subsystems go through rigorous verification and integration testing processes. During system manufacturing, systems go through a thorough testing process to help ensure the highest level of product quality.

Redundant infrastructure

Considerable redundancy in the infrastructure of these systems is included so as to avoid failing components leading to system outages.

Such components include power supplies, fans, processor and memory voltage regulation outputs, global service processors, and processor clocks.

All of these redundant elements are present, even in single-system node systems.

Processor and memory availability functions

The Power Systems family continues to offer and introduce significant enhancements designed to increase system availability.

POWER8 processor functions

As previously provided in POWER7 and POWER7+, the POWER8 processor has the ability to do processor instruction retry for some transient errors and alternate processor recovery for a number of core-related faults. This significantly reduces exposure to both hard (logic) and soft (transient) errors in the processor core. Soft failures in the processor core are transient (intermittent) errors, often due to cosmic rays or other sources of radiation, and generally are not repeatable. When such an error is encountered in the core, the POWER8 processor will first automatically retry

the instruction. If the source of the error was truly transient, the instruction will succeed and the system will continue as before.

Hard failures are more difficult, being true logical errors that will be replicated each time the instruction is repeated. Retrying the instruction will not help in this situation. As POWER7/POWER7+ technology, processors have the ability to extract the failing instruction from the faulty core and retry it elsewhere in the system for a number of faults, after which the failing core is dynamically deconfigured and called out for replacement in the PowerVM environment. These features are designed to avoid a full system outage.

As in POWER7/POWER7+, the POWER8 processor includes single processor check stopping for certain faults that cannot be handled by the availability enhancements described in the preceding section. This significantly reduces the probability of any one processor affecting total system availability.

Partition availability priority

Also available is the ability to assign availability priorities to partitions. In the PowerVM environment, if an alternate processor recovery event requires spare processor resources in order to protect a workload, when no other means of obtaining the spare resources is available, the system will determine which partition has the lowest priority and attempt to claim the needed resource. On a properly configured POWER8 processor-based server, this allows that capacity to be first obtained from, for example, a test partition instead of a financial accounting system.

Cache availability

The L2 and L3 caches in the POWER8 processor and L4 cache in the memory buffer chip are protected with double-bit detect, single-bit correct error detection code (ECC). In addition, a threshold of correctable errors detected on cache lines can result in the data in the cache lines being purged and the cache lines removed from further operation without requiring a reboot in the PowerVM environment. In addition, the L2 and L3 caches have the ability to dynamically substitute a spare bit-line for a faulty bit-lane, allowing an entire faulty "column" of cache, impacting multiple cache lines, to be repaired. An ECC uncorrectable error detected in these caches can also trigger a purge and delete of cache lines. This results in no loss of operation if the cache lines contained data unmodified from what was stored in system memory.

Modified data would be handled through Special Uncorrectable Error handling. L1 data and instruction caches also have a retry capability for intermittent errors and a cache set delete mechanism for handling solid failures.

Special Uncorrectable Error handling

Special Uncorrectable Error (SUE) handling is designed to prevent an uncorrectable error in memory or cache from immediately causing the system to terminate. Rather, the system tags the data and determines whether it will ever be used again. If the error is irrelevant, it will not force a check stop. If the data is used, termination may be limited to the program/kernel or hypervisor owning the data; or the I/O adapters controlled by an I/O hub controller would freeze if data were transferred to an I/O device.

Memory error correction and recovery

The memory has error detection and correction circuitry designed such that the failure of any one specific memory module within an ECC word by itself can be corrected absent any other fault.

In addition, a spare DRAM per rank on each memory port provides for dynamic DRAM device replacement during runtime operation. Also, dynamic lane sparing on the DMI link allows for repair of a faulty data lane.

Other memory protection features include retry capabilities for certain faults detected at both the memory controller and the memory buffer. Memory is also

periodically scrubbed to allow for soft errors to be corrected and for solid single-cell errors reported to the hypervisor, which supports operating system deallocation of a page associated with a hard single-cell fault.

Active memory mirroring for the hypervisor

The POWER8 memory subsystem is capable of mirroring sections of memory by writing to two different memory locations, and when an error is detected when reading from one location, taking data from the alternate location. This is used by the POWER hypervisor in these systems to mirror critical memory within the hypervisor so that a fault, even a solid uncorrectable error in the data, can be tolerated using the mirrored memory.

Dynamic processor and memory deallocation

When correctable solid faults occur in components of the processor and memory subsystem, the system will attempt to correct the problem by using spare capacity in the failing component, using a spare column in an L2 or L3 cache, for example, a spare data line in a memory or processor bus, or a spare DRAM in memory. Use of such spare capacity restores the system to full functionality without the need to take a repair action.

When such spare capacity is not available, the service processor and POWER hypervisor may request deallocation of the component experiencing the fault. When there are sufficient resources to continue running partitions at requested capacity, the system will continue to do so. This includes taking advantage of unlicensed capacity update on demand processor and memory resources as well as licensed but unallocated resources.

When such unlicensed or unused capacity is used in this manner, a request for service will be made.

PCI extended error handling

PCI extended error handling (EEH)-enabled adapters respond to a special data packet generated from the affected PCI slot hardware by calling system firmware, which will examine the affected bus, allow the device driver to reset it, and continue without a system reboot. For Linux, EEH support extends to the majority of frequently used devices, although some third-party PCI devices may not provide native EEH support.

Mutual surveillance

The service processor monitors the operation of the firmware during the boot process and also monitors the hypervisor for termination. The hypervisor monitors the service processor and reports the service reference code when it detects surveillance loss. In the PowerVM environment, it will perform a reset/reload if it detects the loss of the service processor.

Environmental monitoring functions

The Power Systems family does ambient and over temperature monitoring and reporting.

Uncorrectable error recovery

When the auto-restart option is enabled, the system can automatically restart following an unrecoverable software error, hardware failure, or environmentally induced (ac power) failure.

Serviceability

The purpose of serviceability is to efficiently repair the system while attempting to minimize or eliminate impact to system operation. Serviceability includes system installation, MES (system upgrades/downgrades), and system maintenance/repair.

Depending upon the system and warranty contract, service may be performed by the customer, an IBM representative, or an authorized warranty service provider.

The serviceability features delivered in this system provide a highly efficient service environment by incorporating the following attributes:

- Design for SSR Set Up and Customer Installed Features (CIF).
- Detection and Fault Isolation (ED/FI).
- First Failure Data Capture (FFDC).
- Guiding Light service indicator architecture is used to control a system of integrated LEDs that lead the individual servicing the machine to the correct part as quickly as possible.
- Service labels, service cards, and service diagrams available on the system and delivered through the HMC.
- Step-by-step service procedures available through the HMC.

Service environment

The POWER8 processor-based system requires attachment to one or more HMCs.

The HMC is a dedicated server that provides functions for configuring and managing servers for either partitioned or full-system partition using a GUI or command-line interface (CLI). An HMC attached to the system allows support personnel (with client authorization) to remotely log in to review error logs and perform remote maintenance if required.

The I/O device and adapter diagnostics consists of stand-alone diagnostics, which are loaded from the DVD-RAM drive and online diagnostics. Online diagnostics, when installed, are resident with the AIX operating system on the disk or system. They can be booted in single-user mode (service mode), run in maintenance mode, or run concurrently (concurrent mode) with other applications. They have access to the AIX error log and the AIX configuration data.

- Service mode enables checking of system devices and features.
- Concurrent mode allows the normal system functions to continue while selected resources are being checked.
- Maintenance mode enables checking of devices and adapters.

Note: Because the 9119-MME and 9119-MHE systems have an optional DVD-RAM, alternative methods for maintaining and servicing the system need to be available if the DVD-RAM is not ordered. An external Internet connection must be available to maintain or update system firmware to the latest required level.

Concurrent maintenance guided service procedures will continue to be supported by the Repair and Verify (R&V) component of the Service Focal Point™ application running on the HMC. Repair procedures that are not covered by the guided R&V component will be documented and available for display on any web browser-enabled system as well as on the HMC. These procedures are available through IBM Knowledge Center.

Service interface

The service interface allows support personnel to communicate with the service support applications in a server using a console, an interface, or a terminal. Delivering a clear, concise view of available service applications, the service interface allows the support team to manage system resources and service information in an efficient and effective way. Applications available through the service interface are carefully configured and placed to give service providers access to important service functions.

Different service interfaces are used, depending on the state of the system, hypervisor, and operating environment. The primary service interfaces are:

- Service Indicators
- Operator Panel
- Service Processor menu
- Operating system service menu
- Service Focal Point on the HMC

In the Guiding Light service indicator implementation, when a fault condition is detected on the POWER8 processor-based server, a blue Enclosure Fault LED will illuminate on the enclosure containing the failing part. The Guiding Light system pinpoints the exact part by blinking the amber FRU identify LED associated with the part to be replaced when selected by the servicer as part of the repair procedure. This action will roll up to the blue enclosure locate LED and down to the individual component to be serviced.

First Failure Data Capture and error data analysis

First Failure Data Capture (FFDC) is a technique that helps ensure that when a fault is detected in a system, the root cause of the fault will be captured without the need to re-create the problem or run any sort of extending tracing or diagnostics program. For the vast majority of faults, a good FFDC design means that the root cause can also be detected automatically without servicer intervention.

FFDC information, error data analysis, and fault isolation are necessary to implement the advanced serviceability techniques that enable efficient service of the systems and to help determine the failing items.

In the rare absence of FFDC and Error Data Analysis, diagnostics are required to re-create the failure and determine the failing items.

Diagnostics

General diagnostic objectives are to detect and identify problems so they can be resolved quickly. Elements of IBM's diagnostics strategy include:

- Provide a common error code format equivalent to a system reference code with PowerVM, system reference number, checkpoint, or firmware error code.
- Provide fault detection and problem isolation procedures. Support remote connection ability to be used by the IBM Remote Support Center or IBM Designated Service.
- Provide interactive intelligence within the diagnostics with detailed online failure information while connected to IBM's back-end system.

Automatic diagnostics

Because of the FFDC technology designed into IBM servers, it is not necessary to perform re-create diagnostics for failures or require user intervention. Solid and intermittent errors are designed to be correctly detected and isolated at the time the failure occurs. Runtime and boot-time diagnostics fall into this category.

Stand-alone diagnostics with PowerVM

As the name implies, stand-alone or user-initiated diagnostics requires user intervention. The user must perform manual steps, including:

- Booting from the diagnostics CD, DVD, USB, or network
- Interactively selecting steps from a list of choices

Concurrent maintenance

It is expected that the majority of the components that will fail will be able to be replaced using concurrent maintenance. These include power supplies, power cable, fans, op panel, real-time clock battery, and PCIe adapters.

The system also supports updating firmware with service packages, typically concurrently. The determination of whether a firmware release can be updated concurrently is identified in the readme information file that is released with the firmware.

Service labels

Service providers use these labels to assist them in performing maintenance actions. Service labels are found in various formats and positions and are intended to transmit readily available information to the servicer during the repair process. Following are some of these service labels and their purpose:

- Location diagrams: Location diagrams are located on the system hardware, relating information regarding the placement of hardware components.

Location diagrams may include location codes, drawings of physical locations, concurrent maintenance status, or other data pertinent to a repair. Location diagrams are especially useful when multiple components such as DIMMs, CPUs, processor books, fans, adapter cards, LEDs, and power supplies are installed.

- Remove/replace procedures: Service labels that contain remove/replace procedures are often found on a cover of the system or in other spots accessible to the servicer. These labels provide systematic procedures, including diagrams, detailing how to remove or replace certain serviceable hardware components.
- Arrows: Numbered arrows are used to indicate the order of operation and the serviceability direction of components. Some serviceable parts such as latches, levers, and touch points need to be pulled or pushed in a certain direction and in a certain order for the mechanical mechanisms to engage or disengage. Arrows generally improve the ease of serviceability.

Packing for service

The following service enhancements are included in the physical packaging of the systems to facilitate service:

- Color coding (touch points): Terracotta-colored touch points indicate that the system may not be required to be powered off to perform service to the FRU. This is dependent on system configuration and preparatory steps may be required before the service action is taken. Blue-colored touch points indicate that the procedure may require that the unit or system be shut down before servicing. This is dependent on system configuration, and preparatory steps may be required before the service action is taken.
- Tool-less design: Most FRUs support tool-less or simple tool designs. These designs require no tools or simple tools such as flathead screw drivers to service the hardware components.
- A lift tool may be required for certain installation and service situations (system backplane). The service and installation scenario should be reviewed during system installation planning.
- Positive retention: Positive retention mechanisms help to assure proper connections between hardware components such as cables to connectors, and between two cards that attach to each other. Without positive retention, hardware components run the risk of becoming loose during shipping or installation, preventing a good electrical connection. Positive retention mechanisms like latches, levers, thumb-screws, pop Nylatches (U-clips), and cables are included to help prevent loose connections and aid in installing (seating) parts correctly. These positive retention items do not require tools.

Error handling and reporting

In the unlikely event of system hardware or environmentally induced failure, the system runtime error capture capability systematically analyzes the hardware error signature to determine the cause of failure. The analysis result will be stored in system NVRAM. When the system can be successfully restarted either manually or automatically, or if the system continues to operate, the error will be reported to the operating system. Hardware and software failures are recorded in the system

log. An Error Log Analysis (ELA) routine analyzes the error, forwards the event to the Service Focal Point (SFP) application running on the HMC, and notifies the system administrator that it has isolated a likely cause of the system problem. The Service Processor event log also records unrecoverable checkstop conditions, forwards them to the SFP application, and notifies the system administrator. The system has the ability to call home through OS to report platform recoverable errors and errors associated with PCI adapters/devices. When the information is logged in the SFP application, if the system is properly configured, a call home service request will be initiated and the pertinent failure data with service parts information and part locations will be sent to an IBM service organization. Customer contact information and specific system-related data such as the machine type, model, and serial number, along with the error log data related to the failure, are sent to IBM Service.

Live Partition Mobility

With Live Partition Mobility, users can migrate an AIX, Linux, or IBM i partition running on one POWER partition system to another POWER system without disrupting services. The migration transfers the entire system environment, including processor state, memory, attached virtual devices, and connected users. It provides continuous operating system and application availability during planned partition outages for repair of hardware and firmware faults.

When initially purchasing a system, the client needs to consider the effect on the workloads that servicing the system will make. It is expected that most of the system FRUs that fail will be replaced while the system is still powered on, using Concurrent Maintenance. For the remainder of the FRUs, the entire system must be powered off to service the FRU. For customers with critical workloads, which cannot afford to be stopped, the use of Live Partition Mobility needs to be planned for when the initial purchase of the system is made.

Service processor

The service processor provides the capability to diagnose, check the status of, and sense the operational conditions of a system. It runs on its own power boundary and does not require resources from a system processor to be operational to perform its tasks.

Under PowerVM the service processor supports surveillance of the connection to the HMC and to the system firmware (hypervisor). It also provides several remote power control options, environmental monitoring, reset, restart, remote maintenance, and diagnostic functions, including console mirroring. The service processors menus (ASMI) can be accessed concurrently with system operation, allowing nondisruptive abilities to change system default parameters.

Call home

Call home refers to an automatic or manual call from a customer location to the IBM support structure with error log data, server status, or other service-related information. Call home invokes the service organization in order for the appropriate service action to begin. Call home can be done through the HMC. While configuring call home is optional, clients are encouraged to implement this feature in order to obtain service enhancements such as reduced problem determination and faster and potentially more accurate transmittal of error information. In general, using the call home feature can result in increased system availability. The Electronic Service Agent™ application can be configured for automated call home. Refer to the next section for specific details on this application.

IBM Electronic Services

Electronic Service Agent and the IBM Electronic Services web portal comprise the IBM Electronic Services solution, which is dedicated to providing fast, exceptional support to IBM customers. IBM Electronic Service Agent is a no-charge tool that proactively monitors and reports hardware events such as system errors, performance issues, and inventory. Electronic Service Agent can help focus on the

customer's company business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues.

System configuration and inventory information collected by Electronic Service Agent also can be viewed on the secure Electronic Services web portal and used to improve problem determination and resolution between the customer and the IBM support team. As part of an increased focus to provide even better service to IBM customers, Electronic Service Agent tool configuration and activation comes standard with the system. In support of this effort, a new HMC External Connectivity security whitepaper has been published, which describes data exchanges between the HMC and the IBM Service Delivery Center (SDC) and the methods and protocols for this exchange. To read the whitepaper and prepare for Electronic Service Agent installation, go to the "Security" section at

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

Select your country. Click " IBM Electronic Service Agent Connectivity Guide."

Benefits: increased uptime

Electronic Service Agent is designed to enhance the warranty and maintenance service by providing faster hardware error reporting and uploading system information to IBM Support. This can optimize the time monitoring the symptoms, diagnosing the error, and manually calling IBM Support to open a problem record. And 24x7 monitoring and reporting means no more dependency on human intervention or off-hours customer personnel when errors are encountered in the middle of the night.

Security: The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM. The Electronic Service Agent tool is designed to securely transmit either through the Internet (HTTPS or VPN) or modem to provide customers a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a customer's system.

For additional information, refer to IBM Electronic Service Agent

http://www-01.ibm.com/support/esa/

More accurate reporting

Because system information and error logs are automatically uploaded to the IBM Support Center in conjunction with the service request, customers are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM, problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

Customized support

Using the IBM ID entered during activation, customers can view system and support information in the "My Systems" and "Premium Search" sections of the Electronic Services website.

The Electronic Services web portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This web portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The newly improved My Systems and Premium Search functions make it even easier for Electronic Service Agent-enabled customers to track system inventory and find pertinent fixes.

My Systems provides valuable reports of installed hardware and software using information collected from the systems by IBM Electronic Service Agent. Reports are available for any system associated with the customer's IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase.

Using Premium Search and the Service Agent information that has been collected from the system, customers are able to see search results that apply specifically to their systems.

For more information on how to utilize the power of IBM Electronic Services, visit the following website or contact an IBM Systems Services Representative

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

PowerCare service

Included with Power E880 system is a PowerCare services option, which entitles you to choose one of several high-value technical service offerings from IBM to complement and assist in the deployment of a new Power E880 system. This option is provided at no additional charge and requires no additional approvals. By leveraging the skills, experiences, and proven methodology of IBM Systems Lab Services professionals, you can potentially increase the efficiency and quality of your complex data center operations.

The PowerCare option is included with new Power E880 systems and MES upgrades into a Power E880. The Lab Services PowerCare team will contact the account team/ customer after the shipment to help with the selection of a PowerCare service offer.

Optionally, the account team or the client may contact the WW PowerCare team at

pwrcare@us.ibm.com

The customer has up to 90 days from the installation date of the Power E880 to select a PowerCare offering. Delivery of the selected service must be completed within nine months of the installation date of the Power E880 system.

For more details on available PowerCare options, visit

http://www-03.ibm.com/systems/power/support/powercare/

Statement of general direction

IBM plans to enhance the Power Systems enterprise system portfolio with greater scalability, availability, and flexibility. IBM intends to deliver the following offerings:

- A more scalable Power E880 enterprise-class system with up to 192 POWER8 processor cores and up to 16 TB of total memory
- Support for concurrent maintenance on the Power E880 I/O Expansion Drawer by enabling hot add and repair capabilities

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

Reference information

Refer to Hardware Announcement 114-160, dated October 06, 2014, for IBM Power System E880 Server..

Product number

The following are newly announced features on the specific models of the IBM Power Systems 9119 machine type:

Description	Machine type	Model	Feature number
IBM Power System E880	9119	MHE	
UPS Factory Integration Specify	9119	MHE	0373
HMC Factory Integration Specify	9119	MHE	0374
Display Factory Integration Specify	9119	MHE	0375
Reserve Rack Space for UPS	9119	MHE	0376
Reserve Rack Space for HMC	9119	MHE	0377
Reserve Rack Space for Display	9119	MHE	0378
MMA/MMB/MHB upgrade indicator	9119	MHE	0397
Product assembled in USA manufacturing plant	9119	MHE	0984
USB 160 GB Removable Disk Drive	9119	MHE	1106
USB 500 GB Removable Disk Drive	9119	MHE	1107
Serial-to-Serial Port Cable for Drawer/Drawer-3.7M	9119	MHE	3124
1m, (3.3-ft) IB 40G Copper Cable QSFP/QSFP	9119	MHE	3287
3m, (9.8-ft.) IB 40G Copper Cable QSFP/QSFP	9119	MHE	3288
5m QDR IB/E'Net Copper Cable QSFP/QSFP	9119	MHE	3289
Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M	9119	MHE	3927
Rack Indicator- Not Factory Integrated	9119	MHE	4650
Rack Indicator, Rack #1	9119	MHE	4651
Rack Indicator, Rack #2	9119	MHE	4652
Rack Indicator, Rack #3	9119	MHE	4653
Rack Indicator, Rack #4	9119	MHE	4654
Rack Indicator, Rack #5	9119	MHE	4655
Rack Indicator, Rack #6	9119	MHE	4656
Rack Indicator, Rack #7	9119	MHE	4657
Rack Indicator, Rack #8	9119	MHE	4658
Rack Indicator, Rack #9	9119	MHE	4659
Rack Indicator, Rack #10	9119	MHE	4660
Rack Indicator, Rack #11	9119	MHE	4661
Rack Indicator, Rack #12	9119	MHE	4662
Rack Indicator, Rack #13	9119	MHE	4663
Rack Indicator, Rack #14	9119	MHE	4664
Rack Indicator, Rack #15	9119	MHE	4665
Rack Indicator, Rack #16	9119	MHE	4666
CBU SPECIFY	9119	MHE	4891
PowerVM Enterprise Edition	9119	MHE	5228
PCIe2 LP 4-port 1GbE Adapter	9119	MHE	5260
PCIe LP 8Gb 2-Port Fibre Channel Adapter	9119	MHE	5273
PCIe2 2-Port 4X IB QDR Adapter 40Gb	9119	MHE	5285
PCIe2 2-port 10GbE SR Adapter	9119	MHE	5287
PCIe2 8Gb 4-port Fibre Channel Adapter	9119	MHE	5729
HIGH-END APPEARANCE SIDE COVERS	9119	MHE	6238
Power Cord 2.8m (9.2-ft), Drawer to Wall/IBM PDU, (250V/10A)	9119	MHE	6665
SDI Software Pre-Install Indicator	9119	MHE	7305
Order Routing Indicator- System Plant	9119	MHE	9169
Month Indicator	9119	MHE	9461
Day Indicator	9119	MHE	9462
Hour Indicator	9119	MHE	9463
Minute Indicator	9119	MHE	9464
Qty Indicator	9119	MHE	9465
Countable Member Indicator	9119	MHE	9466
QSFP+ 40GBase-SR Transceiver	9119	MHE	EB27
1m (3.3-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)	9119	MHE	EB2B
3m (9.8-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)	9119	MHE	EB2H
10m (30.3-ft), IBM Passive QSFP+ MTP Optical Cable	9119	MHE	EB2J
30m (90.3-ft), IBM Passive QSFP+ MTP Optical Cable	9119	MHE	EB2K

Single 5250 Enterprise Enablement	9119	MHE	EB2R
Lift Tool	9119	MHE	EB2Z
Full 5250 Enterprise Enablement	9119	MHE	EB30
5U system node drawer	9119	MHE	EBA1
IBM Rack-mount Drawer Bezel and Hardware	9119	MHE	EBA3
OEM Rack-mount Drawer Bezel and Hardware	9119	MHE	EBA4
AC Power Chunnels	9119	MHE	EBAA
1.6M USB Cable	9119	MHE	EBK4
CAPI Activation	9119	MHE	EC19
PCIe2 LP 2-Port 10GbE RoCE SR Adapter	9119	MHE	EC29
PCIe2 2-port 10GbE SFN6122F Adapter	9119	MHE	EC2J
PCIe3 LP 2-Port 40GbE NIC RoCE QSFP+ Adapter	9119	MHE	EC3A
PCIe3 2-Port 40GbE NIC RoCE QSFP+ Adapter	9119	MHE	EC3B
PCIe2 3D Graphics Adapter x1	9119	MHE	EC42
PCIe2 LP 4-Port USB 3.0 Adapter	9119	MHE	EC45
PCIe2 4-Port USB 3.0 Adapter	9119	MHE	EC46
5m (16.4-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)	9119	MHE	ECBN
2M Optical Cable Pair for PCIe3 Expansion Drawer	9119	MHE	ECC6
10M Optical Cable Pair for PCIe3 Expansion Drawer	9119	MHE	ECC8
System Node to System Control Unit Cable Set for Drawer 1	9119	MHE	ECCA
System Node to System Control Unit Cable Set for Drawer 2	9119	MHE	ECCB
System Node to System Control Unit Cable Set for Drawer 3	9119	MHE	ECCC
System Node to System Control Unit Cable Set for Drawer 4	9119	MHE	ECCD
Integrated Solution Packing	9119	MHE	ECSS
IBM Cognos® Business Intelligence	9119	MHE	EHCE
InfoSphere Information Server (IIS) / Data Stage	9119	MHE	EHDS
SPSS on Power Solution Indicator	9119	MHE	EHSS
PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	9119	MHE	EJ07
PCIe3 LP RAID SAS ADAPTER	9119	MHE	EJ0M
PCIe3 LP SAS Tape/DVD Adapter Quad-port 6Gb x8	9119	MHE	EJ11
PCIe Crypto Coprocessor Gen3 BSC 4765-001	9119	MHE	EJ28
Non-paired Indicator ESA3 PCIe SAS RAID Adapter	9119	MHE	EJS1
Specify Mode-2 & (2)ESA3 for EXP24S (#5887/#EL1S)	9119	MHE	EJS2
Specify Mode-1 & (2)ESA3 for EXP24S (#5887/#EL1S)	9119	MHE	EJS3
Specify Mode-2 & (4)ESA3 for EXP24S (#5887/#EL1S)	9119	MHE	EJS4
Power IFL Processor Activation	9119	MHE	ELJ6
Power Integrated Facility for Linux Package	9119	MHE	ELJG
Power IFL Memory Activation	9119	MHE	ELJH
Power IFL PowerVM for Linux	9119	MHE	ELJJ
#ESDN Load Source Specify (571GB 15K RPM SFF-2)	9119	MHE	ELSN
#ES0R Load Source Specify (387GB SSD SFF-2 4K)	9119	MHE	ELSR
#ES0T Load Source Specify (775GB SSD SFF-2 4K)	9119	MHE	ELST
#ESFN Load Source Specify (571GB 15K RPM SAS SFF-2 4K Block - 4224)	9119	MHE	ELTN
#ESEY Load Source Specify (283GB 15K RPM SAS SFF-2 4K Block - 4224)	9119	MHE	ELTY
ACTIVE MEMORY EXPANSION ENABLEMENT	9119	MHE	EM82
64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	9119	MHE	EM8J
128GB (4X32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	9119	MHE	EM8K
256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	9119	MHE	EM8L
512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	9119	MHE	EM8M
1GB Memory Activation	9119	MHE	EMA5
Quantity of 100 1GB Memory Activations (#EMA5)	9119	MHE	EMA6
100 GB Mobile Memory Activations	9119	MHE	EMA7
100 GB Mobile Enabled Memory Activations	9119	MHE	EMA9
Bundle of eight #EM8M, 512GB 1600 MHz Memory	9119	MHE	EMB6
512 GB Memory activations for #EMB6	9119	MHE	EMB7
Five Hundred and Twelve Memory Activations for IFL	9119	MHE	EMB8
1 GB-Day billing for Elastic CoD memory	9119	MHE	EMJ4
100 GB-Day billing for Elastic CoD memory	9119	MHE	EMJ5
999 GB-Day billing for Elastic CoD memory	9119	MHE	EMJ6
384 GB-Days of Elastic CoD Memory Resources	9119	MHE	EMJ8
PCIe Gen3 I/O Expansion Drawer	9119	MHE	EMX0
AC Power Supply Conduit for PCIe3 Expansion Drawer	9119	MHE	EMXA
PCIe3 6-Slot Fanout Module for PCIe3 Expansion			

Drawer	9119	MHE	EMXF
1m (3.3-ft), 10GbE'Net Cable SFP+ Act Twinax Copper	9119	MHE	EN01
3m (9.8-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9119	MHE	EN02
5m (16.4-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9119	MHE	EN03
PCIe2 16Gb 2-port Fibre Channel Adapter	9119	MHE	EN0A
PCIe2 LP 16Gb 2-port Fibre Channel Adapter	9119	MHE	EN0B
PCIe2 4-port (10Gb FCoE & 1GbE) SR&RJ45	9119	MHE	EN0H
PCIe2 LP 4-port (10Gb FCoE & 1GbE) SR&RJ45	9119	MHE	EN0J
PCIe2 LP 4-port(10Gb FCoE & 1GbE) SFP+Copper&RJ45	9119	MHE	EN0L
PCIe2 4-Port (10Gb+1GbE) SR+RJ45 Adapter	9119	MHE	EN0S
PCIe2 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter	9119	MHE	EN0U
PCIe2 2-port 10/1GbE BaseT RJ45 Adapter	9119	MHE	EN0W
PCIe2 LP 2-port 10/1GbE BaseT RJ45 Adapter	9119	MHE	EN0X
PCIe2 LP 8Gb 4-port Fibre Channel Adapter	9119	MHE	EN0Y
2 Port Async EIA-232 PCIe Adapter	9119	MHE	EN27
1-Core Mobile Activation	9119	MHE	EP2T
1-Core Mobile Activation from Power 7	9119	MHE	EP2V
4.35 GHz, 32-core POWER8 processor	9119	MHE	EPBB
1 core Processor Activation for #EPBB	9119	MHE	EPBK
1 core Processor Activation for #EPBB, Mobile Eabled	9119	MHE	EPBP
48 Proc-Days of Elastic CoD Processor Resources	9119	MHE	EPJ3
1 Proc-Day Elastic CoD Billing for #EPBB, AIX/ Linux	9119	MHE	EPJC
1 Proc-Day Elastic CoD Billing for #EPBB, IBM i	9119	MHE	EPJD
100 Elastic CoD Proc-Days of Billing for Processor #EPBB. AIX/Linux	9119	MHE	EPJE
100 Elastic CoD Proc-Days of Billing for Processor #EPBB. IBM i	9119	MHE	EPJF
Proc CoD Utility Billing, 100 Proc-mins. for #EPBB, AIX/Linux	9119	MHE	EPJG
Proc CoD Utility Billing, 100 Proc-mins. for #EPBB, IBM i	9119	MHE	EPJH
Quantity 150 of #ES0Q 387GB SFF-2 4k SSD (AIX/ Linux)	9119	MHE	EQ0Q
Quantity 150 of #ES0R 387GB SFF-2 4k SSD (IBM i)	9119	MHE	EQ0R
Quantity 150 of #ES0S 775GB SFF-2 4k SSD (AIX/ Linux)	9119	MHE	EQ0S
Quantity 150 of #ES0T 775GB SFF-2 4k SSD (IBM i)	9119	MHE	EQ0T
Quantity 150 of #ESDN (571GB 15K RPM SAS SFF-2 for IBM i)	9119	MHE	EQDN
Quantity 150 of #ESDP (600GB 15K RPM SAS SFF-2 for AIX/LINUX)	9119	MHE	EQDP
Quantity 150 of #ESEY (283 GB SFF-2)	9119	MHE	EQEY
Quantity 150 of #ESEZ (300GB SFF-2)	9119	MHE	EQEZ
Quantity 150 of #ESFN (571GB SFF-2)	9119	MHE	EQFN
Quantity 150 of #ESFP (600GB SFF-2)	9119	MHE	EQFP
Indicator, reserve 5 EIA rack space	9119	MHE	ER16
Specify Reserve 4 EIA Rack Space for PCIe3 Expansion Drawer	9119	MHE	ER1A
Field Integration of Rack and Server	9119	MHE	ER21
RFID Tags for Servers, Compute Nodes, Chassis, Racks, and HMCs	9119	MHE	ERF1
Rear rack extension	9119	MHE	ERG0
Optional Front Door for Power 770 & 780 2.0m Rack	9119	MHE	ERG7
387GB SFF-2 4K SSD for AIX/Linux	9119	MHE	ES0Q
387GB SFF-2 4k SSD for IBM i	9119	MHE	ES0R
775GB SFF-2 4k SSD for AIX/Linux	9119	MHE	ES0S
775GB SFF-2 4k SSD for IBM i	9119	MHE	ES0T
PCIe2 1.8GB Cache RAID SAS Adapter Tri-port 6Gb CR	9119	MHE	ESA3
571GB 15K RPM SAS SFF-2 Disk Drive - 528 Block (IBM i)	9119	MHE	ESDN
600GB 15K RPM SAS SFF-2 Disk Drive - 5xx Block (AIX/Linux)	9119	MHE	ESDP
283GB 15K RPM SAS SFF-2 4K Block - 4224 Disk Drive	9119	MHE	ESEY
300GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive	9119	MHE	ESEZ
571GB 15K RPM SAS SFF-2 4K Block - 4224 Disk Drive	9119	MHE	ESFN

Description	Machine type	Model	Feature number
600GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive	9119	MHE	ESFP
1TB Removable Disk Drive Cartridge	9119	MHE	EU01
RDX USB External Docking Station for Removable Disk Cartridge	9119	MHE	EU04
RDX 320 GB Removable Disk Drive	9119	MHE	EU08
Service Processor	9119	MHE	EU0A
SATA Slimline DVD-RAM with write CACHE	9119	MHE	EU13
1.5TB Removable Disk Drive Cartridge	9119	MHE	EU15
BLU Acceleration Solution Edition Indicator	9119	MHE	EU2B
2TB Removable Disk Drive Cartridge (RDX)	9119	MHE	EU2T
Software preload define	9119	MHE	EUC1
Software preload define	9119	MHE	EUC2
Software preload define	9119	MHE	EUC3

The following are features already announced for the IBM Power Systems 9119 machine type:

Description	Machine type	Model	Feature number
One CSC Billing Unit	9119	MHE	0010
Ten CSC Billing Units	9119	MHE	0011
Mirrored System Disk Level, Specify Code	9119	MHE	0040
Device Parity Protection-All, Specify Code	9119	MHE	0041
Mirrored System Bus Level, Specify Code	9119	MHE	0043
Device Parity RAID-6 All, Specify Code	9119	MHE	0047
RISC-to-RISC Data Migration	9119	MHE	0205
AIX Partition Specify	9119	MHE	0265
Linux Partition Specify	9119	MHE	0266
IBM i Operating System Partition Specify	9119	MHE	0267
Specify Custom Data Protection	9119	MHE	0296
Mirrored Level System Specify Code	9119	MHE	0308
RAID Hot Spare Specify	9119	MHE	0347
V.24/EIA232 6.1m (20-Ft) PCI Cable	9119	MHE	0348
V.35 6.1m (20-Ft) PCI Cable	9119	MHE	0353
X.21 6.1m (20-Ft) PCI Cable	9119	MHE	0359
SSD Placement Indicator - 5887, EL1S	9119	MHE	0465
19 inch, 1.8 meter high rack	9119	MHE	0551
19 inch, 2.0 meter high rack	9119	MHE	0553
IBM i 7.1 Specify Code	9119	MHE	0567
Rack Filler Panel Kit	9119	MHE	0599
Power Cloud Integrated Solution Indicator For Order Routing	9119	MHE	0712
EXP24S SFF Gen2 Load Source Specify (#5887 or #EL1S)	9119	MHE	0728
SAN Load Source Specify	9119	MHE	0837
#1947 Load Source Specify (139GB 15k RPM SAS SFF-2 Disk Drive for IBM i)	9119	MHE	0871
#1948 Load Source Specify (283GB 15k RPM SAS SFF-2 Disk)	9119	MHE	0872
#1956 Load Source Specify (283GB 10k RPM SAS SFF-2 Disk)	9119	MHE	0874
#1962 Load Source Specify (571GB 10k RPM SAS SFF-2 Disk)	9119	MHE	0875
#1738 Load Source Specify (856GB 10k RPM SAS SFF-2 Disk)	9119	MHE	0880
#ES0D Load Source Specify (387GB SFF-2 SSD for IBM i)	9119	MHE	0894
#ESD2 Load Source Specify (1.1TB 10k SFF-2)	9119	MHE	0911
US TAA Compliance Indicator	9119	MHE	0983
Modem Cable - US/Canada and General Use	9119	MHE	1025
Decline Electronic Service Agent Install Indicator	9119	MHE	1120
Custom Service Specify, Rochester Minn, USA	9119	MHE	1140
856GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9119	MHE	1738
900GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9119	MHE	1752
Quantity 150 of #1962	9119	MHE	1817

Quantity 150 of #1964	9119	MHE	1818
Quantity 150 of #1956	9119	MHE	1844
Quantity 150 of #1917	9119	MHE	1866
Quantity 150 of #1947	9119	MHE	1868
Quantity 150 of #1925	9119	MHE	1869
146GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9119	MHE	1917
300GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9119	MHE	1925
Quantity 150 of #1948	9119	MHE	1927
Quantity 150 of #1953	9119	MHE	1929
139GB 15k RPM SAS SFF-2 Disk Drive (IBM i)	9119	MHE	1947
283GB 15k RPM SAS SFF-2 Disk Drive (IBM i)	9119	MHE	1948
300GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9119	MHE	1953
283GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9119	MHE	1956
571GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9119	MHE	1962
600GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9119	MHE	1964
Primary OS - IBM i	9119	MHE	2145
Primary OS - AIX	9119	MHE	2146
Primary OS - Linux	9119	MHE	2147
2M LC-SC 50 Micron Fiber Converter Cable	9119	MHE	2456
2M LC-SC 62.5 Micron Fiber Converter Cable	9119	MHE	2459
PCIe 2-Line WAN w/Modem	9119	MHE	2893
3M Asynchronous Terminal/Printer Cable EIA-232	9119	MHE	2934
Asynchronous Cable EIA-232/V.24 3M	9119	MHE	2936
Serial-to-Serial Port Cable for Rack/Rack- 8M	9119	MHE	3125
10 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	9119	MHE	3290
30 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	9119	MHE	3293
SAS YO Cable 1.5m - HD 6Gb Adapter to Enclosure	9119	MHE	3450
SAS YO Cable 3m - HD 6Gb Adapter to Enclosure	9119	MHE	3451
SAS YO Cable 6m - HD 6Gb Adapter to Enclosure	9119	MHE	3452
SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	9119	MHE	3453
SAS X Cable 3m - HD 6Gb 2-Adapter to Enclosure	9119	MHE	3454
SAS X Cable 6m - HD 6Gb 2-Adapter to Enclosure	9119	MHE	3455
SAS X Cable 10m - HD 6Gb 2-Adapter to Enclosure	9119	MHE	3456
SAS YO Cable 15m - HD 3Gb Adapter to Enclosure	9119	MHE	3457
SAS X Cable 15m - HD 3Gb 2-Adapter to Enclosure	9119	MHE	3458
Widescreen LCD Monitor	9119	MHE	3632
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 3M:	9119	MHE	3661
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 6M:	9119	MHE	3662
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 15M:	9119	MHE	3663
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 1.5 M	9119	MHE	3691
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 3 M	9119	MHE	3692
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 6 M	9119	MHE	3693
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 15 M	9119	MHE	3694
0.3M Serial Port Converter Cable, 9-Pin to 25-Pin	9119	MHE	3925
Serial Port Null Modem Cable, 9-pin to 9-pin, 10M	9119	MHE	3928
System Serial Port Converter Cable	9119	MHE	3930
1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)	9119	MHE	4242
Extender Cable - USB Keyboards, 1.8M	9119	MHE	4256
VGA to DVI Connection Converter	9119	MHE	4276
Software Preload Required	9119	MHE	5000
Sys Console On HMC	9119	MHE	5550
System Console-Ethernet LAN adapter	9119	MHE	5557
4-Port 10/100/1000 Base-TX PCI Express® Adapter	9119	MHE	5717
8 Gigabit PCI Express Dual Port Fibre Channel Adapter	9119	MHE	5735
POWER GXT145 PCI Express Graphics Accelerator	9119	MHE	5748
2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	9119	MHE	5767
2-Port Gigabit Ethernet-SX PCI Express Adapter	9119	MHE	5768
10 Gigabit Ethernet-SR PCI Express Adapter	9119	MHE	5769
10 Gigabit Ethernet-LR PCI Express Adapter	9119	MHE	5772
4 Gigabit PCI Express Dual Port Fibre Channel Adapter	9119	MHE	5774

4 Port Async EIA-232 PCIe Adapter	9119	MHE	5785
EXP24S SFF Gen2-bay Drawer	9119	MHE	5887
PCIe2 4-port 1GbE Adapter	9119	MHE	5899
PCIe Dual-x4 SAS Adapter	9119	MHE	5901
PCIe2 1.8GB Cache RAID SAS Adapter Tri-port 6Gb	9119	MHE	5913
SAS AA Cable 3m - HD 6Gb Adapter to Adapter	9119	MHE	5915
SAS AA Cable 6m - HD 6Gb Adapter to Adapter	9119	MHE	5916
SAS AA Cable 1.5m - HD 6Gb Adapter to Adapter	9119	MHE	5917
SAS AA Cable 0.6m - HD 6Gb Adapter to Adapter	9119	MHE	5918
Non-paired Indicator 5913 PCIe SAS RAID Adapter	9119	MHE	5924
Opt Front Door for 1.8m Rack	9119	MHE	6068
Opt Front Door for 2.0m Rack	9119	MHE	6069
1.8m Rack Trim Kit	9119	MHE	6246
2.0m Rack Trim Kit	9119	MHE	6247
1.8m Rack Acoustic Doors	9119	MHE	6248
2.0m Rack Acoustic Doors	9119	MHE	6249
1.8m Rack Trim Kit	9119	MHE	6263
2.0m Rack Trim Kit	9119	MHE	6272
Power Cord 4.3m (14-ft), Drawer to Wall/IBM PDU (250V/10A)	9119	MHE	6458
Power Cord 4.3m (14-ft), Drawer To OEM PDU (125V, 15A)	9119	MHE	6460
Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (250V/15A) U. S.	9119	MHE	6469
Power Cord 1.8m (6-ft), Drawer to Wall (125V/15A)	9119	MHE	6470
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (125V/15A)	9119	MHE	6471
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/16A)	9119	MHE	6472
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/10A)	9119	MHE	6473
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/13A)	9119	MHE	6474
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/16A)	9119	MHE	6475
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)	9119	MHE	6476
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/16A)	9119	MHE	6477
Power Cord 2.7 M(9-foot), To Wall/OEM PDU, (250V, 16A)	9119	MHE	6478
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (125V/15A or 250V/10A)	9119	MHE	6488
4.3m (14-Ft) 3PH/24A 380-415V Power Cord	9119	MHE	6489
4.3m (14-Ft) 1PH/48A 200-240V Power Cord	9119	MHE	6491
4.3m (14-Ft) 1PH/48-60A 200-240V Power Cord	9119	MHE	6492
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)	9119	MHE	6493
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)	9119	MHE	6494
Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 10A)	9119	MHE	6496
Power Cable - Drawer to IBM PDU, 200-240V/10A	9119	MHE	6577
Optional Rack Security Kit	9119	MHE	6580
Modem Tray for 19-Inch Rack	9119	MHE	6586
Power Cord 2.7M (9-foot), To Wall/OEM PDU, (125V, 15A)	9119	MHE	6651
4.3m (14-Ft) 3PH/16A 380-415V Power Cord	9119	MHE	6653
4.3m (14-Ft) 1PH/24-30A Pwr Cord	9119	MHE	6654
4.3m (14-Ft) 1PH/24-30A WR Pwr Cord	9119	MHE	6655
4.3m (14-Ft)1PH/24A Power Cord	9119	MHE	6656
4.3m (14-Ft) 1PH/24A Power Cord	9119	MHE	6657
4.3m (14-Ft) 1PH/24A Pwr Cd-Korea	9119	MHE	6658
Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 15A)	9119	MHE	6659
Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (125V/15A)	9119	MHE	6660
4.3m (14-Ft) 3PH/32A 380-415V Power Cord-Australia	9119	MHE	6667
Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)	9119	MHE	6669
Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A	9119	MHE	6671
Power Cord 1.5M (5-foot), Drawer to IBM PDU,			

250V/10A	9119	MHE	6672
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)	9119	MHE	6680
Intelligent PDU+, 1 EIA Unit, Universal UTG0247 Connector	9119	MHE	7109
Environmental Monitoring Probe	9119	MHE	7118
Power Distribution Unit	9119	MHE	7188
2.0m Rack Side Attach Kit	9119	MHE	7780
Ethernet Cable, 15m, Hardware Management Console to System Unit	9119	MHE	7802
Side-by-Side for 1.8m Racks	9119	MHE	7840
Ruggedize Rack Kit	9119	MHE	7841
Base Customer Spec Plcmnt	9119	MHE	8453
USB Mouse	9119	MHE	8845
Language Group Specify - US English	9119	MHE	9300
specify mode-1 & (1)5901/5278 for EXP24S #5887/ EL1S	9119	MHE	9359
Specify mode-1 & (2)5901/5278 for EXP24S #5887/ EL1S	9119	MHE	9360
Specify mode-2 & (2)5901/5278 for EXP24S #5887/ EL1S	9119	MHE	9361
Specify mode-4 & (4)5901/5278 for EXP24S #5887/ EL1S	9119	MHE	9365
Specify mode-2 & (4)5901/5278 for EXP24S #5887/ EL1S	9119	MHE	9366
Specify mode-1 & (2)5903/5805 for EXP24S #5887/ EL1S	9119	MHE	9367
Specify mode-2 & (4)5903/5805 for EXP24S #5887/ EL1S	9119	MHE	9368
Specify mode-1 & (2) 5913 for EXP24S #5887/EL1S	9119	MHE	9385
Specify mode-2 & (4) 5913 for EXP24S #5887/EL1S	9119	MHE	9386
New AIX License Core Counter	9119	MHE	9440
New IBM i License Core Counter	9119	MHE	9441
New Red Hat License Core Counter	9119	MHE	9442
New SUSE License Core Counter	9119	MHE	9443
Other AIX License Core Counter	9119	MHE	9444
Other Linux License Core Counter	9119	MHE	9445
3rd Party Linux License Core Counter	9119	MHE	9446
VIOS Core Counter	9119	MHE	9447
Other License Core Counter	9119	MHE	9449
Language Group Specify - Dutch	9119	MHE	9700
Language Group Specify - French	9119	MHE	9703
Language Group Specify - German	9119	MHE	9704
Language Group Specify - Polish	9119	MHE	9705
Language Group Specify - Norwegian	9119	MHE	9706
Language Group Specify - Portuguese	9119	MHE	9707
Language Group Specify - Spanish	9119	MHE	9708
Language Group Specify - Italian	9119	MHE	9711
Language Group Specify - Canadian French	9119	MHE	9712
Language Group Specify - Japanese	9119	MHE	9714
Language Group Specify - Traditional Chinese (Taiwan)	9119	MHE	9715
Language Group Specify - Korean	9119	MHE	9716
Language Group Specify - Turkish	9119	MHE	9718
Language Group Specify - Hungarian	9119	MHE	9719
Language Group Specify - Slovakian	9119	MHE	9720
Language Group Specify - Russian	9119	MHE	9721
Language Group Specify - Simplified Chinese (PRC)	9119	MHE	9722
Language Group Specify - Czech	9119	MHE	9724
Language Group Specify -- Romanian	9119	MHE	9725
Language Group Specify - Croatian	9119	MHE	9726
Language Group Specify -- Slovenian	9119	MHE	9727
Language Group Specify - Brazilian Portuguese	9119	MHE	9728
Language Group Specify - Thai	9119	MHE	9729
Mobile Enablement	9119	MHE	EB35
IBM i 7.2 Indicator	9119	MHE	EB72
Rack Front Door (Black)	9119	MHE	EC01
Rack Rear Door	9119	MHE	EC02
Rack Side Cover	9119	MHE	EC03
Rack Suite Attachment Kit	9119	MHE	EC04
Rear Door Heat Exchanger for 2.0 Meter Slim Rack	9119	MHE	EC15
PCIe2 2-Port 10GbE RoCE SFP+ Adapter	9119	MHE	EC28
PCIe2 2-Port 10GbE RoCE SR Adapter	9119	MHE	EC30
SAS X Cable 3m - HD Narrow 6Gb 2-Adapters to			

Enclosure	9119	MHE	ECBJ
SAS X Cable 6m - HD Narrow 6Gb 2-Adapters to Enclosure	9119	MHE	ECBK
SAS X Cable 10m - HD Narrow 6Gb 2-Adapters to Enclosure	9119	MHE	ECBL
SAS X Cable 15m - HD Narrow 3Gb 2-Adapters to Enclosure	9119	MHE	ECBM
SAS YO Cable 1.5m - HD Narrow 6Gb Adapter to Enclosure	9119	MHE	ECBT
SAS YO Cable 3m - HD Narrow 6Gb Adapter to Enclosure	9119	MHE	ECBU
SAS YO Cable 6m - HD Narrow 6Gb Adapter to Enclosure	9119	MHE	ECBV
SAS YO Cable 10m - HD Narrow 6Gb Adapter to Enclosure	9119	MHE	ECBW
SAS YO Cable 15m - HD Narrow 3Gb Adapter to Enclosure	9119	MHE	ECBX
SAS AE1 Cable 4m - HD Narrow 6Gb Adapter to Enclosure	9119	MHE	ECBY
SAS YE1 Cable 3m - HD Narrow 6Gb Adapter to Enclosure	9119	MHE	ECBZ
SAS AA Cable 0.6m - HD Narrow 6Gb Adapter to Adapter	9119	MHE	ECC0
SAS AA Cable 1.5m - HD Narrow 6Gb Adapter to Adapter	9119	MHE	ECC2
SAS AA Cable 3m - HD Narrow 6Gb Adapter to Adapter	9119	MHE	ECC3
SAS AA Cable 6m - HD Narrow 6Gb Adapter to Adapter	9119	MHE	ECC4
Custom Service Specify, Mexico	9119	MHE	ECSM
Custom Service Specify, Poughkeepsie, USA	9119	MHE	ECSP
387GB SFF-2 SSD converted for AIX/Linux	9119	MHE	EH10
387GB SFF-2 SSD converted for AIX/Linux	9119	MHE	EH11
387GB SFF-2 SSD converted for IBM i	9119	MHE	EH12
387GB SFF-2 SSD converted for IBM i	9119	MHE	EH13
GEN2-S Conversion Carrier for Feature ES0C 387GB SSD	9119	MHE	EH14
Qty 150 Gen2-S Conversion Carriers for feature EQ0A 387GB SSD	9119	MHE	EH15
GEN2-S Conversion Carrier for Feature ES0D 387GB SSD (IBM i)	9119	MHE	EH16
Qty 150 GEN2-S Conversion Carriers for Feature EQ0B 387GB SSD (IBM i)	9119	MHE	EH17
PCIe3 RAID SAS Adapter Quad-port 6Gb x8	9119	MHE	EJ0J
PCIe3 12GB Cache RAID SAS Adapter Quad-port 6Gb x8	9119	MHE	EJ0L
PCIe3 SAS Tape/DVD Adapter Quad-port 6Gb x8	9119	MHE	EJ10
Specify mode-2 (1)5901/5278 for EXP24 #5887 or #EL1S	9119	MHE	EJPJ
Specify mode-2 (2)5901/5278 for EXP24 #5887 or #EL1S	9119	MHE	EJPK
Specify mode-4 (1)5901/5278 for EXP24 #5887 or #EL1S	9119	MHE	EJPL
Specify mode-4 (2)5901/5278 for EXP24 #5887 or #EL1S	9119	MHE	EJPM
Specify mode-4 (3)5901/5278 for EXP24 #5887 or #EL1S	9119	MHE	EJPN
Specify mode-2 (2)5903/5805 for EXP24 #5887 or #EL1S	9119	MHE	EJPR
Specify mode-2 (2)5913 for EXP24 #5887 or #EL1S	9119	MHE	EJPT
Specify Mode-1 & (1)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJR1
Specify Mode-1 & (2)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJR2
Specify Mode-2 & (2)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJR3
Specify Mode-2 & (4)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJR4
Specify Mode-4 & (4)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJR5
Specify Mode-2 & (1)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJR6
Specify Mode-2 & (2)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJR7
Specify Mode-2 & (1)EJ0J for EXP24S (#5887/El1S)	9119	MHE	EJRA
Specify Mode-2 & (2)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJRB
Specify Mode-4 & (1)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJRC
Specify Mode-4 & (2)EJ0J for EXP24S (#5887/EL1S)	9119	MHE	EJRD
Specify Mode-4 & (3)EJ0J for EXP24S (#5888/EL1S)	9119	MHE	EJRE
Specify Mode-1 & (2)EJ0L for EXP24S (#5887/EL1S)	9119	MHE	EJRP
Specify Mode-2 & (2)EJ0L for EXP24S (#5887/EL1S)	9119	MHE	EJRS

Specify Mode-2 & (2)EJ0L for EXP24S (#5887/EL1S)	9119	MHE	EJRT
Non-paired Indicator EJ0L PCIe SAS RAID Adapter	9119	MHE	EJRU
Full Width Keyboard -- USB, US English, #103P	9119	MHE	EK51
Full Width Keyboard -- USB, French, #189	9119	MHE	EK52
Full Width Keyboard -- USB, Italian, #142	9119	MHE	EK53
Full Width Keyboard -- USB, German/Austrian, #129	9119	MHE	EK54
Full Width Keyboard -- USB, UK English, #166P	9119	MHE	EK55
Full Width Keyboard -- USB, Spanish, #172	9119	MHE	EK56
Full Width Keyboard -- USB, Japanese, #194	9119	MHE	EK57
Full Width Keyboard -- USB, Brazilian Portuguese, #275	9119	MHE	EK58
Full Width Keyboard -- USB, Hungarian, #208	9119	MHE	EK59
Full Width Keyboard -- USB, Korean, #413	9119	MHE	EK60
Full Width Keyboard -- USB, Chinese, #467	9119	MHE	EK61
Full Width Keyboard -- USB, French Canadian, #445	9119	MHE	EK62
Full Width Keyboard -- USB, Belgian/UK, #120	9119	MHE	EK64
Full Width Keyboard -- USB, Swedish/Finnish, #153	9119	MHE	EK65
Full Width Keyboard -- USB, Danish, #159	9119	MHE	EK66
Full Width Keyboard -- USB, Bulgarian, #442	9119	MHE	EK67
Full Width Keyboard -- USB, Swiss/French/German, #150	9119	MHE	EK68
Full Width Keyboard -- USB, Norwegian,#155	9119	MHE	EK69
Full Width Keyboard -- USB, Dutch, #143	9119	MHE	EK70
Full Width Keyboard -- USB, Portuguese, #163	9119	MHE	EK71
Full Width Keyboard -- USB, Greek, #319	9119	MHE	EK72
Full Width Keyboard -- USB, Hebrew, #212	9119	MHE	EK73
Full Width Keyboard -- USB, Polish, #214	9119	MHE	EK74
Full Width Keyboard -- USB, Slovakian, #245	9119	MHE	EK75
Full Width Keyboard -- USB, Czech, #243	9119	MHE	EK76
Full Width Keyboard -- USB, Turkish, #179	9119	MHE	EK77
Full Width Keyboard -- USB, LA Spanish, #171	9119	MHE	EK78
Full Width Keyboard -- USB, Arabic, #253	9119	MHE	EK79
Full Width Keyboard -- USB, Thai, #191	9119	MHE	EK80
Full Width Keyboard -- USB, Russian, #443	9119	MHE	EK81
Full Width Keyboard -- USB, Slovenian, #234	9119	MHE	EK82
Full Width Keyboard -- USB, US English Euro, #103P	9119	MHE	EK83
PDU Access Cord 0.38m	9119	MHE	ELC0
#ES1A Load Source Specify (387GB SSD SFF-2)	9119	MHE	ELS9
#ES0H Load Source Specify (775GB SSD SFF-2)	9119	MHE	ELSH
90 Days Elastic CoD Memory Enablement	9119	MHE	EM9T
PCIe2 4-port (10Gb FCoE & 1GbE) SFP+Copper&RJ45	9119	MHE	EN0K
PCIe 1-port Bisync Adapter	9119	MHE	EN13
90 Days Elastic CoD Processor Core Enablement	9119	MHE	EP9T
Quanity 150 of #3452 SAS YO Cable 6m - HD 6Gb Adapter to Enclosure	9119	MHE	EQ02
Quantity 150 of #3453 SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	9119	MHE	EQ03
Quantity of 150 #ES0C	9119	MHE	EQ0C
Quantity of 150 #ES0D	9119	MHE	EQ0D
Quantity 150 of #ES0G (775GB SSD SFF-2)	9119	MHE	EQ0G
Quantity 150 of #ES0H (775GB SSD SFF-2)	9119	MHE	EQ0H
Quantity 150 of #ES19 (387GB SSD SFF-2)	9119	MHE	EQ19
Quantity 150 of #ES1A (387GB SSD SFF-2)	9119	MHE	EQ1A
Quantity 150 of #1738 (856GB SFF-2 disk)	9119	MHE	EQ38
Quantity 150 of #1752 (900GB SFF-2 disk)	9119	MHE	EQ52
Quantity 150 of #ESD2 (1.1TB 10k SFF-2)	9119	MHE	EQD2
Quantity 150 of #ESD3 (1.2TB 10k SFF-2)	9119	MHE	EQD3
42U Slim Rack	9119	MHE	ER05
387GB SFF-2 SSD for AIX/Linux with eMLC	9119	MHE	ES0C
387GB SFF-2 SSD for IBM i with eMLC	9119	MHE	ES0D
775GB SFF-2 SSD for AIX/Linux	9119	MHE	ES0G
775GB SFF-2 SSD for IBM i	9119	MHE	ES0H
387GB SFF-2 SSD for AIX/Linux	9119	MHE	ES19
387GB SFF-2 SSD for IBM i	9119	MHE	ES1A
S&H - No Charge	9119	MHE	ESC0
S&H	9119	MHE	ESC9
1.1TB 10K RPM SAS SFF-2 Disk Drive (IBMi)	9119	MHE	ESD2
1.2TB 10K RPM SAS SFF-2 Disk Drive (AIX/Linux)	9119	MHE	ESD3
Core Use HW Feature	9119	MHE	EUC6
Core Use HW Feature 10X	9119	MHE	EUC7

The following are newly announced features on the specific models of the IBM Power Systems 7014 and 7965 machine type:

New features available October 31, 2014

Description	Machine type	Model	Feature number
Rack Content Specify for #EMX0 I/O Expansion Drawer	7014	T42	ER0M
RACK SPECIFY FC EMX0	7014	B42	ER19
	7014	T00	
	7014	T42	
	7965	94Y	
Rack Content Specify: Reserve 2U Rack Space at Bottom of Rack	7014	T42	ER2B
Rack Content Specify: Reserve 2U Rack Space at Top of Rack	7014	T42	ER2T

The following are newly announced features on the specific models of the IBM Power Systems 7014 and 7965 machine type:

New features available November 18, 2014

Description	Machine type	Model	Feature number
Rack Content Specify first enclosure: 9119-MHE, 9119-MME - 7 EIA	7014	T42	ER10
Rack Content Specify second enclosure: 9119-MHE, 9119-MME - 12 EIA	7014	T42	ER11
Rack Content Specify third enclosure: 9119-MHE, 9119-MME - 17 EIA	7014	T42	ER12
Rack Content Specify fourth enclosure: 9119-MHE, 9119-MME - 22 EIA	7014	T42	ER13
Rack Content Specify 1U Horizontal PDU: 9119-MHE, 9119-MME - 1 EIA	7014	T42	ER14
Rack Content Specify reserve 5U rack space: 9119-MHE, 9119-MME	7014	T42	ER15
Rack Rear Extension	7014	T42	ERG0

Type/Model conversions

From Type	From Model	To Type	To Model
9179	MHD	9119	MHE

Feature conversions

The existing components being replaced during a model or feature conversion become the property of IBM and must be returned.

Feature conversions are always implemented on a "quantity of one for quantity of one" basis. Multiple existing features may not be converted to a single new feature. Single existing features may not be converted to multiple new features.

The following conversions are available to customers:

Feature conversions for 9119-MHE memory features

From FC:	To FC:	Return parts
EMA6 - Quantity of 100 1GB Memory Activations (#EMA5)	EMA7 - 100 GB Mobile Memory Activations	No
EMA9 - 100 GB Mobile Enabled Memory Activations	EMA7 - 100 GB Mobile Memory Activations	No
EMA6 - Quantity of 100 1GB Memory Activations (#EMA5)	EMA9 - 100 GB Mobile Enabled Memory Activations	No

Feature conversions for 9119-MHE processor features

From FC:	To FC:	Return parts
EPBK - 1 core Processor Activation for #EPBB	EP2T - 1-Core Mobile Activation	No
EPBP - 1 core Processor Activation for #EPBB, Mobile Eabled	EP2T - 1-Core Mobile Activation	No

Feature conversions for 9179-MHD to 9119-MHE adapter features

From FC:	To FC:	Return parts
EJ29 - PCIe Crypto Coprocessor Gen4 BSC 4765-001	EJ28 - PCIe Crypto Coprocessor Gen3 BSC 4765-001	No

Feature conversions for 9179-MHD to 9119-MHE administrative features

From FC:	To FC:	Return parts
ELJ0 - Power Integrated Facility for Linux Package	ELJG - Power Integrated Facility for Linux Package	No

Feature conversions for 9179-MHD to 9119-MHE memory features

From FC:	To FC:	Return parts
ELJ2 - Power IFL Memory Activation	ELJH - Power IFL Memory Activation	No
4791 - ACTIVE MEMORY EXPANSION ENABLEMENT	EM82 - ACTIVE MEMORY EXPANSION ENABLEMENT	No
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5601 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM40 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM41 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5601 - 0/64GB DDR3 Memory	EM8K - 128GB (4X32GB)	Yes

(4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5602 - 0/128GB DDR3 Memory	EM8K - 128GB (4X32GB)	Yes
(4X32GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM40 - 0/32GB DDR3 Memory	EM8K - 128GB (4X32GB)	Yes
(4X8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM41 - 0/64GB DDR3 Memory	EM8K - 128GB (4X32GB)	Yes
(4X16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM42 - 0/128GB DDR3 Memory	EM8K - 128GB (4X32GB)	Yes
(4X32GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5564 - 0/256GB DDR3 Memory	EM8L - 256GB (4X64GB)	Yes
(4X64GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5600 - 0/32GB DDR3 Memory	EM8L - 256GB (4X64GB)	Yes
(4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5601 - 0/64GB DDR3 Memory	EM8L - 256GB (4X64GB)	Yes
(4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5602 - 0/128GB DDR3 Memory	EM8L - 256GB (4X64GB)	Yes
(4X32GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM40 - 0/32GB DDR3 Memory	EM8L - 256GB (4X64GB)	Yes
(4X8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM41 - 0/64GB DDR3 Memory	EM8L - 256GB (4X64GB)	Yes
(4X16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM42 - 0/128GB DDR3 Memory	EM8L - 256GB (4X64GB)	Yes
(4X32GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM44 - 0/256GB DDR3 Memory	EM8L - 256GB (4X64GB)	Yes
(4X64GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5564 - 0/256GB DDR3 Memory	EM8M - 512GB (4X128GB)	Yes
(4X64GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5600 - 0/32GB DDR3 Memory	EM8M - 512GB (4X128GB)	Yes
(4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5601 - 0/64GB DDR3 Memory	EM8M - 512GB (4X128GB)	Yes
(4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
5602 - 0/128GB DDR3 Memory	EM8M - 512GB (4X128GB)	Yes
(4X32GB) DIMMS - 1066 MHz - POWER7 CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM40 - 0/32GB DDR3 Memory	EM8M - 512GB (4X128GB)	Yes
(4X8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM41 - 0/64GB DDR3 Memory	EM8M - 512GB (4X128GB)	Yes
(4X16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM42 - 0/128GB DDR3 Memory	EM8M - 512GB (4X128GB)	Yes
(4X32GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM44 - 0/256GB DDR3 Memory	EM8M - 512GB (4X128GB)	Yes
(4X64GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EMA2 - Activation of 1 GB DDR3 Memory	EMA5 - 1GB Memory Activation	No
EMA3 - Activation of 100 GB DDR3 POWER7+ Memory	EMA6 - Quantity of 100 1GB Memory Activations (#EMA5)	No
EMA4 - 100 GB Mobile Memory Activation	EMA7 - 100 GB Mobile Memory Activations	No

Feature conversions for 9179-MHD to 9119-MHE processor features

From FC:	To FC:	Return parts
4992 - Single 5250 Enterprise Enablement	EB2R - Single 5250 Enterprise Enablement	No
4997 - Full 5250 Enterprise Enablement	EB30 - Full 5250 Enterprise Enablement	No
ELJ1 - Power IFL Processor Activation	ELJ6 - Power IFL Processor Activation	No
ELJ4 - Power IFL Processor Activation	ELJ6 - Power IFL Processor Activation	No
EP23 - 1-Core Mobile Activation	EP2V - 1-Core Mobile Activation from Power 7	No
EPH0 - 4.42 GHz Proc Card, 0/16 Core POWER7+, 16 DDR3 Memory Slots	EPBB - 4.35 GHz, 32-core POWER8 processor	Yes
EPH2 - 3.72 GHz Proc Card, 0/32 Core POWER7+, 16 DDR3 Memory Slots	EPBB - 4.35 GHz, 32-core POWER8 processor	Yes
EPHA - 1-Core Activation for Processor Feature EPHO	EPBK - 1 core Processor Activation for #EPBB	No
EPHC - 1-Core Activation for Processor Feature EPH2	EPBK - 1 core Processor Activation for #EPBB	No
EPHL - #EPH0 Processor Activation, Mobile Enabled	EPBP - 1 core Processor Activation for #EPBB, Mobile Eabled	No
EPHM - #EPH2 Processor Activation, Mobile Enabled	EPBP - 1 core Processor Activation for #EPBB, Mobile Eabled	No

Feature conversions for 9179-MHD to 9119-MHE rack-related features

From FC:	To FC:	Return parts
6250 - HIGH-END APPEARANCE FRONT DOOR	ERG7 - Optional Front Door for Power 770 & 780 2.0m Rack	No

Feature conversions for 9179-MHD to 9119-MHE system unit base features

From FC:	To FC:	Return parts
EB95 - System CEC Enclosure with IBM BEZEL, I/O Backplane, and System Midplane	EBA1 - 5U system node drawer	Yes
EB96 - System CEC Enclosure with OEM BEZEL, I/O Backplane, and System Midplane	EBA1 - 5U system node drawer	Yes

Feature conversions for 9179-MHD to 9119-MHE virtualization engine features

From FC:	To FC:	Return parts
7942 - PowerVM -Standard Edition	5228 - PowerVM Enterprise Edition	No
7995 - PowerVM - Enterprise Edition	5228 - PowerVM Enterprise Edition	No
ELJ3 - Power IFL PowerVM for Linux	ELJJ - Power IFL PowerVM for Linux	No

Business Partner information

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

https://www.ibm.com/partnerworld/mem/sla.jsp?num=114-158

Publications

IBM Power Systems hardware documentation provides you with the following topical information:

- Licenses, notices, safety, and warranty information
- Planning for the system
- Installing and configuring the system
- Troubleshooting, service, and support
- Installing, configuring, and managing consoles, terminals, and interfaces
- Installing operating systems
- Creating a virtual computing environment
- Enclosures and expansion units
- Glossary

You can access the product documentation at

http://www.ibm.com/support/knowledgecenter/POWER8

Product documentation is also available on DVD (SK5T-7087).

The following information is shipped with the 9119-MHE:

```
Power Hardware Information DVD (SK5T-7087)
Important Notices
Warranty Information
License Agreement for Machine Code
```

Hardware documentation such as installation instructions, user's information, and service information is available to download or view at

http://www.ibm.com/support

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http://www.ibm.com/services/learning/ites.wss/zz/en?pageType=tp_search_new

Technical information

Specified operating environment

Physical specifications

IBM Power System E880 model MHE

System node

- Width: 445 mm (17.5 in.)
- Depth: 902 mm (35.5 in.)
- Height: 219 mm (8.6 in.) 5 EIA units
- Weight: 75.7 kg (167 lb)

System control unit

- Width: 434 mm (17.1 in.)
- Depth: 813 mm (32.0 in.)
- Height: 86 mm (3.4 in.) 2 EIA units
- Weight: 23.6 kg (52 lb)

PCIe Gen3 I/O Expansion Drawer

- Width: 482 mm (19 in.)
- Depth: 802 mm (31.6 in.)
- Height: 173 mm (6.8 in.) 4 EIA units
- Weight: 54.4 kg (120 lb)

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

Operating environment

- Temperature:
  - 5° to 45°C (41° to 113°F) nonoperating
  - 18° to 30°C (64° to 86°F) recommended operating
  - 5° to 40°C (41° to 104°F) allowable operating
  - Derate maximum allowable dry-bulb temperature 1°C (1.8°F) per 175 m (574 ft) above 950 m (3117 ft)
- Relative humidity (noncondensing):
  - 8% to 80% nonoperating

  - 20% to 80% operating
- Maximum dew point:
  - 28°C (82°F) nonoperating
  - 29°C (84°F) operating
- Operating voltage: 200 to 240 V ac
- Operating frequency: 50 to 60 Hz +/- 3 Hz
- Power consumption: 4,150 watts maximum (per system node)
- Power source loading: 4.2 kVA maximum (per system node)
- Thermal output: 14,164 Btu/hr maximum (per system node)
- Power consumption: 510 watts maximum (per system control unit)
- Power source loading: .520 kVA maximum (per system control unit)
- Thermal output: 1,740 Btu/hr maximum (per system control unit)
- Maximum altitude: 3,048 m (10,000 ft)
- Noise level:
  - One enclosure with all cores active:
    -- 7.7 bels (operating/idle : A-Weighted Sound Power Level)
    -- 7.15 bels (operating/idle : A-Weighted Sound Power Level) with acoustic rack door
    -- 9.5 bels (heavy workload & DPS-FP mode : A-Weighted Sound Power Level)
    -- 8.85 bels (heavy workload & DPS-FP mode : A-Weighted Sound Power Level) with acoustic rack door
  - Two enclosures with all cores active:
    -- 8.0 bels (operating/idle : A-Weighted Sound Power Level)
    -- 7.45 bels (operating/idle : A-Weighted Sound Power Level) with acoustic rack door
    -- 9.8 bels (heavy workload & DPS-FP mode : A-Weighted Sound Power Level)
    -- 9.15 bels (heavy workload & DPS-FP mode : A-Weighted Sound Power Level) with acoustic rack door

The Power E880 must be installed in a rack with a rear door and side panels for EMC compliance. The native HMC Ethernet ports must use shielded Ethernet cables.

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 noise 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 where you designate the racks to be installed; 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.

EMC conformance classification

This equipment is subject to FCC rules and shall comply with the appropriate FCC rules before final delivery to the buyer or centers of distribution.

- US: FCC CFR, Title 47, Part 15, EMI Class A
- EEA, Turkey: EU Council Directive 2004/108/EC, EMI Class A
- Japan: VCCI Council, EMI Class A
- Korea: KCC, EMI Class A

- China (PRC): CPCS, EMI Class A
- Taiwan: Taiwan BSMI, EMI Class A
- Australia\New Zealand: ACMA, EMI Class A
- Canada: ICES-003, EMI Class A
- Russia: GOST R, EMI Class A
- Saudi Arabia: MoCI, EMI Class A
- Vietnam: MPT, EMI Class A

Homologation -- Telecom Type Approval

Homologation approval for specific countries has been initiated with the IBM Homologation and Type Approval (HT&A) organization in LaGaude, France.

The Power E880 system nodes or system control unit or PCIe Gen3 Expansion units are not certified for connection to interfaces of public telecommunications networks. Certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions and for information on PCIe adapters that can be used in the system and which are certified.

Product safety/Country testing/Certification

- UL 60950-1:2007 Underwriters Laboratory
- CAN/CSA22.2 No. 60950-1-07
- EN60950-1:2006 European Norm
- IEC 60950-1 2nd Edition + all National Differences

General requirements

The product is in compliance with IBM Corporate Bulletin C-B 0-2594-000 Statement of Conformity of IBM Product to External Standard (Suppliers Declaration).

Homologation

The Power E880 system nodes or system control unit or PCIe Gen3 Expansion units are not certified for direct connection to interfaces of public telecommunications networks. Certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions and for information on PCIe adapters which can be used in the system and which are certified.

Hardware requirements

Minimum system configuration

The 9119-MHE main components are the system node and the system control unit. The system node is 5 EIA units and the system control unit is 2 EIA units.

When either AIX or Linux are the primary operating systems, the order must include a minimum of the following items:

```
Feature number  Description

EPBB  x  1      4.35 GHz, 32-core POWER8 processor module
EPBK  x  8      1-core Processor Activation for #EPBB
EM8J  x  4      64 GB (4 x 16 GB) CDIMMs, 1600 MHz, 4 Gb DDR3 DRAM
EMA5  x  28     1 GB Memory Activation
EMA6  x  1      Quantity of 100 1 GB Memory Activations
EBA1  x  1      5U system node drawer
EU0A  x  2      Service Processor
0728  x  1      EXP24S SFF Gen2 Load Source Specify (#5887 or #EL1S)
  or
0837  x  1      SAN Load Source Specify
EBA3  x  1      IBM Rack-mount Drawer Bezel and Hardware
ECCA  x  1      System Node to System Control Unit Cable Set for Drawer 1
EBAA  x  1      AC Power Chunnels
```

```
9300/97xx  x  1 Language Group Specify
2146  x  1      Primary Operating System Indicator - AIX
  or
2147  x  1      Primary Operating System Indicator - Linux
```

When IBM i is the primary operating system, the order must include a minimum of the following items:

```
Feature number  Description

EPBB  x  1      4.35 GHz, 32-core POWER8 processor module
EPBK  x  8      1-core Processor Activation for #EPBB
EM8J  x  4      64 GB (4 x 16 GB) CDIMMs, 1600 MHz, 4 Gb DDR3 DRAM
EMA5  x  28     1 GB Memory Activation
EMA6  x  1      Quantity of 100 1 GB Memory Activations
EBA1  x  1      5U system node drawer
EU0A  x  2      Service Processor
0728  x  1      EXP24S SFF Gen2 Load Source Specify (#5887 or #EL1S)
  or
0837  x  1      SAN Load Source Specify
0040  x  1      Mirrored System Disk Level, Specify Code
  or
0041  x  1      Device Parity Protection-All, Specify Code
  or
0043  x  1      Mirrored System Bus Level, Specify Code
  or
0047  x  1      Device Parity RAID 6 All, Specify Code
  or
0308  x  1      Mirrored Level System Specify Code
5550  x  1      Sys Console On HMC
  or
5557  x  1      System Console-Ethernet No IOP
EBA3  x  1      IBM Rack-mount Drawer Bezel and Hardware
ECCA  x  1      System Node to System Control Unit Cable Set
                for Drawer 1
EBAA  x  1      AC Power Chunnels
9300/97xx  x  1 Language Group Specify
2145  x  1      Primary Operating System Indicator - IBM i

IBM i configuration requires a DVD to be available. The DVD can be in
the system control unit or it can be located elsewhere, for example in
an IBM Multimedia drawer such as the 7226-1U3. If in the system control
unit, then use:
EU13  x  1      SATA Slimline DVD-RAM with write CACHE
EC45  x  1      PCIe2 LP 4-Port USB 3.0 Adapter
  or
EC46  x  1      PCIe2 4-Port USB 3.0 Adapter
EBK4  x  1      1.6 meter USB cable
```

- Additional optional features can be added, as desired. IBM i systems require a DVD to be available to the system. This DVD can be located in the system control unit (DVD #EU13) or it can be located externally in an enclosure like the 7226-1U3. A USB PCIe adapter such as feature EC45 is required for feature EU13. A SAS PCIe adapter such as feature EJ11 is required to attach a SATA DVD in the 7226.
- Feature-coded racks are allowed for I/O expansion only.
- A machine type/model rack, if desired, should be ordered as the primary rack.
- A minimum number of eight processor activations must be ordered per system.
- A minimum of four memory features per system node is required.
- At least 50% of available memory must be activated through a combination of feature EMA5, EMA6, and EMA9.
- Memory sizes can differ across the four SCMs of the system node, but the eight CDIMM slots connected to the same SCM must be filled with identical CDIMMs (one or two identical memory features per SCM).
- If SAN Load Source Specify (#0837) is ordered, features 0040, 0041, 0043, 0047, and 0308 are not supported.
- The language group is auto-selected based on geographic rules.

- No feature codes are assigned for the following:
  - Four ac power supplies are delivered as part of the system node. No features are assigned to power supplies. Four line cords are auto-selected according to geographic rules.
  - Two default ac PDU to wall cables are included. No features are assigned. Cables are auto-selected according to geographic rules.
  - There must be one system control unit on each system. The system control unit is considered the system with the system serial number.
- One HMC is required for every 9119-MHE; however, a communal HMC is acceptable. HMCs supported on POWER8 hardware are 7042-CR5 through 7042-CR8.

IBM factory rack integration:

The 9119-MHE requires integration in a 2.0 m rack, 42 EIA enterprise rack (7014-T42 or #0553), which provides:

- Proper dimensions
- Mounting surfaces
- Power distribution
- Ventilation
- Stability
- Other functional requirements

A single 7014-T42 rack can be ordered containing one or two Power E880 systems. Note that two four-node Power E880 will not fit in a single 42U rack and that care must be taken anytime ordering a pair of Power 880 servers in a rack to ensure there is space for horizontal PDUs, future system node additions and anything else the rack needs to contain. A customer can order one factory-integrated system node and later order an additional system node to be installed in the same rack at the client establishment. IBM factory-integrated orders of the 7014-T42 can be with standard rack doors (#ERG7 or #6069) or OEM doors. On initial order, if the rack contains a system node, the 7014-T42 machine/type[1] must be ordered. If a MES same-serial-number upgrade the 0553 feature[1] must be ordered.

[1] See also deracking feature ER21.

Only horizontal PDUs are used by IBM Manufacturing in racks hosting the 9119-MHE systems. Each PDU will occupy one EIA to aid cable routing.

Minimum requirements for the 7014-T42 rack integration:

Feature number			Description
ER10	x	1	Rack Content Specify first enclosure - 7 EIA
or			
ER11	x	1	Rack Content Specify second enclosure - 12 EIA
or			
ER12	x	1	Rack Content Specify third enclosure - 17 EIA
or			
ER13	x	1	Rack Content Specify fourth enclosure - 22 EIA
ER2B	x	1	Rack Content Specify: Reserve 2U Rack Space at Bottom of Rack
and/or			
ER2T	x	1	Rack Content Specify: Reserve 2U Rack Space at Top of Rack
ER14	x	2	Rack Content Specify 1U Horizontal PDU - 1 EIA
ERG0	x	1	Rack Rear Extension (defaulted and recommended, but optional)

Hardware Management Console (HMC) machine code

If attaching an HMC to a new server or adding function to an existing server that requires a firmware update, the HMC machine code may need to be updated. To

determine the HMC machine code level required for the firmware level on any server, go to the following website to access the Fix Level Recommendation Tool (FLRT) on or after the planned availability date for this product. FLRT will identify the correct HMC machine code for the selected system firmware level

http://www14.software.ibm.com/webapp/set2/flrt/home

If a single HMC is attached to multiple servers, the HMC machine code level must be updated to the server with the most recent firmware level. All prior levels of server firmware are supported with the latest HMC machine code level.

An HMC is required to manage POWER8 processor-based system nodes implementing partitioning. Multiple POWER8 processor-based system nodes can be supported by a single HMC.

If an HMC is used to manage any POWER8 processor-based system node, the HMC must be 7042 -- CR5 through CR8 rack models or 7042 -- CR8 deskside model, or later.

When PowerVC is enabled, 4 GB of RAM is recommended. HMC 7042-CR5 ships with a default of 2 GB RAM.

Software requirements

If installing the AIX operating system LPAR with any I/O configuration (one of these):

- AIX Version 7.1 with the 7100-03 Technology Level Service Pack 4, and APAR IV63332, or later
- AIX Version 7.1 with the 7100-02 Technology Level Service Pack 6, or later (planned availability: January 30, 2015)
- AIX Version 6.1 with the 6100-09 Technology Level Service Pack 4, and APAR IV63331, or later
- AIX Version 6.1 with the 6100-08 Technology Level Service Pack 6, or later (planned availability: January 30, 2015)

If installing the AIX operating system Virtual I/O only LPAR (one of these):

- AIX Version 7.1 with the 7100-02 Technology Level Service Pack 1, or later
- AIX Version 7.1 with the 7100-03 Technology Level Service Pack 1, or later
- AIX Version 6.1 with the 6100-08 Technology Level Service Pack 1, or later
- AIX Version 6.1 with the 6100-09 Technology Level Service Pack 1, or later

If installing the IBM i operating system (one of these):

- IBM i 7.1 Technology Release 9, or later
- IBM i 7.2 Technology Release 1, or later

Visit the IBM Prerequisite website for compatibility information for hardware features and the corresponding AIX and IBM i Technology Levels

http://www-912.ibm.com/e_dir/eserverprereq.nsf

If installing the Linux operating system (one of these):

- Red Hat Enterprise Linux 6.5, or later
- SUSE Linux Enterprise Server 11 Service Pack 3 and later Service Packs

If installing VIOS:

- VIOS 2.2.3.4 with interim fix IV63331, or later

Java™ is supported on POWER8 servers. For best exploitation of the outstanding performance capabilities and most recent improvements of POWER8 technology, IBM recommends upgrading Java-based applications to Java 7 or Java 6, whenever possible.

- For those clients who want to run Java in AIX environments, refer to

  http://www.ibm.com/developerworks/java/jdk/aix/service.html
- For Linux (including POWER Linux), visit

  http://www.ibm.com/developerworks/java/jdk/linux/download.html
- For those clients who want to run Java in IBM i environments, read the following planning statements:
  - Java 1.4.2 and Java 5 are not supported environments for IBM i 7.2.
  - Java 1.4.2 and Java 5 while available for IBM i 7.1 are considered to be stabilized. Clients are strongly encouraged to move to a more current supported version: Java 6, Java 7, and Java 7.1.

Limitations

The 9119-MME and 9119-MHE have the following limitations:

- Memory rules and restrictions for the Power E880 (9119-MHE)
  - The first (in plug order) 16 memory DIMM slots of each system node must always be populated to ensure each SCM has at least one memory feature. Using the same memory capacity feature (equal memory CDIMM sizes) can typically provide optimal memory performance, but is not required.
- Power VM Enterprise Edition is standard on 9119-MME and 9119-MHE. Enterprise Edition includes Active Memory Expansion (AME), Active Memory Deduplication, and Live Partition Mobility (LPM).
- Active Memory Mirroring is standard on the 9119-MHE.
- For same-serial-number upgrades, all features that are not supported on the 9119-MHE must be removed.
- Static memory activations can be converted during a D-model, same-serial-number upgrade, and mobile activations can be moved to POWER8 servers in a Power Systems Enterprise Pool.
- The system node or system control unit or PCIe3 I/O drawer does not provide a serial port to which a UPS communication cable can be attached for IBM i such as is available on smaller Power servers. Clients should use standard data center electrical power backup options used by many larger data centers.
- The PCIe Gen3 I/O Expansion Drawer has a few adapter plugging considerations
  - The following adapters are only supported in slot C6 of either fanout module (maximum two adapters per drawer)
    - -- 4-Port Async EIA-232 PCIe Adapter (#5785)
    - -- PCIe 2-Line WAN w/Modem (#2893/2894)
    - -- POWER GXT145 PCI Express Graphics Accelerator (#5748)
  - The following 4-port SAS adapters are not supported in slots C2 or C5 of either fanout module (maximum eight adapters per drawer).
    - -- PCIe3 RAID SAS Adapter Quad-port 6Gb x8 (#EJ0J)
    - -- PCIe3 SAS Tape/DVD Adapter Quad-port 6Gb x8 (#EJ10)
    - -- PCIe3 12 GB Cache RAID SAS Adapter Quad-port 6Gb x8 (#EJ0L)
    - -- The following hardware features supported on the 9117-MMD and 9179-MHD are not supported on the 9119-MHE. Newer technology must be used.

DDR2 1066 MHz Memory

```
#5564,  0/256GB DDR3 Memory (4X64GB) DIMMs - 1066 MHz - POWER7 CoD Memory
#5600,  0/32GB DDR3 Memory (4X8GB) DIMMs - 1066 MHz - POWER7 CoD Memory
#5601,  0/64GB DDR3 Memory (4X16GB) DIMMs - 1066 MHz - POWER7 CoD Memory
#5602,  0/128GB DDR3 Memory (4X32GB) DIMMs - 1066 MHz - POWER7 CoD Memory
```

#EM40, 0/32GB DDR3 Memory (4X8GB) DIMMs - 1066 MHz - POWER7+ CoD Memory
#EM41, 0/64GB DDR3 Memory (4X16GB) DIMMs - 1066 MHz - POWER7+ CoD Memory
#EM42, 0/128GB DDR3 Memory (4X32GB) DIMMs - 1066 MHz - POWER7+ CoD Memory
#EM44, 0/256GB DDR3 Memory (4X64GB) DIMMs - 1066 MHz - POWER7+ CoD Memory

GX++ or 12X-attached I/O drawers

#5796, PCI-DDR 12X Expansion Drawer
#5802, 12X I/O Drawer PCIe, SFF disk
#5877, 12X I/O Drawer PCIe, No Disk
#5886, EXP 12S Expansion Drawer
#EDR1, EXP30 Ultra SSD I/O Drawer

PCI-X adapters

- None are supported on POWER8 servers.

#1912, PCI-X DDR Dual Channel Ultra320 SCSI Adapter
#2738, 2-Port USB PCI Adapter
#2943, 8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus
#2849, POWER GXT135P Graphics Accelerator with Digital Support
#2947, IBM ARTIC960Hx 4-Port Multiprotocol PCI Adapter
#2962, 2-Port Multiprotocol PCI Adapter
#4764, PCI-X Cryptographic Coprocessor (FIPS 4)
#5700, IBM Gigabit Ethernet-SX PCI-X Adapter
#5701, IBM 10/100/1000 Base-TX Ethernet PCI-X Adapter
#5706, IBM 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter
#5713, 1 Gigabit iSCSI TOE PCI-X on Copper Media Adapter
#5714, 1 Gigabit iSCSI TOE PCI-X on Optical Media Adapter
#5716, 2 Gigabit Fibre Channel PCI-X Adapter
#5721, 10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter
#5722, 10 Gb Ethernet-LR PCI-X 2.0 DDR Adapter
#5740, 4-Port 10/100/1000 Base-TX PCI-X Adapter
#5749, 4Gbps Fibre Channel (2-Port)
#5758, 4 GB Single-Port Fibre Channel PCI-X 2.0 DDR Adapter
#5900, PCI-X DDR Dual -x4 SAS Adapter
#5902, PCI-X DDR Dual - x4 3Gb SAS RAID Adapter
#6805, PCI 2-Line WAN IOA No IOP
#6808, PCI 4-Modem WAN IOA No IOP
#6809, PCI 4-Modm WAN IOA NoIOP CIM
#6833, PCI 2-Line WAN w/Modem NoIOP

PCIe adapters

#2055, PCIe RAID & SSD SAS Adapter 3Gb w/ Blind Swap Cassette
#2728, 4 port USB PCIe Adapter
#4808, PCIe Crypto Coprocessor Gen3 BSC 4765-001 (Note, check RPQs
for exceptions)
#4809, PCIe Crypto Coprocessor Gen4 BSC 4765-001
#5288, PCIe2 2-Port 10GbE SFP+Copper Adapter
#5773, 4 Gigabit PCI Express Single Port Fibre Channel Adapter
#ESA1, PCIe2 RAID SAS Adapter Dual-port 6Gb
#ES09, IBM Flash Adapter 90

SFF-1 SAS Disk

- Located in the POWER7/POWER7+ system unit or in the feature 5802 or 5803 12X I/O drawer.
- All but the 69.7 GB or 73 GB drives can be converted to SFF-2 drives and placed in an EXP24S drawer attached to the POWER8 system.

#1737, 856 GB 10k RPM SAS SFF Disk Drive (IBM i)
#1751, 900 GB 10K RPM SAS SFF Disk Drive (AIX/Linux)
#1790, 600 GB 10K RPM SAS SFF Disk Drive (AIX/Linux)
#1880, 300 GB 15K RPM SAS SFF Disk Drive (AIX/Linux)
#1882, 146.8 GB 10K RPM SAS SFF Disk Drive
#1883, 73.4 GB 15K RPM SAS SFF Disk Drive
#1884, 69.7 GB 15K RPM SAS SFF Disk Drive

#1885, 300 GB 10K RPM SFF SAS Disk Drive
#1886, 146 GB 15K RPM SFF SAS Disk Drive (AIX/Linux)
#1888, 139 GB 15K RPM SFF SAS Disk Drive (IBM i)
#1916, 571 GB 10k RPM SAS SFF Disk Drive (IBM i)
#3646, 73 GB 15K RPM SAS Disk Drive
#3676, 69.7 GB 15k rpm SAS Disk Drive
#ESD0, 1.1 TB 10K RPM SAS SFF-1 Disk Drive (IBM i)
#ESD1, 1.2 TB 10K RPM SAS SFF-1 Disk Drive (AIX/Linux)
#ESDK, 600 GB 15K RPM SAS SFF-1 for AIX/Linux

SFF-1 SAS SSD

- Located in the POWER7/POWER7+ system unit or in the feature 5802 or 5803 12X I/O drawer.
- The 387 GB and 775 GB drives can be converted to SFF-2 drives and placed in an EXP24S drawer attached to the POWER8 system.

#1996, 177 GB SSD Module with eMLC (IBM i)
#3586, 69 GB 3.5" SAS Solid-State Drive
#3587, 69 GB 3.5" SAS Solid-State Drive
#ES02, 387 GB 1.8" SAS SSD for AIX/Linux with eMLC
#ES04, 387 GB 1.8" SAS SSD for IBM i with eMLC
#ES0E, 775 GB SFF-1 SSD for AIX/Linux
#ES0F, 775 GB SFF-1 SSD for IBM i
#ES0J, 387 GB 1.8" SSD for AIX/Linux
#ES0K, 387 GB 1.8" SSD for IBM i
#ES10, 387 GB SFF-1 SSD for AIX/Linux
#ES11, 387 GB SFF-1 SSD for IBM i
#ES2A, 387 GB SFF-1 SSD for AIX/Linux
#ES2B, 387 GB SFF-1 SSD for IBM i
#ES2C, 387 GB SFF-2 SSD for AIX/Linux
#ES2D, 387 GB SFF-2 SSD for IBM i

Displays

#3635, T210 Flat-Panel Monitor
#3737, IBM T541H /L150p 15" TFT Color Monitor
#3639, IBM ThinkVision L170p Flat Panel Monitor
#3640, ThinkVision L171p Flat Panel Monitor
#3641, IBM T115 Flat Panel Monitor
#3642, ThinkVision L191p Flat Panel Monitor
#3643, IBM T120 Flat Panel Monitor
#3644, IBM T119 Flat Panel Monitor
#3645, IBM T117 Flat Panel Monitor

Other system 770/780-specific adapters/cards/components

#1768, Integrated Multifunction Card with Copper SFP+
#1769, Integrated Multifunction Card with SR Optical
#1808, GX++ 12X DDR Adapter, Dual-port
#1853, Operator Panel
#1914, GX++ 2-port PCIe2 x8 Adapter
#5532, System AC Power Supply, 1925 W
#5652, Disk/Media Backplane
#5662, 175MB Cache RAID - Dual IOA Enablement Card
#5665, FSP/Clock Pass Through Card
#6446, Dual-port 12X Channel Interface Attach - Short Run
#6457, Dual-port 12X Channel Interface Attach- Long Run
#EC53, Operator Panel
#EN10, Integrated Multifunction Card w/ 10GbE RJ45 & Copper Twinax
#EN11, Integrated Multifunction Card w/ 10GbE RJ45 & SR Optical

Keyboards: #5951, #5952, #5953, #5954, #5955, #5956, #5957, #5958, #5959, #5960, #5961, #5962, #5963, #5964, #5965, #5966, #5967, #5968, #5969. #5970, #5971, #5972, #5973, #5974, #5975, #5976, #5977, #5978, #5979, #5980, #5981, #5982, and #5983

Mouse: #8841, Mouse - USB, with Keyboard Attachment Cable

Older Power Distribution Units (PDU)

```
#5160,  Power Dist Unit 1 Phase NEMA
#5161,  Power Dist Unit 1 Phase IEC
#5162,  Power Dist Unit 2 of 3 Phase
#5163,  Power Dist Unit - 3 Phase
```

Linecords: #1413, #1454, #1426, #1416, #1456, #1417, #1427, #1406, #1477, #1451, #1453, #1414, #1424, #1457, #1458, #459, #1455, #1415, #1425, #1438, #1440, #1439, #1445, #1441, #1442, #1443, #1476, #1409, #1421, #1396, #1450, #1420, #1419, #1408, #1418, #1399, #1447, #1446, #1448, #1449, #8430, #8431, #8432, #8434, #8435, #8436, #8437, #8438, #8439, #8440, #8441, #6670, #6497, #6487, #6687, #6498, #6662, #6692, #6690, #6691, #6479, and #6495

Linecords - Drawer: #1452, #6459, #6664, #6663, #6499, #6681, #6461, #6462, #6453, #6466, #6463, #6465, #6467, #6464, #6455, #6468, #6452, #6454, #6451, and #6456

Planning information

Cable orders

No additional cables are required.

Security, auditability, and control

This product uses the security and auditability features of host software and application software.

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

Electronic Service Agent and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company's strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support all at no additional cost to you.

Now integrated into the base operating system of AIX 5.3, AIX 6.1, and AIX 7.1, Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM, which can result in faster problem resolution and increased availability. System configuration and inventory information collected by the Electronic Service Agent tool also can be viewed on the secure Electronic Support web portal, and used to improve problem determination and resolution by you and the IBM support team. To access the tool main menu, simply type "smitty esa_main", and select "Configure Electronic Service Agent." In addition, ESA now includes a powerful Web user interface, giving the administrator easy access to status, tool settings, problem information, and filters. For more information and documentation on how to configure and use Electronic Service Agent, refer to

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

The IBM Electronic Support portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support.

This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-enabled customers to track system inventory and find pertinent fixes.

Benefits

Increased uptime: The Electronic Service Agent tool is designed to enhance the Warranty or Maintenance Agreement by providing faster hardware error reporting and uploading system information to IBM Support. This can translate to less wasted time monitoring the "symptoms," diagnosing the error, and manually calling IBM Support to open a problem record. Its 24 x 7 monitoring and reporting mean no more dependence on human intervention or off-hours customer personnel when errors are encountered in the middle of the night.

Security: The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM. The Electronic Service Agent tool securely transmits either via the Internet (HTTPS or VPN) or modem, and can be configured to communicate securely through gateways to provide customers a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a customer's system. System inventory information is stored in a secure database, which is protected behind IBM firewalls. It is viewable only by the customer and IBM. The customer's business applications or business data is never transmitted to IBM.

More accurate reporting: Since system information and error logs are automatically uploaded to the IBM Support center in conjunction with the service request, customers are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM, problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

Customized support: Using the IBM ID entered during activation, customers can view system and support information in the "My Systems" and "Premium Search" sections of the Electronic Support Web site at

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

My Systems provides valuable reports of installed hardware and software using information collected from the systems by Electronic Service Agent. Reports are available for any system associated with the customer's IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase. Using Premium Search and the Electronic Service Agent information that has been collected from your system, customers are able to see search results that apply specifically to their systems.

For more information on how to utilize the power of IBM Electronic Services, contact your IBM Systems Services Representative, or visit

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

Terms and conditions

Volume orders

Contact your IBM representative.

IBM Global Financing

Yes

Products -- terms and conditions

Warranty period

One year.

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 that 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 are the same as those for the machine in which it is installed.

Warranty services

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM Web site. 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. If applicable to your product, parts considered Customer Replaceable Units (CRUs) will be provided as part of the machine's standard warranty service.

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.

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.

Service level is:

- 24 hours per day, 7 days a week, 4-hour average, same-day response.

Non-IBM parts service

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

Warranty service upgrades

During the warranty period, warranty service upgrades provide an enhanced level of On-site Service for an additional charge. Service levels are response-time objectives and are not guaranteed. See the Warranty services section for additional details.

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.

Maintenance services

If required, IBM provides repair or exchange service depending on the types of maintenance service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM Web site. 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 maintenance 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 following service selections are available as maintenance options for your machine type.

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.

Service levels are:

- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

http://www-5.ibm.com/services/europe/maintenance/

Non-IBM parts service

Under certain conditions, IBM provides services for selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

This service includes hardware problem determination (PD) on the non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, memory) installed within IBM machines and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

Usage plan machine

No

IBM hourly service rate classification

Two

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

General terms and conditions

Field-installable features

Yes

Model conversions

Yes

Machine installation

Installation is performed by IBM. IBM will install the machine in accordance with the IBM installation procedures for the machine. In the United States, contact IBM at 1-800-IBM-SERV (426-7378) and in other countries contact the local IBM office.

The Machine Installation Guide specifies site preparation, physical requirements and installation (operating) environment and any cabling included in the installation along with the approximate installation time in hours. Customer requests for installation of items not covered in the installation guide may be performed at IBM's hourly service rate designated for 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.ibm.com/servers/support/machine_warranties/machine_code.html

Access to Machine Code updates is conditioned on entitlement and license validation in accordance with IBM policy and practice. IBM may verify entitlement through customer number, serial number, electronic restrictions, or any other means or methods employed by IBM in its discretion.

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.

Machine Code License Acceptance Requirement

Acceptance-By-Use Machine: No, the LIC license requires signed acceptance by the machine's end user directly with IBM, applicable to orders for a new machine, machine type conversion MES, and to machines transferred to another user.

Educational allowance

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

The educational allowance is 13% for the products in this announcement.

Prices

For additional information and current prices, contact your local IBM representative.

Product charges

The following are newly announced features on the specific models of the IBM Power Systems 9119 machine type:

Description	Model number	Feature number	Purchase price	Minimum Monthly Maint. Charge	Initial/ MES/ Both/ Support	CSU	RP MES
IBM Power System E880							
	MHE					No	
One CSC Billing Unit							
	MHE	0010			Both	Yes	No
Ten CSC Billing Units							
	MHE	0011			Both	Yes	No
Mirrored System Disk Level, Sp							
	MHE	0040			Both	Yes	No
Device Parity Protection All							
	MHE	0041			Both	Yes	No
Mirrored System Bus Level							
	MHE	0043			Both	N/A	No
Device Parity RAID 6 All							
	MHE	0047			Both	Yes	No
RISC to RISC Data Migration							
	MHE	0205			Initial	N/A	No
AIX Partition Specify							
	MHE	0265			Both	Yes	No
Linux Partition Specify							
	MHE	0266			Both	Yes	No
IBM i Partition Specify							
	MHE	0267			Both	Yes	No
Specify Custom Data Protection							
	MHE	0296			Both	Yes	No
Mirrored Level System Specify							
	MHE	0308			Both	Yes	No
RAID Hot Spare Specify							
	MHE	0347			Both	Yes	No
V.24/EIA232 6.1m (20 Ft) PCI C							
	MHE	0348			Both	Yes	No
V.35 6.1m (20 Ft) PCI Cable							
	MHE	0353			Both	Yes	No
X.21 6.1m (20 Ft) PCI Cable							
	MHE	0359			Both	Yes	No
UPS Factory Integration Spcfy							
	MHE	0373			MES	Yes	No
HMC Factory Integration Spcfy							
	MHE	0374			MES	Yes	No
Display Factory Int. Specify							
	MHE	0375			MES	Yes	No
Rack Space for UPS							
	MHE	0376			MES	Yes	No
Reserve Rack for HMC							
	MHE	0377			MES	Yes	No
Reserve Rack Space for Display							
	MHE	0378			MES	Yes	No

MMA/MMB/MHB upgrade indicator
MHE 0397 MES Yes No
SSD Placement Ind 5887,EL1S
MHE 0465 Initial N/A No
19 inch, 1.8 meter high rack
MHE 0551 MES Yes No
19 inch, 2.0 meter high rack
MHE 0553 MES Yes No
IBM i 7.1 Specify Code
MHE 0567 Both Yes No
Rack Filler Panel Kit
MHE 0599 Both Yes No
Power Cloud Solution Indicator
MHE 0712 Initial N/A No
#5887/EL1S Load Source Specify
MHE 0728 Both Yes No
SAN Load Source Specify
MHE 0837 Both Yes No
#1947 Load Source Specify
MHE 0871 Both Yes No
#1948 Load Source Specify
MHE 0872 Both Yes No
#1956 Load Source Specify
MHE 0874 Both Yes No
#1962 Load Source Specify
MHE 0875 Both Yes No
#1738 Load Source Specify
MHE 0880 Both Yes No
#ES0D Load Source Specify
MHE 0894 MES Yes No
#ESD2 Load Source Specify
MHE 0911 Both Yes No
US TAA Compliance Indicator
MHE 0983 Both Yes No
Asm in USA manufacturing plant
MHE 0984 Both Yes No
Modem Cable US/Canada and GU
MHE 1025 Both Yes No
USB 160 GB Removable Disk Dr
MHE 1106 Support Yes No
USB 500 GB Removable Disk Dr
MHE 1107 Both Yes No
Decline ESA Indicator
MHE 1120 NC Initial N/A No
Custom Serv. Specify, Roch
MHE 1140 Initial N/A No
856GB 10k RPM SAS SFF-2 Disk
MHE 1738 Both Yes No
900GB 10k RPM SAS SFF-2 Disk
MHE 1752 Both Yes No
Quantity 150 of #1962
MHE 1817 Both Yes No
Quantity 150 of #1964
MHE 1818 Both Yes No
Quantity 150 of #1956
MHE 1844 Both Yes No
Quantity 150 of #1917
MHE 1866 Both Yes No
Quantity 150 of #1947
MHE 1868 Both Yes No
Quantity 150 of #1925
MHE 1869 Both Yes No
146GB 15k RPM SAS SFF-2 Disk
MHE 1917 Both Yes No
300GB 10k RPM SAS SFF-2 Disk
MHE 1925 Both Yes No
Quantity 150 of #1948
MHE 1927 Both Yes No
Quantity 150 of #1953
MHE 1929 Both Yes No
139GB 15k RPM SAS SFF-2 Disk
MHE 1947 Both Yes No
283GB 15k RPM SAS SFF-2 Disk
MHE 1948 Both Yes No

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300GB 15k RPM SAS SFF-2 Disk
                        MHE     1953                    Both     Yes No
283GB 10k RPM SAS SFF-2 Disk
                        MHE     1956                    Both     Yes No
571GB 10k RPM SAS SFF-2 Disk
                        MHE     1962                    Both     Yes No
600GB 10k RPM SAS SFF-2 Disk
                        MHE     1964                    Both     Yes No
Primary OS - IBM i
                        MHE     2145                    Both     Yes No
Primary OS AIX
                        MHE     2146                    Both     Yes No
Primary OS Linux
                        MHE     2147                    Both     Yes No
LC-SC 50 Micron Fiber Conv Cab
                        MHE     2456                    Both     Yes No
LC-SC 62.5 Mic.Fib.Conv.Cable
                        MHE     2459                    Both     Yes No
PCIe 2 Line WAN w/Modem
                        MHE     2893                    Support  Yes No
Asynch.Termin/Print.Cbl EIA232
                        MHE     2934                    Both     Yes No
Asynchronous Cable EIA 232/V
                        MHE     2936                    Both     Yes No
Ser to Ser Port Cab Draw/Draw
                        MHE     3124                    Both     Yes No
Serial to Se.Port Cbl Rack 8M
                        MHE     3125                    Both     Yes No
1m, QDR IB Copper Cable
                        MHE     3287                    Both     Yes No
3m, QDR IB Copper Cable
                        MHE     3288                    Both     Yes No
5m QDR IB/E'Net Copper Cable
                        MHE     3289                    Both     Yes No
10m QDR IB Optic Cable
                        MHE     3290                    Both     Yes No
30m QDR IB Optic Cable
                        MHE     3293                    Both     Yes No
SAS YO Cable 1.5m - HD 6Gb Ada
                        MHE     3450                    Both     Yes No
SAS YO Cable 3m - HD 6Gb Adapt
                        MHE     3451                    Both     Yes No
SAS YO Cable 6m - HD 6Gb Adapt
                        MHE     3452                    Both     Yes No
SAS YO Cable 10m - HD 6Gb Adap
                        MHE     3453                    Both     Yes No
SAS X Cable 3m - HD 6Gb 2-Adap
                        MHE     3454                    Both     Yes No
SAS X Cable 6m - HD 6Gb 2-Adap
                        MHE     3455                    Both     Yes No
SAS X Cable 10m - HD 6Gb 2-Ada
                        MHE     3456                    Both     Yes No
SAS YO Cable 15m - HD 3Gb Adap
                        MHE     3457                    Both     Yes No
SAS X Cable 15m - HD 3Gb 2-Ada
                        MHE     3458                    Both     Yes No

NOTE: The monitor or display features are subject to a $8

Electronic Waste Recycling Fee (15-INCH TO 34-INCH VIDEO DEVICE.)

Widescreen LCD Monitor
                        MHE     3632                    Both     Yes No
SAS Cable (X) Adapter to SAS E
                        MHE     3661                    Both     Yes No
SAS Cbl X Adp SAS Enclosure 6M
                        MHE     3662                    Both     Yes No
SAS Cbl X Adp SAS Encl 15M
                        MHE     3663                    Both     Yes No
SAS Cab(YO) Adapter to SAS1.5M
                        MHE     3691                    Both     Yes No
SAS Cab(YO) Adapter to SAS 3M
                        MHE     3692                    Both     Yes No
SAS Cab(YO) Adapter to SAS 6M
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                        MHE     3693                    Both     Yes No
SAS Cab(YO) Adapter to SAS 15M
                        MHE     3694                    Both     Yes No
0.3M Serial Prt Converter Cbl
                        MHE     3925                    Both     Yes No
Serial Port Null Mod Cab 3.7M
                        MHE     3927                    Both     Yes No
Ser.Port Null Modem Cable,10M
                        MHE     3928                    Both     Yes No
System Serial Port Converter C
                        MHE     3930                    Both     Yes No
6Foot Extend.Cbl for Displays
                        MHE     4242                    Both     Yes No
Extender Cable USB Keybo 1.8M
                        MHE     4256                    Both     Yes No
VGA to DVI Connection Converte
                        MHE     4276                    Both     Yes No

One and only one rack indicator feature is required on
all orders (#4650 to #4666).
No Factory Integration Ind.
                        MHE     4650                    Initial  N/A No
Rack Indicator, Rack 1
                        MHE     4651                    Initial  N/A No
Rack Indicator, Rack 2
                        MHE     4652                    Initial  N/A No
Rack Indicator, Rack 3
                        MHE     4653                    Initial  N/A No
Rack Indicator, Rack 4
                        MHE     4654                    Initial  N/A No
Rack Indicator, Rack 5
                        MHE     4655                    Initial  N/A No
Rack Indicator, Rack 6
                        MHE     4656                    Initial  N/A No
Rack Indicator, Rack 7
                        MHE     4657                    Initial  N/A No
Rack Indicator, Rack 8
                        MHE     4658                    Initial  N/A No
Rack Indicator, Rack 9
                        MHE     4659                    Initial  N/A No
Rack Indicator, Rack 10
                        MHE     4660                    Initial  N/A No
Rack Indicator, Rack 11
                        MHE     4661                    Initial  N/A No
Rack Indicator, Rack 12
                        MHE     4662                    Initial  N/A No
Rack Indicator, Rack 13
                        MHE     4663                    Initial  N/A No
Rack Indicator, Rack 14
                        MHE     4664                    Initial  N/A No
Rack Indicator, Rack 15
                        MHE     4665                    Initial  N/A No
Rack Indicator, Rack 16
                        MHE     4666                    Initial  N/A No
CBU SPECIFY
                        MHE     4891                    Both     Yes No
Software Preload Required
                        MHE     5000                    Initial  N/A No
PowerVM Enterprise Edition
                        MHE     5228                    Both     Yes No
PCIe2 LP 4-port 1GbE Adapter
                        MHE     5260                    Both     Yes No
PCIe LP 8Gb 2 Port Fibre Chann
                        MHE     5273                    Both     Yes No
PCIe 2-Port 4X IB QDR Adapt
                        MHE     5285                    Both     Yes No
PCIe2 2-port 10GbE SR Adapter
                        MHE     5287                    Support  Yes No
Sys Console On HMC
                        MHE     5550                    Both     Yes No
Sys Console-Ethernet LAN
                        MHE     5557                    Initial  N/A No
4 Port 10/100/1000 Base TX PCI
                        MHE     5717                    Support  Yes No
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PCIe2 8Gb 4-port Fibre Channel	MHE	5729		Both	Yes No
8 Gigabit PCI Express Dual Por	MHE	5735		Both	Yes No
POWER GXT145 PCI Express Graph	MHE	5748		Both	Yes No
2 Port 10/100/1000 Base TX Eth	MHE	5767		Support	Yes No
2 Port Gigabit Ethernet SX PCI	MHE	5768		Support	Yes No
10 Gb Eth SR PCI Express Adp	MHE	5769		Both	Yes No
10 Gigabit Ethernet LR PCI	MHE	5772		Both	Yes No
4 Gigabit PCI Express Dual Por	MHE	5774		Both	Yes No
4 Port Async EIA 232 PCIe Adap	MHE	5785		Support	Yes No
EXP24S SFF Gen2-bay Drawer	MHE	5887		Both	Yes No
PCIe2 4-port 1GbE Adapter	MHE	5899		Both	Yes No
PCIe Dual x4 SAS Adapter	MHE	5901		Both	Yes No
PCIe2 1.8GB Cache RAID SAS Ada	MHE	5913		Support	Yes No
SAS AA Cable 3m - HD 6Gb Adapt	MHE	5915		Both	Yes No
SAS AA Cable 6m - HD 6Gb Adapt	MHE	5916		Both	Yes No
SAS AA Cable 1.5m - HD 6Gb Ada	MHE	5917		Both	Yes No
SAS AA Cbl 0.6m - HD 6Gb Adapt	MHE	5918		Both	Yes No
Non-paired Indicator 5913 PCIe	MHE	5924		Support	Yes No
Opt Front Door for 1.8m Rack	MHE	6068		MES	Yes No
Opt Front Door for 2.0m Rack	MHE	6069		MES	Yes No
High-end Side Covers	MHE	6238		MES	Yes No
1.8m Rack Trim Kit	MHE	6246		Support	Yes No
2.0m Rack Trim Kit	MHE	6247		Support	Yes No
1.8m Rack Acoustic Doors	MHE	6248		MES	Yes No
2.0m Rack Acoustic Doors	MHE	6249		MES	Yes No
1.8m Rack Trim Kit	MHE	6263		MES	Yes No
2.0m Rack Trim Kit	MHE	6272		MES	Yes No
Pwr Crd 4.3m 14ft Wall IBM PDU	MHE	6458		Both	Yes No
Pwr Crd (14FT), Drwr - OEM PDU	MHE	6460		Both	Yes No
Pwr Crd 4.3m 14ft Wall OEM PDU	MHE	6469		Both	Yes No
Pwr Crd 1.8m 6ft Wall 125V/15A	MHE	6470		Both	Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6471		Both	Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6472		Both	Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6473		Both	Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6474		Both	Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6475		Both	Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6476		Both	Yes No

Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6477	Both	Yes	No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6478	Both	Yes	No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6488	Both	Yes	No
4.3m (14 Ft) 3PH/24A Power Cor	MHE	6489	MES	Yes	No
4.3m (14 Ft) 1PH/48A Pwr Cord	MHE	6491	MES	Yes	No
4.3m (14 Ft) 1PH/48 60A Pwr Co	MHE	6492	MES	Yes	No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6493	Both	Yes	No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6494	Both	Yes	No
Pwr Crd 2.7m 9ft Wall 250V,10A	MHE	6496	Both	Yes	No
Power Cable Drawer to IBM PD	MHE	6577	Both	Yes	No
Optional Rack Security Kit	MHE	6580	MES	Yes	No
Modem Tray for 19-Inch Rack	MHE	6586	MES	Yes	No
Pwr Crd 2.7m 9ft Wall 125V,15A	MHE	6651	Both	Yes	No
4.3m 3PH/16A Power Cord	MHE	6653	MES	Yes	No
4.3m 1PH/24-30A Pwr Cord	MHE	6654	MES	Yes	No
4.3m 14Ft 1PH/24 30A WR Pwr	MHE	6655	MES	Yes	No
4.3m 14Ft 1PH/24A Power Cord	MHE	6656	MES	Yes	No
4.3m 14Ft 1PH/24A Power Cord	MHE	6657	MES	Yes	No
4.3m 14Ft 1PH/24A Pwr Cd Kor	MHE	6658	MES	Yes	No
Pwr.Cord(9ft),To Wall/OEM PDU	MHE	6659	Both	Yes	No
Pwr Crd 14ft 4.3m WallOEM PDU	MHE	6660	Both	Yes	No
Pwr Crd 2.8m 9.2ft Wall PDU	MHE	6665	Both	Yes	No
4.3m 14Ft 3PH/32A Pwr Cd Aus	MHE	6667	MES	Yes	No
Pwr Crd 4.3M, Drwr - OEM PDU	MHE	6669	Both	Yes	No
Pwr Crd 2.7m, Drwr - IBM PDU	MHE	6671	Both	Yes	No
Pwr Crd 1.5M, Drwr - IBM PDU	MHE	6672	Both	Yes	No
Pwr Crd 2.7m 9ft Wall OEM PDU	MHE	6680	Both	Yes	No
IIntelligent PDU+ 1 EIA Unit	MHE	7109	MES	Yes	No
Environmental Monitoring Probe	MHE	7118	MES	Yes	No
Power Distribution Unit	MHE	7188	MES	Yes	No
AAP Software Pre-Inst.Indic.	MHE	7305	Initial	N/A	No
2.0m Rack Side Attach Kit	MHE	7780	Support	Yes	No
Eth Cbl 15M HW Management	MHE	7802	Both	Yes	No
Side-by-Side for 1.8m Racks	MHE	7840	Support	Yes	No
Ruggedize Rack Kit	MHE	7841	Support	Yes	No
Base Customer Spec Plcmnt	MHE	8453	Initial	N/A	No
USB Mouse					

	MHE	8845		Both	Yes	No
Order Routing Indicator Syste						
	MHE	9169		Initial	N/A	No
Language Group Spcf-US Eng						
	MHE	9300	NC	Initial	N/A	No
specify mode-1 & (1)5901/5278						
	MHE	9359		Both	Yes	No
Specify mode-1 & (2)5901/5278						
	MHE	9360		Both	Yes	No
Specify mode-2 & (2)5901/5278						
	MHE	9361		Both	Yes	No
Specify mode-4 & (4)5901/5278						
	MHE	9365		Both	Yes	No
Specify mode-2 & (4)5901/5278						
	MHE	9366		Both	Yes	No
Specify mode-1 & (2)5903/5805						
	MHE	9367		Support	Yes	No
Specify mode-2 & (4)5903/5805						
	MHE	9368		Support	Yes	No
Specify mode-1 & (2) 5913 EXP						
	MHE	9385		Both	Yes	No
Specify mode-2 & (4) 5913 EXP						
	MHE	9386		Both	Yes	No
New AIX License Core Counter						
	MHE	9440	NC	Initial	N/A	No
New IBM i Lic Core Counter						
	MHE	9441	NC	Initial	N/A	No
New Red Hat Lic Core Counter						
	MHE	9442	NC	Initial	N/A	No
New SUSE Lic Core Counter						
	MHE	9443	NC	Initial	N/A	No
Other AIX Lic Core Counter						
	MHE	9444	NC	Initial	N/A	No
Other Linux Lic Core Counter						
	MHE	9445	NC	Initial	N/A	No
3rd Party Linux Lic Core Cnt						
	MHE	9446	NC	Initial	N/A	No
VIOS Core Counter						
	MHE	9447	NC	Initial	N/A	No
Other License Core Counter						
	MHE	9449	NC	Initial	N/A	No
Month Indicator						
	MHE	9461		Initial	N/A	No
Day Indicator						
	MHE	9462		Initial	N/A	No
Hour Indicator						
	MHE	9463		Initial	N/A	No
Minute Indicator						
	MHE	9464		Initial	N/A	No
Qty Indicator						
	MHE	9465		Initial	N/A	No
Countable Member Indicator						
	MHE	9466		Initial	N/A	No
Language Group Spcf-Dutch						
	MHE	9700	NC	Initial	N/A	No
Language Group Spcf-French						
	MHE	9703	NC	Initial	N/A	No
Language Group Spcf-German						
	MHE	9704	NC	Initial	N/A	No
Language Group Spcf-Polish						
	MHE	9705	NC	Initial	N/A	No
Lang Group Specify - Norwegian						
	MHE	9706	NC	Initial	N/A	No
Lang.Group Spcf-Portuguese						
	MHE	9707	NC	Initial	N/A	No
Language Group Spcf-Spanish						
	MHE	9708	NC	Initial	N/A	No
Language Group Spcf-Italian						
	MHE	9711	NC	Initial	N/A	No
Langua Gr Speci Canadian Frenc						
	MHE	9712	NC	Initial	N/A	No
Language Group Spcf-Japanese						
	MHE	9714	NC	Initial	N/A	No
Language Group Specify Tr Chin						

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                        MHE     9715     NC            Initial  N/A No
Language Group Spcf-Korean
                        MHE     9716     NC            Initial  N/A No
Language Group Spcf-Turkish
                        MHE     9718     NC            Initial  N/A No
Language Group Spcf-Hungarian
                        MHE     9719     NC            Initial  N/A No
Language Group Spcf-Slovakian
                        MHE     9720     NC            Initial  N/A No
Language Group Spcf-Russian
                        MHE     9721     NC            Initial  N/A No
Lang Group Spcf Simpl Chinese
                        MHE     9722     NC            Initial  N/A No
Language Group Spcf-Czech
                        MHE     9724     NC            Initial  N/A No
Language Group Spcf-Romanian
                        MHE     9725     NC            Initial  N/A No
Lang Group Specify - Croatian
                        MHE     9726     NC            Initial  N/A No
Language Group Spcf-Slovenian
                        MHE     9727     NC            Initial  N/A No
Lang Group Specify - Braz Port
                        MHE     9728     NC            Initial  N/A No
Lang Group Specify - Thai
                        MHE     9729     NC            Initial  N/A No
QSFP+ 40G Transceiver
                        MHE     EB27                   Both     Yes No
1m Passive QSFP+ to QSFP+ Cbl
                        MHE     EB2B                   Both     Yes No
3m Passive QSFP+ to QSFP+ Cbl
                        MHE     EB2H                   Both     Yes No
10m QSFP+ MTP Optical Cable
                        MHE     EB2J                   Both     Yes No
30m QSFP+ MTP Optical Cable
                        MHE     EB2K                   Both     Yes No
Single 5250 Enter. Enable
                        MHE     EB2R                   Both     Yes No
Lift Tool
                        MHE     EB2Z                   Both     Yes No
Full 5250 Enter. Enable.
                        MHE     EB30                   Both     Yes No
Mobile Enablement
                        MHE     EB35                   MES      Yes No
IBM i 7.2 Indicator
                        MHE     EB72                   Both     Yes No
5U system node drawer
                        MHE     EBA1                   Both     Yes No
Rack mount Drawer Bezel and Ha
                        MHE     EBA3                   Both     Yes No
OEM Rack mount Drawer Bezel
                        MHE     EBA4                   Both     Yes No
AC Power Chunnels
                        MHE     EBAA                   Both     Yes No
1.6M USB Cable
                        MHE     EBK4                   Both     Yes No
Rack Front Door (Black)
                        MHE     EC01                   MES      Yes No
Rack Rear Door
                        MHE     EC02                   MES      Yes No
Rack Side Cover
                        MHE     EC03                   MES      Yes No
Rack Suite Attachment Kit
                        MHE     EC04                   MES      Yes No
Rear Door Heat Exchanger
                        MHE     EC15                   MES      Yes No
CAPI Activation
                        MHE     EC19                   Both     Yes No
PCIe2 2-Port 10GbE RoCE SFP+ A
                        MHE     EC28                   Both     Yes No
PCIe2 LP 2-Port 10GbE RoCE SR
                        MHE     EC29                   Both     Yes No
PCIe2 2-port 10GbE SFN6122F
                        MHE     EC2J                   Both     Yes No
PCIe2 2-Port 10GbE RoCE SR Ada
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	MHE	EC30	Both	Yes	No
PCIe3 LP 2-Port 40GbE NIC RoCE					
	MHE	EC3A	Both	Yes	No
PCIe3 2-Port 40GbE NIC RoCE					
	MHE	EC3B	Both	Yes	No
PCIe2 3D Graphics Adapterx1					
	MHE	EC42	Both	Yes	No
PCIe2 LP 4-Pt USB 3.0 Adapter					
	MHE	EC45	Both	Yes	No
PCIe2 4-Port USB 3.0 Adapter					
	MHE	EC46	Both	Yes	No
SAS X Cable 3m - HD Narrow					
	MHE	ECBJ	Both	Yes	No
SAS X Cable 6m - HD Narrow					
	MHE	ECBK	Both	Yes	No
SAS X Cable 10m - HD Narrow					
	MHE	ECBL	Both	Yes	No
SAS X Cable 15m -HD Narrow 3Gb					
	MHE	ECBM	Both	Yes	No
5m Passive QSFP+ to QSFP+ Cbl					
	MHE	ECBN	Both	Yes	No
SAS YO Cable 1.5m - HD Narrow					
	MHE	ECBT	Both	Yes	No
SAS YO Cable 3m - HD Narrow					
	MHE	ECBU	Both	Yes	No
SAS YO Cable 6m - HD Narrow					
	MHE	ECBV	Both	Yes	No
SAS YO Cable 10m - HD Narrow					
	MHE	ECBW	Both	Yes	No
SAS YO Cable 15m-HD Narrow 3Gb					
	MHE	ECBX	Both	Yes	No
SAS AE1 Cable 4m - HD Narrow					
	MHE	ECBY	Both	Yes	No
SAS YE1 Cable 3m - HD Narrow					
	MHE	ECBZ	Both	Yes	No
SAS AA Cable 0.6m - HD Narrow					
	MHE	ECC0	Both	Yes	No
SAS AA Cable 1.5m - HD Narrow					
	MHE	ECC2	Both	Yes	No
SAS AA Cable 3m - HD Narrow					
	MHE	ECC3	Both	Yes	No
SAS AA Cable 6m - HD Narrow					
	MHE	ECC4	Both	Yes	No
2M Optical Cable Pair					
	MHE	ECC6	Both	Yes	No
10M Optical Cable Pair					
	MHE	ECC8	Both	Yes	No
System Cable Set DWR 1					
	MHE	ECCA	Both	Yes	No
System Cable Set DWR 2					
	MHE	ECCB	Both	Yes	No
System Cable Set DWR 3					
	MHE	ECCC	Both	Yes	No
System Cable Set DWR 4					
	MHE	ECCD	Both	Yes	No
Custom Serv. Specify, Mexico					
	MHE	ECSM	Initial	N/A	No
Custom Serv. Spec Poughkeepsie					
	MHE	ECSP	Initial	N/A	No
Integrated Solution Packing					
	MHE	ECSS	Initial	N/A	No
387GB SFF-2 SSD converted					
	MHE	EH10	Support	Yes	No
387GB SFF-2 SSD converted					
	MHE	EH11	Support	Yes	No
387GB SFF-2 SSD converted					
	MHE	EH12	Support	Yes	No
387GB SFF-2 SSD converted					
	MHE	EH13	Support	Yes	No
GEN2-S Carrier for ES0C					
	MHE	EH14	Support	Yes	No
Qty 150 Gen2-S Conversion Carr					
	MHE	EH15	Support	Yes	No
GEN2-S Carrier for ES0D IBM i					

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                        MHE     EH16                Support  Yes No
Qty 150 GEN2-S Carriers
                        MHE     EH17                Support  Yes No
Cognos Business Intelligence
                        MHE     EHCE                Initial  N/A No
IIS / Data Stage
                        MHE     EHDS                Initial  N/A No
SPSS on Pwr Sol Ind
                        MHE     EHSS                Initial  N/A No
PCIe3 Optical Cable Adapter
                        MHE     EJ07                Both     Yes No
PCIe3 RAID SAS Adapter 4-port
                        MHE     EJ0J                Both     Yes No
PCIe3 12GB Cache RAID SAS Adap
                        MHE     EJ0L                Both     Yes No
PCIe3 LP RAID SAS ADAPTER
                        MHE     EJ0M                Both     Yes No
PCIe3 SAS Tape/DVD Adapter
                        MHE     EJ10                Both     Yes No
PCIe3 LP SAS Tape/DVD Adapter
                        MHE     EJ11                Both     Yes No
PCIe Crypto Coprocessor G3 BSC
                        MHE     EJ28                Both     Yes No
Mode-2 (1)5901/5278
                        MHE     EJPJ                Both     Yes No
Mmode-2(2)5901/5278
                        MHE     EJPK                Both     Yes No
Mode-4 (1)5901/5278
                        MHE     EJPL                Both     Yes No
Mode-4 (2) 5901/5278
                        MHE     EJPM                Both     Yes No
Mode-4 (3) 5901/5278
                        MHE     EJPN                Both     Yes No
Mode-2 (2)5903/5805
                        MHE     EJPR                Support  Yes No
Mode-2 (2) 5913
                        MHE     EJPT                Both     Yes No
Specify Mode1 & (1)EJ0J-EXP24S
                        MHE     EJR1                Both     Yes No
Specify Mode1 &1(2)EJ0J-EXP24S
                        MHE     EJR2                Both     Yes No
Specify Mode1 & (2)EJ0J-EXP24S
                        MHE     EJR3                Both     Yes No
Specify Mode2 & (4)EJ0J-EXP24S
                        MHE     EJR4                Both     Yes No
Specify Mode4 & (4)EJ0J-EXP24S
                        MHE     EJR5                Both     Yes No
Specify Mode2 & (1)EJ0J-EXP24S
                        MHE     EJR6                Both     Yes No
Specify Mode2 & (2)EJ0J-EXP24S
                        MHE     EJR7                Both     Yes No
Specify Mode2 & (1)EJ0J-EXP24S
                        MHE     EJRA                Both     Yes No
Specify Mode2 & (2)EJ0J-EXP24S
                        MHE     EJRB                Both     Yes No
Specify-Mode4 & (1)EJ0J-EXP24S
                        MHE     EJRC                Both     Yes No
Specify-Mode4 & (2)EJ0J-EXP24S
                        MHE     EJRD                Both     Yes No
Specify-Mode4 & (3)EJ0J-EXP24S
                        MHE     EJRE                Both     Yes No
Specify Mode1 & (2)EJ0L-EXP24S
                        MHE     EJRP                Both     Yes No
Specify Mode2 & (2)EJ0L-EXP24S
                        MHE     EJRS                Both     Yes No
Specify Mode2 & (2)EJ0L-EXP24S
                        MHE     EJRT                Both     Yes No
Non-paired Indicator EJ0L PCIe
                        MHE     EJRU                Both     Yes No
Non-paired Indicator ESA3 PCIe
                        MHE     EJS1                Support  Yes No
Specify Mode2 & (2)ESA3-EXP24S
                        MHE     EJS2                Support  Yes No
Specify Mode1 & (2)ESA3-EXP24S
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                        MHE     EJS3                    Support  Yes No
Specify Mode2 & (4)ESA3-EXP24S
                        MHE     EJS4                    Support  Yes No
Full Width Key USB, US English
                        MHE     EK51                    Both     Yes No
Full Width Key USB, French
                        MHE     EK52                    Both     Yes No
Full WidthKey USB,Italian
                        MHE     EK53                    Both     Yes No
Full Width Key USB, German/Aus
                        MHE     EK54                    Both     Yes No
Full Width Key USB, UK English
                        MHE     EK55                    Both     Yes No
Full Width Key USB, Spanish
                        MHE     EK56                    Both     Yes No
Full Width Key USB, Japanese
                        MHE     EK57                    Both     Yes No
Full Width Key USB, BrazilianP
                        MHE     EK58                    Both     Yes No
Full Width Key USB, Hungarian
                        MHE     EK59                    Both     Yes No
Full Width Key USB, Korean
                        MHE     EK60                    Both     Yes No
Full Width Key USB, Chinese
                        MHE     EK61                    Both     Yes No
Full Width Key USB, French Can
                        MHE     EK62                    Both     Yes No
Full Width Key USB, Belgian/UK
                        MHE     EK64                    Both     Yes No
Full Width Key USB, Swedish/Fi
                        MHE     EK65                    Both     Yes No
Full Width Key USB, Danish
                        MHE     EK66                    Both     Yes No
Full Width Key USB, Bulgarian
                        MHE     EK67                    Both     Yes No
Full Width Key USB, Swiss/Fr/G
                        MHE     EK68                    Both     Yes No
Full Width Key USB, Norwegian
                        MHE     EK69                    Both     Yes No
Full Width Key USB, Dutch
                        MHE     EK70                    Both     Yes No
Full Width Key USB, Portuguese
                        MHE     EK71                    Both     Yes No
Full Width Key USB, Greek
                        MHE     EK72                    Both     Yes No
Full Width Key USB, Hebrew
                        MHE     EK73                    Both     Yes No
Full Width Key USB, Polish
                        MHE     EK74                    Both     Yes No
Full Width Key USB, Slovakian
                        MHE     EK75                    Both     Yes No
Full Width Key USB, Czech
                        MHE     EK76                    Both     Yes No
Full Width Key USB, Turkish
                        MHE     EK77                    Both     Yes No
Full Width Key USB, LA Spanish
                        MHE     EK78                    Both     Yes No
Full Width Key USB, Arabic
                        MHE     EK79                    Both     Yes No
Full Width Key USB, Thai
                        MHE     EK80                    Both     Yes No
Full Width Key USB, Russian
                        MHE     EK81                    Both     Yes No
Full Width Key USB, Slovenian
                        MHE     EK82                    Both     Yes No
Full Width Key USB, US English
                        MHE     EK83                    Both     Yes No
PDU Access Cord 0.38m
                        MHE     ELC0                    MES      Yes No
Power IFL Processor Activation
                        MHE     ELJ6                    Both     Yes No
Power Int Fac For Linux Packag
                        MHE     ELJG                    Both     Yes No
Power IFL Memory Activation
```

```
                        MHE     ELJH                    Both     Yes No
Power IFL PowerVM for Linux
                        MHE     ELJJ                    Both     Yes No
#ES1A Load Source Specify 387G
                        MHE     ELS9                    Both     Yes No
#ES0H Load Source Specify 775G
                        MHE     ELSH                    Both     Yes No
#ESDN Load Source Specify 571G
                        MHE     ELSN                    Both     Yes No
#ES0R Load Source Specify 387G
                        MHE     ELSR                    Both     Yes No
#ES0T Load Source Specify 775G
                        MHE     ELST                    Both     Yes No
#ESFN Load Source Specify 571G
                        MHE     ELTN                    Both     Yes No
#ESEY Load Source Specify 283G
                        MHE     ELTY                    Both     Yes No
Active Memory Exp Enablement
                        MHE     EM82                    Both     Yes No
64GB (4X16GB) CDIMMs, 1600 MHz
                        MHE     EM8J                    Both     No  No
128GB (4X32GB) CDIMMs, 1600MHz
                        MHE     EM8K                    Both     No  No
256GB (4X64GB) CDIMMs, 1600MHz
                        MHE     EM8L                    Both     No  No
512GB (4X128GB) CDIMM, 1600MHz
                        MHE     EM8M                    Both     No  No
90 Days Elastic CoD Mem Enable
                        MHE     EM9T                    MES      Yes No
1GB Memory Activation
                        MHE     EMA5                    Both     Yes No
QTY 100 of 1GB Activations
                        MHE     EMA6                    Both     Yes No
100GB Mobile Mem Activation
                        MHE     EMA7                    MES      Yes No
100GB Mobile Enabled Mem Activ
                        MHE     EMA9                    Both     Yes No
Bundle of 8 #EM8M 512GB Memory
                        MHE     EMB6                    Both     No  No
512 GB Memory Activations for #EMB6
                        MHE     EMB7                    Both     Yes No
512 Memory Activations for IFL
                        MHE     EMB8                    Both     Yes No
1 GB-Day billing CoD memory
                        MHE     EMJ4                    MES      Yes No
100 GB-Day billing CoD memory
                        MHE     EMJ5                    MES      Yes No
999 GB-Day billing CoD memory
                        MHE     EMJ6                    MES      Yes No
384 GB- Days Elastic CoD Mem
                        MHE     EMJ8                    Both     Yes No
PCIe Gen3 I/O Expansion Drawer
                        MHE     EMX0                    Both     Yes No
AC Power Supply Conduit
                        MHE     EMXA                    Both     Yes No
PCIe3 6-Slot Fanout Module
                        MHE     EMXF                    Both     Yes No
1m 10GbE Cable SFP+ Act Twinax
                        MHE     EN01                    Both     Yes No
3m 10GbE Cable SFP+ Act Twinax
                        MHE     EN02                    Both     Yes No
5m 10GbE Cable SFP+ Act Twinax
                        MHE     EN03                    Both     Yes No
PCIe2 16Gb 2-port Fibre Channe
                        MHE     EN0A                    Both     Yes No
PCIe2 LP 16Gb 2-port Fibre Cha
                        MHE     EN0B                    Both     Yes No
PICe2 4-port 10Gb FCoE & 1GbE
                        MHE     EN0H                    Both     Yes No
PCIe2 LP 4-port 10GB FCoE & 1G
                        MHE     EN0J                    Both     Yes No
PCIe2 4-port 10GB FCoE & 1GbE
                        MHE     EN0K                    Both     Yes No
PCIe2 LP 4-port 10GB FCoE &1GE
```

MHE	EN0L	Both	Yes	No
PCIe2 4-pt(10+1 GbE)SR+RJ45				
MHE	EN0S	Both	Yes	No
PCIe2 4-pt(10+1GbE)CRSR+RJ45				
MHE	EN0U	Both	Yes	No
PCIe2 2-pt 10/1GbE BaseT RJ45				
MHE	EN0W	Both	Yes	No
PCIe2 LP2-pt10/1GbE BaseT RJ45				
MHE	EN0X	Both	Yes	No
PCIe2 LP 8Gb 4-port Fibre Chan				
MHE	EN0Y	Both	Yes	No
PCIe 1-port Bisync Adapter				
MHE	EN13	Both	Yes	No
2 Port Async EIA 232 PCIe Adap				
MHE	EN27	Both	Yes	No
1-Core Mobile Activation				
MHE	EP2T	MES	Yes	No
1-Core Mobile Activation				
MHE	EP2V	MES	Yes	No
90 Days Elastic CoDProc Enable				
MHE	EP9T	MES	Yes	No
4.35 GHz 32-core processor				
MHE	EPBB	Both	No	No
1 core activation for #EPBB				
MHE	EPBK	Both	Yes	No
1 core Mobile Act for #EPBB				
MHE	EPBP	Both	Yes	No
48 Proc-Days of Elastic CoD				
MHE	EPJ3	Initial	N/A	No
1 Elastic Proc-day #EPBB, AIXL				
MHE	EPJC	MES	Yes	No
1 Elastic Proc-day #EPBB, IBMi				
MHE	EPJD	MES	Yes	No
100 Elastic Prc-day #EPBB AIXL				
MHE	EPJE	MES	Yes	No
100 Elastic Prc-day #EPBB IBMi				
MHE	EPJF	MES	Yes	No
100 CoD Utl mins, #EPBB, AIXL				
MHE	EPJG	MES	Yes	No
100 CoD Utl mins, #EPBB, IBMi				
MHE	EPJH	MES	Yes	No
Quantity 150 of #3452 SAS Cabl				
MHE	EQ02	Both	Yes	No
Quantity 150 of #3453 SAS YO				
MHE	EQ03	Both	Yes	No
Quantity of 150 #ES0C				
MHE	EQ0C	Support	Yes	No
Quantity of 150 #ES0D				
MHE	EQ0D	Support	Yes	No
Quantity 150 # ES0G 775G SSD				
MHE	EQ0G	Both	Yes	No
Quantity 150 #ES0H 775GB SSD				
MHE	EQ0H	Both	Yes	No
Qty 150 of #ES0Q 387GB 4k SSD				
MHE	EQ0Q	Both	Yes	No
Qty 150 of #ES0R 387GB 4k SSD				
MHE	EQ0R	Both	Yes	No
QTY 150 of #ES0S 775GB 4k SSD				
MHE	EQ0S	Both	Yes	No
Qty 150 of #ES0T 775GB 4k SSD				
MHE	EQ0T	Both	Yes	No
Quantity 150 #ES19 387GB SSD				
MHE	EQ19	Both	Yes	No
Quantity 150 #ES1A 387GB SSD				
MHE	EQ1A	Both	Yes	No
Quantity 150 of #1738				
MHE	EQ38	Both	Yes	No
Quantity 150 of #1752				
MHE	EQ52	Both	Yes	No
Quantity 150 #ESD2 1.1TB Disk				
MHE	EQD2	Both	Yes	No
Quantity 150 #ESD3 1.2TB Disk				
MHE	EQD3	Both	Yes	No
Qty 150 of #ESDN 571GB 15k HDD				

MHE	EQDN	Both	Yes	No
Qty 150 of #ESDP 600GB 15k HDD				
MHE	EQDP	Both	Yes	No
Quantity 150 of #ESEY 283 GB S				
MHE	EQEY	Both	Yes	No
Quantity 150 of #ESEZ 300GB				
MHE	EQEZ	Both	Yes	No
Quantity 150 of #ESFN 571GB				
MHE	EQFN	Both	Yes	No
Quantity 150 of #ESFP 600GB				
MHE	EQFP	Both	Yes	No
42U Slim Rack				
MHE	ER05	MES	Yes	No
Indicator, reserve 5 EIA				
MHE	ER16	Both	N/A	No
Specify Reserve 4 EIA Space				
MHE	ER1A	Initial	N/A	No
Field Integration: Rack-Server				
MHE	ER21	Both	Yes	No
RFID Tags for Compute Nodes				
MHE	ERF1	Initial	N/A	No
Rear rack extension				
MHE	ERG0	MES	Yes	No
Front Door for P770/780 2MRack				
MHE	ERG7	MES	Yes	No
387GB SFF-2 SSD for AIX/Linux				
MHE	ES0C	Support	Yes	No
387GB SFF-2 SSD for IBM i				
MHE	ES0D	Support	Yes	No
775GB SFF-2 SSD for AIX/Linux				
MHE	ES0G	Both	Yes	No
775GB SFF-2 SSD for IBM i				
MHE	ES0H	Both	Yes	No
387GB SFF-2 4k SSD AIX/Linux				
MHE	ES0Q	Both	Yes	No
387GB SFF-2 4k SSD for IBM i				
MHE	ES0R	Both	Yes	No
775GB SFF-2 4k SSD AIX/Linux				
MHE	ES0S	Both	Yes	No
775GB SFF-2 4k SSD for IBM i				
MHE	ES0T	Both	Yes	No
387GB SFF-2 SSD for AIX/Linux				
MHE	ES19	Both	Yes	No
387GB SFF-2 SSD for IBM i				
MHE	ES1A	Both	Yes	No
PCIe2 1.8GB Cache RAID SAS Ada				
MHE	ESA3	Support	Yes	No
S&H - No Charge				
MHE	ESC0	Initial	N/A	No
S&H				
MHE	ESC9	Both	Yes	No
1.1TB 10K RPM SAS SFF-2 Disk				
MHE	ESD2	Both	Yes	No
1.2TB 10K RPM SAS SFF-2 (AIX/				
MHE	ESD3	Both	Yes	No
571GB 15k SAS SFF-2 Disk Drive				
MHE	ESDN	Both	Yes	No
600GB 15k SAS SFF-2 Disk Drive				
MHE	ESDP	Both	Yes	No
283GB 15K SAS SFF-2 4K BLK HDD				
MHE	ESEY	Both	Yes	No
300GB 15K SAS SFF-2 4K BLK HDD				
MHE	ESEZ	Both	Yes	No
571GB 15K SAS SFF-2 4K BLK HDD				
MHE	ESFN	Both	Yes	No
600GB 15K SAS SFF-2 4K BLK HDD				
MHE	ESFP	Both	Yes	No
1TB Removable Disk Cartridge				
MHE	EU01	Both	Yes	No
RDX USB External Docking				
MHE	EU04	Both	Yes	No
RDX 320 GB Removable Disk Driv				
MHE	EU08	Both	Yes	No
Service Processor				

```
                      MHE     EU0A                  Both     Yes No
SATA Slimline DVD-RAM
                      MHE     EU13                  Both     Yes No
1.5TB Removable Disk Cartridge
                      MHE     EU15                  Both     Yes No
BLU Accelerationi Solution Ed
                      MHE     EU2B                  Initial  N/A No
2TB Removable Disk Cartrdg-RDX
                      MHE     EU2T                  Both     Yes No
Software preload define
                      MHE     EUC1                  Initial  N/A No
Software preload define
                      MHE     EUC2                  Initial  N/A No
Software preload define
                      MHE     EUC3                  Initial  N/A No
Core Use HW Feature
                      MHE     EUC6                  MES      Yes No
Core Use HW Feature 10
                      MHE     EUC7                  MES      Yes No
```

Type/Model conversions

```
   From          To         Parts    Purchase
Type   Model  Type   Model  Returned Price

9179    MHD   9119    MHE    Yes
```

The following are newly announced features on the specific models of the IBM Power Systems 7014 and 7965 machine type:

```
                                          Minimum Initial/
                                          Monthly MES/
Description          Model  Feature Purchase Maint.  Both/        RP
Machine Type 7014    number number  price    Charge  Support  CSU MES

Rack Content Specify for EMX0
                      T42     ER0M                  Initial  N/A No
Specify 1st Enclosure - 7 EIA
                      T42     ER10                  Initial  N/A No
Specify 2nd Enclosure - 12 EIA
                      T42     ER11                  Initial  N/A No
Specify 3th Enclosure - 17 EIA
                      T42     ER12                  Initial  N/A No
Specify 4th Enclosure - 22 EIA
                      T42     ER13                  Initial  N/A No
Specify 1U PDU - 1 EIA
                      T42     ER14                  Initial  N/A No
Specify reserves 5U
                      T42     ER15                  Initial  N/A No
RACK SPECIFY FC EMX0
                      B42     ER19                  Initial  N/A No
                      T00                           Initial  N/A No
                      T42                           Initial  N/A No
Rack Rear Extension
                      T42     ERG0                  Both     No  No

                                          Minimum Initial/
                                          Monthly MES/
Description          Model  Feature Purchase Maint.  Both/        RP
Machine type 7965    number number  price    Charge  Support  CSU MES

RACK SPECIFY FC EMX0
                      94Y     ER19                  Initial  N/A No
```

The following are features already announced for the IBM Power Systems 7014 machine type:

Description Machine type 7014	Model number	Feature number	Purchase price	Minimum Monthly Maint. Charge	Initial/ MES/ Both/ Support	CSU	RP MES
Reserve 2U at Bottom of Rack	T42	ER2B			Initial	N/A	No
Reserve 2U at Top of Rack	T42	ER2T			Initial	N/A	No

Feature conversions

Feature conversions for 9119-MHE memory features

From FC:	To FC:	Parts Returned	Purchase Price
EMA6 - Quantity of 100 1GB Memory Activations (#EMA5)	EMA7 - 100 GB Mobile Memory Activations	No	
EMA9 - 100 GB Mobile Enabled Memory Activations	EMA7 - 100 GB Mobile Memory Activations	No	
EMA6 - Quantity of 100 1GB Memory Activations (#EMA5)	EMA9 - 100 GB Mobile Enabled Memory Activations	No	

Feature conversions for 9119-MHE processor features

From FC:	To FC:	Parts Returned	Purchase Price
EPBK - 1 core Processor Activation for #EPBB	EP2T - 1-Core Mobile Activation	No	
EPBP - 1 core Processor Activation for #EPBB, Mobile Eabled	EP2T - 1-Core Mobile Activation	No	

Feature conversions for 9179-MHD to 9119-MHE adapter features

From FC:	To FC:	Parts Returned	Purchase Price
EJ29 - PCIe Crypto Coprocessor Gen4 BSC 4765-001	EJ28 - PCIe Crypto Coprocessor Gen3 BSC 4765-001	No	

Feature conversions for 9179-MHD to 9119-MHE administrative features

From FC:	To FC:	Parts Returned	Purchase Price
ELJ0 - Power Integrated Facility for Linux Package	ELJG - Power Integrated Facility for Linux Package	No	

Feature conversions for 9179-MHD to 9119-MHE memory features

From FC:	To FC:	Parts Returned	Purchase Price
ELJ2 - Power IFL Memory Activation	ELJH - Power IFL Memory Activation	No	

4791 - ACTIVE MEMORY EXPANSION ENABLEMENT	EM82 - ACTIVE MEMORY EXPANSION ENABLEMENT	No
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5601 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM40 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM41 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5601 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5602 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM40 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM41 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM42 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5564 - 0/256GB DDR3 Memory (4X64GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5601 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5602 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM40 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM41 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM42 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM44 - 0/256GB DDR3 Memory (4X64GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes

5564 - 0/256GB DDR3 Memory (4X64GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8M - 512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8M - 512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5601 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8M - 512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5602 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8M - 512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM40 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8M - 512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM41 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8M - 512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM42 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8M - 512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EM44 - 0/256GB DDR3 Memory (4X64GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8M - 512GB (4X128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
EMA2 - Activation of 1 GB DDR3 Memory	EMA5 - 1GB Memory Activation	No
EMA3 - Activation of 100 GB DDR3 POWER7+ Memory	EMA6 - Quantity of 100 1GB Memory Activations (#EMA5)	No
EMA4 - 100 GB Mobile Memory Activation	EMA7 - 100 GB Mobile Memory Activations	No

Feature conversions for 9179-MHD to 9119-MHE processor features

From FC:	To FC:	Parts Returned	Purchase Price
4992 - Single 5250 Enterprise Enablement	EB2R - Single 5250 Enterprise Enablement	No	
4997 - Full 5250 Enterprise Enablement	EB3O - Full 5250 Enterprise Enablement	No	
ELJ1 - Power IFL Processor Activation	ELJ6 - Power IFL Processor Activation	No	
ELJ4 - Power IFL Processor Activation	ELJ6 - Power IFL Processor Activation	No	
EP23 - 1-Core Mobile Activation	EP2V - 1-Core Mobile Activation from Power 7	No	
EPH0 - 4.42 GHz Proc Card, 0/16 Core POWER7+, 16 DDR3 Memory Slots	EPBB - 4.35 GHz, 32-core POWER8 processor	Yes	
EPH2 - 3.72 GHz Proc Card, 0/32 Core POWER7+, 16 DDR3 Memory Slots	EPBB - 4.35 GHz, 32-core POWER8 processor	Yes	
EPHA - 1-Core Activation for Processor Feature EPHO	EPBK - 1 core Processor Activation for #EPBB	No	
EPHC - 1-Core Activation for Processor Feature EPH2	EPBK - 1 core Processor Activation for #EPBB	No	
EPHL - #EPH0 Processor Activation, Mobile Enabled	EPBP - 1 core Processor Activation for #EPBB, Mobile Eabled	No	
EPHM - #EPH2 Processor Activation, Mobile	EPBP - 1 core Processor Activation for #EPBB,	No	

Enabled	Mobile Eabled

Feature conversions for 9179-MHD to 9119-MHE rack related features

From FC:	To FC:	Parts Returned	Purchase Price
6250 - HIGH-END APPEARANCE FRONT DOOR	ERG7 - Optional Front Door for Power 770 & 780 2.0m Rack	No	

Feature conversions for 9179-MHD to 9119-MHE system unit base features

From FC:	To FC:	Parts Returned	Purchase Price
EB95 - System CEC Enclosure with IBM BEZEL, I/O Backplane, and System Midplane	EBA1 - 5U system node drawer	Yes	
EB96 - System CEC Enclosure with OEM BEZEL, I/O Backplane, and System Midplane	EBA1 - 5U system node drawer	Yes	

Feature conversions for 9179-MHD to 9119-MHE virtualization engine features

From FC:	To FC:	Parts Returned	Purchase Price
7942 - PowerVM -Standard Edition	5228 - PowerVM Enterprise Edition	No	
7995 - PowerVM - Enterprise Edition	5228 - PowerVM Enterprise Edition	No	
ELJ3 - Power IFL PowerVM for Linux	ELJJ - Power IFL PowerVM for Linux	No	

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Corrections

(Corrected on December 15, 2014)

The Planned availability, Product number, Description, Software requirements, and Prices sections were revised.

(Corrected on October 16, 2014)

The Prices section was revised to correct information for feature ER16.