



IBM Power E870C Enterprise server offers world-class private and hybrid cloud infrastructure

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At a glance

The IBM^(R) Power^(R) E870C server provides a rich, flexible environment for cloud (private and hybrid) and traditional IT. The offering includes:

- Private cloud management
 - IBM Cloud PowerVC Manager (OpenStack-based)
 - Cloud-based HMC Apps as a Service
 - Open source cloud automation and configuration tooling
- Hybrid cloud infrastructure management tools
- The ability to securely connect system of record workloads and data to cloud native applications
- IBM Cloud Starter Pack, with entitlement to IBM Cloud (IBMSoftLayer^(R))
- Flexible Power capacity on demand (CoD) resource conversion to SoftLayer capacity
- Funded services to assist private and hybrid cloud implementation

The Power E870C server provides the IBM POWER8^(R) underlying hardware components:

- Scalable server
 - Up to 64 POWER8 processor cores
 - Up to 16 TB memory
 - Up to 16 PCIe Gen3 x16 slots in system nodes
 - Up to 96 PCIe Gen3 slots with expansion drawers
 - Up to over 3,000 directly attached SAS disks or solid-state drives (SSDs)
- System control unit, providing redundant system master clock and redundant system service processor
- CoD processor and memory options
- Power Integrated Facility for LinuxTM (IFL) for more cost-effective Linux clouds
- Dynamic logical partition (LPAR) support for adjusting workload placement of processor and memory resources
- Power Enterprise Pools, supporting unsurpassed enterprise flexibility for workload balancing and system

Overview

Business climates are changing, and organizations must provide an infrastructure that can quickly adapt to those changes. In order to succeed, organizations need to work smarter and faster with greater agility and flexibility. The promise of cloud computing enables clients to do just that. Cloud computing, in its many forms (public, private, or hybrid) is quickly becoming both the delivery and consumption models for IT. However, getting the right mix between traditional IT, private cloud, and public cloud can be a challenge.

The new Power E870C server with OpenStack-based cloud management and open source automation enables clients to accelerate the transformation of their IT infrastructure for cloud while providing tremendous flexibility during the transition. In addition, the Power E870C server is designed to provide clients with increased security, high availability, rapid scalability, simplified maintenance, and management, all while enabling business growth and enabling clients to dramatically reduce costs. The Power E870C systems management capability speeds up and simplifies cloud deployment by providing fast and automated VM deployments, prebuilt image templates, and self-service capabilities all with an intuitive and user-friendly interface.

The Power E870C enterprise server is designed to provide the highest levels of reliability, availability, flexibility, and performance in order to bring you a world-class enterprise private and hybrid cloud infrastructure. Through enterprise-class security, efficient built-in virtualization that drives industry-leading workload density, and dynamic resource allocation and management, the server is designed to consistently deliver the highest levels of service across hundreds of virtual workloads on a single system.

The Power E870C server includes the cloud management software, and services to assist with clients' move to the cloud, both private and hybrid. Those additional capabilities include the following:

Private Cloud Management

- IBM Cloud PowerVC Manager (OpenStack-based cloud management)

Managing a private cloud requires software tools to help create a virtualized pool of compute resources, provide a self-service portal for end users, and policies for resource allocation, control, security, and metering data for resource billing. Management tools for private clouds tend to be service driven, as opposed to resource driven, because cloud environments are typically highly virtualized and organized in terms of portable workloads.

The OpenStack-based IBM Cloud PowerVC Manager provides the self-service cloud portal for IBM Power Systems™. This self-service portal enables users to quickly request cloud resources and reliably deploy virtual machines with approval policies to maintain control over provisioning of cloud resources.

- Cloud-based HMC Apps as a Service

IBM intends to release a new HMC Apps as a Service offering that is planned to provide clients the capability to aggregate Power Systems performance and inventory data from across their enterprise, removing the burden of manual collection and aggregation of system information. IBM intends to host these IBM developed applications in a secure cloud and intends to provide health state, geo tagging, and threshold alerts that can be accessed through a secure portal from clients' mobile devices. IBM intends to entitle clients who purchase a new Power E870C server to this new service offering for no additional charge and without having to install any new software or infrastructure. The performance and inventory applications are initially planned to be offered in a technology preview in 2016 and with general availability planned for 2017.

- Open source cloud automation and configuration tooling for AIX^(R)

IBM has expanded its commitment to keep key open source cloud management packages updated and to provide timely security fixes in order to enable clients to leverage open source skills. Power E870C server clients are well positioned to

take advantage of key packages recently provided to enable cloud automation, including:

- **chef** automation for configuration, deployment, and management. IBM is collaborating along with clients in this community to provide useful resources for using chef with AIX systems.
- **yum** package management is now available, with repository access from both ftp and https protocols. rpm is also updated to enable automatic dependency discovery.
- **cloud-init** and all dependencies are now available in the repository and includes support for licensed AIX users. For more information, go to the [AIX Toolbox for Linux Applications](#) website.

Hybrid cloud support

Hybrid cloud is quickly becoming the de facto state of IT. Two-thirds of organizations that blend traditional and cloud infrastructure together are already gaining advantage from their hybrid cloud. A hybrid cloud model enables the building and deploying of applications quickly with optimized utilization of resources and the lowering of costs. In addition, being able to centrally manage private, public, or dedicated cloud resources with a single management tool while securely connecting traditional workloads with cloud-native apps enables clients to respond to their dynamically changing business priorities in a more agile and timely fashion.

In order to assist with a client's move to a hybrid cloud infrastructure, the Power E870C server includes the following:

Hybrid infrastructure management tools

Power Systems OpenStack-based PowerVC management upwardly integrates into a variety of third-party hybrid cloud orchestration products, including IBM Cloud Orchestrator, VMware vRealize, and others. Clients can simply manage both their private cloud VMs and their public cloud VMs from a single, integrated management tool.

Securely connect system of record workloads and data to cloud native applications

IBM's API Connect and IBM WebSphere^(R) Connect provide secure connectivity to cloud-based applications, giving clients the ability to rapidly develop new applications and services accelerating their time to value. IBM's Power to Cloud services can help clients get started with these solutions and in designing new applications leveraging IBM's Bluemix^(R), which enables clients' to rapidly build, deploy, and manage their cloud applications, while tapping a growing ecosystem of available services and runtime frameworks.

IBM Cloud Starter Pack

To help clients get started with their hybrid cloud infrastructure, the Power E870C offering includes entitlement to one year of an POWER8 Linux bare metal system in the IBM Cloud (SoftLayer).

Flexible capacity on demand

With the purchase of a new Power E870C server, clients now have the ability to convert previously purchased capacity (Mobile Processor activations and Elastic COD Processor Days) to SoftLayer capacity.

Power to Cloud Services

To assist clients with their move to the cloud, IBM is bundling 10,000 points of on-site cloud deployment services with every Power E870C system purchase. For those clients looking to create their own private cloud, expert services are available for cloud provisioning and automation with IBM Cloud PowerVC Manager with heavy focus on creating and supporting a DevOps cloud implementation.

For those clients looking for a hybrid cloud solution, Design for Hybrid Cloud Workshop services are available to provide instruction on how to produce best-of-breed applications using API Connect and Bluemix with Power Systems.

To learn more about all the new cloud capabilities that comes with the Power E870C server, go to the [Power Hardware Enterprise Cloud](#) website.

Power E870C provides the POWER8 hardware components

- System with processor, memory, and base I/O, delivers:
 - Up to 64 POWER8 processor cores
 - Up to 16 TB of 1600 MHz, 4 Gb DDR4 DRAM memory
 - Eight PCIe G3 x16 I/O expansion slots per system node enclosure, a maximum of 16 per system
- 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 the base DVD
- Nineteen-inch PCIe Gen3 4U I/O expansion drawer and PCIe Fan-Out modules, supporting a maximum of 96 PCIe Gen3 slots
- PCIe Gen1, Gen2, and Gen3 adapter cards supported in both the system node and I/O expansion drawer
- EXP24S SFF Gen2-bay Drawer with twenty-four 2.5-inch form-factor SAS bays;
- Dynamic logical partition (LPAR) support for adjusting workload placement of processor and memory resources
- Active Memory™ Expansion that is optimized onto the processor chip
- And Power Enterprise Pools, supporting unsurpassed enterprise flexibility for workload balancing and system maintenance

Feature exchange

Not applicable.

Key prerequisites

The Power E870C 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

September 29, 2016

Description

The Power E870C offering provides a rich set of capabilities for both cloud and traditional IT. Many of its cloud aspects are ordered outside of the 9080-MME hardware machine type. The following information focuses on just the 9080-MME.

The Power E870C server is a scale, SMP system that delivers its exceptional performance, scalability, reliability, availability, and serviceability with great virtualization capability for larger cloud environments. The E870C server uses modular building blocks called *system nodes*. The E870C can have one or two system nodes. Its related server, the E880C, can have one, two, three, or four system nodes.

Summary of features

The following features are available on the Power E870C server:

- One or two 5U system nodes
- One 2U system control unit
- Only 12U for a system with two system nodes
- One or two processor features per system with four single-chip modules (SCMs) per feature:
 - 4.024 GHz, (4 x 0/8W) 32-core POWER8 processor (#EPBA)
- CoD processor core activation features available on a per-core basis
 - Static, mobile-enabled (static), mobile, Power IFL
 - Activation feature varies by processor feature
- 32 CDIMM slots per system node
- DDR3/DDR4 1600 MHz CDIMM memory cards:
 - 64 GB (4 x 16 GB), (#EM8J DDR3)
 - 128 GB (4 x 32 GB), (#EM8K DDR3)
 - 256 GB (4 x 64 GB), (#EM8L DDR3)
 - 512 GB (4 x 128 GB), (#EM8M DDR3)
 - 1024 GB (4 x 256GB), (#EM8Y DDR4)
- CoD memory activation features include:
 - 1 GB (static) Memory Activation (#EMA5)
 - 100 GB (static) Memory Activations (#EMA6)
 - 100 GB Mobile Memory Activations (#EMA7)
 - 100 GB Mobile Enabled Memory Activations (#EMA9)
 - 512 GB Memory Activations for IFL (#EMB8)
 - Plus activations for a few specific bundle scenarios
- Active Memory Expansion, optimized onto the processor chip (#EM82)
- Eight PCIe Gen3 x16 I/O low-profile expansion slots per system node (maximum 16 in a 2-node system)
- One optional DVD in system control unit enclosure (defaulted in e-config, with an option to de-select)
- Redundant hot-swap AC power supplies in each system node drawer
- Two Hardware Management Console (HMC) ports in the system control unit
- Optional PCIe Gen3 I/O Expansion Drawer with PCIe Gen3 slots:
 - Zero to four drawers per system node drawer (#EMX0)
 - Each Gen3 I/O drawer holds one or two 6-slot PCIe3 Fan-out Modules (#EMXF)
 - Each fan-out module attaches to the system node through a PCIe3 Optical Cable Adapter (#EJ07)
- Dynamic LPAR support and processor and memory capacity upgrade on demand (CUoD)
- PowerVM^(R) Virtualization included at no additional charge:
 - Micro-Partitioning^(R)
 - Dynamic LPAR
 - Shared processor pools
 - Shared storage pools
 - Live Partition Mobility
 - Active Memory Sharing
 - Active Memory Deduplication
 - NPIV support
 - PowerVPTM Performance Monitor

- Optional PowerHA^(R) for AIX and IBM i

System nodes

Each 5 EIA or 5U system node of the system has four air-cooled SCMs optimized for performance and scalability. The E870C SCMs have eight POWER8 cores running at up to 4.024 GHz and simultaneous multithreading executing up to eight threads per core. Each SCM has dual memory controllers to support up to 128 GB off-chip eDRAM L4 cache to deliver up to 230 GBps of sustained memory bandwidth or 920 GBps per node. Up to 410GBps of peak memory bandwidth from the L4 cache to memory DIMMs is provided per SCM or up to 1640 GBps per node. Using dual PCIe Gen3 I/O controllers, which are also integrated onto each SCM to further reduce latency, up to 256 GBps I/O bandwidth is available per node. Thus a Power E870C system bandwidth can help deliver over twice the performance per core of competitors, enabling applications to run faster and be more responsive.

Each system node has 32 CDIMM slots and can support up to 8 TB of DDR4 memory. Thus a two-node server can have up to 16 TB of memory. Each system node has eight PCIe slots that are all x16, low profile. Thus a two-node server can have up to 16 PCIe slots. PCIe Gen3 expansion units can optionally expand the number of PCIe slots on the server.

A system node is ordered using a processor feature. Each processor feature will deliver a set of four identical SCMs in one system node. 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 one-system node configuration, feature ECCA is required.
- For a two-system node configuration, features ECCA and ECCB are required.

Processor core activations

Each Power E870C system requires a minimum of just eight permanent processor core activations using either static activations or Power IFL activations. This minimum is per system, not per node. The rest of the cores can be permanently or temporarily activated or remain inactive (dark) until needed. The activations are not specific to hardware cores or SCMs or nodes. They are known to the system as a total number of activations of different types and used or assigned by the Power hypervisor appropriately.

A variety of activations fit different usage and pricing options. Static activations are permanent and support any type of application environment on this server. Mobile activations are ordered against a specific server, but can be moved to any server within the Power Enterprise Pool and can support any type of application. Mobile-enabled activations are technically static, but can be converted to mobile at no charge when logistically or administratively eligible. Power IFL activations can only run Linux workloads. Temporary activations are used for CoD: Elastic, Utility, and Trial options.

32-core (#EPBA)

1-core static activation (#EPBQ)

1-core mobile activation (#EP2S)

1-core mobile-enabled activation (#EPBN)

4-core Power IFL package (#ELJG)

System control unit

The 2U system control unit provides redundant system master clocks and redundant system master service processors (MSPs). Additionally, it contains the Operator Panel, the System VPD, and optionally a DVD. One system control unit is required for each server. A unique feature number is not used to order the system control unit. One is shipped with each E870C server. Two service processors (FSPs) in the system control unit are ordered using two EU0A features. All system nodes connect to the system control unit using the cable features ECCA and ECCB.

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 1 and two UPIC cables attach to system node 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.

If the optional DVD feature EU13 is ordered, use the 1.6 meter USB cable (#EBK4) to attach to a PCIe USB adapter located either in the system node or a PCIe Gen3 expansion unit. The DVD is a SATA DVD, but a USB-to-SATA converter is included in the EU13 feature.

Memory

IBM-custom DIMMs (CDIMMs) are extremely high-performance, high-reliability, high-function memory cards that contain L4 cache, intelligence, and 1600 MHz DRAM memory. Both DDR3 and DDR4 technology is employed and both provide the same 1600 MHz performance. CDIMMs are placed in CDIMM slots in the system node.

Each system node has 32 memory CDIMM slots, and at least half of the memory slots are always physically filled. Eight CDIMM slots are local to each of the four SCMs in the server, but SCMs and their cores have access to all the other memory in the server. At least half of the eight memory slots for each SCM must physically be filled. When filling the other four memory slots in the SCM, a quantity of four CDIMMs must be used. Thus the CDIMM slots are either 50% or 100% filled. The system node (four SCMs) CDIMM slots can have 16, 20, 24, 28, or 32 CDIMMs physically installed (quad plugging rules).

To assist with the quad plugging rules above, four CDIMMs are ordered using one memory feature. Select from 64 GB feature EM8J (4x16 DDR3), 128 GB feature EM8K (4x32 DDR3), 256 GB feature EM8L (4x64 DDR3), 512 GB feature EM8M (4x128 DDR3), or 1024 GB feature EM8Y (4x256 DDR4).

All CDIMMs must be identical on the same SCM, so if you are using eight CDIMMs, both memory features on an SCM must be identical. A different SCM in the same system node can use a different memory feature. For example, one system node could technically use 64GB, 128GB, 256GB, and 512GB memory features. Note that DDR3 and DDR4 memory cannot be mixed on the same system node. With firmware 840, DDR3 and DDR4 memory cannot be mixed on the same multinode system.

To provide more flexible pricing, memory activations are ordered separately from the physical memory and can be permanent or temporary. Activation features can be used on either DDR3 or DDR4 memory features and used on any size memory feature. Activations are not specific to a CDIMM, but are known as a total quantity to the server. The Power hypervisor determines what physical memory to use. Memory activation features are:

- 1 GB Memory Activation (#EMA5) (static)
- 100 GB Memory Activations (#EMA6) (static)
- 100 GB Mobile Memory Activations (#EMA7)
- 100 GB Mobile Enabled Memory Activations (#EMA9) (technically static, but no charge to convert to mobile)
- 512 GB Memory Activations for Power IFL (#EMB8)
- 8 TB activations (#EMBA) ordered with 8TB memory using feature EM8Y CDIMMs
- 4 TB activations (#EMB7) ordered with 4TB memory using feature EMB6 package

A minimum of 50% of the total physical memory capacity of a server must have permanent memory activations ordered for that server. For example, a server with a total of 8 TB of physical memory must have at least 4 TB of permanent memory activations ordered for that server. These activations can be static, mobile-enabled, mobile, or Power IFL. At least 25% must be static activations or Power IFL activations. For example, a server with a total of 8 TB physical memory must

have at least 2 TB of static activations or Power IFL activations. The 50% minimum cannot be fulfilled using mobile activations ordered on a different server.

The minimum activations ordered with MES orders of additional physical memory features will depend on the existing total installed physical memory capacity and the existing total installed memory activation features. If you already have more than 50% activations ordered or installed for your existing system, then you can order less than 50% activations for the MES ordered memory. The resulting configuration after the MES order of physical memory and any MES activations must meet the same 50% and 25% minimum rules above.

For the best possible performance, it is generally 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 enables memory access in a consistent manner and typically results in better performance for your configuration.

Though maximum memory bandwidth is achieved by filling 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.

IBM Active Memory Expansion (AME) is an option that can increase the effective memory capacity of the system. See the Active Memory Expansion information later in the Description section.

System node PCIe slots

- Each system node enclosure provides excellent configuration flexibility and expandability with eight half-length, low-profile (half-high) 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 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 BSCs, even if the BSCs are empty. A feature number 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 PCIe adapters that are supported are found in the Sales Manual, identified by feature 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, the nodes automatically speed up the fans to increase airflow across the PCIe adapters.
- Each system node supports up to four CAPI adapters (one per SCM), which can be located in slots C2, C4, C6, or C8.

PCIe Gen3 I/O Expansion Drawer

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. The PCIe Gen3 I/O Expansion Drawer (#EMX0) and two PCIe Fan-Out Modules (#EMXF) provide 12 PCIe I/O full-length, full-height slots. One fan-out module provides six PCIe slots labeled C1 through C6. The C1 and C4 are x16 slots and C2, C3, C5, and C6 are x8 slots. Concurrent repair and add/removal of PCIe adapter cards is done by HMC-guided menus or by operating system support utilities.

PCIe Gen1, Gen2, and Gen3 full-high adapter cards are supported. The full-high PCIe adapters that are supported are found in the Sales Manual, identified by feature number. See the PCI Adapter Placement manual for details and rules

associated with specific adapters supported and their supported placement in x8 or x16 slots.

Up to four PCIe I/O drawers per node can be attached. Using two 6-slot fan-out modules per drawer provides a maximum of 48 PCIe slots per system node. With two system nodes, up to 96 PCIe Gen3 slots (8 I/O drawers) are supported.

Additional PCIe I/O drawer configuration flexibility is provided by the option of using a "half" drawer consisting of just one PCIe fan-out module in the I/O drawer. This enables a lower-cost configuration if fewer PCIe slots are required. Thus a system node supports the following half-drawer options: one half drawer, two half drawers, three half drawers, or four half drawers. Because there is a maximum of four EMX0 drawers per node, a single system node cannot have more than four half drawers. A server with more system nodes can support more half drawers, up to four per node. A system can also mix half drawers and full PCIe Gen3 I/O drawers. The maximum of four PCIe Gen3 drawers per system node applies whether a full or half PCIe drawer.

PCIe Gen3 drawers can be concurrently added to the server at a later time. The drawer being added can have either one or two fan-out modules. Note that adding a second fan-out module to a half-full drawer does require scheduling downtime.

PCIe Gen3 I/O Drawer attachment and cabling

- A PCIe X16 to Optical CXP converter adapter (#EJ07) and 2.0 M (#ECC6), 10.0 M (#ECC8), or 20 M (#ECC9) CXP 16X Active Optical cables (AOC) connect the system node to a PCIe Fan-Out Module in the I/O expansion drawer. One ECC6, ECC8, or ECC9 feature 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.
- **Recommendation:** One I/O drawer can 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.
- **Recommendation:** Any attached PCIe Gen3 I/O Expansion Drawer can 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. If attaching a large number of cables such as SAS cables or CAT5/CAT6 Ethernet cables to a PCIe Gen3 I/O drawer, then it is generally better to place that EMX0 in a separate rack for better cable management.

Limitation: When this cable is ordered with a system in a rack specifying IBM Plant integration, IBM Manufacturing will ship SAS cables longer than 3 meters in a separate box and not attempt to place the cable in the rack. This is because the longer SAS cable is probably used to attach to an EXP24S drawer in a different rack.

- A maximum of 16 EXP24s Drawers is needed per PCIe Gen3 Drawer (#EMX0) to enable SAS cables to be properly handled by the feature EMX0 cable management bracket.

A BSC is used to house the full-high adapters that go into the fan-out module slots. The BSC is the same BSC as used with the previous generation server's 12X attached I/O drawers (#5802, #5803, #5877, #5873) and is often referred to as a Gen3 cassette. The drawer is shipped with a full set of BSCs, even if the BSCs are empty. A feature number to order additional full-high BSC is not required or announced.

EXP24S disk/SSD drawer

- 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.

- The Power E870C server supports up to 3,072 drives with a maximum of 128 EXP24S drawers. The maximum of 16 EXP24S drawers per PCIe Gen3 I/O drawer due to cabling considerations remains unchanged.
- 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 HDDs or 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.
- **Recommendation:** For SAS cabling ease, locate the EXP24S drawer 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 IBM POWER7^(R) 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 number so that IBM configuration tools can better interpret what is required.
- A maximum of 16 EXP24s Drawers is needed per PCIe Gen3 Drawer (#EMX0) to enable SAS cables to be properly handled by the feature EMX0 cable management bracket.
- Clients booting from a disk or SSD that is not on a storage area network (SAN) have a specify option when ordering their server to better reflect their configuration on IBM configuration tools. Clients can specify they will be using an existing EXP24S I/O drawer (#5887) for their system boot drive by using specify feature ELS0. This enables a client upgrading with the same serial number or migrating to a new serial number system to avoid buying an additional EXP24S.
- A commonly used boot drive configuration for an EPX24S drawer (#5887) in mode 4 attached to four SAS adapters (#EJ0J full high or #EJ0M low profile) would use two X HD narrow 6Gb cables (#ECBJ-#ECBL) and a manufacturing specify code EJR5.

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:
 - Disk (HDD) or SSD located in an EXP24S drawer attached to a PCIe adapter
 - A network through LAN adapters
 - A SAN attached to Fibre Channel or Fibre Channel over Ethernet (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 HDD or SSD in the system for AIX and Linux and two for IBM i. If you are using option 3 above, an HDD or SSD drive is not required.
- For IBM i, a DVD drive must be available on the server when required.
- A DVD can optionally be in the system control unit or one or more DVDs can be located in an external enclosure such as a 7226-1U3 Multimedia drawer.

Racks

The Power E870C server 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). Clients 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. Clients should work with IBM Service to determine other racks' appropriateness. The Power E870C rails can adjust their depth to fit a rack that is 23.25 inches - 30.4375 inches in depth.

Recommendation: Order the Power E870C server 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 an equivalent 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 that provides 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 feature ER21 on the order to do this.

Five rack front door options are supported for the 42U enterprise rack (7014-T42 or #0553): the original acoustic door (#6249 (front and back) or #ERGB (front only)), the newer thinner acoustic door (#EC07/#EC08), the ruggedized door (#ERGD), the attractive geometrically accented door (#ERG7), and the cost-effective plain black front door (#6069). The front trim kit is also supported (#6272). The Power 780 logo rack door (#6250) is not supported.

When considering an acoustic door, note the majority of the acoustic value is provided by the front door because the servers' fans are mostly located in the front of the rack. Not including a rear acoustic door saves some floor space, which may make it easier to use the optional 8-inch expansion feature on the rear of the rack.

Recommendation: Leave the bottom 2U of the rack 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 20.3 cm (8 in.) (#ERG0) provides space to hold cables on the side of the rack and keep the center area clear for cooling and service access.

Recommendation: Include this extension when 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. Approximately 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 number 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.

Recommendation: To avoid any delay in service, it is 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).

PCIe Gen3 I/O Expansion Drawer and Racks

IBM Manufacturing can factory-integrate the PCIe Gen3 I/O Expansion Drawer (#EMX0) with new server orders. Because expansion drawers complicate the access to vertical PDUs if located at the same height, IBM recommends accommodating PDUs horizontally on racks containing one or more PCIe Gen3 I/O Expansion Drawers. Following this recommendation, IBM Manufacturing will always assemble the integrated rack configuration with horizontally mounted PDUs unless CRSP (#0469) is on the order. When specifying CRSP, the client will provide the locations where the PCIe Gen3 I/O Expansion Drawers must be placed, avoiding locating those adjacent to vertical PDU locations, EIA 6 through 16 and 21 through 31.

Additional 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 features on the same order as the I/O drawers. Use feature 0553 (42U enterprise rack) for this order. Regardless of the rack-integrated system to which the PCIe Gen3 I/O Expansion Drawer is attached, if the Expansion Drawer is ordered as factory-integrated, the PDUs in the rack will be defaulted to be placed horizontally to enhance cable management. Vertical PDUs can be used only if CRSP (#0469) is on the order.

After the rack with Expansion Drawers is delivered to the client, the client is allowed to rearrange the PDUs from horizontal to vertical. However, the IBM configurator tools will continue to assume that the PDUs are placed horizontally for the matter of calculating the free space still available in the rack for additional future orders.

Power distribution units (PDU)

- The Power E870C 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 opening 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 at least two of either feature 7109, 7188, or 7196.
 - Feature 7109: Intelligent PDU with Universal UTG0247 Connector is for an intelligent AC power distribution unit (PDU+) that will enable 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.
 - Feature 7196: Three-phase Power Distribution Unit provides six C19 power outlets and is rated up to 48A. It has a 4.3 m (14 ft) fixed power cord to attach to the power source (IEC309 60A plug (3P+G)). A separate "to-the-wall" power cord is not required or orderable. Use the Power Cord 2.8 m (9.2 ft), Drawer to Wall/IBM PDU, (250V/10A) (#6665) to connect devices to this PDU. These power cords are different than the ones used on the feature 7188 and 7109 PDUs. Supported countries for the feature 7196 PDU are Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Indonesia, Jamaica, Japan, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Puerto Rico, Surinam, Taiwan, Trinidad and Tobago, United States, and Venezuela.

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.
- An alternative to using AC power is DC power. Four DC power supplies are used: Power Chunnel (#EBAD)

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 1, and two UPIC cables attach to system node 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.

Hot-plug options

The following options are hot-plug capable:

- PCIe I/O adapters.
- PCIe Gen3 I/O Drawers.
- 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.
- EXP24S SAS Storage enclosure drawer.
- Drives in the EXP24S Storage enclosure drawer.

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 [IBM Knowledge Center](#).

PowerVM

PowerVM Enterprise virtualization is built into the Power E870C 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 enables 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 E870C 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 underutilized machines so that they can be powered off to save on energy and cooling costs. Active Memory Sharing enables 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.

Active Memory Expansion

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

The POWER8 chip includes a hardware accelerator designed to boost Active Memory Expansion efficiency and uses less POWER^(R) core resource. 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. When they are 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, enabling 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 at the [Power Systems Capacity on Demand](#) web page.

Active Memory Expansion is enabled by chargeable hardware feature EM82, which can be ordered with the initial order of the system 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 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.

Active Memory Mirroring

The Power E870C server offers the Active Memory Mirroring for Hypervisor feature, which is designed to prevent a system outage in the event of an uncorrectable error in memory being used by the system hypervisor.

IBM i operating system

For clients loading the IBM i operating system, the four-digit numeric QPRCFEAT value is generally the same as the four-digit numeric feature number for the processors used in the system. The special ordering processor features used for the CBU for PowerHA are exceptions to this rule. For the Power E870C:

- Processor feature EPBA (4.02 GHz 32-core node) -- QPRCFEAT value for the system is EPBA.

If the highly efficient 5250 OLTP function is to be used on the server, order one or more EB2R feature or order the full system 5250 enablement feature EB30. Feature EB2R provides one processor core's worth of 5250 capacity, which can be spread across multiple physical processor cores or multiple partitions. Feature EB30 provides unlimited 5250 capacity on that server.

Capacity on demand

Several types of CoD processors and memory are available. 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 CoD

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 (physical HMC or virtual appliance) 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. Billing features specific to the processor feature and ordered as hardware MES

orders against the server are used. Before using temporary capacity on your server, you must enable your server.

Elastic CoD processor-related features can vary by the processor feature.

32-core 4.02 GHz (#EPBA)
90X-day enablement (#EP9T)
1-day elastic billing feature using AIX/Linux (#EPJ6)
1-day elastic billing feature using IBM i (#EPJ7)
100-day elastic billing feature using AIX/Linux (#EPJ8)
100-day elastic billing feature using IBM i (#EPJ9)

Elastic CoD memory-related features are the same across the processor features or operating system.

- 90X-day enablement (#EM9T)
- 8 GB-day elastic billing feature (#EMJ4)
- 800 GB-day elastic billing feature (#EMJ5)
- 999 GB-day elastic billing feature (#EMJ6)

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.

Utility CoD processor-related billing features vary by the processor feature.

32-core 4.02 GHz (#EPBA)
100-minute utility billing feature using IBM i (#EPJB)
100-minute utility billing feature using AIX/Linux (#EPJA)

Utility CoD is focused on processor cores and does not include temporary memory activations.

Trial CoD

Trial CoD provides the ability to activate inactive processors or memory for up to 30 days at no additional cost.

For more information on Elastic, Utility, and Trial CoD, see the [Power Systems Capacity on Demand](#) website.

Power Enterprise Pools

Power Enterprise Pools deliver the support to meet clients' business goals when it comes to:

- 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

When established, Power Enterprise Pools 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 or notification. This capability enables 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. This capability is especially appealing to aid in providing continuous application availability during maintenance windows.

In addition to memory and processor activations, some specific IBM licensing entitlements can also be moved along with the processor core activations. For example, if server A and B were in the same pool and you moved 10 processor activations from A to B, you could also move up to 10 AIX or IBM i license entitlements, assuming the entitlements were no longer required for use on server A. At least one license for each server involved in the entitlement transfer must be installed. Eligible software is AIX, IBM i, Systems Director, VMControl, PowerSC™, PowerHA, and PowerVC.

Like the specific software above, IBM i clients can move 5250 Enterprise Enablement along with the processor core activations, assuming the enablements were no longer required on server A. At least one 5250 enablement for each server involved in the entitlement must be installed.

Power Enterprise Pools mobile activations are available for use on the Power 770, 780, and 795 systems, Power E870 and Power E880 systems, and now on the Power E870C and E880C systems. Two types of Power Enterprise Pools can be created:

- A midrange pool that can consist of Power 770 (9117-MMD), Power E870 (9119-MME), Power E870C (9080-MME), and Power E880C (9080-MHE) servers.
- A high-end pool that can consist of Power 780 (9179 -MHD), Power 795 (9119-FHB), Power E880 (9119-MHE), Power E870C (9080-MME), and Power E880C (9080-MHE) servers.
- Both pools enable 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 a pool must be within one country. (The EU is treated as one country.)

Mobile and static activations

A 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, 795, E880, and E870 and are announced on the E870C and E880C, 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 Power E870C and E880C servers 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 be in the same system and in the same partition. Mobile activation features 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. There is often a price advantage to initially buying a mobile-enabled activation with a no-charge conversion to mobile compared to initially buying a static activation and converting to mobile.

The mobile activation features for the Power E870C server are as follows:

- Memory

- 100 GB Mobile Memory Activation (#EMA7)
- 100 GB Mobile Enabled Memory Activation (#EMA9)
- Processor - Mobile-enabled (technical static, financially mobile)
- 1-core Mobile-Enabled Activation for EPBA 4.02GHz (#EPBN)
- Processor - Mobile
- 1-core Mobile Processor Activation (#EP2S)

The mobile activation feature numbers for the Power E870 server are the same as for the Power E870C server. See the Power 780 (D model) and Power 795 for their corresponding mobile activation features, which can be shared across high-end Power Enterprise Pools.

Additional features help enable the administrative records transfer of Enterprise Pools enablement and mobile memory activations during upgrades from a Power 770 server to a Power E870C server.

- 100 GB Mobile Memory Activation (#EMAF)
- 100 GB Mobile Enabled Memory Activations (#EMAG)
- 1 Mobile processor activation (#EP2U)

The Power Enterprise Pools mobile activation features continue to exist for the Power 770, 780, and 795 servers and can co-exist in the same pool as the Power E870 and E870C features. The Power 770, 780, and 795 mobile activations features are described below.

Power Enterprise Pools and the HMC

Each Power Enterprise Pool has a single master HMC (physical hardware HMC or a virtual appliance (vHMC)). The HMC that is used to create a Power Enterprise Pool is set as the master HMC of that pool. After a Power Enterprise Pool is created, under HMC firmware level 8.4, a single additional managing HMC can be configured. Either of these HMCs can do typical HMC tasks, but only the master HMC can do Power Enterprise Pool tasks. With HMC firmware 8.5, multiple managing HMCs can be configured for the pool. Under HMC firmware 8.5, all Power Enterprise Pool resource assignments must be performed by the master HMC, but any managing HMC connected to the master HMC offers a user interface to request Power Enterprise Pool tasks.

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 midrange systems. An HMC can manage multiple Power Enterprise Pools but is limited to 1,000 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 in the Power Enterprise Pool offering, a Power E870C server can participate in either a high-end Enterprise Pool or a midrange Enterprise Pool. Therefore, a Power E870C server can participate in a high-end pool, which must be one of the following:

- IBM Power E880C with POWER8 processors, designated as 9080-MHE
- IBM Power E870C with POWER8 processors, designated as 9080-MME
- IBM Power E880 with POWER8 processors, designated as 9119-MHE
- IBM Power 795 with POWER7 processors, designated as 9119-FHB
- IBM Power 780 with POWER7 + processors, designated as 9179-MHD

Alternatively, a Power E870C server can participate in a midrange pool, which must be one of the following:

- IBM Power E880C with POWER8 processors, designated as 9080-MHE
- IBM Power E870C with POWER8 processors, designated as 9080-MME
- IBM Power E870 with POWER8 processors, designated as 9119-MME
- IBM Power 770 with POWER7 + processors, designated as 9117-MMD

Each E880C and E870C system must have installed Machine Code release level 840.30, 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

Information for ordering and enabling mobile activations can be found at the [Power Systems Capacity on Demand PDF](#).

Adding or removing systems from Power Enterprise Pools

Adding or removing a system or any mobile resource associated with the 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. Contact your IBM representative for more information.

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.

Power Integrated Facility for Linux

Power IFL enables users to easily acquire processor and memory activations on their enterprise-class Power Systems for use with their Linux operating systems and do so at pricing that is comparable to x86 systems. Users can reduce the complexity of operations associated with server sprawl by consolidating disparate, redundant, or underutilized Linux servers while taking advantage of enterprise-level resources, processes, and skills that are already in place. Power IFL is designed to enable clients to better exploit the performance, reliability, and scale of enterprise-class

Power servers to improve quality of service and reduce the cost of managing their Linux ecosystem.

A consolidated environment for Linux workloads offers the following benefits to the enterprise environment:

- Improves scaling performance
- Delivers virtual network connections
- Improves security
- Offers seamless added capacity without interruption
- Reduces overhead
- Improves disaster recovery processes

Power IFLs represent a virtual stack engine using CoD IFL activations for enterprise-class systems. Enablement is packaged in units of four processor core activations, 32 GB of memory activations, and four PowerVM for Linux licenses. There are also savings with PowerVM software maintenance and hardware maintenance.

Order as many ELJG package features as wanted, up to 100% of the server's cores. Each ELJG package provides four processor core activations (#ELJ5 or #ELJ6 depending on the gigahertz) and 32 GB memory activations (#ELJH) and four PowerVM for Linux entitlements (#ELJJ). Separate Power IFL memory activations can be ordered using a 512 GB bundle (#EMB8).

Power IFL activations can only run Linux workloads. AIX or IBM i workloads can not be run with these activations.

Capacity BackUp for IBM i

The 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 9080-MME. 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 Power E870C server can be any of the following:

- 9080-MHE
- 9080-MME
- 9119-MHE
- 9119-MME
- 9119-FHB
- 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 later. 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 770 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, go to the [IBM Capacity Backup for Power Systems](#) website.

Power 770 serial number protected upgrade to Power E870C

Power 770 (9117-MMD) upgrades to a Power E870C (9080-MME) server is supported. This gives Power 770 "D model" clients who choose the E870C server additional growth options in processor cores, gigahertz, maximum memory, and maximum I/O. Multiple feature conversions are introduced to provide the underlying ordering capability for this upgrade.

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 that are 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 is 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 and 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 enables 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, enabling 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 that was 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 enables 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 Special Uncorrectable Error (SUE) 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 processors 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, enable 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 client, 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 enables 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 enables the normal system functions to continue while selected resources are being checked.
- Maintenance mode enables checking of devices and adapters.

Note: Because the 9080-MHE and 9080-MME 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 enables 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 enables 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 illuminates 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 rolls 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, indicating where to place 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, that detail 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 the operating system 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. Client 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 clients with critical workloads that 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 processor menus (ASMI) can be accessed concurrently with system operation, enabling nondisruptive abilities to change system default parameters.

Call home

Call home refers to an automatic or manual call from a client 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. See 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 clients. 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 client'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 client and the IBM support team. As part of an increased focus to provide even better service to IBM clients, 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 the [IBM Electronic Service Agent website](#).

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 client 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 clients a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a client's system.

For additional information, go to the [IBM Electronic Service Agent](#) website.

More accurate reporting

Because system information and error logs are automatically uploaded to the IBM Support Center in conjunction with the service request, clients 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 IBMid entered during activation, clients 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 clients 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 client's IBMid. 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, clients 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, go to the [Support Portal](#) website or contact an IBM Systems Services Representative

PowerCare service

Included with Power E870C system is a Power Care 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 E870C 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 Power Care option is included with new Power E870C systems and MES upgrades into a Power E870C server. The Lab Services PowerCare team will contact the account team/client 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 client has up to 90 days from the installation date of the Power E870C server to select a Power Care offering. Delivery of the selected service must be completed within nine months of the installation date of the Power E870C system.

For more details on available PowerCare options, go to the [PowerCare support](#) website.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the [Product accessibility information](#) website.

Section 508 of the US Rehabilitation Act

IBM Power System E870C is capable as of September 29, 2016, when used in accordance with IBM's associated 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 found on the [Product accessibility information](#) website.

Statement of general direction

IBM plans to deliver a 48-core Power E850 system configuration designed to support up to 4 TB of HANA production database workload.

IBM intends to release a new HMC Apps as a Service offering that is planned to provide clients the capability to aggregate Power Systems performance and inventory data from across their enterprise, removing the burden of manual collection and aggregation of system information. IBM intends to host these IBM developed applications in a secure cloud and intends to provide health state, geo tagging, and threshold alerts that can be accessed through a secure portal from clients' mobile devices. IBM intends to entitle clients who purchase a new Power E870C server to this new service offering for no additional charge and without having to install any new software or infrastructure. The performance and inventory applications are initially planned to be offered in a technology preview in 2016 and with general availability planned for 2017.

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 remain at our sole discretion.

Reference information

Refer to Hardware Announcement [114-158](#), dated October 6, 2014, for IBM Power System E880 Server.

Refer to Hardware Announcement [114-160](#), dated October 6, 2014, for IBM Power System E870 Server.

Product number

The following are newly announced features on the specific models of the IBM Power Systems 9080 machine type:

Description	Machine type	Model	Feature number
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IBM Power System E870C	9080	MME	
One CSC Billing Unit	9080	MME	0010
Ten CSC Billing Units	9080	MME	0011
Mirrored System Disk Level, Specify Code	9080	MME	0040
Device Parity Protection-All, Specify Code	9080	MME	0041
Mirrored System Bus Level, Specify Code	9080	MME	0043
Device Parity RAID-6 All, Specify Code	9080	MME	0047
RISC-to-RISC Data Migration	9080	MME	0205
AIX Partition Specify	9080	MME	0265
Linux Partition Specify	9080	MME	0266
IBM i Operating System Partition Specify	9080	MME	0267
Specify Custom Data Protection	9080	MME	0296
Mirrored Level System Specify Code	9080	MME	0308
RAID Hot Spare Specify	9080	MME	0347
V.24/EIA232 6.1m (20-Ft) PCI Cable	9080	MME	0348
V.35 6.1m (20-Ft) PCI Cable	9080	MME	0353
X.21 6.1m (20-Ft) PCI Cable	9080	MME	0359
UPS Factory Integration Specify	9080	MME	0373
HMC Factory Integration Specify	9080	MME	0374
Display Factory Integration Specify	9080	MME	0375
Reserve Rack Space for UPS	9080	MME	0376
Reserve Rack Space for HMC	9080	MME	0377
Reserve Rack Space for Display	9080	MME	0378
SSD Placement Indicator - 5887, EL1S	9080	MME	0465
19 inch, 1.8 meter high rack	9080	MME	0551
19 inch, 2.0 meter high rack	9080	MME	0553
IBM i 7.1 Specify Code	9080	MME	0567
Rack Filler Panel Kit	9080	MME	0599
EXP24S SFF Gen2 Load Source Specify (#5887 or #EL1S)	9080	MME	0728
SAN Load Source Specify	9080	MME	0837
#1947 Load Source Specify (139GB 15k RPM SAS SFF-2 Disk Drive for IBM i)	9080	MME	0871
#1948 Load Source Specify (283GB 15k RPM SAS SFF-2 Disk)	9080	MME	0872
#1956 Load Source Specify (283GB 10k RPM SAS SFF-2 Disk)	9080	MME	0874
#1962 Load Source Specify (571GB 10k RPM SAS SFF-2 Disk)	9080	MME	0875
#1738 Load Source Specify (856GB 10k RPM SAS SFF-2 Disk)	9080	MME	0880
#ES0D Load Source Specify (387GB SFF-2 SSD for IBM i)	9080	MME	0894
#ESD2 Load Source Specify (1.1TB 10k SFF-2)	9080	MME	0911
US TAA Compliance Indicator	9080	MME	0983
Product assembled in USA manufacturing plant	9080	MME	0984
Modem Cable - US/Canada and General Use	9080	MME	1025
USB 160 GB Removable Disk Drive	9080	MME	1106
USB 500 GB Removable Disk Drive	9080	MME	1107
Decline Electronic Service Agent Install Indicator	9080	MME	1120
Custom Service Specify, Rochester Minn, USA	9080	MME	1140
856GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9080	MME	1738
900GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9080	MME	1752
Quantity 150 of #1962	9080	MME	1817
Quantity 150 of #1964	9080	MME	1818
Quantity 150 of #1956	9080	MME	1844
Quantity 150 of #1917	9080	MME	1866
Quantity 150 of #1947	9080	MME	1868
Quantity 150 of #1925	9080	MME	1869
146GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9080	MME	1917
300GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9080	MME	1925
Quantity 150 of #1948	9080	MME	1927
Quantity 150 of #1953	9080	MME	1929
139GB 15k RPM SAS SFF-2 Disk Drive (IBM i)	9080	MME	1947
283GB 15k RPM SAS SFF-2 Disk Drive (IBM i)	9080	MME	1948
300GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9080	MME	1953
283GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9080	MME	1956
571GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9080	MME	1962

600GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9080	MME	1964
Primary OS - IBM i	9080	MME	2145
Primary OS - AIX	9080	MME	2146
Primary OS - Linux	9080	MME	2147
2M LC-SC 50 Micron Fiber Converter Cable	9080	MME	2456
2M LC-SC 62.5 Micron Fiber Converter Cable	9080	MME	2459
PCIe 2-Line WAN w/Modem	9080	MME	2893
3M Asynchronous Terminal/Printer Cable EIA-232	9080	MME	2934
Asynchronous Cable EIA-232/V.24 3M	9080	MME	2936
Serial-to-Serial Port Cable for Drawer/Drawer-3.7M	9080	MME	3124
Serial-to-Serial Port Cable for Rack/Rack- 8M 1m, (3.3-ft) IB 40G Copper Cable QSFP/QSFP	9080	MME	3125
3m, (9.8-ft.) IB 40G Copper Cable QSFP/QSFP	9080	MME	3287
5m QDR IB/E'Net Copper Cable QSFP/QSFP	9080	MME	3288
10 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	9080	MME	3289
30 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	9080	MME	3290
SAS YO Cable 1.5m - HD 6Gb Adapter to Enclosure	9080	MME	3293
SAS YO Cable 3m - HD 6Gb Adapter to Enclosure	9080	MME	3450
SAS YO Cable 6m - HD 6Gb Adapter to Enclosure	9080	MME	3451
SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	9080	MME	3452
SAS X Cable 3m - HD 6Gb 2-Adapter to Enclosure	9080	MME	3453
SAS X Cable 6m - HD 6Gb 2-Adapter to Enclosure	9080	MME	3454
SAS X Cable 10m - HD 6Gb 2-Adapter to Enclosure	9080	MME	3455
SAS X Cable 15m - HD 3Gb Adapter to Enclosure	9080	MME	3456
SAS YO Cable 15m - HD 3Gb Adapter to Enclosure	9080	MME	3457
SAS X Cable 15m - HD 3Gb 2-Adapter to Enclosure	9080	MME	3458
Widescreen LCD Monitor	9080	MME	3632
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 3M:	9080	MME	3661
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 6M:	9080	MME	3662
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 15M:	9080	MME	3663
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 1.5 M	9080	MME	3691
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 3 M	9080	MME	3692
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 6 M	9080	MME	3693
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 15 M	9080	MME	3694
0.3M Serial Port Converter Cable, 9-Pin to 25-Pin	9080	MME	3925
Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M	9080	MME	3927
Serial Port Null Modem Cable, 9-pin to 9-pin, 10M	9080	MME	3928
System Serial Port Converter Cable	9080	MME	3930
1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)	9080	MME	4242
Extender Cable - USB Keyboards, 1.8M	9080	MME	4256
VGA to DVI Connection Converter	9080	MME	4276
Rack Indicator- Not Factory Integrated	9080	MME	4650
Rack Indicator, Rack #1	9080	MME	4651
Rack Indicator, Rack #2	9080	MME	4652
Rack Indicator, Rack #3	9080	MME	4653
Rack Indicator, Rack #4	9080	MME	4654
Rack Indicator, Rack #5	9080	MME	4655
Rack Indicator, Rack #6	9080	MME	4656
Rack Indicator, Rack #7	9080	MME	4657
Rack Indicator, Rack #8	9080	MME	4658
Rack Indicator, Rack #9	9080	MME	4659
Rack Indicator, Rack #10	9080	MME	4660
Rack Indicator, Rack #11	9080	MME	4661
Rack Indicator, Rack #12	9080	MME	4662
Rack Indicator, Rack #13	9080	MME	4663
Rack Indicator, Rack #14	9080	MME	4664
Rack Indicator, Rack #15	9080	MME	4665
Rack Indicator, Rack #16	9080	MME	4666
CBU SPECIFY	9080	MME	4891
Software Preload Required	9080	MME	5000
PowerVM Enterprise Edition	9080	MME	5228
PCIe2 LP 4-port 1GbE Adapter	9080	MME	5260

PCIe LP POWER GXT145 Graphics Accelerator	9080	MME	5269
PCIe LP 10Gb FCoE 2-port Adapter	9080	MME	5270
PCIe LP 4-Port 10/100/1000 Base-TX Ethernet Adapter			
PCIe LP 8Gb 2-Port Fibre Channel Adapter	9080	MME	5271
PCIe LP 2-Port 1GbE SX Adapter	9080	MME	5274
PCIe LP 4Gb 2-Port Fibre Channel Adapter	9080	MME	5276
PCIe LP 4-Port Async EIA-232 Adapter	9080	MME	5277
PCIe LP 2-Port 1GbE TX Adapter	9080	MME	5281
PCIe2 LP 2-Port 4X IB QDR Adapter 40Gb	9080	MME	5283
PCIe2 LP 2-port 10GbE SR Adapter	9080	MME	5284
PCIe2 2-Port 4X IB QDR Adapter 40Gb	9080	MME	5285
PCIe2 2-port 10GbE SR Adapter	9080	MME	5287
Sys Console On HMC	9080	MME	5550
System Console-Ethernet LAN adapter	9080	MME	5557
10Gb FCoE PCIe Dual Port Adapter	9080	MME	5708
4-Port 10/100/1000 Base-TX PCI Express Adapter	9080	MME	5717
PCIe2 8Gb 4-port Fibre Channel Adapter	9080	MME	5729
8 Gigabit PCI Express Dual Port Fibre Channel Adapter	9080	MME	5735
PCIe2 4-Port 10GbE&1GbE SR&RJ45 Adapter	9080	MME	5744
2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	9080	MME	5767
2-Port Gigabit Ethernet-SX PCI Express Adapter	9080	MME	5768
10 Gigabit Ethernet-SR PCI Express Adapter	9080	MME	5769
10 Gigabit Ethernet-LR PCI Express Adapter	9080	MME	5772
4 Gigabit PCI Express Dual Port Fibre Channel Adapter	9080	MME	5774
4 Port Async EIA-232 PCIe Adapter	9080	MME	5785
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	9080	MME	5805
EXP24S SFF Gen2-bay Drawer	9080	MME	5887
PCIe2 4-port 1GbE Adapter	9080	MME	5899
PCIe Dual-x4 SAS Adapter	9080	MME	5901
PCIe2 1.8GB Cache RAID SAS Adapter Tri-port 6Gb	9080	MME	5913
SAS AA Cable 3m - HD 6Gb Adapter to Adapter	9080	MME	5915
SAS AA Cable 6m - HD 6Gb Adapter to Adapter	9080	MME	5916
SAS AA Cable 1.5m - HD 6Gb Adapter to Adapter	9080	MME	5917
SAS AA Cable 0.6m - HD 6Gb Adapter to Adapter	9080	MME	5918
Non-paired Indicator 5913 PCIe SAS RAID Adapter	9080	MME	5924
Opt Front Door for 1.8m Rack	9080	MME	6068
Opt Front Door for 2.0m Rack	9080	MME	6069
1.8m Rack Trim Kit	9080	MME	6246
2.0m Rack Trim Kit	9080	MME	6247
1.8m Rack Acoustic Doors	9080	MME	6248
2.0m Rack Acoustic Doors	9080	MME	6249
1.8m Rack Trim Kit	9080	MME	6263
2.0m Rack Trim Kit	9080	MME	6272
Power Cord 4.3m (14-ft), Drawer to wall/IBM PDU (250V/10A)	9080	MME	6458
Power Cord 4.3m (14-ft), Drawer To OEM PDU (125V, 15A)	9080	MME	6460
Power Cord 4.3m (14-ft), Drawer to wall/OEM PDU (250V/15A) U. S.	9080	MME	6469
Power Cord 1.8m (6-ft), Drawer to wall (125V/15A)	9080	MME	6470
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (250V/10A)	9080	MME	6471
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (250V/16A)	9080	MME	6472
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (250V/10A)	9080	MME	6473
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/13A)	9080	MME	6474
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/16A)	9080	MME	6475
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	9080	MME	6476
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/16A)	9080	MME	6477
Power Cord 2.7 M(9-foot), To wall/OEM PDU, (250V, 16A)	9080	MME	6478
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (125V/15A or 250V/10A)	9080	MME	6488
4.3m (14-Ft) 3PH/24A 380-415V Power Cord	9080	MME	6489
4.3m (14-Ft) 1PH/63A 200-240V Power Cord	9080	MME	6491

4.3m (14-Ft) 1PH/48-60A 200-240V Power Cord	9080	MME	6492
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	9080	MME	6493
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	9080	MME	6494
Power Cord 2.7M (9-foot), To wall/OEM PDU, (250V, 10A)	9080	MME	6496
Power Cable - Drawer to IBM PDU, 200-240V/10A	9080	MME	6577
Optional Rack Security Kit	9080	MME	6580
Modem Tray for 19-Inch Rack	9080	MME	6586
Power Cord 2.7M (9-foot), To wall/OEM PDU, (125V, 15A)	9080	MME	6651
4.3m (14-Ft) 3PH/16A 380-415V Power Cord	9080	MME	6653
4.3m (14-Ft) 1PH/24-30A Pwr Cord	9080	MME	6654
4.3m (14-Ft) 1PH/24-30A WR Pwr Cord	9080	MME	6655
4.3m (14-Ft)1PH/24A Power Cord	9080	MME	6656
4.3m (14-Ft) 1PH/32A Power Cord	9080	MME	6657
4.3m (14-Ft) 1PH/24A Pwr Cd-Korea	9080	MME	6658
Power Cord 2.7M (9-foot), To wall/OEM PDU, (250V, 15A)	9080	MME	6659
Power Cord 4.3m (14-ft), Drawer to wall/OEM PDU (125V/15A)	9080	MME	6660
Power Cord 2.8m (9.2-ft), Drawer to wall/IBM PDU, (250V/10A)	9080	MME	6665
4.3m (14-Ft) 3PH/32A 380-415V Power Cord-Australia	9080	MME	6667
Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)	9080	MME	6669
Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A	9080	MME	6671
Power Cord 2M (6.5-foot), Drawer to IBM PDU, 250V/10A	9080	MME	6672
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	9080	MME	6680
Intelligent PDU+, 1 EIA Unit, Universal UTG0247 Connector	9080	MME	7109
Environmental Monitoring Probe	9080	MME	7118
Power Distribution Unit	9080	MME	7188
Power Distribution Unit (US) - 1 EIA Unit, Universal, Fixed Power Cord	9080	MME	7196
SDI Software Pre-Install Indicator	9080	MME	7305
2.0m Rack Side Attach Kit	9080	MME	7780
Ethernet Cable, 15m, Hardware Management Console to System Unit	9080	MME	7802
Side-by-Side for 1.8m Racks	9080	MME	7840
Ruggedize Rack Kit	9080	MME	7841
Base Customer Spec Plcmnt	9080	MME	8453
USB Mouse	9080	MME	8845
Order Routing Indicator- System Plant	9080	MME	9169
Language Group Specify - US English	9080	MME	9300
specify mode-1 & (1)5901/5278 for EXP24S #5887/EL1S	9080	MME	9359
Specify mode-1 & (2)5901/5278 for EXP24S #5887/EL1S	9080	MME	9360
Specify mode-2 & (2)5901/5278 for EXP24S #5887/EL1S	9080	MME	9361
Specify mode-4 & (4)5901/5278 for EXP24S #5887/EL1S	9080	MME	9365
Specify mode-2 & (4)5901/5278 for EXP24S #5887/EL1S	9080	MME	9366
Specify mode-1 & (2)5903/5805 for EXP24S #5887/EL1S	9080	MME	9367
Specify mode-2 & (4)5903/5805 for EXP24S #5887/EL1S	9080	MME	9368
Specify mode-1 & (2) 5913 for EXP24S #5887/EL1S	9080	MME	9385
Specify mode-2 & (4) 5913 for EXP24S #5887/EL1S	9080	MME	9386
New AIX License Core Counter	9080	MME	9440
New IBM i License Core Counter	9080	MME	9441
New Red Hat License Core Counter	9080	MME	9442
New SUSE License Core Counter	9080	MME	9443
Other AIX License Core Counter	9080	MME	9444
Other Linux License Core Counter	9080	MME	9445

3rd Party Linux License Core Counter	9080	MME	9446
VIOS Core Counter	9080	MME	9447
Other License Core Counter	9080	MME	9449
Ubuntu Linux License Core Counter	9080	MME	9450
Month Indicator	9080	MME	9461
Day Indicator	9080	MME	9462
Hour Indicator	9080	MME	9463
Minute Indicator	9080	MME	9464
Qty Indicator	9080	MME	9465
Countable Member Indicator	9080	MME	9466
Language Group Specify - Dutch	9080	MME	9700
Language Group Specify - French	9080	MME	9703
Language Group Specify - German	9080	MME	9704
Language Group Specify - Polish	9080	MME	9705
Language Group Specify - Norwegian	9080	MME	9706
Language Group Specify - Portuguese	9080	MME	9707
Language Group Specify - Spanish	9080	MME	9708
Language Group Specify - Italian	9080	MME	9711
Language Group Specify - Canadian French	9080	MME	9712
Language Group Specify - Japanese	9080	MME	9714
Language Group Specify - Traditional Chinese (Taiwan)	9080	MME	9715
Language Group Specify - Korean	9080	MME	9716
Language Group Specify - Turkish	9080	MME	9718
Language Group Specify - Hungarian	9080	MME	9719
Language Group Specify - Slovakian	9080	MME	9720
Language Group Specify - Russian	9080	MME	9721
Language Group Specify - Simplified Chinese (PRC)	9080	MME	9722
Language Group Specify - Czech	9080	MME	9724
Language Group Specify -- Romanian	9080	MME	9725
Language Group Specify - Croatian	9080	MME	9726
Language Group Specify -- Slovenian	9080	MME	9727
Language Group Specify - Brazilian Portuguese	9080	MME	9728
Language Group Specify - Thai	9080	MME	9729
QSFP+ 40GBase-SR Transceiver	9080	MME	EB27
1m (3.3-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)	9080	MME	EB2B
3m (9.8-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)	9080	MME	EB2H
10m (30.3-ft), IBM Passive QSFP+ MTP Optical Cable	9080	MME	EB2J
30m (90.3-ft), IBM Passive QSFP+ MTP Optical Cable	9080	MME	EB2K
Single 5250 Enterprise Enablement	9080	MME	EB2R
Lift Tool	9080	MME	EB2Z
Full 5250 Enterprise Enablement	9080	MME	EB30
Mobile Enablement	9080	MME	EB35
IBM i 7.2 Indicator	9080	MME	EB72
IBM i 7.3 Indicator	9080	MME	EB73
5U system node drawer	9080	MME	EBA0
IBM Rack-mount Drawer Bezel and Hardware	9080	MME	EBA2
OEM Rack-mount Drawer Bezel and Hardware	9080	MME	EBA4
HVDC PDU Horizontal Mounting	9080	MME	EBA5
AC Power Chunnels	9080	MME	EBAA
DC Power Chunnels	9080	MME	EBAD
1.6M USB Cable	9080	MME	EBK4
Rack Front Door (Black)	9080	MME	EC01
Rack Rear Door	9080	MME	EC02
Rack Side Cover	9080	MME	EC03
Rack Suite Attachment Kit	9080	MME	EC04
Slim Rear Acoustic Door	9080	MME	EC07
Slim Front Acoustic Door	9080	MME	EC08
Rear Door Heat Exchanger for 2.0 Meter Slim Rack	9080	MME	EC15
CAPI Activation	9080	MME	EC18
PCIe2 LP 2-Port 10GbE RoCE SFP+ Adapter	9080	MME	EC27
PCIe2 2-Port 10GbE RoCE SFP+ Adapter	9080	MME	EC28
PCIe2 LP 2-Port 10GbE RoCE SR Adapter	9080	MME	EC29
PCIe2 LP 2-port 10GbE SFN6122F Adapter	9080	MME	EC2G
PCIe2 2-port 10GbE SFN6122F Adapter	9080	MME	EC2J
PCIe3 LP 2-port 10GbE NIC&RoCE SR Adapter	9080	MME	EC2M
PCIe3 2-port 10GbE NIC&RoCE SR Adapter	9080	MME	EC2N
PCIe2 2-Port 10GbE RoCE SR Adapter	9080	MME	EC30
PCIe3 LP 2-port 10GbE NIC&RoCE SFP+ Copper Adapter	9080	MME	EC37

PCIe3 2-port 10GbE NIC&RoCE SFP+ Copper Adapter	9080	MME	EC38
PCIe3 LP 2-Port 40GbE NIC RoCE QSFP+ Adapter	9080	MME	EC3A
PCIe3 2-Port 40GbE NIC RoCE QSFP+ Adapter	9080	MME	EC3B
PCIe2 LP 3D Graphics Adapter x1	9080	MME	EC41
PCIe2 LP 4-Port USB 3.0 Adapter	9080	MME	EC45
PCIe2 4-Port USB 3.0 Adapter	9080	MME	EC46
PCIe3 LP 1.6TB NVMe Flash Adapter	9080	MME	EC54
PCIe3 LP 3.2TB NVMe Flash Adapter	9080	MME	EC56
SAS X Cable 3m - HD Narrow 6Gb 2-Adapters to Enclosure	9080	MME	ECBJ
SAS X Cable 6m - HD Narrow 6Gb 2-Adapters to Enclosure	9080	MME	ECBK
SAS X Cable 10m - HD Narrow 6Gb 2-Adapters to Enclosure	9080	MME	ECBL
SAS X Cable 15m - HD Narrow 3Gb 2-Adapters to Enclosure	9080	MME	ECBM
5m (16.4-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)	9080	MME	ECBN
SAS YO Cable 1.5m - HD Narrow 6Gb Adapter to Enclosure	9080	MME	ECBT
SAS YO Cable 3m - HD Narrow 6Gb Adapter to Enclosure	9080	MME	ECBU
SAS YO Cable 6m - HD Narrow 6Gb Adapter to Enclosure	9080	MME	ECBV
SAS YO Cable 10m - HD Narrow 6Gb Adapter to Enclosure	9080	MME	ECBW
SAS YO Cable 15m - HD Narrow 3Gb Adapter to Enclosure	9080	MME	ECBX
SAS AE1 Cable 4m - HD Narrow 6Gb Adapter to Enclosure	9080	MME	ECBY
SAS YE1 Cable 3m - HD Narrow 6Gb Adapter to Enclosure	9080	MME	ECBZ
SAS AA Cable 0.6m - HD Narrow 6Gb Adapter to Adapter	9080	MME	ECC0
SAS AA Cable 1.5m - HD Narrow 6Gb Adapter to Adapter	9080	MME	ECC2
SAS AA Cable 3m - HD Narrow 6Gb Adapter to Adapter	9080	MME	ECC3
SAS AA Cable 6m - HD Narrow 6Gb Adapter to Adapter	9080	MME	ECC4
2M Optical Cable Pair for PCIe3 Expansion Drawer	9080	MME	ECC6
10M Optical Cable Pair for PCIe3 Expansion Drawer	9080	MME	ECC8
20M Optical Cable Pair for PCIe3 Expansoin Drawer	9080	MME	ECC9
System Node to System Control Unit Cable Set for Drawer 1	9080	MME	ECCA
System Node to System Control Unit Cable Set for Drawer 2	9080	MME	ECCB
Custom Service Specify, Mexico	9080	MME	ECSM
Custom Service Specify, Poughkeepsie, USA	9080	MME	ECSP
Integrated Solution Packing	9080	MME	ECSS
Optical wrap Plug	9080	MME	ECW0
387GB SFF-2 SSD converted for AIX/Linux	9080	MME	EH10
387GB SFF-2 SSD converted for AIX/Linux	9080	MME	EH11
387GB SFF-2 SSD converted for IBM i	9080	MME	EH12
387GB SFF-2 SSD converted for IBM i	9080	MME	EH13
GEN2-S Conversion Carrier for Feature ES0C 387GB SSD	9080	MME	EH14
Qty 150 Gen2-S Conversion Carriers for feature EQ0A 387GB SSD	9080	MME	EH15
GEN2-S Conversion Carrier for Feature ES0D 387GB SSD (IBM i)	9080	MME	EH16
Qty 150 GEN2-S Conversion Carriers for Feature EQ0B 387GB SSD (IBM i)	9080	MME	EH17
Mobile Enablement	9080	MME	EH35
MT 9080 Specify code	9080	MME	EH80
PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	9080	MME	EJ07
PCIe3 RAID SAS Adapter Quad-port 6Gb x8	9080	MME	EJ0J
PCIe3 12GB Cache RAID SAS Adapter Quad-port 6Gb x8	9080	MME	EJ0L
PCIe3 LP RAID SAS ADAPTER	9080	MME	EJ0M
PCIe3 SAS Tape/DVD Adapter Quad-port 6Gb x8	9080	MME	EJ10
PCIe3 LP SAS Tape/DVD Adapter Quad-port 6Gb x8	9080	MME	EJ11

PCIe3 12GB Cache RAID PLUS SAS Adapter Quad-port 6Gb x8	9080	MME	EJ14
PCIe3 LP CAPI FlashSystem Accelerator Adapter	9080	MME	EJ18
PCIe Crypto Coprocessor Gen3 BSC 4765-001	9080	MME	EJ28
Specify mode-2 (1)5901/5278 for EXP24 #5887 or #EL1S	9080	MME	EJ28
Specify mode-2 (2)5901/5278 for EXP24 #5887 or #EL1S	9080	MME	EJ28
Specify mode-4 (1)5901/5278 for EXP24 #5887 or #EL1S	9080	MME	EJ28
Specify mode-4 (2)5901/5278 for EXP24 #5887 or #EL1S	9080	MME	EJ28
Specify mode-4 (3)5901/5278 for EXP24 #5887 or #EL1S	9080	MME	EJ28
Specify mode-2 (2)5903/5805 for EXP24 #5887 or #EL1S	9080	MME	EJ28
Specify mode-2 (2)5913 for EXP24 #5887 or #EL1S	9080	MME	EJ28
Specify Mode-1 & (1)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-1 & (2)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (2) X for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (4)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-4 & (4)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (1)EJ0J/EJ0M/EL3B & (2) YO for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (2) YO for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (1)EJ0J/EJ0M/EL3B & (1) YO for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (1) X for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-4 & (1)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-4 & (2)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-4 & (3)EJ0J/EJ0M/EL3B for EXP24S (#5888/EL1S)	9080	MME	EJ28
Specify Mode-1 & (2)EJ14 for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (2)EJ14 & (2) X for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (2)EJ14 & (1) X for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (4)EJ14 for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-1 & (2)EJ0L for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify mode-2 & (4) EJ0L for EXP24S #5887/EL1S	9080	MME	EJ28
Specify Mode-2 & (2)EJ0L & (2) X for EXP24S (#5887/EL1S)	9080	MME	EJ28
Specify Mode-2 & (2)EJ0L & (1) X for EXP24S (#5887/EL1S)	9080	MME	EJ28
Non-paired Indicator EJ0L PCIe SAS RAID Adapter	9080	MME	EJ28
Non-paired Indicator ESA3 PCIe SAS RAID Adapter	9080	MME	EJ28
Specify Mode-2 & (2)ESA3 for EXP24S (#5887/#EL1S)	9080	MME	EJ28
Specify Mode-1 & (2)ESA3 for EXP24S (#5887/#EL1S)	9080	MME	EJ28
Specify Mode-2 & (4)ESA3 for EXP24S (#5887/#EL1S)	9080	MME	EJ28
Full width keyboard -- USB, US English, #103P	9080	MME	EK51
Full width keyboard -- USB, French, #189	9080	MME	EK52
Full width keyboard -- USB, Italian, #142	9080	MME	EK53
Full width keyboard -- USB, German/Austrian, #129	9080	MME	EK54
Full width keyboard -- USB, UK English, #166P	9080	MME	EK55
Full width keyboard -- USB, Spanish, #172	9080	MME	EK56
Full width keyboard -- USB, Japanese, #194	9080	MME	EK57
Full width keyboard -- USB, Brazilian Portuguese, #275	9080	MME	EK58
Full width keyboard -- USB, Hungarian, #208	9080	MME	EK59
Full width keyboard -- USB, Korean, #413	9080	MME	EK60
Full width keyboard -- USB, Chinese, #467	9080	MME	EK61
Full width keyboard -- USB, French Canadian, #445	9080	MME	EK62
Full width keyboard -- USB, Belgian/UK, #120	9080	MME	EK64
Full width keyboard -- USB, Swedish/Finnish, #153	9080	MME	EK65
Full width keyboard -- USB, Danish, #159	9080	MME	EK66

Full width Keyboard -- USB, Bulgarian, #442	9080	MME	EK67
Full width Keyboard -- USB, Swiss/French/German, #150	9080	MME	EK68
Full width Keyboard -- USB, Norwegian, #155	9080	MME	EK69
Full width Keyboard -- USB, Dutch, #143	9080	MME	EK70
Full width Keyboard -- USB, Portuguese, #163	9080	MME	EK71
Full width Keyboard -- USB, Greek, #319	9080	MME	EK72
Full width Keyboard -- USB, Hebrew, #212	9080	MME	EK73
Full width Keyboard -- USB, Polish, #214	9080	MME	EK74
Full width Keyboard -- USB, Slovakian, #245	9080	MME	EK75
Full width Keyboard -- USB, Czech, #243	9080	MME	EK76
Full width Keyboard -- USB, Turkish, #179	9080	MME	EK77
Full width Keyboard -- USB, LA Spanish, #171	9080	MME	EK78
Full width Keyboard -- USB, Arabic, #253	9080	MME	EK79
Full width Keyboard -- USB, Thai, #191	9080	MME	EK80
Full width Keyboard -- USB, Russian, #443	9080	MME	EK81
Full width Keyboard -- USB, Slovenian, #234	9080	MME	EK82
Full width Keyboard -- USB, US English Euro, #103P	9080	MME	EK83
PDU Access Cord 0.38m	9080	MME	ELC0
Power IFL Processor Activation	9080	MME	ELJ5
Power Integrated Facility for Linux Package	9080	MME	ELJG
Power IFL Memory Activation	9080	MME	ELJH
Power IFL PowerVM for Linux	9080	MME	ELJJ
Boot From Existing Drive Specified	9080	MME	ELSO
#ES1A Load Source Specify (387GB SSD SFF-2)	9080	MME	ELS9
#ES0H Load Source Specify (775GB SSD SFF-2)	9080	MME	ELSH
#ESDN Load Source Specify (571GB 15K RPM SFF-2)	9080	MME	ELSN
#ES0R Load Source Specify (387GB SSD SFF-2 4K)	9080	MME	ELSR
#ES0T Load Source Specify (775GB SSD SFF-2 4K)	9080	MME	ELST
#ES81 Load Source Specify (1.9TB SFF-2 SSD)	9080	MME	ELT1
#ESF2 Load Source Specify (1.1TB HDD SFF-2)	9080	MME	ELT2
#ES86 Load Source Specify (387GB SFF-2 SSD 4k for IBM i)	9080	MME	ELT6
#ES79 Load Source Specify (387GB SFF-2 SSD 5xx for IBM i)	9080	MME	ELT9
#ES8D Load Source Specify (775GB SFF-2 SSD 4k for IBM i)	9080	MME	ELTD
#ES7F Load Source Specify (775GB SFF-2 SSD 5xx for IBM i)	9080	MME	ELTF
#ES8G Load Source Specify (1.55TB SFF-2 SSD 4k for IBM i)	9080	MME	ELTG
#ESFN Load Source Specify (571GB 15K RPM SAS SFF-2 4K Block - 4224)	9080	MME	ELTN
#ESFS Load Source Specify (1.7TB HDD SFF-2)	9080	MME	ELTS
#ESEU Load Source Specify (571GB HDD SFF-2)	9080	MME	ELTU
#ESEY Load Source Specify (283GB 15K RPM SAS SFF-2 4K Block - 4224)	9080	MME	ELTY
ACTIVE MEMORY EXPANSION ENABLEMENT	9080	MME	EM82
64GB (4X16GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	9080	MME	EM8J
128GB (4X32GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	9080	MME	EM8K
256GB (4X64GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	9080	MME	EM8L
512GB (4X128GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	9080	MME	EM8M
1024GB (4x256GB) CDIMMs, 1600 MHZ, 4GBIT, DDR4 DRAM	9080	MME	EM8Y
90 Days Elastic CoD Memory Enablement	9080	MME	EM9T
1GB Memory Activation	9080	MME	EMA5
Quantity of 100 1GB Memory Activations (#EMA5)	9080	MME	EMA6
100 GB Mobile Memory Activations	9080	MME	EMA7
100 GB Mobile Enabled Memory Activations	9080	MME	EMA9
100 GB Mobile Memory Activation (Upgrade from P7)	9080	MME	EMAF
Bundle of eight #EM8M, 512GB 1600 MHZ Memory	9080	MME	EMB6
Memory Activations for #EMB6	9080	MME	EMB7
Five Hundred and Twelve Memory Activations for IFL	9080	MME	EMB8
Bundle of eight #EM8Y, 1024GB 1600 MHZ Memory	9080	MME	EMBA
Memory Activations for #EMBA	9080	MME	EMBB
1,024 Memory Activations for IFL	9080	MME	EMBC
Static to Mobile Memory Auto Conversion	9080	MME	EMEO
8 GB-Day billing for Elastic CoD memory	9080	MME	EMJ4
800 GB-Day billing for Elastic CoD memory	9080	MME	EMJ5
999 GB-Day billing for Elastic CoD memory	9080	MME	EMJ6
PCIe Gen3 I/O Expansion Drawer	9080	MME	EMX0
AC Power Supply Conduit for PCIe3 Expansion			

Drawer	9080	MME	EMXA
DC Power Supply Conduit for PCIe3 Expansion			
Drawer	9080	MME	EMXB
PCIe3 6-Slot Fanout Module for PCIe3 Expansion			
Drawer	9080	MME	EMXF
1m (3.3-ft), 10GbE'Net Cable SFP+ Act Twinax Copper	9080	MME	EN01
3m (9.8-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9080	MME	EN02
5m (16.4-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9080	MME	EN03
PCIe3 16Gb 2-port Fibre Channel Adapter	9080	MME	EN0A
PCIe3 LP 16Gb 2-port Fibre Channel Adapter	9080	MME	EN0B
PCIe2 LP 8Gb 2-Port Fibre Channel Adapter	9080	MME	EN0F
PCIe2 8Gb 2-Port Fibre Channel Adapter	9080	MME	EN0G
PCIe3 4-port (10Gb FCoE & 1GbE) SR&RJ45	9080	MME	EN0H
PCIe3 LP 4-port (10Gb FCoE & 1GbE) SR&RJ45	9080	MME	EN0J
PCIe3 4-port (10Gb FCoE & 1GbE) SFP+Copper&RJ45	9080	MME	EN0K
PCIe3 LP 4-port(10Gb FCoE & 1GbE) SFP+Copper&RJ45	9080	MME	EN0L
PCIe3 4-port(10Gb FCoE & 1GbE) LR&RJ45 Adapter	9080	MME	EN0M
PCIe3 LP 4-port(10Gb FCoE & 1GbE) LR&RJ45 Adapter	9080	MME	EN0N
PCIe2 4-Port (10Gb+1GbE) SR+RJ45 Adapter	9080	MME	EN0S
PCIe2 LP 4-Port (10Gb+1GbE) SR+RJ45 Adapter	9080	MME	EN0T
PCIe2 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter	9080	MME	EN0U
PCIe2 LP 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter	9080	MME	EN0V
PCIe2 2-port 10/1GbE BaseT RJ45 Adapter	9080	MME	EN0W
PCIe2 LP 2-port 10/1GbE BaseT RJ45 Adapter	9080	MME	EN0X
PCIe2 LP 8Gb 4-port Fibre Channel Adapter	9080	MME	EN0Y
PCIe2 8Gb 4-port Fibre Channel Adapter	9080	MME	EN12
PCIe 1-port Bisync Adapter	9080	MME	EN13
PCIe3 4-port 10GbE SR Adapter	9080	MME	EN15
PCIe3 LPX 4-port 10GbE SR Adapter	9080	MME	EN16
PCIe3 4-port 10GbE SFP+ Copper Adapter	9080	MME	EN17
PCIe3 LPX 4-port 10GbE SFP+ Copper Adapter	9080	MME	EN18
2 Port Async EIA-232 PCIe Adapter	9080	MME	EN27
PCIe LP 2-Port Async EIA-232 Adapter	9080	MME	EN28
2 Port Async EIA-232 PCIe Adapter	9080	MME	EN29
1-Core Mobile Activation	9080	MME	EP2S
1-Core Mobile Activation from Power 7	9080	MME	EP2U
90 Days Elastic CoD Processor Core Enablement	9080	MME	EP9T
HVDC PDU - 90A 6xoutlet	9080	MME	EPAA
Auto Selected HVDC Power Cord	9080	MME	EPAC
2.5 Meter HVDC Power Cord	9080	MME	EPAD
4.02 GHz, 32-core POWER8 processor	9080	MME	EPBA
1 core Processor Activation for #EPBA	9080	MME	EPBJ
1 core Processor Activation for #EPBA, Mobile Enabled	9080	MME	EPBN
Static to Mobile Processor Auto Conversion	9080	MME	EPE0
1 Proc-Day Elastic CoD Billing for #EPBA, AIX/Linux	9080	MME	EPJ6
1 Proc-Day Elastic CoD Billing for #EPBA, IBM i	9080	MME	EPJ7
100 Elastic CoD Proc-Days of Billing for Processor #EPBA. AIX/Linux	9080	MME	EPJ8
100 Elastic CoD Proc-Days of Billing for Processor #EPBA. IBM i	9080	MME	EPJ9
Proc CoD Utility Billing, 100 Proc-mins. for #EPBA, AIX/Linux	9080	MME	EPJA
Proc CoD Utility Billing, 100 Proc-mins. for #EPBA, IBM i	9080	MME	EPJB
Quantity 150 of #3452 SAS YO Cable 6m - HD 6Gb Adapter to Enclosure	9080	MME	EQ02
Quantity 150 of #3453 SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	9080	MME	EQ03
Quantity of 150 #ES0C	9080	MME	EQ0C
Quantity of 150 #ES0D	9080	MME	EQ0D
Quantity 150 of #ES0G (775GB SSD SFF-2)	9080	MME	EQ0G
Quantity 150 of #ES0H (775GB SSD SFF-2)	9080	MME	EQ0H
Quantity 150 of #ES0Q 387GB SFF-2 4k SSD (AIX/Linux)	9080	MME	EQ0Q
Quantity 150 of #ES0R 387GB SFF-2 4k SSD (IBM i)	9080	MME	EQ0R
Quantity 150 of #ES0S 775GB SFF-2 4k SSD (AIX/Linux)	9080	MME	EQ0S

Quantity 150 of #ES0T 775GB SFF-2 4k SSD (IBM i)	9080	MME	EQ0T
Quantity 150 of #ES19 (387GB SSD SFF-2)	9080	MME	EQ19
Quantity 150 of #ES1A (387GB SSD SFF-2)	9080	MME	EQ1A
Quantity 150 of #1738 (856GB SFF-2 disk)	9080	MME	EQ38
Quantity 150 of #1752 (900GB SFF-2 disk)	9080	MME	EQ52
Quantity 150 of #ES78 387GB SFF-2 SSD 5xx	9080	MME	EQ78
Quantity 150 of #ES79 387GB SFF-2 SSD 5xx	9080	MME	EQ79
Quantity 150 of #ES7E 775GB SFF-2 SSD 5xx	9080	MME	EQ7E
Quantity 150 of #ES7F 775GB SFF-2 SSD 5xx	9080	MME	EQ7F
Quantity 150 of #ES80 1.9TB SFF-2 SSD 4k	9080	MME	EQ80
Quantity 150 of ES81 1.9TB SFF-2 SSD 4k	9080	MME	EQ81
Quantity 150 of #ES85 387GB SFF-2 SSD 4k	9080	MME	EQ85
Quantity 150 of #ES86 387GB SFF-2 SSD 4k	9080	MME	EQ86
Quantity 150 of #ES8C 775GB SFF-2 SSD 4k	9080	MME	EQ8C
Quantity 150 of #ES8D 775GB SFF-2 SSD 4k	9080	MME	EQ8D
Quantity 150 of #ES8F 1.55TB SFF-2 SSD 4k	9080	MME	EQ8F
Quantity 150 of #ES8G 1.55TB SFF-2 SSD 4k	9080	MME	EQ8G
Quantity 150 of #ESD2 (1.1TB 10k SFF-2)	9080	MME	EQD2
Quantity 150 of #ESD3 (1.2TB 10k SFF-2)	9080	MME	EQD3
Quantity 150 of #ESDN (571GB 15K RPM SAS SFF-2 for IBM i)	9080	MME	EQDN
Quantity 150 of #ESDP (600GB 15K RPM SAS SFF-2 for AIX/LINUX)	9080	MME	EQDP
Quantity 150 of #ESEU (571GB 10k SFF-2)	9080	MME	EQEU
Quantity 150 of #ESEV (600GB 10k SFF-2)	9080	MME	EQEV
Quantity 150 of #ESEY (283 GB SFF-2)	9080	MME	EQEY
Quantity 150 of #ESEZ (300GB SFF-2)	9080	MME	EQEZ
Quantity 150 of #ESF2 (1.1TB 10k SFF-2)	9080	MME	EQF2
Quantity 150 of #ESF3 (1.2TB 10k SFF-2)	9080	MME	EQF3
Quantity 150 of #ESFN (571GB SFF-2)	9080	MME	EQFN
Quantity 150 of #ESFP (600GB SFF-2)	9080	MME	EQFP
Quantity 150 of #ESFS (1.7TB 10k SFF-2)	9080	MME	EQFS
Quantity 150 of #ESFT (1.8TB 10k SFF-2)	9080	MME	EQFT
42U slim Rack	9080	MME	ER05
Indicator, reserve 5 EIA rack space	9080	MME	ER16
Specify Reserve 4 EIA Rack Space for PCIe3 Expansion Drawer	9080	MME	ER1A
Field Integration of Rack and Server	9080	MME	ER21
RFID Tags for Servers, Compute Nodes, Chassis, Racks, and HMCs	9080	MME	ERF1
Rear rack extension	9080	MME	ERG0
Optional Origami Front Door for 2.0m Rack	9080	MME	ERG7
Acoustic Black Front Door	9080	MME	ERGB
387GB SFF-2 SSD for AIX/Linux with eMLC	9080	MME	ES0C
387GB SFF-2 SSD for IBM i with eMLC	9080	MME	ES0D
775GB SFF-2 SSD for AIX/Linux	9080	MME	ES0G
775GB SFF-2 SSD for IBM i	9080	MME	ES0H
387GB SFF-2 4K SSD for AIX/Linux	9080	MME	ES0Q
387GB SFF-2 4k SSD for IBM i	9080	MME	ES0R
775GB SFF-2 4k SSD for AIX/Linux	9080	MME	ES0S
775GB SFF-2 4k SSD for IBM i	9080	MME	ES0T
387GB SFF-2 SSD for AIX/Linux	9080	MME	ES19
387GB SFF-2 SSD for IBM i	9080	MME	ES1A
387GB SFF-2 SSD for AIX/Linux	9080	MME	ES2C
387GB SFF-2 SSD for IBM i	9080	MME	ES2D
387GB SFF-2 SSD 5xx eMLC4 for AIX/Linux	9080	MME	ES78
387GB SFF-2 SSD 5xx eMLC4 for IBM i	9080	MME	ES79
775GB SFF-2 SSD 5xx eMLC4 for AIX/Linux	9080	MME	ES7E
775GB SFF-2 SSD 5xx eMLC4 for IBM i	9080	MME	ES7F
1.9TB Read Intensive SAS 4k SFF-2 SSD for AIX/Linux	9080	MME	ES80
1.9TB Read Intensive SAS 4k SFF-2 SSD for IBM i	9080	MME	ES81
387GB SFF-2 SSD 4k eMLC4 for AIX/Linux	9080	MME	ES85
387GB SFF-2 SSD 4k eMLC4 for IBM i	9080	MME	ES86
775GB SFF-2 SSD 4k eMLC4 for AIX/Linux	9080	MME	ES8C
775GB SFF-2 SSD 4k eMLC4 for IBM i	9080	MME	ES8D
1.55TB SFF-2 SSD 4k eMLC4 for AIX/Linux	9080	MME	ES8F
1.55TB SFF-2 SSD 4k eMLC4 for IBM i	9080	MME	ES8G
PCIe2 1.8GB Cache RAID SAS Adapter Tri-port 6Gb CR	9080	MME	ESA3
S&H - No Charge	9080	MME	ESC0
S&H	9080	MME	ESC8
1.1TB 10K RPM SAS SFF-2 Disk Drive (IBMi)	9080	MME	ESD2
1.2TB 10K RPM SAS SFF-2 Disk Drive (AIX/Linux)	9080	MME	ESD3

571GB 15K RPM SAS SFF-2 Disk Drive - 528 Block (IBM i)	9080	MME	ESDN
600GB 15K RPM SAS SFF-2 Disk Drive - 5xx Block (AIX/Linux)	9080	MME	ESDP
571GB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4224	9080	MME	ESEU
600GB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096	9080	MME	ESEV
283GB 15K RPM SAS SFF-2 4K Block - 4224 Disk Drive	9080	MME	ESEY
300GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive	9080	MME	ESEZ
1.1TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4224	9080	MME	ESF2
1.2TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096	9080	MME	ESF3
571GB 15K RPM SAS SFF-2 4K Block - 4224 Disk Drive	9080	MME	ESFN
600GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive	9080	MME	ESFP
1.7TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4224	9080	MME	ESFS
1.8TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096	9080	MME	ESFT
1TB Removable Disk Drive Cartridge	9080	MME	EU01
RDX USB External Docking Station for Removable Disk Cartridge	9080	MME	EU04
RDX 320 GB Removable Disk Drive	9080	MME	EU08
Service Processor	9080	MME	EU0A
SATA Slimline DVD-RAM with write CACHE	9080	MME	EU13
1.5TB Removable Disk Drive Cartridge	9080	MME	EU15
2TB Removable Disk Drive Cartridge (RDX)	9080	MME	EU2T
Software preload define	9080	MME	EUC1
Software preload define	9080	MME	EUC2
Software preload define	9080	MME	EUC3
Core Use HW Feature	9080	MME	EUC6
Core Use HW Feature 10X	9080	MME	EUC7

Model conversions

From model	To model
9117-MMD	9080-MME

Feature conversions

Feature conversions for 9080-MME memory features:

From FC:	To FC:	Parts returned
EM8J - 64GB (4x16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
EM8K - 128GB (4x32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
EM8L - 256GB (4x64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
EM8M - 512GB (4x128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
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	EMA9 - 100 GB Mobile Enabled Memory	No

(#EMA5)	Activations	
EMB6 - Bundle of eight #EM8M, 512GB 1600 MHZ Memory	EMBA - Bundle of eight #EM8Y, 1024GB 1600 MHZ Memory	Yes

Feature conversions for 9080-MME processor features:

From FC:	To FC:	Parts returned
EPBJ - 1 core Processor Activation for #EPBA	EP2S - 1-Core Mobile Activation	No
EPBN - 1 core Processor Activation for #EPBA, Mobile Enabled	EP2S - 1-Core Mobile Activation	No
EPBJ - 1 core Processor Activation for #EPBA	EPBN - 1 core Processor Activation for #EPBA, Mobile Enabled	No

Feature conversions for 9117-MMD to 9080-MME adapter features:

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

Feature conversions for 9117-MMD to 9080-MME administrative features:

From FC:	To FC:	Parts returned
ELJ0 - Power Integrated Facility for Linux Package	ELJG - Power Integrated Facility for Linux Package	No

Feature conversions for 9117-MMD to 9080-MME memory features:

From FC:	To FC:	Parts returned
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	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes

Memory			
5602 - 0/128GB DDR3	EM8K - 128GB (4X32GB)	Yes	
Memory (4X32GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
EM40 - 0/32GB DDR3	EM8K - 128GB (4X32GB)	Yes	
Memory (4X8GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
EM41 - 0/64GB DDR3	EM8K - 128GB (4X32GB)	Yes	
Memory (4X16GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
EM42 - 0/128GB DDR3	EM8K - 128GB (4X32GB)	Yes	
Memory (4X32GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
5564 - 0/256GB DDR3	EM8L - 256GB (4X64GB)	Yes	
Memory (4X64GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
5600 - 0/32GB DDR3	EM8L - 256GB (4X64GB)	Yes	
Memory (4X8GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
5601 - 0/64GB DDR3	EM8L - 256GB (4X64GB)	Yes	
Memory (4X16GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
5602 - 0/128GB DDR3	EM8L - 256GB (4X64GB)	Yes	
Memory (4X32GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
EM40 - 0/32GB DDR3	EM8L - 256GB (4X64GB)	Yes	
Memory (4X8GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
EM41 - 0/64GB DDR3	EM8L - 256GB (4X64GB)	Yes	
Memory (4X16GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
EM42 - 0/128GB DDR3	EM8L - 256GB (4X64GB)	Yes	
Memory (4X32GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
EM44 - 0/256GB DDR3	EM8L - 256GB (4X64GB)	Yes	
Memory (4X64GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
5564 - 0/256GB DDR3	EM8M - 512GB (4X128GB)	Yes	
Memory (4X64GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
5600 - 0/32GB DDR3	EM8M - 512GB (4X128GB)	Yes	
Memory (4X8GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
5601 - 0/64GB DDR3	EM8M - 512GB (4X128GB)	Yes	
Memory (4X16GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
5602 - 0/128GB DDR3	EM8M - 512GB (4X128GB)	Yes	
Memory (4X32GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7 CoD	DDR3 DRAM		
Memory			
EM40 - 0/32GB DDR3	EM8M - 512GB (4X128GB)	Yes	
Memory (4X8GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
EM41 - 0/64GB DDR3	EM8M - 512GB (4X128GB)	Yes	
Memory (4X16GB) DIMMS -	CDIMMs, 1600 MHz, 4GBIT		
1066 MHz - POWER7+ CoD	DDR3 DRAM		
Memory			
EM42 - 0/128GB DDR3	EM8M - 512GB (4X128GB)	Yes	

Memory (4x32GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	
EM44 - 0/256GB DDR3 Memory (4x64GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8M - 512GB (4x128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	Yes
5564 - 0/256GB DDR3 Memory (4x64GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
5600 - 0/32GB DDR3 Memory (4x8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
5601 - 0/64GB DDR3 Memory (4x16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
5602 - 0/128GB DDR3 Memory (4x32GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
EM40 - 0/32GB DDR3 Memory (4x8GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
EM41 - 0/64GB DDR3 Memory (4x16GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
EM42 - 0/128GB DDR3 Memory (4x32GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
EM44 - 0/256GB DDR3 Memory (4x64GB) DIMMS - 1066 MHz - POWER7+ CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 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
EMAG - 100 GB Mobile Enabled Memory Activations	EMA9 - 100 GB Mobile Enabled Memory Activations	No
EMA4 - 100 GB Mobile Memory Activation	EMAF - 100 GB Mobile Memory Activation (Upgrade from P7)	No

Feature conversions for 9117-MMD to 9080-MME processor features:

From FC:	To FC:	Parts returned
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	ELJ5 - Power IFL Processor Activation	No
ELJ4 - Power IFL Processor Activation	ELJ5 - Power IFL Processor Activation	No
EP22 - 1-Core Mobile Activation	EP2U - 1-Core Mobile Activation from Power 7	No
EPM0 - 4.22 GHz Proc Card, 0/12 Core POWER7+, 16 DDR3 Memory Slots	EPBA - 4.02 GHz, 32-core POWER8 processor	Yes
EPM1 - 3.80 GHz Proc Card, 0/16 Core POWER7+, 16 DDR3 Memory Slots	EPBA - 4.02 GHz, 32-core POWER8 processor	Yes

EPMA - 1-Core Activation for Processor Feature EPM0	EPBJ - 1 core Processor Activation for #EPBA	No
EPMB - 1-Core Activation for Processor Feature EPM1	EPBJ - 1 core Processor Activation for #EPBA	No
EPMC - #EPM0 Processor Activation, Mobile Enabled	EPBN - 1 core Processor Activation for #EPBA, Mobile Enabled	No
EPMD - #EPM1 Processor Activation, Mobile Enabled	EPBN - 1 core Processor Activation for #EPBA, Mobile Enabled	No

Feature conversions for 9117-MMD to 9080-MME system unit base features:

From FC:	To FC:	Parts returned
EB85 - System CEC Enclosure with IBM BEZEL, I/O Backplane, and System Midplane	EBA0 - 5U system node drawer	Yes
EB86 - System CEC Enclosure with OEM BEZEL, I/O Backplane, and System Midplane	EBA0 - 5U system node drawer	Yes

Feature conversions for 9117-MMD to 9080-MME virtualization engine features:

From FC:	To FC:	Parts returned
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^(R) ID and password are required (use IBMid).

[BP Attachment for Announcement Letter 116-092](#)

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

IBM Knowledge Center provides access to the PurePower System™ Solution documentation at the [POWER8 systems information](#) web page.

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

The following information is shipped with the 9080-MME:

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

For hardware documentation such as installation instructions, user's information, and service information, available to download or view, go to the [Support Portal](#) website.

The IBM Knowledge Center provides you with a single point of reference where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access by going to [IBM Knowledge Center](#) for all your product information needs.

To access the IBM Publications Center Portal, go to the [IBM Publications Center](#) website.

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

Services

Global Technology Services

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

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

For details on available services, contact your IBM representative or go to the [IBM Global Technology Services^{\(R\)}](#) website.

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or go to the [Resiliency Services](#) website.

Details on education offerings related to specific products can be found on the [IBM authorized training](#) website.

Technical information

Specified operating environment

Physical specifications

IBM Power E870C model MME

- 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° - 45°C (41° - 113°F) nonoperating
 - 18° - 30°C (64° - 86°F) recommended operating
 - 5° - 40°C (41° - 104°F) allowable operating
 - Derate maximum allowable dry-bulb temperature 1°C (1.8°F) per 175 m (574 ft) above 950 m (3,117 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 PCIe Gen3 I/O Expansion drawer
- Power source loading: .520 kVA maximum per PCIe Gen3 I/O Expansion drawer
- Thermal output: 1,740 Btu/hr maximum per I/O Expansion drawer
- 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 and DPS-FP mode: A-Weighted Sound Power Level)
- 8.85 bels (heavy workload and 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 and DPS-FP mode: A-Weighted Sound Power Level)
 - 9.15 bels (heavy workload and DPS-FP mode: A-Weighted Sound Power Level) with acoustic rack door

The Power E870C 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 E870C 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 E870C 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 that can be used in the system and which are certified.

Hardware requirements

Minimum system configuration

The 9080-MME 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
EPBA x 1	4.024 GHz, 32-core POWER8 processor module
EPBJ x 8	1-core Processor Activation for #EPBA
EM8J x 4	64 GB (4 x 16 GB) CDIMMs, 1600 MHz, 4 Gb DDR3 DRAM
EMA5 x 128	1 GB Memory Activation
EMA6 x 1	Quantity of 100 1 GB Memory Activations
EBA0 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
EBA2 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
EPBA x 1	4.024 GHz, 32-core POWER8 processor module
EPBJ x 8	1-core Processor Activation for #EPBA
EM8J x 4	64 GB (4 x 16 GB) CDIMMs, 1600 MHz, 4 Gb DDR3 DRAM
EMA5 x 128	1 GB Memory Activation
EMA6 x 1	Quantity of 100 1 GB Memory Activations

Feature number	Description
EBA0 x 1	5U system node drawer
EU0A x 2	Service Processor
0728 x 1	EXP24S SFF Gen2 Load Source Specify (#5887 or #EL15)
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
EBA2 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:

Feature number	Description
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

Notes:

- Additional optional features can be added, as wanted. IBM i systems require a DVD to be available to the system. This DVD can be located in the system control unit (DVD feature #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 wanted, 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.
- Power Integrated Facility for Linux Package feature (#ELJG) is a chargeable feature that will cause IBM configuration tools to add the proper quantity of no-charge features associated with processor activations (#ELJ5), and memory activations (#ELJH). This feature delivers a quantity of four processor activations, a quantity of thirty-two 1 GB memory activations and a quantity of four PowerVM[®] for Linux licenses for four processor cores. When the number of ELJG features ordered is equal to defined system minimum order requirements for static processor and memory activations, the activation requirement is satisfied.
- At least 50% of available memory must be activated through a combination of features 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 memory sizes (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 numbers 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 9080-MME (physical hardware HMC or a virtual appliance (vHMC)); however, a communal HMC is acceptable. HMCs supported on POWER8 hardware are 7042-CR5, or later.

Stand-alone and rack integration options

The 9080-MME default order will be without a rack (stand-alone).

The 9080-MME integration in a 2.0 m (19 in.) or 42 EIA enterprise rack (7014-T42 or #0553) provides the following:

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

A single 7014-T42 rack can be ordered containing one or two Power E870C systems. Note that care must be taken anytime you order a pair of Power 870 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 client can order one factory-integrated system node and later order a second system node to be installed in the same rack at the client establishment. On initial order, if the rack contains a system node, the 7014-T42 machine/type must be ordered.¹ If a MES same-serial-number upgrade, the 0553 feature must be ordered.¹

¹ See also deracking feature ER21.

Only horizontal PDUs are used by IBM Manufacturing in racks hosting the 9080-MME system nodes. Each PDU will occupy a separate 1 EIA to aid cable routing.

Minimum requirements for a 7014-T42 rack integration option:

The 7014-T42 rack is optional for the 9080-MME.

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	

Feature number	Description
ER13 x 1	Rack Content Specify fourth enclosure - 22 EIA
ER2B x 1	Rack Content Specify: Reserve 2U Rack Space at Bottom of Rack
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.

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, 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 6.1 with the 6100-08 Technology Level Service Pack 6, or later
- AIX 6.1 with the 6100-09 Technology Level Service Pack 4, and APAR IV63331, or later
- AIX 7.1 with the 7100-02 Technology Level Service Pack 6, or later
- AIX 7.1 with the 7100-03 Technology Level Service Pack 4, and APAR IV63332, or later
- AIX 7.1 with the 7100-04 Technology Level, or later
- AIX 7.2 with the 7200-00 Technology Level, or later

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

- AIX 7.1 with the 7100-02 Technology Level Service Pack 1, or later
- AIX 7.1 with the 7100-03 Technology Level Service Pack 1, or later
- AIX 6.1 with the 6100-08 Technology Level Service Pack 1, or later
- AIX 6.1 with the 6100-09 Technology Level Service Pack 1, or later
- AIX 7.1 with the 7100-04 Technology Level, or later
- AIX 7.2 with the 7200-00 Technology Level, or later

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

- IBM i 7.1 with 7.1.0 machine code RS710-S, or later

- IBM i 7.2 TR4, or later
- IBM i 7.3, or later

See the [IBM Prerequisite](#) website for compatibility information for hardware features and the corresponding AIX and IBM i Technology Levels.

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

- Red Hat Enterprise Linux 6.5, or later
- Red Hat Enterprise Linux 7.0, or later
- SUSE Linux Enterprise Server 11 Service Pack 3, or later
- SUSE Linux Enterprise Server 12, or later
- Ubuntu 16.04, or later

If installing VIOS:

- VIOS 2.2.3.70, or later
- VIOS 2.2.4.20, 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 8, Java 7, or Java 6, whenever possible. For those clients who want to run Java in AIX environments, see the [IBM AIX Download and service information](#) web page.

For Linux (including POWER® Linux), see the [Linux Download information](#) web page.

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 or IBM i 7.1.
- Java 6 is not a supported environment for IBM i 7.3.

Clients are strongly encouraged to move to a more current supported version: Java 6, Java 7, Java 7.1, or Java 8.

Limitations

The 9080-MME and 9080-MHE have the following limitations:

- Memory rules and restrictions for the Power E880C (9080-MHE) and E870C (9080-MME) servers:
 - 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.
- PowerVM Enterprise Edition is standard on the 9080-MHE and 9080-MME. Enterprise Edition includes PowerVP™, Active Memory Expansion (AME), Active Memory Deduplication, and Live Partition Mobility (LPM).

Note: AME is not part of PowerVM Enterprise Edition. AME is an extra feature (#EM82) and will be charged.
- Active Memory Mirroring is standard on the 9080-MHE and 9080-MME.
- For same-serial-number upgrades, all features that are not supported on the 9080-MHE and 9080-MME 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 of two adapters per drawer)
 - 4-Port Async EIA-232 PCIe Adapter (#5785)
 - PCIe 2-Line WAN w/Modem (#2893/2894)
 - POWER GXT145 PCI Express^(R) Graphics Accelerator (#5748)
 - The following 4-port SAS adapters are not supported in slots C2 or C5 of either fanout module (maximum of 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)
 - PCIe3 12 GB Cache RAID PLUS SAS Adapter Quad-port 6Gb x8 (#EJ14)

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

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

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

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

To learn how Electronic Services can work for you, go to the [Support Portal](#) website.

Terms and conditions

Volume orders

Contact your IBM representative.

IBM Global Financing

Yes

Products - terms and conditions

Warranty period

One year

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM. An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. 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. 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 through an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. 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-specific and location-specific information.

CRU 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.

Tier 1 (mandatory) CRU

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

The following parts have been designated as Tier 1 CRUs:

- Hard disk drive
- Optical drive
- Fan
- I/O adapters
- Operator panel

- PCI adapters
- Power cord
- Power supply
- Processor power regulator
- Service processor

CRU and On-site Service

At IBM's discretion, you will receive specified CRU service, or 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.

Advanced Part Exchange Warranty Service

Advanced Part Exchange warranty service allows you to order and track replacement parts directly under Customer Replaceable Unit or Parts Only Service following procedures that are provided by IBM. Replacement parts are shipped to your location for you to install. IBM will use commercially reasonable delivery methods to ship the replacement part for NBD delivery. Advanced Part Exchange warranty service is not available in all countries. You must be approved and registered to use this service. Contact your IBM representative or your reseller for further information.

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.

International Warranty Service

International Warranty Service allows you to relocate any machine that is eligible for International Warranty Service and receive continued warranty service in any country where the IBM machine is serviced. If you move your machine to a different country, you are required to report the machine information to your Business Partner or IBM representative.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased. Warranty service will be provided with the prevailing warranty service type and service level available for the eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.

The following types of information can be found on the [International Warranty Service](#) website

- Machine warranty entitlement and eligibility
- Directory of contacts by country with technical support contact information
- Announcement Letters

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 website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts.

Maintenance service options

CRU and On-site Service

At IBM's discretion you will receive CRU service or 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. The following on-site response-time objectives are available as warranty service upgrades for your machine. Available offerings are:

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

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, through an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. Service levels are response-time objectives and are not guaranteed. The specified level of 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-specific 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, 2-hour average response

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. It can also be found on the [License Agreement for Machine Code and Licensed Internal Code](#).

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

B.) Acceptance-By-Use Machine: No, the Machine Code 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.

The following are newly announced features on the specific models of the IBM Power Systems 9080 machine type:

Description	Model number	Feature number	Purchase price	Minimum Monthly Charge	Initial/MES/Both/Support	RP CSU	MES
IBM Power System E870C							
One CSC Billing Unit	MME					No	
Ten CSC Billing Units	MME	0010			Both	Yes	No
Mirrored System Disk Level, Sp	MME	0011			Both	Yes	No
Device Parity Protection All	MME	0040			Both	Yes	No
Mirrored System Bus Level	MME	0041			Both	Yes	No
Device Parity RAID 6 All	MME	0043			Both	Yes	No
RISC to RISC Data Migration	MME	0047			Both	Yes	No
AIX Partition Specify	MME	0205			Initial	N/A	No
Linux Partition Specify	MME	0265			Both	Yes	No
IBM i Partition Specify	MME	0266			Both	Yes	No
Specify Custom Data Protection	MME	0267			Both	Yes	No
Mirrored Level System Specify	MME	0296			Both	Yes	No
RAID Hot Spare Specify	MME	0308			Both	Yes	No
V.24/EIA232 6.1m (20 Ft) PCI C	MME	0347			Both	Yes	No
V.35 6.1m (20 Ft) PCI Cable	MME	0348			Both	Yes	No
X.21 6.1m (20 Ft) PCI Cable	MME	0353			Both	Yes	No
UPS Factory Integration Spcfy	MME	0359			Both	Yes	No
HMC Factory Integration Spcfy	MME	0373			MES	Yes	No
Display Factory Int. Specify	MME	0374			MES	Yes	No
Rack Space for UPS	MME	0375			MES	Yes	No
Reserve Rack for HMC	MME	0376			MES	Yes	No
Reserve Rack Space for Display	MME	0377			MES	Yes	No
	MME	0378			MES	Yes	No

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

283GB 10k RPM SAS SFF-2 Disk					
	MME	1956	Support	Yes	No
571GB 10k RPM SAS SFF-2 Disk					
	MME	1962	Both	Yes	No
600GB 10k RPM SAS SFF-2 Disk					
	MME	1964	Both	Yes	No
Primary OS - IBM i					
	MME	2145	Both	Yes	No
Primary OS AIX					
	MME	2146	Both	Yes	No
Primary OS Linux					
	MME	2147	Both	Yes	No
LC-SC 50 Micron Fiber Conv Cab					
	MME	2456	Both	Yes	No
LC-SC 62.5 Mic.Fib.Conv.Cable					
	MME	2459	Both	Yes	No
PCIe 2 Line WAN w/Modem					
	MME	2893	Support	Yes	No
Asynch.Termin/Print.Cbl EIA232					
	MME	2934	Both	Yes	No
Asynchronous Cable EIA 232/V					
	MME	2936	Both	Yes	No
Ser to Ser Port Cab Draw/Draw					
	MME	3124	Both	Yes	No
Serial to Se.Port Cbl Rack 8M					
	MME	3125	Both	Yes	No
1m, QDR IB Copper Cable					
	MME	3287	Both	Yes	No
3m, QDR IB Copper Cable					
	MME	3288	Both	Yes	No
5m QDR IB/E'Net Copper Cable					
	MME	3289	Both	Yes	No
10m QDR IB Optic Cable					
	MME	3290	Both	Yes	No
30m QDR IB Optic Cable					
	MME	3293	Both	Yes	No
SAS YO Cable 1.5m - HD 6Gb Ada					
	MME	3450	Both	Yes	No
SAS YO Cable 3m - HD 6Gb Adapt					
	MME	3451	Both	Yes	No
SAS YO Cable 6m - HD 6Gb Adapt					
	MME	3452	Both	Yes	No
SAS YO Cable 10m - HD 6Gb Adap					
	MME	3453	Both	Yes	No
SAS X Cable 3m - HD 6Gb 2-Adap					
	MME	3454	Both	Yes	No
SAS X Cable 6m - HD 6Gb 2-Adap					
	MME	3455	Both	Yes	No
SAS X Cable 10m - HD 6Gb 2-Ada					
	MME	3456	Both	Yes	No
SAS YO Cable 15m - HD 3Gb Adap					
	MME	3457	Both	Yes	No
SAS X Cable 15m - HD 3Gb 2-Ada					
	MME	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					
	MME	3632	Both	Yes	No
SAS Cable (X) Adapter to SAS E					
	MME	3661	Both	Yes	No
SAS Cbl X Adp SAS Enclosure 6M					
	MME	3662	Both	Yes	No
SAS Cbl X Adp SAS Encl 15M					
	MME	3663	Both	Yes	No
SAS Cab(YO) Adapter to SAS1.5M					
	MME	3691	Both	Yes	No
SAS Cab(YO) Adapter to SAS 3M					
	MME	3692	Both	Yes	No
SAS Cab(YO) Adapter to SAS 6M					
	MME	3693	Both	Yes	No
SAS Cab(YO) Adapter to SAS 15M					
	MME	3694	Both	Yes	No
0.3M Serial Prt Converter Cbl					
	MME	3925	Both	Yes	No

Serial Port Null Mod Cab 3.7M	MME	3927	Both	Yes	No
Ser.Port Null Modem Cable,10M	MME	3928	Both	Yes	No
System Serial Port Converter C	MME	3930	Both	Yes	No
6Foot Extend.Cbl for Displays	MME	4242	Both	Yes	No
Extender Cable USB Keybo 1.8M	MME	4256	Both	Yes	No
VGA to DVI Connection Converte	MME	4276	Both	Yes	No
One and only one rack indicator feature is required on all orders (#4650 to #4666). No Factory Integration Ind.					
Rack Indicator, Rack 1	MME	4650	Initial	N/A	No
Rack Indicator, Rack 2	MME	4651	Initial	N/A	No
Rack Indicator, Rack 3	MME	4652	Initial	N/A	No
Rack Indicator, Rack 4	MME	4653	Initial	N/A	No
Rack Indicator, Rack 5	MME	4654	Initial	N/A	No
Rack Indicator, Rack 6	MME	4655	Initial	N/A	No
Rack Indicator, Rack 7	MME	4656	Initial	N/A	No
Rack Indicator, Rack 8	MME	4657	Initial	N/A	No
Rack Indicator, Rack 9	MME	4658	Initial	N/A	No
Rack Indicator, Rack 10	MME	4659	Initial	N/A	No
Rack Indicator, Rack 11	MME	4660	Initial	N/A	No
Rack Indicator, Rack 12	MME	4661	Initial	N/A	No
Rack Indicator, Rack 13	MME	4662	Initial	N/A	No
Rack Indicator, Rack 14	MME	4663	Initial	N/A	No
Rack Indicator, Rack 15	MME	4664	Initial	N/A	No
Rack Indicator, Rack 16	MME	4665	Initial	N/A	No
Rack Indicator, Rack 16	MME	4666	Initial	N/A	No
CBU SPECIFY					
Software Preload Required	MME	4891	Both	Yes	No
PowerVM Enterprise Edition	MME	5000	Initial	N/A	No
PCIe2 LP 4-port 1GbE Adapter	MME	5228	Both	Yes	No
PCIe LP POWER GXT145 Graphics	MME	5260	Both	Yes	No
PCIe LP 10Gb FCoE 2 port Adapt	MME	5269	Both	Yes	No
PCIe LP 4 Port 10/100/1000 Bas	MME	5270	Support	Yes	No
PCIe LP 8Gb 2 Port Fibre Chann	MME	5271	Support	Yes	No
PCIe LP 2 Port 1GbE SX Adapter	MME	5273	Both	Yes	No
PCIe LP 4Gb 2 Port Fibre Chann	MME	5274	Both	Yes	No
PCIe LP 4 Port Async EIA 232 A	MME	5276	Support	Yes	No
PCIe LP 2-Port 1GbE TX Adapter	MME	5277	Both	Yes	No
PCIe2 LP 2-Port 4X IB QDR Adap	MME	5281	Support	Yes	No
PCIe2 LP 2 port 10GbE SR Adapt	MME	5283	Both	Yes	No

PCIe 2-Port 4X IB QDR Adapt	MME	5284	Support	Yes	No
PCIe2 2-port 10GbE SR Adapter	MME	5285	Both	Yes	No
Sys Console on HMC	MME	5287	Support	Yes	No
Sys Console-Ethernet LAN	MME	5550	Both	Yes	No
10Gb FCoE PCIe Dual Port Adapt	MME	5557	Both	Yes	No
4 Port 10/100/1000 Base TX PCI	MME	5708	Support	Yes	No
PCIe2 8Gb 4-port Fibre Channel	MME	5717	Support	Yes	No
8 Gigabit PCI Express Dual Por	MME	5729	Both	Yes	No
PCIe2 4-Port 10GbE&1GbE SR&RJ4	MME	5735	Both	Yes	No
2 Port 10/100/1000 Base TX Eth	MME	5744	Both	Yes	No
2 Port Gigabit Ethernet SX PCI	MME	5767	Support	Yes	No
10 Gb Eth SR PCI Express Adp	MME	5768	Both	Yes	No
10 Gigabit Ethernet LR PCI	MME	5769	Both	Yes	No
4 Gigabit PCI Express Dual Por	MME	5772	Both	Yes	No
4 Port Async EIA 232 PCIe Adap	MME	5774	Both	Yes	No
PCIe 380MB Cache Dual x4 3Gb S	MME	5785	Both	Yes	No
EXP24S SFF Gen2-bay Drawer	MME	5805	Support	Yes	No
PCIe2 4-port 1GbE Adapter	MME	5887	Both	Yes	No
PCIe Dual x4 SAS Adapter	MME	5899	Both	Yes	No
PCIe2 1.8GB Cache RAID SAS Ada	MME	5901	Both	Yes	No
SAS AA Cable 3m - HD 6Gb Adapt	MME	5913	Support	Yes	No
SAS AA Cable 6m - HD 6Gb Adapt	MME	5915	Both	Yes	No
SAS AA Cable 1.5m - HD 6Gb Ada	MME	5916	Both	Yes	No
SAS AA Cbl 0.6m - HD 6Gb Adapt	MME	5917	Both	Yes	No
Non-paired Indicator	MME	5918	Both	Yes	No
Opt Front Door for 1.8m Rack	MME	5913	Support	Yes	No
Opt Front Door for 2.0m Rack	MME	5924	Support	Yes	No
1.8m Rack Trim Kit	MME	6068	MES	Yes	No
2.0m Rack Trim Kit	MME	6069	MES	Yes	No
1.8m Rack Acoustic Doors	MME	6246	Support	Yes	No
2.0m Rack Acoustic Doors	MME	6247	Support	Yes	No
1.8m Rack Trim Kit	MME	6248	MES	Yes	No
2.0m Rack Trim Kit	MME	6249	MES	Yes	No
Pwr Crd 4.3m 14ft wall	MME	6263	MES	Yes	No
Pwr Crd (14FT), Drwr - OEM PDU	IBM PDU	6272	MES	Yes	No
Pwr Crd 4.3m 14ft wall	MME	6458	Both	Yes	No
Pwr Crd 1.8m 6ft wall 125V/15A	OEM PDU	6460	Both	Yes	No
	MME	6469	Both	Yes	No

	MME	6470	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6471	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6472	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6473	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6474	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6475	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6476	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6477	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6478	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6488	Both	Yes	No
4.3m (14 Ft) 3PH/24A Power Cor					
	MME	6489	MES	Yes	No
4.3m (14 Ft) 1PH/63A Pwr Cord					
	MME	6491	MES	Yes	No
4.3m (14 Ft) 1PH/48 60A Pwr Co					
	MME	6492	MES	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6493	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6494	Both	Yes	No
Pwr Crd 2.7m 9ft wall	250V,10A				
	MME	6496	Both	Yes	No
Power Cable Drawer to	IBM PD				
	MME	6577	Both	Yes	No
Optional Rack Security Kit					
	MME	6580	MES	Yes	No
Modem Tray for 19-Inch Rack					
	MME	6586	MES	Yes	No
Pwr Crd 2.7m 9ft wall	125V,15A				
	MME	6651	Both	Yes	No
4.3m 3PH/16A Power Cord					
	MME	6653	MES	Yes	No
4.3m 1PH/24-30A Pwr Cord					
	MME	6654	MES	Yes	No
4.3m 14Ft 1PH/24 30A WR Pwr					
	MME	6655	MES	Yes	No
4.3m 14Ft 1PH/24A Power Cord					
	MME	6656	MES	Yes	No
4.3m 14Ft 1PH/32A Power Cord					
	MME	6657	MES	Yes	No
4.3m 14Ft 1PH/24A Pwr Cd Kor					
	MME	6658	MES	Yes	No
Pwr.Cord(9ft),To wall/OEM PDU					
	MME	6659	Both	Yes	No
Pwr Crd 14ft 4.3m wall	OEM PDU				
	MME	6660	Both	Yes	No
Pwr Crd 2.8m 9.2ft wall	PDU				
	MME	6665	Both	Yes	No
4.3m 14Ft 3PH/32A Pwr Cd Aus					
	MME	6667	MES	Yes	No
Pwr Crd 4.3M, Drwr - OEM PDU					
	MME	6669	Both	Yes	No
Pwr Crd 2.7m, Drwr - IBM PDU					
	MME	6671	Both	Yes	No
Pwr Crd 2M, Drwr - IBM PDU					
	MME	6672	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU				
	MME	6680	Both	Yes	No
IIntelligent PDU+ 1 EIA Unit					
	MME	7109	MES	Yes	No
Environmental Monitoring Probe					
	MME	7118	MES	Yes	No
Power Distribution Unit					
	MME	7188	MES	Yes	No
PowDistribUnit(US)Fixed PowCrd					

	MME	7196	Both	Yes	No
AAP Software Pre-Inst.Indic.	MME	7305	Support	N/A	No
2.0m Rack Side Attach Kit	MME	7780	Support	Yes	No
Eth Cbl 15M HW Management	MME	7802	Both	Yes	No
Side-by-Side for 1.8m Racks	MME	7840	Support	Yes	No
Ruggedize Rack Kit	MME	7841	Support	Yes	No
Base Customer Spec Plcmnt	MME	8453	Initial	N/A	No
USB Mouse	MME	8845	Both	Yes	No
Order Routing Indicator Syste	MME	9169	Initial	N/A	No
Language Group Spcf-US Eng	MME	9300	Initial	N/A	No
specify mode-1 & (1)5901/5278	MME	9359	Both	Yes	No
Specify mode-1 & (2)5901/5278	MME	9360	Both	Yes	No
Specify mode-2 & (2)5901/5278	MME	9361	Both	Yes	No
Specify mode-4 & (4)5901/5278	MME	9365	Both	Yes	No
Specify mode-2 & (4)5901/5278	MME	9366	Both	Yes	No
Specify mode-1 & (2)5903/5805	MME	9367	MES	Yes	No
Specify mode-2 & (4)5903/5805	MME	9368	MES	Yes	No
Specify mode-1 & (2) 5913 EXP	MME	9385	Both	Yes	No
Specify mode-2 & (4) 5913 EXP	MME	9386	Both	Yes	No
New AIX License Core Counter	MME	9440	Initial	N/A	No
New IBM i Lic Core Counter	MME	9441	Initial	N/A	No
New Red Hat Lic Core Counter	MME	9442	Initial	N/A	No
New SUSE Lic Core Counter	MME	9443	Initial	N/A	No
Other AIX Lic Core Counter	MME	9444	Initial	N/A	No
Other Linux Lic Core Counter	MME	9445	Initial	N/A	No
3rd Party Linux Lic Core Cnt	MME	9446	Initial	N/A	No
VIOS Core Counter	MME	9447	Initial	N/A	No
Other License Core Counter	MME	9449	Initial	N/A	No
Ubuntu Linux License Core Cntr	MME	9450	Initial	N/A	No
Month Indicator	MME	9461	Initial	N/A	No
Day Indicator	MME	9462	Initial	N/A	No
Hour Indicator	MME	9463	Initial	N/A	No
Minute Indicator	MME	9464	Initial	N/A	No
Qty Indicator	MME	9465	Initial	N/A	No
Countable Member Indicator	MME	9466	Initial	N/A	No
Language Group Spcf-Dutch	MME	9700	Initial	N/A	No
Language Group Spcf-French					

MME	9703	Initial	N/A	No
Language Group Spcf-German				
MME	9704	Initial	N/A	No
Language Group Spcf-Polish				
MME	9705	Initial	N/A	No
Lang Group Specify - Norwegian				
MME	9706	Initial	N/A	No
Lang.Group Spcf-Portuguese				
MME	9707	Initial	N/A	No
Language Group Spcf-Spanish				
MME	9708	Initial	N/A	No
Language Group Spcf-Italian				
MME	9711	Initial	N/A	No
Langua Gr Speci Canadian Frenc				
MME	9712	Initial	N/A	No
Language Group Spcf-Japanese				
MME	9714	Initial	N/A	No
Language Group Specify Tr Chin				
MME	9715	Initial	N/A	No
Language Group Spcf-Korean				
MME	9716	Initial	N/A	No
Language Group Spcf-Turkish				
MME	9718	Initial	N/A	No
Language Group Spcf-Hungarian				
MME	9719	Initial	N/A	No
Language Group Spcf-Slovakian				
MME	9720	Initial	N/A	No
Language Group Spcf-Russian				
MME	9721	Initial	N/A	No
Lang Group Spcf Simpl Chinese				
MME	9722	Initial	N/A	No
Language Group Spcf-Czech				
MME	9724	Initial	N/A	No
Language Group Spcf-Romanian				
MME	9725	Initial	N/A	No
Lang Group Specify - Croatian				
MME	9726	Initial	N/A	No
Language Group Spcf-Slovenian				
MME	9727	Initial	N/A	No
Lang Group Specify - Braz Port				
MME	9728	Initial	N/A	No
Lang Group Specify - Thai				
MME	9729	Initial	N/A	No
QSFP+ 40G Transceiver				
MME	EB27	Both	Yes	No
1m Passive QSFP+ to QSFP+ Cbl				
MME	EB2B	Both	Yes	No
3m Passive QSFP+ to QSFP+ Cbl				
MME	EB2H	Both	Yes	No
10m QSFP+ MTP Optical Cable				
MME	EB2J	Both	Yes	No
30m QSFP+ MTP Optical Cable				
MME	EB2K	Both	Yes	No
Single 5250 Enter. Enable				
MME	EB2R	Both	Yes	No
Lift Tool				
MME	EB2Z	Both	Yes	No
Full 5250 Enter. Enable.				
MME	EB30	Both	Yes	No
Mobile Enablement				
MME	EB35	MES	Yes	No
IBM i 7.2 Indicator				
MME	EB72	Both	Yes	No
IBM i 7.3 Indicator				
MME	EB73	Both	N/A	No
5U system node drawer				
MME	EBA0	Both	Yes	No
IBM Rack mount Drawer Bezel				
MME	EBA2	Both	Yes	No
OEM Rack mount Drawer Bezel				
MME	EBA4	Both	Yes	No
HVDC PDU Horizontal Mounting				
MME	EBA5	Support	Yes	No
AC Power Chunnels				

	MME	EBAA	Both	Yes	No
DC Power Chunnels	MME	EBAD	Both	Yes	No
1.6M USB Cable	MME	EBK4	Both	Yes	No
Rack Front Door (Black)	MME	EC01	MES	Yes	No
Rack Rear Door	MME	EC02	MES	Yes	No
Rack Side Cover	MME	EC03	MES	Yes	No
Rack Suite Attachment Kit	MME	EC04	MES	Yes	No
Slim Rear Acoustic Door	MME	EC07	MES	Yes	No
Slim Front Acoustic Door	MME	EC08	MES	Yes	No
Rear Door Heat Exchanger	MME	EC15	MES	Yes	No
CAPI Activation	MME	EC18	Both	Yes	No
PCIe2 LP 2-Port 10GbE RoCE SFP	MME	EC27	Both	Yes	No
PCIe2 2-Port 10GbE RoCE SFP+ A	MME	EC28	Both	Yes	No
PCIe2 LP 2-Port 10GbE RoCE SR	MME	EC29	Both	Yes	No
PCIe2 LP 2-port 10GbE SFN6122F	MME	EC2G	Both	Yes	No
PCIe2 2-port 10GbE SFN6122F	MME	EC2J	Both	Yes	No
PCIe3 LP 2-port 10GbE NIC&R SR	MME	EC2M	Both	Yes	No
PCIe3 2-port 10GbE NIC&RoCE SR	MME	EC2N	Both	Yes	No
PCIe2 2-Port 10GbE RoCE SR Ada	MME	EC30	Both	Yes	No
PCIe3 LP 2-port 10GbE NIC&R Cu	MME	EC37	Both	Yes	No
PCIe3 2-port 10GbE NIC&RoCE Cu	MME	EC38	Both	Yes	No
PCIe3 LP 2-Port 40GbE NIC RoCE	MME	EC3A	Both	Yes	No
PCIe3 2-Port 40GbE NIC RoCE	MME	EC3B	Both	Yes	No
PCIe2 LP 3D Graphics Adapterx1	MME	EC41	Both	Yes	No
PCIe2 LP 4-Pt USB 3.0 Adapter	MME	EC45	Both	Yes	No
PCIe2 4-Port USB 3.0 Adapter	MME	EC46	Both	Yes	No
PCIe3 LP 1.6TB NVMe Flash Adap	MME	EC54	Both	Yes	No
PCIe3 LP 3.2TB NVMe Flash Adap	MME	EC56	Both	Yes	No
SAS X Cable 3m - HD Narrow	MME	ECBJ	Both	Yes	No
SAS X Cable 6m - HD Narrow	MME	ECBK	Both	Yes	No
SAS X Cable 10m - HD Narrow	MME	ECBL	Both	Yes	No
SAS X Cable 15m -HD Narrow 3Gb	MME	ECBM	Both	Yes	No
5m Passive QSFP+ to QSFP+ Cbl	MME	ECBN	Both	Yes	No
SAS YO Cable 1.5m - HD Narrow	MME	ECBT	Both	Yes	No
SAS YO Cable 3m - HD Narrow	MME	ECBU	Both	Yes	No
SAS YO Cable 6m - HD Narrow	MME	ECBV	Both	Yes	No
SAS YO Cable 10m - HD Narrow	MME	ECBW	Both	Yes	No
SAS YO Cable 15m-HD Narrow 3Gb					

	MME	ECBX	Both	Yes	No
SAS AE1 Cable 4m - HD Narrow	MME	ECBY	Both	Yes	No
SAS YE1 Cable 3m - HD Narrow	MME	ECBZ	Both	Yes	No
SAS AA Cable 0.6m - HD Narrow	MME	ECC0	Both	Yes	No
SAS AA Cable 1.5m - HD Narrow	MME	ECC2	Both	Yes	No
SAS AA Cable 3m - HD Narrow	MME	ECC3	Both	Yes	No
SAS AA Cable 6m - HD Narrow	MME	ECC4	Both	Yes	No
2M Optical Cable Pair	MME	ECC6	Both	Yes	No
10M Optical Cable Pair	MME	ECC8	Both	Yes	No
20M Optical Cable Pair	MME	ECC9	Both	Yes	No
System Cable Set DWR 1	MME	ECCA	Both	Yes	No
System Cable Set DWR 2	MME	ECCB	Both	Yes	No
Custom Serv. Specify, Mexico	MME	ECSM	Initial	N/A	No
Custom Serv. Spec Poughkeepsie	MME	ECSP	Initial	N/A	No
Integrated Solution Packing	MME	ECSS	Initial	N/A	No
Optical wrap Plug	MME	ECW0	Both	Yes	No
387GB SFF-2 SSD converted	MME	EH10	Support	Yes	No
387GB SFF-2 SSD converted	MME	EH11	Support	Yes	No
387GB SFF-2 SSD converted	MME	EH12	Support	Yes	No
387GB SFF-2 SSD converted	MME	EH13	Support	Yes	No
GEN2-S Carrier for ES0C	MME	EH14	Support	Yes	No
Qty 150 Gen2-S Conversion Carr	MME	EH15	Support	Yes	No
GEN2-S Carrier for ES0D IBM i	MME	EH16	Support	Yes	No
Qty 150 GEN2-S Carriers	MME	EH17	Support	Yes	No
Mobile Enablement	MME	EH35	MES	Yes	No
MT 9080 Specify code	MME	EH80	Both	Yes	No
PCIe3 Optical Cable Adapter	MME	EJ07	Both	Yes	No
PCIe3 RAID SAS Adapter 4-port	MME	EJ0J	Both	Yes	No
PCIe3 12GB Cache RAID SAS Adap	MME	EJ0L	Both	Yes	No
PCIe3 LP RAID SAS ADAPTER	MME	EJ0M	Both	Yes	No
PCIe3 SAS Tape/DVD Adapter	MME	EJ10	Both	Yes	No
PCIe3 LP SAS Tape/DVD Adapter	MME	EJ11	Both	Yes	No
PCIe3 12GB Cache RAID+ SAS Ada	MME	EJ14	Both	Yes	No
PCIe3 LP CAPI Flash Acceleratr	MME	EJ18	Both	Yes	No
PCIe Crypto Coprocessor G3 BSC	MME	EJ28	Both	Yes	No
Mode-2 (1)5901/5278	MME	EJ PJ	Both	Yes	No
Mmode-2(2)5901/5278	MME	EJ PK	Both	Yes	No
Mode-4 (1)5901/5278					

	MME	EJPL	Both	Yes	No
Mode-4 (2) 5901/5278					
	MME	EJPM	Both	Yes	No
Mode-4 (3) 5901/5278					
	MME	EJPN	Both	Yes	No
Mode-2 (2)5903/5805					
	MME	EJPR	MES	Yes	No
Mode-2 (2) 5913					
	MME	EJPT	Both	Yes	No
Specify Mode1 & (1)EJ0J-EXP24S					
	MME	EJR1	Both	Yes	No
Specify Mode1 &1(2)EJ0J-EXP24S					
	MME	EJR2	Both	Yes	No
Specify Mode2 & (2)EJ0J-EXP24S					
	MME	EJR3	Both	Yes	No
Specify Mode2 & (4)EJ0J-EXP24S					
	MME	EJR4	Both	Yes	No
Specify Mode4 & (4)EJ0J-EXP24S					
	MME	EJR5	Both	Yes	No
Specify Mode2 & (1)EJ0J-EXP24S					
	MME	EJR6	Both	Yes	No
Specify Mode2 & (2)EJ0J-EXP24S					
	MME	EJR7	Both	Yes	No
Specify Mode2 & (1)EJ0J-EXP24S					
	MME	EJRA	Both	Yes	No
Specify Mode2 & (2)EJ0J-EXP24S					
	MME	EJRB	Both	Yes	No
Specify-Mode4 & (1)EJ0J-EXP24S					
	MME	EJRC	Both	Yes	No
Specify-Mode4 & (2)EJ0J-EXP24S					
	MME	EJRD	Both	Yes	No
Specify-Mode4 & (3)EJ0J-EXP24S					
	MME	EJRE	Both	Yes	No
Specify Mode1 & (2)EJ14-EXP24S					
	MME	EJRF	Both	Yes	No
Specify Mode2 & (2)EJ14-EXP24S					
	MME	EJRG	Both	Yes	No
Specify Mode2 & (2)EJ14-EXP24S					
	MME	EJRH	Both	Yes	No
Specify Mode2 & (4)EJ14+EXP24S					
	MME	EJRJ	Both	Yes	No
Specify Mode1 & (2)EJ0L-EXP24S					
	MME	EJRP	Both	Yes	No
Specify Mode2 & (4)EJ0L EXP24S					
	MME	EJRR	Both	N/A	No
Specify Mode2 & (2)EJ0L-EXP24S					
	MME	EJRS	Both	Yes	No
Specify Mode2 & (2)EJ0L-EXP24S					
	MME	EJRT	Both	Yes	No
Non-paired Indicator EJ0L PCIe					
	MME	EJRU	Both	Yes	No
Non-paired Indicator ESA3 PCIe					
	MME	EJS1	MES	Yes	No
Specify Mode2 & (2)ESA3-EXP24S					
	MME	EJS2	MES	Yes	No
Specify Mode1 & (2)ESA3-EXP24S					
	MME	EJS3	MES	Yes	No
Specify Mode2 & (4)ESA3-EXP24S					
	MME	EJS4	MES	Yes	No
Full width Key USB, US English					
	MME	EK51	Both	Yes	No
Full width Key USB, French					
	MME	EK52	Both	Yes	No
Full widthKey USB,Italian					
	MME	EK53	Both	Yes	No
Full width Key USB, German/Aus					
	MME	EK54	Both	Yes	No
Full width key USB, UK English					
	MME	EK55	Both	Yes	No
Full width Key USB, Spanish					
	MME	EK56	Both	Yes	No
Full width Key USB, Japanese					
	MME	EK57	Both	Yes	No
Full width Key USB, BrazilianP					

	MME	EK58	Both	Yes	No
Full width Key USB, Hungarian	MME	EK59	Both	Yes	No
Full width Key USB, Korean	MME	EK60	Both	Yes	No
Full width Key USB, Chinese	MME	EK61	Both	Yes	No
Full width Key USB, French Can	MME	EK62	Both	Yes	No
Full width Key USB, Belgian/UK	MME	EK64	Both	Yes	No
Full width Key USB, Swedish/Fi	MME	EK65	Both	Yes	No
Full width Key USB, Danish	MME	EK66	Both	Yes	No
Full width Key USB, Bulgarian	MME	EK67	Both	Yes	No
Full width Key USB, Swiss/Fr/G	MME	EK68	Both	Yes	No
Full width Key USB, Norwegian	MME	EK69	Both	Yes	No
Full width Key USB, Dutch	MME	EK70	Both	Yes	No
Full width Key USB, Portuguese	MME	EK71	Both	Yes	No
Full width Key USB, Greek	MME	EK72	Both	Yes	No
Full width Key USB, Hebrew	MME	EK73	Both	Yes	No
Full width Key USB, Polish	MME	EK74	Both	Yes	No
Full width Key USB, Slovakian	MME	EK75	Both	Yes	No
Full width Key USB, Czech	MME	EK76	Both	Yes	No
Full width Key USB, Turkish	MME	EK77	Both	Yes	No
Full width Key USB, LA Spanish	MME	EK78	Both	Yes	No
Full width Key USB, Arabic	MME	EK79	Both	Yes	No
Full width Key USB, Thai	MME	EK80	Both	Yes	No
Full width Key USB, Russian	MME	EK81	Both	Yes	No
Full width Key USB, Slovenian	MME	EK82	Both	Yes	No
Full width Key USB, US English	MME	EK83	Both	Yes	No
PDU Access Cord 0.38m	MME	ELC0	MES	Yes	No
Power IFL Processor Activation	MME	ELJ5	Both	Yes	No
Power Int Fac For Linux Packag	MME	ELJG	Both	Yes	No
Power IFL Memory Activation	MME	ELJH	Both	Yes	No
Power IFL PowerVM for Linux	MME	ELJJ	Both	Yes	No
Boot From Existing Drive Spec	MME	ELS0	Support	Yes	No
#ES1A Load Source Specify 387G	MME	ELS9	Both	Yes	No
#ES0H Load Source Specify 775G	MME	ELSH	Both	Yes	No
#ESDN Load Source Specify 571G	MME	ELSN	Both	Yes	No
#ES0R Load Source Specify 387G	MME	ELSR	Both	Yes	No
#ES0T Load Source Specify 775G	MME	ELST	Both	Yes	No
#ES81 Load Source Specify	MME	ELT1	Both	Yes	No
#ESF2 Load Source Specify					

#ES86 Load Source Specify	MME	ELT2	Both	Yes	No
#ES79 Load Source Specify	MME	ELT6	Both	Yes	No
#ES8D Load Source Specify	MME	ELT9	Both	Yes	No
#ES7F Load Source Specify	MME	ELTD	Both	Yes	No
#ES8G Load Source Specify	MME	ELTF	Both	Yes	No
#ESFN Load Source Specify 571G	MME	ELTG	Both	Yes	No
#ESFS Load Source Specify	MME	ELTN	Both	Yes	No
#ESEU Load Source Specify	MME	ELTS	Both	Yes	No
#ESEY Load Source Specify 283G	MME	ELTU	Both	Yes	No
Active Memory Exp Enablement	MME	ELTY	Both	Yes	No
64GB (4X16GB) CDIMMs, 1600 MHZ	MME	EM82	Both	Yes	No
128GB (4X32GB) CDIMMs, 1600MHZ	MME	EM8J	Both	No	No
256GB (4X64GB) CDIMMs, 1600MHZ	MME	EM8K	Both	No	No
512GB (4X128GB) CDIMM, 1600MHZ	MME	EM8L	Both	No	No
1024GB (4X256GB) CDIMM,1600MHZ	MME	EM8M	Both	No	No
90 Days Elastic CoD Mem Enable	MME	EM8Y	Both	No	No
1GB Memory Activation	MME	EM9T	MES	Yes	No
QTY 100 of 1GB Activations	MME	EMA5	Both	Yes	No
100GB Mobile Mem Activation	MME	EMA6	Both	Yes	No
100GB Mobile Enabled Mem Activ	MME	EMA7	MES	Yes	No
100 GB Mobile Memory Act(P7)	MME	EMA9	Both	Yes	No
Bundle of 8 #EM8M 512GB Memory	MME	EMAF	MES	Yes	No
Memory Activations for #EMB6	MME	EMB6	Both	No	No
512 Memory Activations for IFL	MME	EMB7	Both	Yes	No
Bundle of 8 #EM8Y 1024 Memory	MME	EMB8	Both	Yes	No
Memory Activations for #EMBA	MME	EMBA	Both	No	No
1024 Memory Activations - IFL	MME	EMBB	Support	Yes	No
Static to Mobile Memory Auto	MME	EMBC	Support	Yes	No
8 GB-Day billing CoD memory	MME	EME0	MES	Yes	No
800 GB-Day billing CoD mem	MME	EMJ4	Both	Yes	No
999 GB-Day billing CoD memory	MME	EMJ5	Both	Yes	No
PCIe Gen3 I/O Expansion Drawer	MME	EMJ6	Both	Yes	No
AC Power Supply Conduit	MME	EMX0	Both	Yes	No
DC Power Supply Conduit	MME	EMXA	Both	Yes	No
PCIe3 6-Slot Fanout Module	MME	EMXB	Both	Yes	No
1m 10GbE Cable SFP+ Act Twinax	MME	EMXF	Both	Yes	No
3m 10GbE Cable SFP+ Act Twinax	MME	EN01	Both	Yes	No

5m 10GbE Cable SFP+ Act Twinax	MME	EN02	Both	Yes	No
PCIe3 16Gb 2-port Fibre Channel	MME	EN03	Both	Yes	No
PCIe3 LP 16Gb 2-port Fibre Channel	MME	EN0A	Both	Yes	No
PCIe2 LP 8Gb 2-Port Fibre Channel	MME	EN0B	Both	Yes	No
PCIe2 8Gb 2-Port Fibre Channel	MME	EN0F	Both	Yes	No
PCIe3 4-port 10Gb FCoE & 1GbE	MME	EN0G	Both	Yes	No
PCIe3 LP 4-port 10GB FCoE & 1G	MME	EN0H	Both	Yes	No
PCIe3 4-port 10GB FCoE & 1GbE	MME	EN0J	Both	Yes	No
PCIe3 LP 4-port 10GB FCoE & 1GE	MME	EN0K	Both	Yes	No
PCIe3 4-port 10Gb FCoE & 1GbE	MME	EN0L	Both	Yes	No
PCIe3 LP 4-port 10Gb FCoE & 1GE	MME	EN0M	Both	Yes	No
PCIe2 4-pt(10+1 GbE)SR+RJ45	MME	EN0N	Both	Yes	No
PCIe2 LP4-pt(10+1 GbE)SR+RJ45	MME	EN0S	Both	Yes	No
PCIe2 4-pt(10+1GbE)CRSR+RJ45	MME	EN0T	Both	Yes	No
PCIe2 LP4-pt(10+1GbE)CRSR+RJ45	MME	EN0U	Both	Yes	No
PCIe2 2-pt 10/1GbE BaseT RJ45	MME	EN0V	Both	Yes	No
PCIe2 LP2-pt10/1GbE BaseT RJ45	MME	EN0W	Both	Yes	No
PCIe2 LP 8Gb 4-port Fibre Channel	MME	EN0X	Both	Yes	No
PCIe2 8Gb 4-port Fibre Channel	MME	EN0Y	Both	Yes	No
Not withdrawn in Japan	MME	EN12	Both	Yes	No
PCIe 1-port Bisync Adapter	MME	EN13	Support	Yes	No
PCIe3 4-port 10GbE SR Adapter	MME	EN15	Both	Yes	No
PCIe3 LPX 4-port 10GbE SR Adapter	MME	EN16	Both	Yes	No
PCIe3 4-port 10GbE SFP+ Adapter	MME	EN17	Both	Yes	No
PCIe3 LPX 4-port 10GbE SFP+ Adapter	MME	EN18	Both	Yes	No
2 Port Async EIA 232 PCIe Adapter	MME	EN27	Support	Yes	No
PCIe LP 2 Port Async EIA 232 Adapter	MME	EN28	Support	Yes	No
2 Port Async EIA 232 PCIe Adapter	MME	EN29	Both	Yes	No
1-Core Mobile Activation	MME	EP2S	MES	Yes	No
1-Core Mobile Activation	MME	EP2U	MES	Yes	No
90 Days Elastic CoDProc Enable	MME	EP9T	MES	Yes	No
HVDC PDU - 90A 6xOutlet	MME	EPAA	MES	Yes	No
Auto Selected HVDC Power Cord	MME	EPAC	Initial	N/A	No
2.5 Meter HVDC Power Cord	MME	EPAD	Both	Yes	No
4.02 GHz 32-core processor	MME	EPBA	Both	No	No
1 core activation for #EPBA	MME	EPBJ	Both	Yes	No
1 core Mobile Act for #EPBA	MME	EPBN	Both	Yes	No

Static to Mobile Processor Aut	MME	EPE0	MES	Yes	No
1 Elastic Proc-day #EPBA, AIXL	MME	EPJ6	Both	Yes	No
1 Elastic Proc-day #EPBA, IBMi	MME	EPJ7	Both	Yes	No
100 Elastic Prc-day #EPBA AIXL	MME	EPJ8	Both	Yes	No
100 Elastic Prc-day #EPBA IBMi	MME	EPJ9	Both	Yes	No
100 CoD Ut1 mins, #EPBA, AIXL	MME	EPJA	Both	Yes	No
100 CoD Ut1 mins, #EPBA, IBMi	MME	EPJB	Both	Yes	No
Quantity 150 of #3452 SAS Cabl	MME	EQ02	Both	Yes	No
Quantity 150 of #3453 SAS YO	MME	EQ03	Both	Yes	No
Quantity of 150 #ES0C	MME	EQ0C	Support	Yes	No
Quantity of 150 #ES0D	MME	EQ0D	Support	Yes	No
Quantity 150 # ES0G 775G SSD	MME	EQ0G	Both	Yes	No
Quantity 150 #ES0H 775GB SSD	MME	EQ0H	Both	Yes	No
Qty 150 of #ES0Q 387GB 4k SSD	MME	EQ0Q	Both	Yes	No
Qty 150 of #ES0R 387GB 4k SSD	MME	EQ0R	Both	Yes	No
QTY 150 of #ES0S 775GB 4k SSD	MME	EQ0S	Both	Yes	No
Qty 150 of #ES0T 775GB 4k SSD	MME	EQ0T	Both	Yes	No
Quantity 150 #ES19 387GB SSD	MME	EQ19	Both	Yes	No
Quantity 150 #ES1A 387GB SSD	MME	EQ1A	Both	Yes	No
Quantity 150 of #1738	MME	EQ38	Both	Yes	No
Quantity 150 of #1752	MME	EQ52	Both	Yes	No
Qty 150 #ES78 SSD 387GB 5xx	MME	EQ78	Both	Yes	No
Qty 150 #ES79 SSD 387GB 5xx	MME	EQ79	Both	Yes	No
Qty 150 #ES7E SSD 775GB 5xx	MME	EQ7E	Both	Yes	No
Qty 150 #ES7F SSD 775GB 5xx	MME	EQ7F	Both	Yes	No
Quantity 150 of ES80 1.9TB SSD	MME	EQ80	Both	Yes	No
Quantity 150 of ES81 1.9TB SSD	MME	EQ81	Both	Yes	No
Qty 150 #ES85 SSD 387GB 4k	MME	EQ85	Both	Yes	No
Qty 150 #ES86 SSD 387GB 4k	MME	EQ86	Both	Yes	No
Qty 150 #ES8C SSD 775GB 4k	MME	EQ8C	Both	Yes	No
Qty 150 #ES8D SSD 775GB 4k	MME	EQ8D	Both	Yes	No
Qty 150 #ES8F SSD 1.55TB 4k	MME	EQ8F	Both	Yes	No
Qty 150 #ES8G SSD 1.55TB 4k	MME	EQ8G	Both	Yes	No
Quantity 150 #ESD2 1.1TB Disk	MME	EQD2	Both	Yes	No
Quantity 150 #ESD3 1.2TB Disk	MME	EQD3	Both	Yes	No
Qty 150 of #ESDN 571GB 15k HDD	MME	EQDN	Both	Yes	No
Qty 150 of #ESDP 600GB 15k HDD	MME	EQDP	Both	Yes	No

Quantity 150 of #ESEU 571GB	MME	EQEU	Both	Yes	No
Quantity 150 of #ESEV 600GB	MME	EQEV	Both	Yes	No
Quantity 150 of #ESEY 283 GB S	MME	EQEY	Both	Yes	No
Quantity 150 of #ESEZ 300GB	MME	EQEZ	Both	Yes	No
Quantity 150 of #ESF2 1.2TB	MME	EQF2	Both	Yes	No
Quantity 150 of #ESF3 1.2TB	MME	EQF3	Both	Yes	No
Quantity 150 of #ESFN 571GB	MME	EQFN	Both	Yes	No
Quantity 150 of #ESFP 600GB	MME	EQFP	Both	Yes	No
Quantity 150 of #ESFS 1.7TB	MME	EQFS	Both	Yes	No
Quantity 150 of #ESFT 1.8TB	MME	EQFT	Both	Yes	No
42U Slim Rack	MME	ER05	MES	Yes	No
Indicator, reserve 5 EIA	MME	ER16	Both	N/A	No
Specify Reserve 4 EIA Space	MME	ER1A	Initial	N/A	No
Field Integration: Rack-Server	MME	ER21	Both	Yes	No
RFID Tags for Compute Nodes	MME	ERF1	Initial	N/A	No
Rear rack extension	MME	ERG0	MES	Yes	No
Origami Front Door 2m Rack	MME	ERG7	MES	Yes	No
Acoustic Black Front Door	MME	ERGB	MES	Yes	No
387GB SFF-2 SSD for AIX/Linux	MME	ES0C	Support	Yes	No
387GB SFF-2 SSD for IBM i	MME	ES0D	Support	Yes	No
775GB SFF-2 SSD for AIX/Linux	MME	ES0G	Both	Yes	No
775GB SFF-2 SSD for IBM i	MME	ES0H	Both	Yes	No
387GB SFF-2 4k SSD AIX/Linux	MME	ES0Q	Both	Yes	No
387GB SFF-2 4k SSD for IBM i	MME	ES0R	Both	Yes	No
775GB SFF-2 4k SSD AIX/Linux	MME	ES0S	Both	Yes	No
775GB SFF-2 4k SSD for IBM i	MME	ES0T	Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	MME	ES19	Both	Yes	No
387GB SFF-2 SSD for IBM i	MME	ES1A	Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	MME	ES2C	MES	Yes	No
387GB SFF-2 SSD for IBM i	MME	ES2D	MES	Yes	No
387GB SFF-2 SSD 5xx for AIX/L	MME	ES78	Both	Yes	No
387GB SFF-2 SSD 5xx for IBM i	MME	ES79	Both	Yes	No
775GB SFF-2 SSD 5xx for AIX/L	MME	ES7E	Both	Yes	No
775GB SFF-2 SSD 5xx for IBM i	MME	ES7F	Both	Yes	No
1.9TB RI SAS 4k SFF-2 SSD AIX	MME	ES80	Both	Yes	No
1.9TB RI SAS 4k SFF-2 SSD IBM	MME	ES81	Both	Yes	No
387GB SFF-2 SSD 4k for AIX/Li	MME	ES85	Both	Yes	No

387GB SFF-2 SSD 4k for IBM i	MME	ES86	Both	Yes	No
775GB SFF-2 SSD 4k for AIX/Li	MME	ES8C	Both	Yes	No
775GB SFF-2 SSD 4k for IBM i	MME	ES8D	Both	Yes	No
1.55TB SFF-2 SSD 4k for AIX/L	MME	ES8F	Both	Yes	No
1.55TB SFF-2 SSD 4k for IBM i	MME	ES8G	Both	Yes	No
PCIe2 1.8GB Cache RAID SAS Ada	MME	ESA3	Support	Yes	No
S&H - No Charge	MME	ESC0	Initial	N/A	No
S&H	MME	ESC8	Both	Yes	No
1.1TB 10K RPM SAS SFF-2 Disk	MME	ESD2	Both	Yes	No
1.2TB 10K RPM SAS SFF-2 (AIX/	MME	ESD3	Both	Yes	No
571GB 15k SAS SFF-2 Disk Drive	MME	ESDN	Both	Yes	No
600GB 15k SAS SFF-2 Disk Drive	MME	ESDP	Both	Yes	No
571GB 10K RPM SFF-2 Disk 4K	MME	ESEU	Both	Yes	No
600GB 10K RPM SFF-2 Disk 4K	MME	ESEV	Both	Yes	No
283GB 15K SAS SFF-2 4K BLK HDD	MME	ESEY	Both	Yes	No
300GB 15K SAS SFF-2 4K BLK HDD	MME	ESEZ	Both	Yes	No
1.1TB 10K RPM SFF-2 Disk 4K	MME	ESF2	Both	Yes	No
1.2TB 10K RPM SFF-2 Disk 4K	MME	ESF3	Both	Yes	No
571GB 15K SAS SFF-2 4K BLK HDD	MME	ESFN	Both	Yes	No
600GB 15K SAS SFF-2 4K BLK HDD	MME	ESFP	Both	Yes	No
1.7TB 10K RPM SFF-2 Disk 4K	MME	ESFS	Both	Yes	No
1.8TB 10K RPM SFF-2 Disk 4K	MME	ESFT	Both	Yes	No
1TB Removable Disk Cartridge	MME	EU01	Both	Yes	No
RDX USB External Docking	MME	EU04	Both	Yes	No
RDX 320 GB Removable Disk Driv	MME	EU08	Support	Yes	No
Service Processor	MME	EU0A	Both	No	No
SATA Slimline DVD-RAM	MME	EU13	Both	Yes	No
1.5TB Removable Disk Cartridge	MME	EU15	Support	Yes	No
2TB Removable Disk Cartrdg-RDX	MME	EU2T	Both	Yes	No
Software preload define	MME	EUC1	Initial	N/A	No
Software preload define	MME	EUC2	Initial	N/A	No
Software preload define	MME	EUC3	Initial	N/A	No
Core Use HW Feature	MME	EUC6	MES	Yes	No
Core Use HW Feature 10	MME	EUC7	MES	Yes	No

(CSU = Customer setup)

Annual minimum maintenance charges

Not applicable.

ServiceElect (ESA) charges

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

Model conversion purchase price

Model		Model conversion purchase price*
From	To	
9179-MMD	9080-MME	\$

* Parts removed or replaced become the property of IBM and must be returned.

Feature conversion purchase price

Feature conversions

Feature conversions for 9080-MME memory features:

From FC:	To FC:	Parts returned	Purchase price
EM8J - 64GB (4x16GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes	
EM8K - 128GB (4x32GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes	
EM8L - 256GB (4x64GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes	
EM8M - 512GB (4x128GB) CDIMMs, 1600 MHz, 4GBIT DDR3 DRAM	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes	
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	
EMB6 - Bundle of eight #EM8M, 512GB 1600 MHz Memory	EMBA - Bundle of eight #EM8Y, 1024GB 1600 MHz Memory	Yes	

Feature conversions for 9080-MME processor features:

From FC:	To FC:	Parts returned	Purchase price
EPBJ - 1 core Processor Activation for #EPBA	EP2S - 1-Core Mobile Activation	No	
EPBN - 1 core Processor Activation for #EPBA, Mobile Enabled	EP2S - 1-Core Mobile Activation	No	
EPBJ - 1 core Processor Activation for #EPBA	EPBN - 1 core Processor Activation for #EPBA, Mobile Enabled	No	

Feature conversions for 9117-MMD to 9080-MME 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 9117-MMD to 9080-MME 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 9117-MMD to 9080-MME 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	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
5601 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHZ - POWER7 CoD	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
EM40 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHZ - POWER7+ CoD	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
EM41 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHZ - POWER7+ CoD	EM8J - 64GB (4X16GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHZ - POWER7 CoD	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
5601 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHZ - POWER7 CoD	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
5602 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHZ - POWER7 CoD	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
EM40 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHZ - POWER7+ CoD	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
EM41 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHZ - POWER7+ CoD	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
EM42 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHZ - POWER7+ CoD	EM8K - 128GB (4X32GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
5564 - 0/256GB DDR3 Memory (4X64GB) DIMMS - 1066 MHZ - POWER7 CoD	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHZ, 4GBIT DDR3 DRAM	Yes	
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS -	EM8L - 256GB (4X64GB) CDIMMs, 1600 MHZ, 4GBIT	Yes	

1066 MHz - POWER7 CoD Memory	DDR3 DRAM	
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
5564 - 0/256GB DDR3 Memory (4X64GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
5600 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
5601 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes
5602 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHz - POWER7 CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHz, 4GBIT, DDR4 DRAM	Yes

EM40 - 0/32GB DDR3 Memory (4X8GB) DIMMS - 1066 MHZ - POWER7+ CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHZ, 4GBIT, DDR4 DRAM	Yes
EM41 - 0/64GB DDR3 Memory (4X16GB) DIMMS - 1066 MHZ - POWER7+ CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHZ, 4GBIT, DDR4 DRAM	Yes
EM42 - 0/128GB DDR3 Memory (4X32GB) DIMMS - 1066 MHZ - POWER7+ CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHZ, 4GBIT, DDR4 DRAM	Yes
EM44 - 0/256GB DDR3 Memory (4X64GB) DIMMS - 1066 MHZ - POWER7+ CoD Memory	EM8Y - 1024GB (4x256GB) CDIMMs, 1600 MHZ, 4GBIT, DDR4 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
EMAG - 100 GB Mobile Enabled Memory Activations	EMA9 - 100 GB Mobile Enabled Memory Activations	No
EMA4 - 100 GB Mobile Memory Activation	EMAF - 100 GB Mobile Memory Activation (Upgrade from P7)	No

Feature conversions for 9117-MMD to 9080-MME 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	EB30 - Full 5250 Enterprise Enablement	No	
ELJ1 - Power IFL Processor Activation	ELJ5 - Power IFL Processor Activation	No	
ELJ4 - Power IFL Processor Activation	ELJ5 - Power IFL Processor Activation	No	
EP22 - 1-Core Mobile Activation	EP2U - 1-Core Mobile Activation from Power 7	No	
EPM0 - 4.22 GHZ Proc Card, 0/12 Core POWER7+, 16 DDR3 Memory Slots	EPBA - 4.02 GHZ, 32-core POWER8 processor	Yes	
EPM1 - 3.80 GHZ Proc Card, 0/16 Core POWER7+, 16 DDR3 Memory Slots	EPBA - 4.02 GHZ, 32-core POWER8 processor	Yes	
EPMA - 1-Core Activation for Processor Feature EPM0	EPBJ - 1 core Processor Activation for #EPBA	No	
EPMB - 1-Core Activation for Processor Feature EPM1	EPBJ - 1 core Processor Activation for #EPBA	No	
EPMC - #EPM0 Processor Activation, Mobile Enabled	EPBN - 1 core Processor Activation for #EPBA, Mobile Enabled	No	
EPMD - #EPM1 Processor Activation, Mobile Enabled	EPBN - 1 core Processor Activation for #EPBA, Mobile Enabled	No	

Feature conversions for 9117-MMD to 9080-MME system unit base features:

From FC:	To FC:	Parts returned	Purchase price
EB85 - System CEC Enclosure with IBM BEZEL, I/O Backplane, and System Midplane	EBA0 - 5U system node drawer	Yes	

EB86 - System CEC Enclosure with OEM BEZEL, I/O Backplane, and System Midplane	EBA0 - 5U system node drawer	Yes
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Feature conversions for 9117-MMD to 9080-MME 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 October 31, 2016)

In the Description section, Processor core activations subsection, corrected two feature numbers in the 32-core (#EPBA) table.

(Corrected on September 22, 2016)

Corrected IBM Power Enterprise Cloud Index website link in Description section.