



# IBM PowerLinux 7R1 is optimized for Linux to help deliver new solutions and services faster, with higher quality

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## At a glance

The PowerLinux 7R1 is fueled by the outstanding performance and energy efficiency of the IBM® POWER7® processor optimized for the Linux™ operating system running on the IBM Power® platform:

- Powerful 64-bit, 8-core POWER7 3.55 GHz processor module
- Up to 128 GB of memory with optional memory riser card
- Rich I/O options in the system unit:
  - Five PCIe Gen2 low profile slots
  - PCIe2 LP 4-port 1GbE adapter
  - Six-disk or solid-state drive (SSD) SAS small form-factor bays -- up to 3.6 TB
  - Slimline DVD-RAM
  - Bay for tape or removable drive
  - Integrated SAS/SATA controller with RAID 0, 1, and 10 support for disk and SSD; support for tape and DVD
- EnergyScale™ technology

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

## Overview

The IBM PowerLinux™ 7R1 server delivers the outstanding performance of the IBM POWER7 processor in a dense, highly efficient 2U rack-optimized form factor for Linux customers. It is ideal for running multiple Linux infrastructure and application workloads, and with PowerVM® virtualization, can be more economical than traditional Linux servers.

Take advantage of the scalability and capacity of IBM PowerLinux 7R1 by leveraging the feature-rich PowerVM virtualization technology from IBM to fully utilize the server's capacity and deploy virtual partitions faster. You can move workloads as needed across PowerLinux and Power Systems™ servers with Live Partition Mobility.

The IBM PowerLinux 7R1 server is a Linux only 2U rack-mount server with one processor socket offering an 8-core 3.55 GHz configuration.

The PowerLinux 7R1 server supports a maximum of eight DDR3 DIMM slots, with four DIMM slots included in the base configuration and four more slots available with one optional memory riser card, allowing for a maximum system memory of 128 GB.

Memory features (two memory DIMMs per feature) supported are 8 GB, 16 GB, and 32 GB, running at speeds of 1066 MHz. PowerVM now features Active Memory™ Sharing, the technology that allows you to intelligently exchange memory between running partitions for increased optimization of physical memory resources. Active Memory Sharing enables the sharing of a pool of physical memory among logical partitions (LPARs) on a single server, helping to increase memory utilization and drive down system costs.

The IBM PowerLinux 7R1 server offers three storage backplane options. The first supports three SFF SAS HDDs or SSDs, an SATA DVD, and a half-high tape drive. The second supports six SFF SAS HDDs or SSDs and an SATA DVD. These two choices both provide an integrated SAS controller, offering RAID 0, 1, and 10 support. The third supports six SFF SAS HDDs or SSDs, an SATA DVD, and adds support for dual write cache RAID 5, RAID 6, and an external SAS port. HDDs and SSDs are hot-swap and front accessible with each of the three alternatives.

Other integrated features include:

- Five PCIe x8 Gen2 low profile expansion slots
- PCIe2 LP 4-port 1GbE adapter
- Service Processor
- Integrated SAS/SATA controller for HDD, SSD, tape, and DVD in the system unit, supporting RAID 0, 1, and 10; RAID 5 and RAID 6 also available
- EnergyScale technology
- Two system ports, three USB ports, and two HMC ports
- Redundant and hot-swap power
- Redundant and hot-swap cooling

The PowerLinux system is specifically designed for emerging workloads that are proven ideal for a virtualized scale-out, Linux server environment.

The PowerLinux 7R1 server benefits from POWER7 performance, Intelligent Threads technology, and high memory and I/O bandwidth. These workloads realize more performance, more efficient virtualization, unique workload optimizing features, and industry-leading reliability, availability, and scalability at prices comparable with traditional Linux servers.

IBM is investing in new technologies to further advance the value of the PowerLinux 7R1 server for emerging and traditional workloads.

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## Key prerequisites

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Refer to the [Hardware requirements](#) section and [Software requirements](#) section.

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## Planned availability date

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July 20, 2012

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## Description

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### IBM PowerLinux 7R1

Summary of standard features:

- Rack-mount (2U) configuration
- 8-core 3.55 GHz processor module
- 8 GB, 16 GB, or 32 GB of 1066 MHz DDR3 ECC memory features (error checking and correcting), minimum 32 GB expandable to 128 GB
- Three storage backplane options:
  - Three SFF SAS HDDs/SSDs, SATA DVD bay, tape drive bay
  - Six SFF SAS HDDs/SSDs, SATA DVD bay
  - Six SFF SAS HDDs/SSDs, SATA DVD bay, dual write cache SAS RAID, external SAS port
- Five PCIe x8 Gen2 and one PCIe x4 Gen2 low profile slots
- One GX++ slot
- Integrated:
  - Service Processor
  - EnergyScale technology
  - Hot-swap and redundant cooling
  - Three USB ports, two system ports, and two HMC ports
- One 1725 watt ac, hot-swap power supply

Certain configurations of the PowerLinux 7R1 are ENERGY STAR Qualified. Refer to

[http://www-03.ibm.com/systems/hardware/energy\\_star/index.html](http://www-03.ibm.com/systems/hardware/energy_star/index.html)

You can order the PowerLinux 7R1 using feature number ELBA for a configuration with one POWER7 3.55 GHz processor module.

In addition to the processor module, the minimum PowerLinux 7R1 initial order must include:

- Eight processor activations
- 32 GB of memory
- Two HDDs/SDDs
- Ethernet adapter
- Storage backplane
- One power supply and one power cord
- Operating system indicator
- IBM PowerVM for IBM PowerLinux or GPFS™
- Language group specify

The minimum defined initial order configuration, if no choice is made, is as follows:

Feature number	Description
ELBA	Package indicator which includes:
1 x EPL5	0/8 core 3.55 GHz POWER7 Processor Module (with ELBA)
8 x EPLA	8 Processor Activation (Zero-priced)
2 x EL16	32 GB Memory (Zero-priced)
2 x EL03	146.8 GB 15k SFF HDD

EL0T	Storage Backplane for 2.5-inch Drives/SATA DVD/Tape (Zero-priced)
EL11	PCIe2 LP 4-port 1GbE Adapter (\$0)
1 x 5603 9300/97xx 2147	Power Supply, 1725 watt AC Language Group Specify Primary Operating System Indicator - Linux (#2147)
8 x #EC22	IBM PowerVM for IBM PowerLinux (1 per core)
or	
5765-G66 1 x 6xxx	GPFS One Power Cord

**Note:**

- The first two memory features chosen on an initial order are installed in the nonfeaturized memory riser card. When 4 x EL15 are chosen to meet the minimum memory requirements, 1 x ELOA must be ordered. Feature number ELOA is not allowed with EL16 or EL17.
- Alternative configuration options are available on a special bid basis from your IBM representative or Business Partner.
- No internal HDD/SSD is required if feature 0837 (boot from SAN) is selected. You must order a Fibre Channel or Fibre Channel over Ethernet adapter if you select feature 0837.

**Dynamic LPAR**

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The dynamic LPAR function offers enhanced resource management for the PowerLinux 7R1 server. Dynamic LPAR enables available system resources to be quickly and easily configured across multiple logical partitions to meet the rapidly changing needs of your business.

With dynamic LPAR, you can add new system resources such as new HDDs or SSDs into your system's configuration without requiring a reboot. If the PowerVM for PowerLinux (EC22) feature is installed in the system, a maximum of 10 dynamic LPARs for each physical processor can be defined, with a PowerLinux 7R1 system maximum of 80 dynamic LPARs.

**Notes for System Director and VMControl:**

- If you are implementing dynamic LPAR:
  - An HMC or IVM is required to manage POWER7 processor-based servers implementing partitioning. Multiple POWER7 processor-based servers can be supported by a single HMC.
  - If you use an HMC to manage any POWER7 processor-based server, the HMC must be a CR3, or later, model, rack-mount or a C06, or later, deskside. SDMC cannot be managed by Systems Director at this time.
- If you install IBM Systems Director for IBM PowerLinux : Systems Director Editions for Power Systems 6.3, or later
- If you install IBM Systems Director VMControl™ for IBM PowerLinux :
  - Systems Director VMControl 2.4, or later, is required.
  - Systems Director VMControl for IBM PowerLinux is included in Systems Director Express® Edition.
  - PowerVM is required to run VMControl.
  - Systems Director VMControl for IBM PowerLinux or VMControl Enterprise Edition requires Systems Director, V6.3, or later. If the product is installed on an older version of Systems Director, you are prompted to perform an upgrade before accessing full functionality.

## IBM PowerVM for IBM PowerLinux (#EC22)

Either PowerVM for PowerLinux or GPFS is required on the PowerLinux 7R1.

PowerVM for PowerLinux enables you to create partitions in units of less than 1 CPU (sub-CPU LPARs) and enables the same system I/O to be added to these partitions. The feature also includes a software component that enables cross-partition workload management.

PowerVM for PowerLinux offers:

- Micro-Partitioning® (up to 10 partitions per processor core, 80 per PowerLinux 7R1 system)
- Virtualized disk and optical devices (VIOperating system)
- Automated CPU reconfiguration
- Real-time partition configuration and load statistics
- Support for dedicated and shared processor LPAR groups
- Support for manual provisioning of resources

At initial order entry, you can select feature number EC22 to enable Micro-Partitioning during manufacture and the enabling software media and publications to be shipped to you. When you order feature number EC22 as an MES, an activation key is posted on the following website, and you must retrieve it and install it on the system.

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

### Notes for PowerVM for PowerLinux:

- If you are implementing PowerVM for PowerLinux, PowerVM V2.2, or later, is required.
- VMs or logical partitions (LPARs) are managed using built-in Integrated Virtualization Manager (IVM) software or optionally through use of a Hardware Management Console (HMC).
- If any processors in a system have the virtualization feature, all active processors must have it.
- After the virtualization feature is installed in a system, it cannot be removed.
- PowerVM V2.2, or later, and a supported Linux operating system level are minimum requirements for performing Live Partition Mobility functions on POWER7 . For more information on minimum Linux operating system levels, refer to the [Software requirements](#) section.
- Active Memory Sharing is supported with RHEL 6 and SLES 11 SP1.
- Virtual Ethernet and Virtual Storage are part of PowerVM Editions.

PowerVM for PowerLinux also includes Live Partition Mobility, which allows for the movement of a logical partition from one POWER6® or POWER7 server to another with no application downtime, and Active Memory Sharing, which dynamically reallocates memory between running logical partitions on a server.

**Note:** PowerVM 2.1.2.11 with Fix Pack 22.1 and Service Pack 1, or later, and a supported Linux operating system level are minimum requirements for performing Live Partition Mobility functions on POWER7 . For more information on minimum Linux operating system levels, refer to the [Software requirements](#) section.

### 19-inch racks

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The PowerLinux 7R1 (8246-L1C) is designed to mount in the 36U 7014-T00 (#0551) or the 42U 7014-T42 (#0553) rack. These racks are built to the 19-inch EIA standard. When you order a new 8246 system, you can also order the appropriate 7014 rack model with the system hardware on the same initial order. IBM is making the racks available as features of the 8246-L1C when you order additional I/O

drawer hardware for an existing system (MES order). The rack feature number should be used if you want IBM to integrate the newly ordered I/O drawer in a 19-inch rack before shipping the MES order.

### **1.8-meter rack (#0551)**

The 1.8-meter rack (#0551) is a 36 EIA unit rack. The rack that is delivered as feature 0551 is the same rack delivered when you order the 7014-T00 rack; the included features may be different. Some features that are delivered as part of the 7014-T00 must be ordered separately with the feature 0551. Order the feature 0551 only when required to support rack integration of MES orders prior to shipment from IBM .

### **2.0-meter rack (#0553)**

The 2.0-meter rack (#0553) is a 42 EIA unit tall rack. The rack that is delivered as feature 0553 is the same rack delivered when you order the 7014-T42 rack; the included features may be different. Some features that are delivered as part of the 7014-T42 must be ordered separately with the feature 0553. Order the feature 0553 only when you require support for rack integration of MES orders prior to shipment from IBM .

## **IBM Power Systems deployment-ready services**

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IBM offers a portfolio of integration, configuration, and customization services for IBM Power Systems . These services are designed to accelerate customer solution deployment and reduce related resources and cost. Offerings include:

- Integration:
  - Component integration
  - Rack integration
  - Operating system preinstallation
  - Unit personalization
  - Third-party hardware/software installation
  - Customer-specified placement
- Asset tagging: Standard RFID
- Special packaging: Box consolidation
- System customization: Remote access partitioning customized operating system and firmware

For more information on deployment-ready services, visit

<http://www.ibm.com/power/deploymentreadyservices/>

## **Reliability, availability, and serviceability (RAS) features**

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### ***Reliability, fault tolerance, and data correction***

The reliability of systems starts with components, devices, and subsystems that are designed to be highly reliable. The POWER7 processor SCM uses lower-voltage technology, improving reliability with stacked latches to reduce soft error (SER) susceptibility. 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.

The system cache and memory offer ECC (error checking and correcting) fault-tolerant features. ECC is designed to correct environmentally induced, single-bit, intermittent memory failures and single-bit hard failures. With ECC, the likelihood of memory failures will be reduced. ECC also provides double-bit memory error detection that helps protect data in the event of a double-bit memory failure.

The Linux operating system supports disk drive mirroring (RAID 1) through software, while other RAID protection schemes are provided via hardware RAID adapters.

### ***Memory error correction extensions***

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

Memory protection features include scrubbing to detect errors, a means to call for the deallocation of memory pages for a pattern of correctable errors detected, and signaling deallocation of a logical memory block when an error occurs that cannot be corrected by the ECC code.

### ***Fault monitoring functions***

- When a POWER7 processor-based system is initially powered on, built-in self-test (BIST) and power-on self-test (POperating systemT) check processor, cache, memory, and associated hardware required for proper booting of the operating system. If a noncritical error is detected or if the errors occur in resources that can be removed from the system configuration, the restarting process is designed to proceed to completion. The errors are logged in the system nonvolatile RAM (NVRAM).
- Disk drive fault tracking is designed to alert the system administrator of an impending disk drive failure before it impacts customer operation.

### ***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 will perform a reset/reload if it detects the loss of the Service Processor. If the reset/reload does not correct the problem, the hypervisor notifies the operating system and the operating system can take appropriate action, including calling for service.

### ***Environmental monitoring functions***

POWER7-based servers include a range of environmental monitoring functions:

- Temperature monitoring warns the system administrator of potential environmental-related problems by monitoring the air inlet temperature. When the inlet temperature rises above a warning threshold, the system initiates an orderly shutdown. When the temperature exceeds the critical level or if the temperature remains above the warning level for too long, the system will shut down immediately.
- Fan speed is controlled by monitoring actual temperatures on critical components and adjusting accordingly. If internal component temperatures reach critical levels, the system will shut down immediately, regardless of fan speed. When a redundant fan fails, the system calls out the failing fan and continues running. When a nonredundant fan fails, the system shuts down immediately.

### ***Availability enhancement functions***

The POWER7 family of systems continues to offer and introduce significant enhancements designed to increase system availability.

### ***POWER7 processor functions***

As in POWER6, the POWER7 processor can perform processor instruction retry 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 an error is encountered in the core, the POWER7 processor will first automatically

retry the instruction. If the source of the error is truly transient, the instruction succeeds and the system continues as before. On IBM systems prior to POWER6 , this error would have caused a checkstop.

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 in POWER6 , POWER7 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. These systems are designed to avoid a full system outage.

### **POWER7 single processor checkstopping**

As in POWER6 , POWER7 provides single processor checkstopping. This significantly reduces the probability of a fault in any one processor affecting total system availability.

### **Partition availability priority**

Also available is the ability to assign availability priorities to partitions. 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 POWER7 processor-based server, this allows that capacity to be first obtained from, for example, a test partition instead of a financial accounting system.

### **POWER7 cache availability**

The POWER® processor-based line of servers continues to be at the forefront of cache availability enhancements. The L3 cache is now integrated on the POWER7 processor. The POWER7 processor provides both L2 and L3 cache line delete functions.

### **Special uncorrectable error handling**

Special Uncorrectable Error (SUE) handling is an IBM innovation introduced for POWER5 processors, where an uncorrectable error in memory or cache does not immediately cause 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 checkstop.

### **PCI extended error handling**

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

### **Predictive failure and dynamic component deallocation**

Servers with POWER processors have long had the capability to perform predictive failure analysis on certain critical components such as processors and memory. When these components exhibit certain symptoms that may indicate a failure is imminent, the system can dynamically deallocate and call home, when enabled, about the failing part before the error is propagated system-wide. In many cases, the system first attempts to reallocate resources in such a way that avoids unplanned outages. In the event that insufficient resources exist to maintain full system availability, these servers attempt to maintain partition availability by user-defined priority.



## **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 repair the system while attempting to minimize or eliminate service cost (within budget objectives), while maintaining high customer satisfaction. Serviceability includes system installation, MES (system upgrades/downgrades), and system maintenance/repair. Depending upon the system and warranty contract, service may be performed by the customer, an IBM representative, or an authorized warranty service provider.

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

- Design for customer setup (CSU), customer installed features (CIF), and customer replaceable units (CRU)
- Error detection and fault isolation (ED/FI)
- First Failure Data Capture (FFDC)
- Converged service approach across multiple IBM server platforms

## **Service environments**

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

The POWER7 processor-based platforms support two main service environments:

- Attachment to one or more HMCs is an option supported by the system. This is the default configuration for servers supporting logical partitions with dedicated or virtual I/O. In this case, all servers have at least one logical partition.
- No HMC; two service strategies for non-HMC systems are available:
  - Full system partition: A single partition owns all the server resources and only one operating system may be installed.
  - Partitioned system: In this configuration, the system can have more than one partition and can be running more than one operating system. In this environment, partitions are managed by the Integrated Virtualization Manager (IVM), which provides some of the functions provided by the HMC.

## **Service interface**

The service interface enables support personnel to communicate with the service support applications in a server using a console, interface, or terminal. Delivering a clear, concise view of available service applications, the service interface allows the support team to manage system resources and service information in an efficient and effective way. Applications available via 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 and its operating environment. The primary service interfaces are:

- LEDs
- Operator panel
- Service Processor menu
- Operating system service menu

- Service focal point on the HMC
- Service focal point Lite on IVM

In the light path LED implementation, the system can clearly identify components for replacement by using specific component-level LEDs, and can also guide the servicer directly to the component by signaling (turning on solid) the amber system fault LED, enclosure fault LED, and the component FRU fault LED. The servicer can also use the identify function to blink the FRU-level LED. When this function is activated, a roll-up to the blue enclosure locate and system locate LEDs will occur. These LEDs will turn on solid and can be used to follow the light path from the system to the enclosure and down to the specific FRU.

### **FFDC analysis**

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 such that they can be resolved quickly. Elements of IBM's diagnostics strategy include:

- Provide a common error code format equivalent to a system reference code, 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**

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

- Compact disc-based diagnostics
- Entering commands
- Interactively selecting steps from a list of choices

### **Concurrent maintenance**

The system will continue to support concurrent maintenance of power, cooling, HDD or SSD, DVD, and firmware updates (when possible). The determination of whether a firmware release can be updated concurrently is identified in the readme information file released with the firmware.

## **Service labels**

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

- **Location diagrams:** Location diagrams are located on the system hardware, relating information regarding the placement of hardware components. Location diagrams may include location codes, drawings of physical locations, concurrent maintenance status, or other data pertinent to a repair. Location diagrams are especially useful when multiple components are installed such as DIMMs, CPUs, processor books, fans, adapter cards, LEDs, and power supplies.
- **Remove/replace procedures:** Service labels that contain remove/replace procedures are often found on a cover of the system or in other spots accessible to the servicer. These labels provide systematic procedures, including diagrams, detailing how to remove/replace certain serviceable hardware components. Numbered arrows indicate the order of operation and 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 certain order for the mechanical mechanisms to engage or disengage. Arrows generally improve the ease of serviceability.

## **Packaging 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 a component (FRU/CRU) can be concurrently maintained. Blue-colored touch points delineate components that are not concurrently maintained -- those that require the system to be turned off for removal or repair.
- **Tool-less design:** Selected IBM systems 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.
- **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 event of system hardware or environmentally induced failure, the system run-time error capture systematically analyzes the hardware error signature to determine the cause of failure. The analysis result is stored in system NVRAM. When the system can be successfully restarted either manually or automatically, the error is reported to the operating system. Error log analysis (ELA) can be used to display the failure cause and the physical location of the failing hardware.

With the integrated Service Processor, the system can automatically send out an alert via phone line to a pager or call for service in the event of a critical system failure. A hardware fault also turns on the amber system fault LED located on the system unit to alert the user of an internal hardware problem. The indicator may also be set to blink by the operator as a tool to allow system identification. For identification, the blue locate LED on the enclosure and at the system level turns on solid. The amber system fault LED is turned on solid when an error condition occurs.

On POWER7 processor-based servers, hardware and software failures are recorded in the system log. When an HMC is attached, an 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. After the information is logged in the SFP application, if the system is properly configured, a call home service request is initiated and the pertinent failure data with service parts information and part locations is sent to an IBM service organization. Customer contact information and specific system-related data such as the machine type, model, and serial number, along with error log data related to the failure are sent to IBM Service.

### ***Service Processor***

The Service Processor can 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.

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, allowing nondisruptive abilities to change system default parameters.

### **Call Home**

Call Home refers to an automatic or manual call from a customer location to 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 HMC or most non-HMC managed systems. 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. The following section contains specific details on this application.

### ***IBM Electronics Services***

Electronic Service Agent and the IBM Electronic Services web portal comprise the IBM Electronic Services solution -- dedicated to providing fast, exceptional support to IBM customers. IBM Electronic Service Agent is a no-charge tool that proactively monitors and reports hardware events such as system errors, performance issues, and inventory. Electronic Service Agent can help focus on the customer's company business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues.

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

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

Select your country.

Click on " IBM Electronic Service Agent Connectivity Guide."

## **Benefits**

### **Increased uptime:**

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

### **Security:**

Electronic Service Agent is secure in monitoring, reporting, and storing the data at IBM . Electronic Service Agent securely transmits via the Internet (HTTPS or VPN) and can be configured to communicate securely through gateways to provide customers a single point of exit from their site. Communication between you and IBM only flows one way; activating Service Agent does not enable IBM to call into your system. System inventory information is stored in a secure database, which is protected behind IBM firewalls. Your business applications or business data is never transmitted to IBM .

### **More accurate reporting:**

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

### **Customized support:**

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

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

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

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

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

## **Big data analytics**

Companies want to deliver insights faster with optimized solutions that process structured and unstructured data on a massive scale. IBM PowerLinux Big Data Solutions offer breakthrough solutions for big data analytics whether it's IBM Big Data software solutions such as IBM InfoSphere® BigInsights or InfoSphere Streams, or Open Source software such as Apache Hadoop.

The IBM PowerLinux Big Data Solution for InfoSphere BigInsights enables organizations to mine data at rest and the PowerLinux Big Data Solution for InfoSphere Streams analyzes data in motion.

Apache Hadoop is a software framework that supports data-intensive applications under a free license. It enables applications to work with thousands of nodes and petabytes of data and can help users perform analysis swiftly, including unstructured data which isn't possible to analyze with conventional systems. The Apache Hadoop software framework has been updated specifically to take advantages of benefits of the Power architecture with the IBM PowerLinux Big Data Solution for Apache Hadoop.

PowerLinux big data solutions are optimized for both structured and unstructured data to help businesses deliver analytics services faster by taking advantage of the workload-optimizing features of the POWER7 architecture that specifically apply to big data:

- Run thousands of tasks in parallel with:
  - Eight higher-frequency cores per socket
  - Four intelligent threads per core
  - Larger on-chip cache (eDRAM)
- Achieve massive scale-out flexibility with:
  - Choice of dense rack or compute nodes
  - High-speed, low-latency interconnect
  - Similar pricing to x86 rack/compute node
- Exploit extreme memory bandwidth:
  - Higher memory bandwidth of other commercially available systems
- Workload accelerators designed for key big data functions planned:
  - Data compression via IBM Research high-performance "gzip" algorithm
  - Text analytics acceleration of SystemT (text parser)

InfoSphere BigInsights for PowerLinux uses the open source Apache Hadoop framework and other open source and IBM value-added technologies for distributed processing of large data sets across clusters of computers. This big data solution can help companies analyze social media sites for the latest buzz about their products, for example, and take action to boost sales.

InfoSphere Streams for PowerLinux analyzes data in motion. Designed to manage stream flows and apply various analytics against streaming data, companies can store less, analyze more, and make better decisions faster. By extracting insight from data as it streams into your organization, you can react to events as they are happening to change business outcomes. For example, financial institutions can inspect real-time credit card usage to detect and prevent fraudulent transactions.

The PowerLinux Big Data Solution for InfoSphere Streams performs complex real-time analytics on data in motion. Enterprises can seamlessly extend existing applications with data mining capabilities - and scale to any size PowerLinux cluster. The PowerLinux Big Data Solution for InfoSphere Streams also leverages GPFS - the industry-leading cluster file system from IBM .

### **Industry application solutions**

More companies are relying on Linux for business applications that are designed for their industry and tuned for specific business needs. PowerLinux provides a highly secure, resilient, and fully optimized stack for industry applications, enabling faster time-to-delivery for new, differentiating services with less downtime. Optimized systems tuned with PowerLinux offer a lower cost per workload for high-quality business services compared to x86 commodity servers. Solutions for government, banking, manufacturing, and others are available in several local markets.

The IBM PowerLinux Solution Edition for SAP Applications delivers a single system SAP environment for midsize businesses, supporting up to 500 SAP users on the competitively priced IBM PowerLinux 7R1 server with IBM PowerVM and IBM DB2® . The IBM PowerLinux 7R1 server provides the ideal platform to consolidate multiple x86 server workloads on to a single server. SAP production, development, test, and database environments can run on a single high performing, efficient and reliable server. Consolidation of the SAP and database environments simplify administration and maintenance for SAP applications and lower IT costs for midsize businesses.

The IBM PowerLinux Solution Edition for SAP Applications leverages IBM PowerVM for IBM PowerLinux that is optimized for the Linux operating system and is offered exclusively on the IBM PowerLinux servers. IBM PowerVM for IBM PowerLinux incorporates all the features of PowerVM Enterprise Edition and provides unique advanced capabilities for Linux environments, including the ability to dynamically remove memory from running virtual machines (VMs) and reallocate it to other VMs and the ability to enhance performance by automatically reacting to anticipated and unanticipated spikes in server demand.

IBM PowerVM for IBM PowerLinux offers new pricing for cost-effective virtualized workload environments. With lower virtualization costs you receive IT savings through the total cost of acquisition (TCA) and the total cost of ownership (TCO).

The IBM PowerLinux Solution Edition for SAP Applications supports SAP's POWER7 certified products like SAP Business Suite and SAP Solution Manager with IBM DB2 V9.7. SAP products are available for order from SAP or SAP Business Partners.

### **Open source infrastructure services**

Today, Linux is the low-cost deployment platform of choice for vital applications like web, email, and social media collaboration. Companies are replacing more expensive infrastructure applications with robust open source offerings running on Linux , and running them in virtualized environments. With the IBM PowerLinux Linux Application Services Edition you can run key infrastructure workloads with industry standards-based Linux on competitively priced PowerLinux servers. Open source applications for Power Linux are included with commercial Linux distributions from Red Hat and SUSE, and supported by Red Hat, SUSE, or IBM . Open source applications like email, file and print, web, and network infrastructure can be installed and configured in the IBM PowerLinux Linux Application Services Edition using the IBM Installation Toolkit. The IBM Installation Toolkit simplifies the setup of your workloads by stepping you through their configuration.

The IBM PowerLinux Linux Application Services Edition leverages IBM PowerVM for IBM PowerLinux for efficient server virtualization. IBM PowerLinux Linux Application Services Edition PowerVM technology is designed to help IBM Power Systems servers deliver higher server utilization rates than VMware on x86. Running open source application workloads on a single server reduces costly IT administration, energy consumption, data center space, and other expenses associated with the deployment and maintenance of numerous servers. IBM can offer a superior economic model for workload consolidation on POWER7 servers with PowerVM software - a key driver behind recent migrations from Oracle (Sun) and HP to Power Systems technology.

IBM PowerVM for IBM PowerLinux offers advanced virtualization functionality and is offered exclusively on the IBM PowerLinux servers. IBM PowerVM for IBM PowerLinux's pricing structure delivers cost-effective virtualized workload environments. PowerVM technology is designed to provide secure and scalable virtualization and to control server and virtual image sprawl.

### **ISV industry and cross-industry solutions**

IBM is working with worldwide ISVs like SAP along with regional ISVs to optimize and exploit integrated PowerVM virtualization functionality and superior performance of the PowerLinux 7R1 with their business application suites. In addition, a growing portfolio of thousands of applications is available from global and regional ISVs for the PowerLinux 7R1 server. To search for ISV applications available for the new

PowerLinux 7R1 server along with the associated Linux distributions, refer to the IBM Global Solutions Directory

<http://www-304.ibm.com/partnerworld/gsd/homepage.do>

To view the full list of available applications that are compatible to run on the PowerLinux 7R1 server, use the following in your search criteria:

- Choose the following hardware platforms:
  - IBM Power Systems , IBM System p® ( pSeries® ), and IBM BladeCenter® JSxx and PSxx ( POWER processor-based)
- Choose from the following operating systems:
  - Red Hat Enterprise Linux (RHEL) 5, RHEL6
  - SUSE Linux Enterprise Server (SLES) 11
  - Other Linux distribution

### **IBM Software**

In addition, IBM Software provides a growing portfolio of solution stacks and services optimized for PowerLinux, including:

- Web Infrastructure with optional database and enterprise integration
- Data Management and Analytics for structured and unstructured data
- Web Portals
- Storage Management

### **Accessibility by people with disabilities**

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

[http://www.ibm.com/able/product\\_accessibility/index.html](http://www.ibm.com/able/product_accessibility/index.html)

### **Section 508 of the US Rehabilitation Act**

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IBM PowerLinux 7R1 server is capable as of August 24, 2012, when used in accordance with associated IBM documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) can be requested via de the IBM website

[http://www.ibm.com/able/product\\_accessibility/index.html](http://www.ibm.com/able/product_accessibility/index.html)

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## **Reference information**

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- IBM PowerVM for IBM PowerLinux [212-012](#), dated April 24, 2012
- Red Hat Enterprise Linux for IBM POWER [212-020](#), dated April 24, 2012
- PowerLinux 7R1 with EXP24S Drawer Support [112-118](#), dated July 10, 2012

### ***New feature***

Description	MT	Model	Feature
IBM PowerVM for IBM PowerLinux	1457	7FL	EC22



## Business Partner information

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

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=112-119>

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## Publications

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

- System overview
- Planning for the system
- Installing and configuring the system
- Working with consoles, terminals, and interfaces
- Managing system resources
- Working with operating systems and software applications
- Troubleshooting, service, and support

You can access the product documentation at

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/index.jsp>

Product documentation is also available on DVD (5K5T-7087).

The following information is shipped with the 8246-L1C:

- Power Hardware Information DVD (SK5T-7087)
- Installing the 8246-L1C
- Safety Information

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

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

Visit the IBM System Support Site, which contains the documentation for the hardware

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

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

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

## IBM Publications Center Portal

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

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

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## Services

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### Global Technology Services

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

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

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

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

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

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

For details on education offerings related to specific products, visit

<http://www.ibm.com/services/learning/index.html>

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

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## Technical information

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### Specified operating environment

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#### *Physical specifications*

- Width: 440 mm (19.0 in)
- Depth: 706 mm (27.8 in)
- Height: 89 mm (3.5 in)
- Weight (Maximum configurator): 29.5 kg (65 lb)

#### *Operating environment*

- Temperature: (nonoperating) 5 to 45 degrees C (41 to 113 F); recommended temperature (operating) 18 to 27 degrees C (64 to 80 F); allowable operating temperature 5 to 35 degrees C (41 to 95 F)
- Relative humidity: Nonoperating 8% to 80%; recommended 5.5 degrees C (42 F) dew point to 60% RH and 15 degrees C (59 F) dew point
- Maximum dew point: 28 degrees C (84 degrees F) (operating)
- Operating voltage: 100 to 127 V ac or 200 to 240 V ac
- Operating frequency: 47/63 Hz
- Maximum measured power consumption:
  - 750 watts (maximum)
- Power factor: 0.98
- Thermal output:
  - 2,560 Btu/hour (maximum)
- Power-source loading
  - 0.765 kVa (maximum configuration)
  - Maximum altitude: 3,050 m (10,000 ft)

**Note:** The maximum measured value is the worst case power consumption expected from a fully populated server under an intensive workload. The maximum measured value also accounts for component tolerance and non-ideal operating conditions. Power consumption and heat load vary greatly by server configuration and utilization. The IBM Systems Energy Estimator should be used to obtain a heat output estimate based on a specific configuration.

<http://www-912.ibm.com/see/EnergyEstimator>

### **Noise level and sound power (Preliminary data)**

6.6 bels (Operating and idling)

### **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.

- U.S.: FCC Class A
- Europe: CISPR 22 Class A
- Japan: VCCI-A
- Korea: Korean Requirement Class A
- China: People's Republic of China commodity inspection law Class A

### **Homologation -- Telecom environmental testing (Safety and EMC):**

Homologation approval for specific countries has been initiated with the IBM Homologation and Type Approval (HT&A) organization in LaGaude, France. This Power Systems model and applicable features meet the environmental testing requirements of the country telecom and have been designed and tested in compliance with the Full Quality Assurance Approval (FQAA) process as delivered by the British Approval Board for Telecom (BABT), the U.K. Telecom regulatory authority.

This product is not certified for connection by any means whatsoever 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.

### **Product safety/Country testing/Certification:**

- UL 60950 Underwriters Laboratory, Safety Information
- CSA C22.2 No. 60950-00, Canadian Standards Association
- EN60950 European Norm
- IEC 60950, Edition 1, International Electrotechnical Commission, Safety Information
- Nordic deviations to IEC 60950-1 1st Edition

### **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).

### **Hardware requirements**

#### **PowerLinux 7R1 minimum system configuration**

The PowerLinux 7R1 offers an 8-core configuration with one processor module. The PowerLinux 7R1 can contain up to 128 GB of system memory (64 GB maximum per memory riser card).

The PowerLinux 7R1 offers five PCIe x8 Gen2 slots and one PCIe x4 Gen2 low profile slots, and three or six SFF HDDs/SDDs and one or two media devices, depending on the storage back-plane selected.

PowerLinux 7R1 initial order must include a minimum of the following items:

- Feature ELBA indicates a package that includes one 3.55 GHz processor module and 8 processor activations (8 x EPLA).
- Choose 32 GB minimum memory from:
  - 4 x 8 GB (2 x 4 GB) Memory DIMMs, 1066 MHz, DDR3 (#EL15)
  - 2 x 16 GB (2 x 8 GB) Memory DIMMs, 1066 MHz, DDR3 (#EL16)
  - 1 x 32 GB (2 x 16 GB) Memory DIMMs, 1066 MHz, DDR3 (#EL17)

**Note:** The first two memory features chosen on an initial order are installed in the nonfeaturized memory riser card. When you choose 4 x EL15 to meet the minimum memory requirements, you must order 1 x #EL0A. Feature EL0A is not allowed with #EL16 or EL17.

- Choose storage backplane from:
  - 3 x SFF/SATA DVD bay/tape bay (#EL0R)
  - 6 x SFF/SATA DVD bay (#EL0T)
  - 6 x SFF/SATA DVD bay with dual write cache RAID, and an external SAS port (#EL0V)
- One PCIe2 LP 4-port 1GbE Adapter (#EL11)

**Note:** Takes up one PCIe slot

- Choose minimum of two HDDs or SSDs from:
  - 177 GB SAS SFF SSD (#1775)
  - 387 GB SAS SFF SSD (#ES0A)
  - 600 GB SAS SFF HDD 10,000 rpm (#EL0P)
  - 300 GB SAS SFF HDD 15,000 rpm (#EL0Z)
  - 146.8 GB SAS SFF HDD 15,000 rpm (#EL03)
  - 300 GB SAS SFF HDD 15,000 rpm (#EL02)
  - 177 GB SAS 1.8-in Solid-State Drive (#1995) (Feature 1995 requires feature 2053.)
  - No internal HDD or SSD is required if #0837 (Boot from SAN) is selected. In this case, a Fibre Channel or Fibre Channel over Ethernet adapter must also be ordered.
- One 1725 watt ac Power Supply (1 x 5603) and one power cord (1 x 6xxx)
- Linux Primary Operating System Indicator (#2147)
- Choose one of the following:
  - PowerVM for PowerLinux (8 x #EC22)
  - GPFS (5765-G66)
- One Language Group, Specify (#9300 or #97xx)

**Note:** The following features are initial order only and are part of package ELBA:

EL11	PCIe2 LP 4-port 1GbE Adapter
EL15	8 GB (2x4 GB) Memory DIMMs, 1066 MHz, 2Gb DDR3 DRAM (Zero-priced)
EL16	16 GB (2x8 GB) Memory DIMMs, 1066 MHz, 2Gb DDR3 DRAM (Zero-priced)
EL17	32 GB (2x16 GB) Memory DIMMs, 1066 MHz, 2Gb DDR3 DRAM (Zero-priced)
EL0R	Storage Backplane -- 3 SFF Drives/SATA DVD/HH Tape (Zero-priced)
EL0T	Storage Backplane -- 6 SFF Drives/SATA DVD (Zero-priced)
EL0V	Storage Backplane -- 6 SFF Drives/SATA DVD/RAID/External SAS Port (Zero-priced)
EL0A	Memory Riser Card (Zero-priced)

EPL5	8-core 3.55 GHz POWER7 Processor Module (Zero-priced)
EPLA	Processor Activation for #EPL5 (Zero-priced)

**Note:** One nonfeaturized memory riser card is included in the base system. One additional memory riser card feature (#EL0K) can be ordered on the PowerLinux 7R1.

## RAID

There are multiple protection options for HDD/SSD drives in the SAS SFF bays in PowerLinux 7R1 system units or drives in disk-only I/O drawers. Although protecting drives is always recommended, Linux users may choose to leave some or all drives unprotected at their own risk and IBM supports these configurations.

This HDD/SSD drive protection can be provided by Linux software or by the HDD or SSD hardware controllers. Mirroring of drives is provided by Linux software. In addition, Linux supports controllers providing RAID 0, 1, 5, 6, or 10. To further augment HDD/SSD protection, hot spare capability can be used for protected drives. Specific hot spare prerequisites apply.

An integrated SAS HDD/SSD controller is provided in the PowerLinux 7R1 system unit and provides support for JBOD and RAID 0, 1, and 10 for Linux. It is optionally augmented by RAID 5 and RAID 6 capability when storage backplane feature number EL0V is added to the configuration. Other disk/SSD controllers are provided as PCIe SAS adapters are supported. PCI Controllers with and without write cache are supported. RAID 5 and RAID 6 on controllers with write cache are supported.

Linux can use disk drives formatted with 512 byte blocks when being mirrored by the operating system. These disk drives must be reformatted to 528 byte sectors when used in RAID arrays. Although a small percentage of the drive's capacity is lost, additional data protection such as ECC and bad block detection is gained in this reformatting. For example, a 300 GB disk drive when reformatted provides around 283 GB. IBM Power SSDs are formatted to 528 bytes.

## Software requirements

- SLES 11 Service Pack 2, or later, with current maintenance updates available from SUSE to enable all planned functionality
- RHEL V6.2 for POWER, or later
- RHEL V5.8 for POWER, or later

**Note:** One of the Linux operating systems listed as a software requirement must be selected when ordering an IBM PowerLinux 7R1. Selection of Linux will require the purchase of a subscription. For additional information on these Linux operating systems and the subscription and support options available for them, refer to US Announce Letters 212-020 (Red Hat) or 209-184 (SUSE)

Users should also update their systems with the latest Linux for Power service and productivity tools available at

<http://www.ibm.com/support/customer/sas/f/lopdiags/home.html>

For software requirements for each feature number, visit

[https://www-912.ibm.com/e\\_dir/eServerPrereq.nsf](https://www-912.ibm.com/e_dir/eServerPrereq.nsf)

## Limitations

### System

- Integrated system ports are not supported under Linux when the HMC ports are connected to an HMC. Either the HMC ports or the integrated system ports can be used, but not both.
- The integrated system ports are supported for modem and async terminal connections by Linux. Any other application using serial ports requires a serial port adapter to be installed in a PCI slot. The integrated system ports do not support HACMP™ configurations.

## HMC machine code

Notes for Systems Director and VMControl:

- If you are implementing dynamic LPAR:
  - An HMC or IVM is required to manage POWER7 processor-based servers implementing partitioning. Multiple POWER7 processor-based servers can be supported by a single HMC.
  - If an HMC is used to manage any POWER7 processor-based server, the HMC must be a CR3, or later, model rack-mount HMC or C05, or later, deskside HMC.
  - When Systems Director is used to manage an HMC, or if the HMC manages more than 254 partitions, the HMC should have 3 GB of RAM minimum and be model, or later, rack-mount or a C06, or later, deskside. SDMC cannot be managed by Systems Director at this time.
- If you install IBM Systems Director for IBM PowerLinux :
  - Systems Director Editions for Power Systems V6.3, or later
- If you install IBM Systems Director VMControl for IBM PowerLinux :
  - Systems Director VMControl , V2.4, or later, is required.
  - Systems Director VMControl for IBM PowerLinux is included in Systems Director Express Edition.
  - PowerVM is required to run VMControl.
  - Systems Director VMControl for IBM PowerLinux or VMControl Enterprise Edition requires Systems Director V6.3, or later. If the product is installed on an older version of Systems Director, you will be prompted to perform an upgrade before accessing full functionality.

If you are 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 web page 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.

<https://www14.software.ibm.com/webapp/set2/sas/f/hmc/home.html>

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.

## Boot requirements

Selecting feature 0837 will indicate boot from SAN.

## Processor modules

- One processor module is required on an order with eight processor cores on the processor module.
- All processors must be activated.
- Eight processor activation codes (8 x #EPLA) must be ordered.

## Power supply

One 1725 watt ac power supply (1 x #5603) is required.

A second power supply is available for redundant power.

## Redundant fans

Redundant fans standard

## Power cords

One power cord is required. The PowerLinux 7R1 supports 100-127 V ac and 200-240 V ac power cords.

## System memory

A minimum 32 GB is required on the PowerLinux 7R1. A system must be ordered with a minimum/maximum of 4 x #EL15, 2 x #EL16, or 1 x #EL17.

If more than 32 GB of memory is required, optional memory features EL1F, EL1G, and EL1H may be ordered.

- The base machine contains one nonfeaturized memory riser card with four DIMM sockets. Memory features consume two memory DIMM sockets.

The PowerLinux 7R1 offers one optional memory riser card feature (1 x #EL0A on initial orders; 1 x #EL0K on MES orders) with an additional four DIMM sockets per feature. Maximum system memory is 64 GB without feature EL0A/EL0K and 128 GB with one x feature EL0A/EL0K.

- A system can be ordered with a single memory feature EL17. The second memory feature ordered on the same memory riser card does not have to match the first memory feature. Memory features can be mixed on either memory riser card.
- A minimum of one memory feature must be plugged into each memory riser card. Empty memory riser cards are not allowed.
- There is a performance benefit when all DIMMs on a memory riser card are of the same capacity.
- It is generally recommended that memory be installed evenly across all memory riser cards in the system. Balancing memory across the installed memory riser cards allows memory access in a consistent manner and typically results in the best possible performance for your configuration. However, balancing memory fairly evenly across multiple memory riser cards, compared to balancing memory exactly evenly typically has a very small performance difference.

Plans for future memory upgrades should be taken into account when deciding which memory feature size to use at the time of initial system order.

### Memory features

Feature	Feature number	Minimum quantity	Maximum quantity
8 GB 1066 Mhz (2 x 4 GB RDIMMs) (Zero priced)	EL15	0	4
16 GB 1066 Mhz (2 x 8 GB RDIMMs) (Zero priced)	EL16	0	2
32 GB 1066 Mhz (2 x 8 GB RDIMMs) (Zero priced)	EL17	0	1
8 GB 1066 Mhz (2 x 4 GB RDIMMs) (Reduced price)	EL1F	0	4
16 GB 1066 Mhz (2 x 8 GB RDIMMs) (Reduced price)	EL1G	0	4
32 GB 1066 Mhz (2 x 8 GB RDIMMs) (Reduced price)	EL1H	0	4

## PCI card slots

The PowerLinux 7R1 contains five x8 Gen2 slots and one x4 Gen2 PCIe Low Profile slot, which is restricted to the standard Ethernet adapter.

## Graphics adapters

- A graphics adapter, keyboard, and mouse are not required in the minimum configuration.
- The maximum number of graphics adapters supported in the PowerLinux 7R1 CEC is four.

## I/O adapters

- Feature number EL11 is required in the 8246-L1C minimum configuration and occupies the x4 slot.
- One GX++ slot is available on the PowerLinux 7R1. The GX++ slot does not share space with the CEC Low Profile adapter slots.
- No GX++ adapters are currently supported.
- Refer to the following table for additional I/O adapter information.

I/O adapter features

I/O adapter	Orderable feature number	Supported feature number	CEC Max qty	Sys Max qty	Size
PCIe LP RAID & SSD SAS A	2053		2	2	LP
PCIe2 LP 4-port 1GbE Adapter	5260		5	5	LP
PCIe LP POWER GXT145 Graphics Acc	5269		4	4	LP
PCIe LP 10Gb FCoE 2-port Adapter	5270		5	5	LP
PCIe LP 4-Port 10/100/1000 Base-T	5271		5	5	LP
PCIe LP 10GbE CX4 1-port Adapter	5272		5	5	LP
PCIe LP 2-Port 1GbE SX Adapter	5274		5	5	LP
PCIe LP 10GbE SR 1-port Adapter	5275		5	5	LP
PCIe LP 4-Port Async EIA-232 Adap	5277		5	5	LP
PCIe2 LP 4-port 1/10GbE SFP+	5279		5	5	LP
PCIe2 LP 4-port 1/10GbE SR	5280		5	5	LP
PCIe2 LP PCIe2 2-port 4X IB QDR	5283		5	5	LP
PCIe2 LP PCIe2 2-Port 10GbE SFP	5286		5	5	LP
PCIe LP 2-Port Async EIA 232	5290		2	2	LP
PCIe LP 4 Gb 2-Port Fibre Channel	EL09		5	5	LP
PCIe LP 2-x4-port SAS Adapter 3Gb	EL10		5	5	LP
PCIe2 LP 4-port 1GbE Adapter (\$0)	EL11		1	1	LP
PCIe2 LP 2-Port 10GbE RoCE SFP+	EL27		5	5	LP
PCIe LP 8Gb 2-Port Fibre Channel	EL2N		5	5	LP
PCIe2 LP PCIe2 2-port 10GbE SR	EL2P		5	5	LP
PCIe2 LP 8Gb 4-port Fibre Channel	EN0Y		5	5	LP

## Storage devices/bays

- The PowerLinux 7R1 has a slim media bay that can contain an optional DVD-RAM (#5762 or follow-on) and a tape bay (only available with #EL0T/#EL0X) that can contain a tape drive or removable disk drive.
- Either feature number EL0R, EL0T, or EL0V must be selected.
  - Feature number EL0T/EL0X supports three small form-factor (SFF) disk units, either HDD or SSD, an SATA DVD, and a tape. No split backplane supported. No RAID 5 or 6 support.
  - Feature number EL0R/EL0W supports six SFF disk units, either HDD or SSD, and an SATA DVD. No split backplane supported. No RAID 5 or 6 support.
  - Feature number EL0V/EL0Y supports six SFF disk units, either HDD or SSD, and an SATA DVD External SAS port. No split backplane supported. RAID 5 and 6 is supported.
  - Two valid orderable HDDs or SSDs are required in a minimum configuration. No HDDs or SSDs are required in the CEC if feature number 0837 is selected.



- A feature EL01 DAT160 80/160 GB tape feature and a feature 1123 USB Internal Docking Station for Removable RDX Disk Drive are mutually exclusive. One or the other can be on the system but not both. A minimum of one x feature 1107 or feature EU01 must be ordered with each feature 1123 ordered.
- SAS-bay-based 1775/ES0A support restrictions:
  - SFF features 1775 and ES0A are supported in the PowerLinux 7R1 CEC.
  - SSDs and disk drives (HDDs) are not allowed to mirror each other.

Storage device features

Device	Maximum quantity	Bay	Orderable feature number
DVD-RAM (SATA)	1	Slim	5762
DAT160 80/160 GB Tape	1	Tape	EL01
USB Internal Docking Station for Removable RDX Disk Drive	1	Tape	1123

Device	Maximum quantity	Bay	Orderable feature number
177 GB SAS, SFF, Solid-state	6	SFF 1-6	1775
387 GB SAS, SFF, Solid-state	6	SFF 1-6	ES0A
300 GB 10K, SAS, SFF	6	SFF 1-6	EL02
146.8 GB 15K, SAS, SFF	6	SFF 1-6	EL03
600 GB 10K, SAS, SFF	6	SFF 1-6	EL0P
300 GB 15K, SAS, SFF	6	SFF 1-6	EL0Z
177 GB 1.8", Solid-state, for #2053	4	2 per #2053	1995

**Note:** Six HDDs or SSDs maximum can be installed internally.

**Planning information**

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**Cable orders**

No cables required.

**Security, auditability, and control**

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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.

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## IBM Electronic Services

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

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

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

To learn how Electronic Services can work for you, visit

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

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## Terms and conditions

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**Volume orders:** Contact your IBM representative.

### ***IBM Global Financing***

Yes

### ***Warranty period***

Three years.

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

### ***Warranty service***

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM website. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend the time of your call and is subject to parts availability. 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 provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU.

#### *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.

#### *Tier 2 (optional) CRU*

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next business day (NBD) delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU. You may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

- DASD drive
- DASD media backplane
- DVD drive
- Fan air baffle
- Fan
- All PCI adapters
- Memory riser card
- Power supply
- Line/power cord
- Keyboard
- Mouse
- External cables
- Display
- Operator panel
- TOD battery
- Memory DIMMs
- Processor VRM
- SAS conduit cable
- SAS tape drive cables
- USB and SAS tape drive
- USB tape drive signal cable
- Storage interposer
- SPCN cable
- Interlock switch
- RAID battery

- RAID package card
- RAID battery card

### ***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 9 hours per day, Monday through Friday, excluding holidays, next-business-day response. Calls must be received by 5:00 p.m. local time in order to qualify for next business day response.

## **Non-IBM parts**

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### ***Warranty service***

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

### ***Warranty service upgrades***

During the warranty period, warranty service upgrades provide an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site Service acquired by the customer. Service levels are response-time objectives and are not guaranteed. Refer to the [Warranty service upgrades](#) 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.

### ***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.

The service levels are:

- 9 hours per day, Monday through Friday, excluding holidays, 4-hour average response, same-business-day response.
- 24 hours per day, 7 days a week, 4-hour average response
- 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, via 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. 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.

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 service levels are:

- 9 hours per day, Monday through Friday, excluding holidays, next-business-day response.
- 9 hours per day, Monday through Friday, excluding holidays, 4-hour average response.
- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

### ***Customer Replaceable Unit (CRU) service***

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), and depending upon the maintenance service offerings in your geography, IBM will ship the replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request.

Based upon availability, CRUs will be shipped for next business day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM . When return is required:

- Return instructions and a container are shipped with the replacement CRU
- you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement

CRUs may be provided as part of the machine's standard maintenance service except that you may install a CRU yourself or request IBM installation, at no additional charge, under any of the on-site service levels specified above.

### ***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.

### ***Warranty service upgrades***

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#### ***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.

**Field-installable features**

Yes

**Model conversions**

No

**Machine installation**

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

**Graduated program license charges apply**

No

**Licensed machine code**

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

[http://www.ibm.com/servers/support/machine\\_warranties/machine\\_code.html](http://www.ibm.com/servers/support/machine_warranties/machine_code.html)

Machine using LMC Type Model  
8246-L1C

IBM may release changes to the machine code. IBM plans to make the machine code changes available for download from the IBM System p technical support website

<http://www-933.ibm.com/support/fixcentral/>

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

**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 18% for the products in this announcement.

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**Prices**

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

## Product charges

The following are newly announced features on the specific models of the IBM Power Systems 8246 machine type:

Description	Model Number	Feature Numbers	Initial/ MES/ Both/ Support	RP CSU MES
IBM PowerLinux 7R2	L1C			Yes
Linux Partition Specify	L1C	0266	Both	Yes No
V.24/EIA232 6.1m (20 Ft) PCI C	L1C	0348	Both	Yes No
V.35 6.1m (20 Ft) PCI Cable	L1C	0353	Both	Yes No
X.21 6.1m (20 Ft) PCI Cable	L1C	0359	Both	Yes No
SSD Placement Indicator	CEC L1C	0462	Both	Yes No
19 inch, 1.8 meter high rack	L1C	0551	MES	Yes No
19 inch, 2.0 meter high rack	L1C	0553	MES	Yes No
Rack Filler Panel Kit	L1C	0599	Both	Yes No
SAN Load Source Specify	L1C	0837	Both	Yes No
US TAA Compliance Indicator	L1C	0983	Both	Yes No
USB External Docking Station R	L1C	1104	Both	Yes No
USB 500 GB Removable Disk Dr	L1C	1107	Both	Yes No
USB Internal Docking Station	L1C	1123	Both	Yes No
Custom Serv. Specify, Roch	L1C	1140	Both	Yes No
177GB SFF-1 SSD w/ eMLC AIX/Li	L1C	1775	Both	Yes No
System port/UPS Conversion Cab	L1C	1827	Both	Yes No
177GB SSD Module with eMLC (AI	L1C	1995	Both	No No
PCIe LP RAID SSD SAS Adapter 3	L1C	2053	Both	Yes No
Primary Operating system Linux	L1C	2147	Both	Yes No
Factory Deconfiguration of 1 c	L1C	2319	Initial	N/A No
LC-SC 50 Micron Fiber Conv Cab	L1C	2456	Both	Yes No
LC-SC 62.5 Mic.Fib.Conv.Cable	L1C	2459	Both	Yes No
Asynch.Termin/Print.Cbl EIA232	L1C	2934	Both	Yes No
Asynchronous Cable EIA 232/V	L1C	2936	Both	Yes No
Ser to Ser Port Cab Draw/Draw	L1C	3124	Both	Yes No
Serial to Se.Port Cbl Rack 8M	L1C	3125	Both	Yes No
1m, QDR IB Copper Cable	L1C	3287	Both	Yes No
3m, QDR IB Copper Cable	L1C	3288	Both	Yes No

5m QDR IB/E'Net Copper Cable	L1C	3289	Both	Yes	No
10m QDR IB Optic Cable	L1C	3290	Both	Yes	No
30m QDR IB Optic Cable	L1C	3293	Both	Yes	No

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

Electronic Waste Recycling Fee (15- to 34-inch video device.)

Widescreen LCD Monitor	L1C	3632	Both	Yes	No
0.3M Serial Prt Converter Cbl	L1C	3925	Both	Yes	No
Serial Port Null Mod Cab 3.7M	L1C	3927	Both	Yes	No
Ser.Port Null Modem Cable,10M	L1C	3928	Both	Yes	No
System Serial Port Converter C	L1C	3930	Both	Yes	No
6Foot Extend.Cbl for Displays	L1C	4242	Both	Yes	No
Extender Cable USB Keybo 1.8M	L1C	4256	Both	Yes	No
VGA to DVI Connection Converte	L1C	4276	Both	Yes	No
Rack Integration Services: BP	L1C	4648	Initial	N/A	No
Rack Integration Services	L1C	4649	Initial	N/A	No
One and only one rack indicator feature is required on all orders (#4650 to #4666).					
No Factory Integration Ind.	L1C	4650	Initial	N/A	No
Rack Indicator, Rack 1	L1C	4651	Initial	N/A	No
Rack Indicator, Rack 2	L1C	4652	Initial	N/A	No
Rack Indicator, Rack 3	L1C	4653	Initial	N/A	No
Rack Indicator, Rack 4	L1C	4654	Initial	N/A	No
Rack Indicator, Rack 5	L1C	4655	Initial	N/A	No
Rack Indicator, Rack 6	L1C	4656	Initial	N/A	No
Rack Indicator, Rack 7	L1C	4657	Initial	N/A	No
Rack Indicator, Rack 8	L1C	4658	Initial	N/A	No
Rack Indicator, Rack 9	L1C	4659	Initial	N/A	No
Rack Indicator, Rack 10	L1C	4660	Initial	N/A	No
Rack Indicator, Rack 11	L1C	4661	Initial	N/A	No
Rack Indicator, Rack 12	L1C	4662	Initial	N/A	No
Rack Indicator, Rack 13	L1C	4663	Initial	N/A	No
Rack Indicator, Rack 14	L1C	4664	Initial	N/A	No
Rack Indicator, Rack 15	L1C	4665	Initial	N/A	No
Rack Indicator, Rack 16	L1C	4666	Initial	N/A	No
Software Preload Required	L1C	5000	Initial	N/A	No
PCIe2 LP 4-port 1GbE Adapter	L1C	5260	Both	Yes	No
PCIe LP POWER GXT145 Graphics	L1C	5269	Both	Yes	No
PCIe LP 10Gb FCoE 2 port Adapt					



PCIe LP 4 Port 10/100/1000 Bas	L1C	5270	Both	Yes	No
PCIe LP 10GbE CX4 1 port Adapt	L1C	5271	Both	Yes	No
PCIe LP 2 Port 1GbE SX Adapter	L1C	5272	Both	Yes	No
PCIe LP 10GbE SR 1 port Adapt	L1C	5274	Both	Yes	No
PCIe LP 4 Port Async EIA 232 A	L1C	5275	Both	Yes	No
PCIe2 4Port 10GBE&1GBE SFP+ LP	L1C	5277	Both	Yes	No
PCIe2 4-Port 10GbE&1GbE SR LP	L1C	5279	Both	Yes	No
PCIe2 LP 2-Port 4X IB QDR Adap	L1C	5280	Both	Yes	No
PCIe2 LP 2 Port 10GbE SFP Copp	L1C	5283	Both	Yes	No
PCIe LP 2 Port Async EIA 232 A	L1C	5286	Both	Yes	No
RFID Tags for Servers, Blades	L1C	5290	Both	Yes	No
System AC Power Supply, 1725 W	L1C	5524	Initial	N/A	No
SATA Slimline DVD RAM Drive	L1C	5603	Both	Yes	No
Opt Front Door for 1.8m Rack	L1C	5762	Both	Yes	No
Opt Front Door for 2.0m Rack	L1C	6068	MES	Yes	No
1.8m Rack Acoustic Doors	L1C	6069	MES	Yes	No
2.0m Rack Acoustic Doors	L1C	6248	MES	Yes	No
1.8m Rack Trim Kit	L1C	6249	MES	Yes	No
2.0m Rack Trim Kit	L1C	6263	MES	Yes	No
Pwr Crd 4.3m 14ft wall IBM PDU	L1C	6272	MES	Yes	No
Pwr Crd (14FT), Drwr - OEM PDU	L1C	6458	Both	Yes	No
Pwr Crd 4.3m 14ft wall OEM PDU	L1C	6460	Both	Yes	No
Pwr Crd 4.3m 14ft wall 125V/15A	L1C	6469	Both	Yes	No
Pwr Crd 1.8m 6ft wall OEM PDU	L1C	6470	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6471	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6472	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6473	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6474	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6475	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6476	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6477	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6478	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6488	Both	Yes	No
4.3m (14 Ft) 3PH/24A Power Cor	L1C	6489	MES	Yes	No
4.3m (14 Ft) 1PH/48A Pwr Cord	L1C	6491	MES	Yes	No
4.3m (14 Ft) 1PH/48 60A Pwr Co	L1C	6492	MES	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6493	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C				

	L1C	6494		Both	Yes	No
Pwr Crd 2.7m 9ft wall 250V,10A	L1C	6496		Both	Yes	No
Power Cable Drawer to IBM PD	L1C	6577		Both	Yes	No
Optional Rack Security Kit	L1C	6580		MES	Yes	No
Modem Tray for 19-Inch Rack	L1C	6586		MES	Yes	No
Pwr Crd 2.7m 9ft wall 125V,15A	L1C	6651		Both	Yes	No
4.3m 1PH/24-30A Pwr Cord	L1C	6654		MES	Yes	No
4.3m 14Ft 1PH/24 30A WR Pwr	L1C	6655		MES	Yes	No
4.3m 14Ft 1PH/24A Power Cord	L1C	6656		MES	Yes	No
Pwr.Cord(9ft),To wall/OEM PDU	L1C	6659		Both	Yes	No
Pwr Crd 14ft 4.3m wallOEM PDU	L1C	6660		Both	Yes	No
Pwr Crd 2.8m 9.2ft wall PDU	L1C	6665		Both	Yes	No
Pwr Crd 4.3M, Drwr - OEM PDU	L1C	6669		Both	Yes	No
Pwr Crd 2.7M, Drwr - IBM PDU	L1C	6671		Both	Yes	No
Pwr Crd 1.5M, Drwr - IBM PDU	L1C	6672		Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	L1C	6680		Both	Yes	No
IIntelligent PDU+ 1 EIA Unit	L1C	7109		MES	Yes	No
Environmental Monitoring Probe	L1C	7118		Both	Yes	No
Power Distribution Unit	L1C	7188		MES	Yes	No
Linux Software Preinstall	L1C	8143		Initial	N/A	No
Linux Software Preinstall BP	L1C	8144		Initial	N/A	No
USB Mouse	L1C	8845		Both	Yes	No
Order Routing Indicator Syste	L1C	9169		Initial	N/A	No
Language Group Spcf-US Eng	L1C	9300	NC	Initial	N/A	No
New Red Hat Lic Core Counter	L1C	9442	NC	Initial	N/A	No
New SUSE Lic Core Counter	L1C	9443	NC	Initial	N/A	No
Other Linux Lic Core Counter	L1C	9445	NC	Initial	N/A	No
3rd Party Linux Lic Core Cnt	L1C	9446	NC	Initial	N/A	No
VIOperating system Core Counter	L1C	9447	NC	Initial	N/A	No
Month Indicator	L1C	9461		Initial	N/A	No
Day Indicator	L1C	9462		Initial	N/A	No
Hour Indicator	L1C	9463		Initial	N/A	No
Minute Indicator	L1C	9464		Initial	N/A	No
Qty Indicator	L1C	9465		Initial	N/A	No
Countable Member Indicator	L1C	9466		Initial	N/A	No
Language Group Spcf-Dutch	L1C	9700	NC	Initial	N/A	No
Language Group Spcf-French	L1C	9703	NC	Initial	N/A	No
Language Group Spcf-German						

Language Group Spcf-Polish	L1C	9704	NC	Initial	N/A	No
Lang Group Specify - Norwegian	L1C	9705	NC	Initial	N/A	No
Lang.Group Spcf-Portuguese	L1C	9706	NC	Initial	N/A	No
Language Group Spcf-Spanish	L1C	9707	NC	Initial	N/A	No
Language Group Spcf-Italian	L1C	9708	NC	Initial	N/A	No
Langua Gr Speci Canadian Frenc	L1C	9711	NC	Initial	N/A	No
Language Group Spcf-Japanese	L1C	9712	NC	Initial	N/A	No
Language Group Specify Tr Chin	L1C	9714	NC	Initial	N/A	No
Language Group Spcf-Korean	L1C	9715	NC	Initial	N/A	No
Language Group Spcf-Turkish	L1C	9716	NC	Initial	N/A	No
Language Group Spcf-Hungarian	L1C	9718	NC	Initial	N/A	No
Language Group Spcf-Slovakian	L1C	9719	NC	Initial	N/A	No
Language Group Spcf-Slovakian	L1C	9720	NC	Initial	N/A	No
Language Group Spcf-Russian	L1C	9721	NC	Initial	N/A	No
Lang Group Spcf Simpl Chinese	L1C	9722	NC	Initial	N/A	No
Language Group Spcf-Czech	L1C	9724	NC	Initial	N/A	No
Language Group Spcf-Romanian	L1C	9725	NC	Initial	N/A	No
Lang Group Specify - Croatian	L1C	9726	NC	Initial	N/A	No
Language Group Spcf-Slovenian	L1C	9727	NC	Initial	N/A	No
Lang Group Specify - Braz Port	L1C	9728	NC	Initial	N/A	No
Lang Group Specify - Thai	L1C	9729	NC	Initial	N/A	No
Full width Key USB, US English	L1C	EK51		Both	Yes	No
Full width Key USB, French	L1C	EK52		Both	Yes	No
Full width Key USB, Italian	L1C	EK53		Both	Yes	No
Full width Key USB, German/Aus	L1C	EK54		Both	Yes	No
Full width Key USB, UK English	L1C	EK55		Both	Yes	No
Full width Key USB, Spanish	L1C	EK56		Both	Yes	No
Full width Key USB, Japanese	L1C	EK57		Both	Yes	No
Full width Key USB, BrazilianP	L1C	EK58		Both	Yes	No
Full width Key USB, Hungarian	L1C	EK59		Both	Yes	No
Full width Key USB, Korean	L1C	EK60		Both	Yes	No
Full width Key USB, Chinese	L1C	EK61		Both	Yes	No
Full width Key USB, French Can	L1C	EK62		Both	Yes	No
Full width Key USB, Belgian/UK	L1C	EK64		Both	Yes	No
Full width Key USB, Swedish/Fi	L1C	EK65		Both	Yes	No
Full width Key USB, Danish	L1C	EK66		Both	Yes	No
Full width Key USB, Bulgarian	L1C	EK67		Both	Yes	No

Full width Key USB, Swiss/Fr/G	L1C	EK68	Both	Yes	No
Full width Key USB, Norwegian	L1C	EK69	Both	Yes	No
Full width Key USB, Dutch	L1C	EK70	Both	Yes	No
Full width Key USB, Portuguese	L1C	EK71	Both	Yes	No
Full width Key USB, Greek	L1C	EK72	Both	Yes	No
Full width Key USB, Hebrew	L1C	EK73	Both	Yes	No
Full width Key USB, Polish	L1C	EK74	Both	Yes	No
Full width Key USB, Slovakian	L1C	EK75	Both	Yes	No
Full width Key USB, Czech	L1C	EK76	Both	Yes	No
Full width Key USB, Turkish	L1C	EK77	Both	Yes	No
Full width Key USB, LA Spanish	L1C	EK78	Both	Yes	No
Full width Key USB, Arabic	L1C	EK79	Both	Yes	No
Full width Key USB, Thai	L1C	EK80	Both	Yes	No
Full width Key USB, Russian	L1C	EK81	Both	Yes	No
Full width Key USB, Slovenian	L1C	EK82	Both	Yes	No
Full width Key USB, US English	L1C	EK83	Both	Yes	No
80/160GB Tape - PowerLinux	L1C	EL01	Both	Yes	No
300GB 10K SFF Disk-PowerLinux	L1C	EL02	Both	Yes	No
146GB 15K SFF Disk-PowerLinux	L1C	EL03	Both	Yes	No
4Gb 2-port FCAL - PowerLinux	L1C	EL09	Both	Yes	No
Memory Riser Card(Zero-priced)	L1C	EL0A	Initial	N/A	No
Memory Riser Card - PowerLinux	L1C	EL0K	Both	Yes	No
600GB 10K SFF Disk-PowerLinux	L1C	EL0P	Both	Yes	No
Storage Backplane 6 SFF Dri	L1C	EL0R	Initial	N/A	No
Storage Backplane 3 SFF Dri	L1C	EL0T	Initial	N/A	No
Storage Backplane w/ext SAS	L1C	EL0V	Initial	N/A	No
Backplane 6 SFFs -PowerLinux	L1C	EL0W	MES	Yes	No
Backplane 3 SFFs -PowerLinux	L1C	EL0X	MES	Yes	No
Backplane w/ext SAS-PowerLinux	L1C	EL0Y	MES	Yes	No
GB 15K SFF Disk-PowerLinux	L1C	EL0Z	Both	Yes	No
2-port SAS adapter -PowerLinux	L1C	EL10	Both	Yes	No
PCIe2 LP 4-port 1GbE Adapter	L1C	EL11	Initial	N/A	No
8GB (2x4GB) Memory-PowerLinux	L1C	EL15	Initial	N/A	No
16GB (2x8GB) Memory-PowerLinux	L1C	EL16	Initial	N/A	No
32GB (2x16GB) Memory-PowerLinux	L1C	EL17	Initial	N/A	No
8GB (2x4GB) Memory-PowerLinux	L1C	EL1F	Both	Yes	No
16GB (2x8GB) Memory-PowerLinux	L1C	EL1G	Both	Yes	No

32GB (2x16GB) Memory-PowerLinu	L1C	EL1H	Both	Yes	No
PCIe2 LP 2-Port 10GbE RoCE SFP	L1C	EL27	Both	Yes	No
PCIe LP 8Gb 2 Port Fibre Chann	L1C	EL2N	Both	Yes	No
PCIe2 LP 2 port 10GbE SR Adapt	L1C	EL2P	Both	Yes	No
PowerLinux Base - 8c 3.55GHz	L1C	ELBA	Initial	N/A	No
Trial Live Partition Mobility	L1C	ELPM	Both	Yes	No
1m 10GbE Cable SFP+ Act Twinax	L1C	EN01	Both	Yes	No
3m 10GbE Cable SFP+ Act Twinax	L1C	EN02	Both	Yes	No
5m 10GbE Cable SFP+ Act Twinax	L1C	EN03	Both	Yes	No
PCIe2 LP 8Gb 4-port Fibre Chan	L1C	EN0Y	Both	Yes	No
8-core 3.55 GHz (Zero-priced)	L1C	EPL5	Initial	N/A	No
EPL5 Proc Activ (Zero-priced)	L1C	EPLA	Initial	N/A	No
RFID Tags for Compute Nodes	L1C	ERF1	Initial	N/A	No
387GB SFF-1 SSD for AIX/Linux	L1C	ES0A	Both	Yes	No
1TB Removable Disk Cartridge	L1C	EU01	Both	Yes	No
RDX 320 GB Removable Disk Driv	L1C	EU08	Both	Yes	No

The following are newly announced features on the specific models of the IBM Power Systems 1457 machine type:

Description	Model	Feature	Initial/	RP	
Machine Type 1457	number	numbers	Both/	CSU	MES
			Support		
IBM PowerVM for IBM PowerLinux	7FL	EC22	Both	Yes	No

## Alternative and maintenance service

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## **Corrections**

### **(Corrected on July 16, 2012)**

Corrected title of Hardware Announcement 112-118.