



IBM Power Facts and Features:

Enterprise and Scale-Out Systems with Power10 Processor Technology

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IBM Power

Why IBM Power?

IBM Power10 servers can help create business agility with flexible and secure hybrid cloud infrastructure to address some of today's most demanding business needs and concerns.

Protect data with persistent security:

With data residing in an increasingly distributed environment, you cannot set a perimeter to it anymore. This reinforces the need for layered security across IT stack. Power10 family of servers introduce a new layer of defense with transparent memory encryption. Transparent memory encryption is designed to simplify encryption and support end-to-end security without impacting performance by leveraging hardware features for a seamless user experience. Since this capability is enabled at the silicon level, there is no additional management setup and performance impact. Power10 also includes 4X more crypto engines in every core compared to Power9 to accelerate encryption performance across the stack. For example, the widely used AES encryption performance is improved by 2.5X¹ over POWER9. With these innovations along with new in-core defense against Programming attacks and support for Post Quantum Encryption and Fully Homomorphic Encryption, IBM Power E1080 makes the server platform the most secure even better.

Streamline insights and automation:

As more AI models are deployed in production, the challenges around the AI infrastructure are coming to the fore. The typical AI deployment involves sending data from an operational platform to a GPU system. This usually induces latency and may even increase security risks with more data in network. Power10 addresses this challenge with in-core AI inferencing and machine learning. The Matrix Math Accelerator (MMA) in Power10 core provides the computational strength (at multiple levels of precision) and data bandwidth to tackle demanding AI inferencing and machine learning. Power E1080 delivers 5X faster AI inferencing per socket for high precision math over Power E980².

Maximize reliability and availability:

Power has been leading the industry in infrastructure reliability with 25% lower downtime vs. comparable high-end server³. With Power E1080 we are making the most reliable server platform in its class even better with advanced recovery, diagnostic capabilities, and Open Memory Interface (OMI) attached advance memory DIMMs. The continuous operations of today's in-memory systems depend on memory reliability because of their large memory footprint. Power10 memory DIMMs deliver 2X better memory reliability and availability than industry standard DIMMs⁴.

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¹ AES-256 in both GCM and XTS modes runs about 2.5 times faster per core when comparing Power10 E1080 (15-core modules) vs. POWER9 E980 (12-core modules) according to preliminary measurements obtained on RHEL Linux 8.4 and the OpenSSL 1.1.1g library

² 5x improvement in per socket inferencing throughput for large size 32b floating point inferencing models from POWER9 E980 (12-core modules) to Power10 E1080 (15-core modules). Based on IBM testing using Pytorch, OpenBLAS on the same BERT Large with SqUAD v1.1 data set

³ Based on "[ITIC 2022 Global Server Hardware, Server OS Reliability Report](#)"

⁴ Based on IBM's internal analysis of the IBM product failure rate of DDIMMS vs Industry Standard-DIMMs

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Power S1024, Power S1022, Power S1022s, and Power S1014

Product Line	IBM Power S1024	IBM Power S1022	IBM Power S1022s	IBM Power S1014
Machine type	9105-42A	9105-22A	9105-22B	9105-41B
System packaging	19" rack drawer (4U)	19" rack drawer (2U)	19" rack drawer (2U)	19" rack drawer (4U) or Deskside
Microprocessor type	64-bit Power10	64-bit Power10	64-bit Power10	64-bit Power10
# of processor sockets per server	1 upgradable or 2	1 upgradable or 2	1 upgradable or 2	1
Processor options GHz (cores/socket) max # of cores	3.4 to 4.0 GHz (12) 24 3.1 to 4.0 (16) 32 2.75 to 3.9 GHz (24) 48	2.90 to 4.0 GHz (12) 24 2.75 to 4.0 (16) 32 2.45 to 3.90 GHz (20) 40	3.0 to 3.9 GHz (4) 8 3.0 to 3.9 GHz (8) 16	3.0 to 3.9 GHz (4) 4 3.0 to 3.9 GHz (8) 8 2.7 to 3.9 GHz (24) 24
EnergyScale	Y	Y	Y	Y
Level 2 (L2) cache per core	2 MB	2 MB	2 MB	2 MB
Level 3 (L3) cache per core	8 MB	8 MB	8 MB	8 MB
System memory (minimum – maximum) 3200 MHz DDR5	64 GB – 8 TB	64 GB - 4 TB	64 GB - 2 TB	64 GB - 1 TB
Reliability, availability, serviceability				
Chipkill memory	Y	Y	Y	Y
Service processor (eBMC)	Y	Y	Y	Y
Hot-swappable NVMe SSD disks	Y	Y	Y	Y
Dynamic Processor Deallocation	Y	Y	Y	Y
Processor Instruction Retry	Y	Y	Y	Y
Hot-plug concurrent maintenance PCIe slots	Y	Y	Y	Y
Redundant hot-plug power	Y	Y	Y	Y
Redundant hot-plug cooling	Y	Y	Y	Y
Dual VIOS	Optional	Optional	Optional	Optional
Active Memory Mirroring	Y	Y	Y	N
Capacity and expandability				
Capacity on Demand (CoD)	CUoD	CUoD	N/A	N/A
Power Private Cloud (EP2.0)	Y	Y	N/A	N/A
PowerVM Enterprise Edition	Y	Y	Y	Y
Max logical partitions/micro-partitions	960	800	320	160
System unit PCIe slots ^a	4 PCIe x16 Gen4 or Gen5 x8 4 PCIe x8 Gen5 2 PCIe x8 Gen4	4 PCIe x16 Gen4 or Gen5 x8 4 PCIe x8 Gen5 2 PCIe x8 Gen4	4 PCIe x16 Gen4 or Gen5 x8 4 PCIe x8 Gen5 2 PCIe x8 Gen4	1 PCIe x16 Gen4 or Gen5 x8 3 PCIe x8 Gen5 1 PCIe x8 Gen4
Max PCIe Gen4 I/O Drawer	2	2	2	1
Max PCIe Gen4 slots: PCIe I/O drawers	24 in I/O drawer	24 in I/O drawer	24 in I/O drawer	12 in I/O drawer
Max NED24 NVMe Drawer	1	1	1	
Max NED24 NVMe slots : NVMe drawer	24 U.2 NVMe bays	24 U.2 NVMe bays	24 U.2 NVMe bays	
Internal Storage Bays	16 NVMe U.2	8 NVMe U.2	8 NVMe U.2	16 NVMe U.2
Maximum TB storage in system unit	102.4 TB (16 x 6.4TB NVMe U.2)	51.2 TB (8 x 6.4TB NVMe U.2)	51.2 TB (8 x 6.4TB NVMe U.2)	102.4 TB (16 x 6.4TB NVMe U.2)
AIX SMT8 rPerf # of cores : perf	12c : 415 24c : 810 32c : 1013 48c : 1331	12c : 358 24c : 699 32c : 924 40c : 1024	4c : 129 8c : 254 16c : 477	4c : 129 8c : 254 24c : 683
IBM i CPW # of cores : perf	12c : 312,500 24c : 585,100 32c : 725,000 48c : 947,500	12c : 106,300* 24c : 106,300* 32c : 106,300* 40c : 104,700* * Max LPAR size: 4-core	8c : 106,300* 16c : 106,300* * Max LPAR size: 4-core 2x4c : 198,200	4c : 106,300 8c : 205,300

IBM Power Power S1012

Product Line	IBM Power S1012
Machine type	9028-21B
System packaging	19" rack drawer 2U (half wide) / Desk Side
Microprocessor type	64-bit Power10
# of processor sockets per server	1
Processor options	3.0 to 3.90 GHz (1) 1
GHz (cores/socket) max # of cores	3.0 to 3.90 (4) 4 3.0 to 3.90 GHz (8) 8
EnergyScale	Y
Level 2 (L2) cache per core	2 MB
Level 3 (L3) cache per core	8 MB
System memory (minimum – maximum) 3200 MHz DDR4	32 GB – 256 GB
Reliability, availability, serviceability	
Chipkill memory	Y
Service processor (eBMC)	Y
Hot-swappable NVMe SSD disks	Y
Dynamic Processor Deallocation	Y
Processor Instruction Retry	Y
Hot-plug concurrent maintenance PCIe slots	N
Redundant hot-plug power	Y
Redundant hot-plug cooling	Y
Dual VIOS	Optional
Active Memory Mirroring	N
Capacity and expandability	
Capacity on Demand (CoD)	N
Power Private Cloud (EP2.0)	N
PowerVM Enterprise Edition	Y
Max logical partitions/micro-partitions	960
System unit PCIe slots ^a	2 PCIe x8 Gen5 or x16 Gen4 2 PCIe x8 Gen5
Max PCIe Gen4 I/O Drawer	N/A
Max PCIe Gen4 slots: PCIe I/O drawers	N/A
Internal Storage Bays	4 NVMe U.2
Maximum TB storage in system unit	6.4 TB (4 x 1.6TB NVMe U.2)
AIX SMT8 rPerf	4c : 130.4
# of cores : perf	8c : 234.1
IBM i CPW	1c : 29,900
# of cores: perf	4c : 111,300 8c : 203,100

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Power L1024 and Power L1022

Product Line	IBM Power L1024	IBM Power L1022
Machine type	9786-42H	9786-22H
System packaging	19" rack drawer (4U)	19" rack drawer (2U)
Microprocessor type	64-bit Power10	64-bit Power10
# of processor sockets per server	1 upgradable or 2	1 upgradable or 2
Processor options GHz (cores/socket) max # of cores	3.40 to 4.0 GHz (12) 24 3.10 to 4.0 GHz (16) 32 2.75 to 3.90 GHz (24) 48	2.90 to 4.0 GHz (12) 24 2.75 to 4.0 GHz (16) 32 2.45 to 3.90 GHz (20) 40
EnergyScale	Y	Y
Level 2 (L2) cache per core	2 MB	2 MB
Level 3 (L3) cache per core	8 MB	8 MB
Level 4 (L4) cache per socket	N/A	N/A
System memory (minimum – maximum) 3200 MHz DDR5	64 GB – 8 TB	64 GB - 4 TB
Reliability, availability, serviceability		
Chipkill memory	Y	Y
Service processor (eBMC)	Y	Y
Hot-swappable disks/ SSD	Y	Y
Dynamic Processor Deallocation	Y	Y
Processor Instruction Retry	Y	Y
Hot-plug concurrent maintenance	Y	Y
PCIe slots		
Redundant hot-plug power	Y	Y
Redundant hot-plug cooling	Y	Y
Dual VIOS	Optional	Optional
Active Memory Mirroring	Y	Y
Capacity and expandability		
Capacity on Demand (CoD)	N/A	N/A
Power Private Cloud	N/A	N/A
PowerVM Enterprise Edition	Y	Y
Max logical partitions/micro-partitions	960	800
System unit PCIe slots ^a	4 PCIe x16 Gen4 or Gen5 x8 4 PCIe x8 Gen5 2 PCIe x8 Gen4	4 PCIe x16 Gen4 or Gen5 x8 4 PCIe x8 Gen5 2 PCIe x8 Gen4
Max PCIe Gen4 I/O Drawer	2	2
Max PCIe Gen4 PCIe I/O drawers	24 in I/O drawer	24 in I/O drawer
Max NED24 NVMe Drawer	1	1
Max NED24 NVMe slots : NVMe drawer	24	24
Internal Storage	16 NVMe U.2	8 NVMe U.2
Maximum TB storage in system unit	102.4 TB (16 x 6.4TB NVMe U.2)	51.2 TB (8 x 6.4TB NVMe U.2)
Performance		
AIX SMT8 rPerf # of cores: perf	12c : 415 24c : 810 32c : 1013 48c : 1331	12c : 358 24c : 699 32c : 924 40c : 1024
IBM i CPW # of cores: perf	12c : 312,500 24c : 585,100 32c : 725,000 48c : 947,500	12c : 106,300* 24c : 106,300* 32c : 106,300* 40c : 104,700*
		* Max LPAR size: 4-core

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Power E1050

Product Line	IBM Power E1050
Machine type	9043-MRX
System packaging	19" rack drawer (4U)
Microprocessor type	64-bit Power10
# of processors per server	2, 3 or 4
Processor options	3.35 to 4.0 GHz (12) 48 max Min activations = 12
GHz (cores/socket) max # of cores	3.20 to 4.0 GHz (18) 72 max Min activations = 18
min # of activations = one socket	2.95 to 3.9 GHz (24) 96 max Min activations = 24
Energy scale	Yes
Level 2 (L2) cache per core	2 MB
Level 3 (L3) cache per core	8 MB
System memory: min / max / (min % active) 3200 MHz DDR5	256 GB / 16 TB / (greater of 256 GB or 50% of installed memory)
Active Memory Expansion	Optional
Reliability, availability, serviceability	
First failure data capture (FFDC)	Yes
Processor Instruction Retry	Yes
L2 and L3 cache error correction code (ECC) protection with cache line delete	Yes
Integrated power and cooling monitor function in processor-on-chip controller	Yes
Fabric bus retry with spare data lane	Yes
Extended cache line delete	Yes
Core contained checkstops	Yes
IBM memory buffer and spare dynamic random access memory (DRAM) module capability with x4 DDIMMs	Yes
Selective dynamic firmware updates	Yes
Chipkill memory	Yes
Service processor (eBMC)	Yes
Hot-swappable disks	Yes
Phase redundant voltage regulators	Yes
Regulator modules for processors, memory and I/O and standby voltage	Yes
Hot-swappable disks	Yes
Dynamic Processor Deallocation	Yes
Hot plug PCIe slots	Yes
Active Memory Mirroring for Hypervisor	Optional
Redundant hot-plug power supplies	Yes
Redundant, hot swappable fans for processor, memory and PCIe slots	Yes
Dual VIOS	Optional
Cloud Management and Deployment	
IBM PowerVC 2.1.1 (5765-VS2)	Defaulted (separately priced)
IBM PowerVC for Private Cloud 2.1.1 (5765-VC2)	
Cloud Management Console	1-year
Open source cloud automation and configuration tooling for AIX	Included
Capacity and expandability	
Capacity on Demand (CoD)	Yes
IBM Power Private Cloud with Dynamic Capacity	Yes
Power Linux only	Optional
PowerVM Enterprise Edition	Y
Max logical partitions/micropartitions	1000 (20 per core)
System unit PCIe full high slots ^a	6 PCIe x8 Gen5 or Gen4 x16 2 PCIe x8 Gen5 3 PCIe x8 Gen4
Max PCIe Gen4 I/O Drawers	3
Max PCIe Gen4 slots	36 (System unit and external I/O drawers)
Max NED24 NVMe Drawer	3
Max NED24 NVMe slots : NVMe drawer	72
USB ports	4
NVMe Backplane	10
Maximum TB storage in system unit	64 TB (10 x 6.4TB NVMe U.2) ¹
Performance	
AIX rPerf: 4-socket SMT8 values:	48c : 1596

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For details: [Power performance report](#)

72c : 2216

96c : 2688

¹ IBM Power E1050 supports up to ten NVMe 7-millimeter or 15-millimeter drives:

- Six NVMe drives within two or three-socket configuration
- Ten NVMe drives within a four-socket configuration

All NVMe drives are driven directly from the system backplane with no PCIe card or cables required.

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Power E1080

Product Line	IBM Power E1080 (1 node)	IBM Power E1080 (2 node)
Machine type	9080-HEX	9080-HEX
System packaging	19" rack drawer (7U) One 5U system node & one 2U system control unit	19" rack drawer (12U) Two 5U system nodes & one 2U system control unit
Microprocessor type	64-bit Power 10	64-bit Power 10
# of processor sockets per server	4	8 (4 per system node)
Processor options GHz (cores/socket) # of cores	3.65 to 3.9 GHz (10) 40 3.60 to 4.15 GHz (12) 48 3.55 to 4.00 GHz (15) 60	3.65 to 3.9 GHz (10) 80 3.60 to 4.15 GHz (12) 96 3.55 to 4.00 GHz (15) 120
Minimum number cores active	16	16
Energy Scale	Y	Y
Level 2 (L2) cache per core	2 MB	2 MB
Level 3 (L3) cache per chip	120 MB	120 MB
System memory: min / max / (min % active) 4000 MHz DDR5	1024 GB / 16 TB / (50%)	2048 GB / 32 TB / (50%)
NVMe bays	4	8
Active Memory Expansion	Optional	Optional
Reliability, availability, serviceability		
First failure data capture (FFDC)	Y	Y
Processor instruction retry	Y	Y
L2 and L3 Cache ECC protection with cache line-delete	Y	Y
Core Checkstops	Y	Y
Dynamic processor deallocation	Y	Y
Chipkill protection for x4 DDIMMs, with DRAM sparing	Y	Y
Processor fabric and memory buses retry with data lane sparing and ½ bandwidth mode	Y	Y
High speed internode cables, with passive components and advanced fault isolation diagnostic capabilities	Y	Y
Guided FSP & SMP cable installation	Y	Y
Concurrent repair of external SMP cable	Y	Y
Redundant phase and spare phase for voltage regulator modules (VRMs) supplying processors	Y	Y
Spare Power Management Integrated Circuit (PMIC) for on DDIMM power regulation	Y	Y
Redundant system clocks with dynamic failover	Y	Y
Redundant, hot-swappable power supplies and cooling fans Concurrent add/repair of I/O drawers	Y	Y
Extended error handling on PCIe slots Hot-plug/blind-swap PCIe adapter slots	Y	Y
Concurrent repair of Op-Panel	Y	Y
Concurrent repair of Time of Day Battery	Y	Y
Selective dynamic firmware updates	Y	Y
Active Memory Mirroring for Hypervisor	Y	Y
Cloud Management and Deployment		
IBM PowerVC 2.1.1 (5765-VS2)	Defaulted (separately priced)	Defaulted (separately priced)
IBM PowerVC for Private Cloud 2.1.1 (5765-VC2)		
Cloud Management Console	1-year	1-year
Open source cloud automation and configuration tooling for AIX	Included	Included
Capacity and expandability		
Capacity on Demand (CoD) functions	Y	Y
Power Private Cloud with Dynamic Capacity	Optional	Optional
PowerVM Enterprise Edition	Supported	Supported
PowerVM Linux Edition		
Max logical partitions/micro-partitions	1,000 (20 per core max)	1,000 (20 per core max)
Max system node PCIe Gen5x8 slots & Gen 4 x16	8 per system node	16 (8 per system node)
Max PCIe Gen4 I/O Drawers	3 per node	6 (3 per node)
Max PCIe Gen4 slots (all PCIe I/O drawers)	36	72
Max NED24 NVMe Drawer	3	6
Max NED24 NVMe slots : NVMe drawer	72	144
Max disk storage in system unit	3.2TB (4 x 800 GB NVMe 7mm) 12.8TB (2 x 6.4TB NVMe 15mm)	6.4TB (8 x 800GB NVMe 7mm) 25.6TB (4 x 6.4TB NVMe 15mm)
Performance		
AIX SMT8 rPerf	40c : 1,366	80c : 2,733
# of cores : perf	48c : 1,680 60c : 1,999	96c : 3,361 120c : 3,999
IBM i CPW	40c : 922,000	80c : 1,834,000
# of cores : perf	48c : 1,129,000 60c : 1,320,000	96c : 2,246,000 120c : 2,626,000

IBM Power

Product Line	IBM Power E1080 (3 node)	IBM Power E1080 (4 node)
Machine type	9080-HEX	9080-HEX
System packaging	19" rack drawer (17U) Three 5U system node & one 2U system control unit	19" rack drawer (22U) Four 5U system nodes & one 2U system control unit
Microprocessor type	64-bit Power10	64-bit Power10
# of processor sockets per server	12 (4 per system node)	16 (4 per system node)
Processor options GHz (cores/socket) # of cores	3.65 to 3.9 GHz (10) 120 3.60 to 4.15 GHz (12) 144 3.55 to 4.00 GHz (15) 180	3.65 to 3.9 GHz (10) 160 3.60 to 4.15 GHz (12) 192 3.55 to 4.00 GHz (15) 240
Minimum number cores active	16	16
Energy Scale	Y	Y
Level 2 (L2) cache per core	2 MB	2 MB
Level 3 (L3) cache per chip	120 MB	120 MB
System memory: min / max / (min % active)	4000 MHz DDR5 3072 GB / 48 TB / (50%)	4096 GB / 64 TB / (50%)
NVMe bays	12	16
Active Memory Expansion	Optional	Optional
Reliability, availability, serviceability		
First failure data capture (FFDC)	Y	Y
Processor instruction retry	Y	Y
L2 and L3 Cache ECC protection with cache line-delete	Y	Y
Core Checkstops	Y	Y
Dynamic processor deallocation	Y	Y
Chipkill protection for x4 DDIMMs, with DRAM sparing	Y	Y
Processor fabric and memory buses retry with data lane sparing and ½ bandwidth mode	Y	Y
High speed internode cables, with passive components and advanced fault isolation diagnostic capabilities	Y	Y
Guided FSP & SMP cable installation	Y	Y
Concurrent repair of external SMP cable	Y	Y
Redundant phase and spare phase for voltage regulator modules (VRMs) supplying processors	Y	Y
Spare Power Mgmt. Integrated Circuit (PMIC) on DDIMM power regulation	Y	Y
Redundant system clocks with dynamic failover	Y	Y
Redundant, hot-swappable power supplies and cooling fans	Y	Y
Concurrent add/repair of I/O drawers	Y	Y
Extended error handling on PCIe slots Hot-plug/blind-swap PCIe adapter slots	Y	Y
Concurrent repair of Op-Panel	Y	Y
Concurrent repair of Time of Day Battery	Y	Y
Selective dynamic firmware updates	Y	Y
Active Memory Mirroring for Hypervisor	Y	Y
Cloud Management and Deployment		
IBM PowerVC 2.1.1 (5765-VS2)	Defaulted (separately priced)	Defaulted (separately priced)
IBM PowerVC for Private Cloud 2.1.1 (5765-VC2)		
Cloud Management Console	1-year	1-year
Open source cloud automation and configuration tooling for AIX	Included	Included
Capacity and expandability		
Capacity on Demand (CoD) functions	Y	Y
Power Private Cloud with Dynamic Capacity	Optional	Optional
PowerVM Enterprise Edition	Y	Y
Max logical partitions/micro-partitions	1,000 (20 per core max)	1,000 (20 per core max)
Max system node PCIe Gen5x8 slots & Gen 4 x16	24 (8 per system node)	32 (8 per system node)
Max PCIe Gen4 I/O Drawers	9 (3 per node)	12 (3 per node)
Max PCIe Gen4 slots (all PCIe I/O drawers)	108	144
Max NED24 NVMe Drawer	9	12
Max NED24 NVMe slots : NVMe drawer	216	288
Max disk storage in system unit	9.6TB (12 x 800GB NVMe 7mm) 38.4TB (6 x 6.4TB NVMe 15mm)	12.8TB (16 x 800GB NVMe 7mm) 51.2TB (8 x 6.4TB NVMe 15mm)
Performance		
AIX SMT8 rPerf	120c : 4,100	160c : 5,467
# of cores : perf	144c : 5,041 180c : 5,999	192c : 6,722 240c : 7,998
IBM i CPW	120c : 2,756,000	160c : 3,678,000
# of cores : perf	144c : 3,375,000 180c : 3,946,000	192c : 4,504,000 240c : 5,266,000

IBM Power System Unit Details (Power Scale-Out Servers)

System Unit Details	Power S1024	Power S1022	Power S1022s	Power S1014	Power L1024	Power L1022	Power S1012
Max memory DDIMM card slots	32 (with 2 Sockets)	32 (with 2 Sockets)	16 (with 2 Sockets)	8	32 (with 2 Sockets)	32 (with 2 Sockets)	4 (RDIMM slots)
Integrated ports							
USB-3 ports	3 (1 front & 2 rear)	3 (1 front & 2 rear)	3 (1 front & 2 rear)	3 (1 front & 2 rear)	3 (1 front & 2 rear)	3 (1 front & 2 rear)	2 (1 front and 1 internal for RDX)
HMC ports (RJ45)	2	2	2	2	2	2	1
DVD-RAM slimline	Attached via USB port	Attached via USB port	Attached via USB port	Attached via USB port	Attached via USB port	Attached via USB port	Attached via USB port
NVMe Storage backplane	1 or 2	1 or 2	1 or 2	1 or 2	1 or 2	1 or 2	1
Optional EXP24SX ports	Y	Y	Y	Y	Y	Y	N
Max PCIe bus speed (GHz)	16.0 (Gen 4) 32 (Gen5 x 8)	16.0 (Gen 4) 32 (Gen5 x 8)	16.0 (Gen 4) 32 (Gen5 x 8)	16.0 (Gen 4) 32 (Gen5 x 8)	16.0 (Gen 4) 32 (Gen5 x 8)	16.0 (Gen 4) 32 (Gen5 x 8)	16.0 (Gen 4) 32 (Gen5 x 8)
Max I/O bandwidth	288 GB/sec	288 GB/sec	288 GB/sec	128 GB/sec	288 GB/sec	288 GB/sec	128 GB/sec
Service indicator LEDs	Y	Y	Y	Y	Y	Y	Y

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System Unit Details (Power Enterprise Servers)

Power E1050

System Unit Details	With 2 processor modules	With 3 processor modules	With 4 processor modules
Power10 sockets	4 (2 filled)	4 (3 filled)	4 (4 filled)
Number of processor modules	2	3	4
Memory DDIMM slots	32	48	64
Integrated ports			
USB-3 ports	4 (2 front & 2 rear)	4 (2 front & 2 rear)	4 (2 front & 2 rear)
HMC ports (RJ45)	2	2	2
Ethernet adapter ports	2 ports, 10Gb and/or 100Gb depending on PCIe adapter selected	2 ports, 10Gb and/or 100Gb depending on PCIe adapter selected	2 ports, 10Gb and/or 100Gb depending on PCIe adapter selected
Storage bays in system unit			
NVMe U.2	6 bays	6 bays	10 bays
Media bays			
DVD-RAM slimline	Attached via USB port	Attached via USB port	Attached via USB port
Optional EXP24SX ports	Y	Y	Y
PCIe adapter slots	7	11	11
PCIe Gen5 x8	2	2	2
PCIe Gen5 x8 or Gen4 x16	2	6	6
PCIe Gen4 x8	3	3	3
Max PCIe bus rate (Gbps)	16 (Gen4 x16) 32 (Gen5 x8)	16 (Gen4 x16) 32 (Gen5 x8)	16 (Gen4 x16) 32 (Gen5 x8)
Service indicator LEDs	Y	Y	Y

**IBM Power
System Node and System Control Unit Details (Power Enterprise Server)
Power E1080**

System Unit Details	Power E1080 system node	System control unit (one per system)
Power10 SCM sockets		
Number of SCMs	4	N/A
Memory DDIMM slots	64	N/A
Integrated ports		
System/serial (RJ45)	N/A	N/A
USB PCIe adapter must be used for enabling USB access 1 x USB 3.0 in	0	1
System Control Unit		
HMC ports (RJ45)	0	4
Ethernet adapter ports ^a	N/A	N/A
Bays in unit		
NVMe bays in unit	4	N/A
Media bays		
DVD-RAM slimline	N/A	Attached via USB port
PCIe Gen4/Gen5 adapter slots		
PCIe x8	8	N/A
PCIe x16	2	N/A
	6	N/A
Max I/O bandwidth (peak)	576 GB/sec	N/A
Service indicator LEDs	Y	Y
Operator panel	N/A	1

IBM Power Server PCIe I/O Drawers

Drawer	Server Attachment	PCIe Slots per Drawer	SAS Bays per Drawer	Available to order	Drawer Footprint
PCIe Gen4 I/O Drawer (#ENZ0)	via x16 PCIe slot	6 or 12	0	Y	19" rack 4U

Server PCIe I/O Drawer Attachment

Server Drawer	Power S1024	Power S1022	Power S1022s	Power S1014	Power L1024	Power L1022	Power S1012
PCIe	2	2	2	1	2	2	0

Server Drawer	Power E1050	Power E1080
PCIe	Max 3	Max 12

PCIe Gen4 I/O Expansion Drawer notes

- Each I/O drawer holds one or two 6-slot fan-out modules. A drawer with just one fan-out module is labeled "½" in this document. Each fan-out module is attached to a x16 PCIe slot in the Scale-out system unit or in the Enterprise system node or CEC.
- The attachment card in a 4U Power10 server or in a 5U E1080 Enterprise system node uses one PCIe slot.
- Each fan-out module provides 6 PCIe Gen4 slots. Four of the six slots are x16 and two are x8.
- Up to three drawers per each system node of an E1050 system
- PCIe Gen4 I/O drawers cannot be shared between two servers
- For good cable management practices, a maximum of 4 PCIe Gen4 I/O drawers per rack is generally recommended for configurations using a large number of 4-port PCIe adapters with cables attached to all the ports. If the rack has an 8-inch rear extender making it deeper and able to manage more cables, then a maximum of 6 PCIe Gen4 I/O drawers is recommended.
- Peak I/O bandwidth per fan-out module is 32 GB/sec.

For additional connectivity information, please reference the IBM Sales Manual for more information on I/O features and adapters.

IBM Power Server NVMe Expansion Drawers

Drawer	Server Attachment	U.2 NVMe bays per Drawer	SAS Bays per Drawer	Available to order	Drawer Footprint
NED24 NVMe Drawer (#ESR0)	via x16 PCIe slot	24	0	Y	19" rack 4U

Server NVMe Expansion Drawer Attachment

Server Drawer	Power S1024	Power S1022	Power S1022s	Power S1014	Power L1024	Power L1022	Power S1012
NVMe	1	1	1	1	1	1	0

Server Drawer	Power E1050	Power E1080
PCIe	Max 3	Max 12

NVMe Expansion Drawer notes

- Each NVMe drawer is a storage expansion enclosure with 24 U.2 NVMe bays. It supports up to 24 U.2 NVMe devices in 15 mm Gen3 carriers. The 15 mm carriers can accommodate either 7 mm or 15 mm NVME devices.
- Each NVMe drawer contains two redundant AC power supplies. The AC power supplies are part of the enclosure base.
- Up to three drawers per each system node of an E1050 system

For additional connectivity information, please reference the IBM Sales Manual for more information on I/O features and adapters.

IBM Power Physical Planning Characteristics

Note: More comprehensive information may be found in the IBM Power10 documentation at <https://www.ibm.com/docs/en/power10>. Plus, additional summary information can be found in the IBM Sales Manual for each server at [IBM Documentation](#).

Server	Power S1024	Power S1022	Power S1022s	Power S1014	Power L1024	Power L1022	Power S1012
Packaging	19" rack drawer (4U)	19" rack drawer (2U)	19" rack drawer (2U)	19" rack drawer (4U) or Deskside	19" rack drawer (4U)	19" rack drawer (2U)	19" rack half rack-width (2U) / Desk Side
Power supplies used	Four 1600W N + 1 standard	Two 2000W N+1 standard	Two 2000W N+1 standard	Four 1200W for Tower Two 1600W for Rack N+1 standard	Four 1600W N+1 standard	Two 2000W N+1 standard	Two 800W Rack or tower/desk N+1 standard
Voltage (AC) single phase	200 - 240	200 - 240	200 - 240	100 - 127 or 200 - 240	200 - 240	200 - 240	100 - 127 or 200 - 240
Maximum altitude							
Feet	10000	10000	10000	10000	10000	10000	10000
Meters	3048	3048	3048	3048	3048	3048	3048

Server	Power E1050	Power E1080 System node	Power E1080 System control unit
Packaging	19" rack drawer 4U	19" rack drawer 5U per node	19" rack drawer (one per 1080) 2U
Power supplies used	Four 2300W N + 1 standard	Four 1950W per node N + 2 standard	Zero – redundant power input from system node(s)
Voltage (AC) single phase	200 - 240	200 - 240	n/a
Maximum altitude			
Feet	10000	10000	10000
Meters	3050	3050	3050

To avoid any delay in service, obtain an optional lift tool (#EB2Z). One feature EB2Z lift tool can be shared among many servers and I/O drawers. The EB2Z lift tool provides a hand crank to lift and position up to 159 kg (350 lb.). The EB2Z lift tool is 1.12 meters x 0.62 meters (44 in. x 24.5 in.). Note that a single system node can weigh up to 86.2 kg (190 lb.).

Racks	7965-S42 Rack
42U	
Width	
Inches	23.6
Millimeters	600
Depth	
Inches	42.1
Millimeters	1070
Height	
Inches	79.5
Millimeters	2020
Weight	
lb.	365
kg	166

Power E1080 are supported by IBM Manufacturing only in the 7965-42S.

IBM Power Warranty¹ / Installation

Warranty Service Levels	Power S1024	Power S1022	Power S1022s	Power S1014	Power L1024	Power L1022	Power S1012
24x7 with Initial contact time objective	Optional	Optional	Optional	Optional	Optional	Optional	Optional
9x5 with four hour with Initial contact time objective	Optional	Optional	Optional	Optional	Optional	Optional	Optional
9x5 next-business-day	Standard ⁵	Standard ²	Standard ²	Standard ²	Standard ²	Standard ²	Standard ²
Warranty Period	3 years	3 years	3 years	3 years	3 years	3 years	3 years
Server install ³	CSU	CSU	CSU	CSU	CSU	CSU	CSU

Warranty Service Levels	Power E1050	Power E1080
24x7 same-business-day	Optional ⁴	Standard
9x5 with four hour with Initial contact time objective	-	-
9x5 next-business-day	Standard	-
Warranty Services Period	3 years	1 year
Server installation ³	CSU	IBI

1. These warranty terms and conditions are for the United States and may be different in other countries. Consult your local IBM representative or IBM Business Partner for country-specific information.
2. Mandatory Customer Replaceable Unit (CRU) or Limited On-site service depending on the feature code. With an upgrade to a higher support service level, the mandatory CRU features become optional CRU.
3. CSU = Customer Set Up, IBI = Installation by IBM. For server hardware only. Note for IBI servers, server feature codes such as an EXP24SX I/O drawer or PCIe Gen4 I/O drawer or PCIe adapter or disk drive are installed by the IBM service representative as part of the initial installation. Optionally a client may choose to install CSU features without an IBM service representative.
4. System is provided with a three-year warranty 9x5 NBD. For your convenience, IBM is defaulting Expert Care Advance tier to provide a 24x7 service level coverage on this offering. Clients have a choice whether or not to accept the additional 24x7 service level. If the choice is to not accept, contact your adviser. (Varies by country).
5. Mandatory Customer Replaceable Unit (CRU). With an upgrade to a higher support service level, mandatory CRU becomes optional CRU.

For additional Warranty coverage by country, refer to the following link :

<https://public.dhe.ibm.com/systems/power/docs/hw/p10/gi114340.pdf>

IBM Power Power Scale-Out Servers Software Support

Power Systems Software	IBM Power S1024	IBM Power S1022	IBM Power S1022s	IBM Power S1014	IBM Power L1024	IBM Power L1022	IBM Power S1012
Software Tier	Small	Small	Small	Small	Small	Small	Small
PowerVM™							
PowerVM Enterprise Edition	Supported	Supported	Supported	Supported	Supported	Supported	Supported
AIX ***							
AIX 7.2 *	Supported	Supported	Supported	Supported	Supported	Supported	Supported
AIX 7.3 *	Supported	Supported	Supported	Supported	Supported	Supported	Supported
IBM i							
IBM i Software Tier	P20/P30	P10	P10	P05/P10	P20/P30	P10	P05/P10
IBM i 7.3 TR12 *	Supported	Supported	Supported	Supported	Supported	Supported	N/A
IBM i 7.4 TR6 *	Supported	Supported	Supported	Supported	Supported	Supported	Supported
IBM i 7.5 TR2*	Supported	Supported	Supported	Supported	Supported	Supported	Supported
Linux							
Red Hat Enterprise Linux 8.4 LE*	Supported	Supported	Supported	Supported	Supported	Supported	N/A
Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 8.4 for Power LE*	Supported	Supported	Supported	Supported	Supported	Supported	N/A
Red Hat Enterprise Linux 9.0 (LE)*	Supported	Supported	Supported	Supported	Supported	Supported	Supported
SUSE Linux Enterprise Server 15 Service Pack 3*	Supported	Supported	Supported	Supported	Supported	Supported	N/A
SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 15 Service Pack 3*	Supported	Supported	Supported	Supported	Supported	Supported	N/A
Red Hat OpenShift Container Platform 4.9*	Supported	Supported	Supported	Supported	Supported	Supported	N/A
PowerHA™							
PowerHA SystemMirror for AIX 7 Standard and Enterprise Edition	Supported	Supported	Supported	Supported	Supported	Supported	Supported
PowerHA SystemMirror for IBM i Standard and Enterprise Edition	Supported	Supported	Supported	Supported	Supported	Supported	Supported

* Or later

IBM Power Power Enterprise Servers Software Support

Power Systems Software	Power E1050	Power E1080
Software Tier	Small	Medium
PowerVM™		
PowerVM Enterprise Edition	Standard	Standard
AIX ***		
AIX 7.2	Supported	Supported
AIX 7.3 *	Supported	Supported
IBM i		
IBM i Software Tier	N/A	P30
IBM i 7.3 TR11 *	N/A	Supported
IBM i 7.4 TR8 *	N/A	Supported
IBM i 7.5 TR2*	N/A	Supported
Linux		
Red Hat Enterprise Linux 8.2 LE (p9compat)	N/A	Supported
Red Hat Enterprise Linux 8.4 for Power LE*	Supported	Supported
Red Hat Enterprise Linux 9.0 for Power LE*	Supported	Supported
Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 8.4 for Power LE*	Supported	Supported
Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 9.0 for Power LE*	Supported	Supported
SUSE Linux Enterprise Server 12 Service Pack 5* (p9compat)	N/A	Supported
SUSE Linux Enterprise Server 15 Service Pack 3*	Supported	Supported
SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 15 Service Pack 3*	Supported	Supported
Red Hat OpenShift Container Platform 4.9 *	Supported	Supported
PowerHA™		
PowerHA SystemMirror for AIX 7 Standard and Enterprise Edition	Supported	Supported
PowerHA SystemMirror for IBM i Standard and Enterprise Edition	N/A	Supported

* Or later

IBM Power Performance Notes

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rPerf (Relative Performance) is an estimate of commercial processing performance relative to other IBM UNIX® systems. It is derived from an IBM analytical model which uses characteristics from IBM internal workloads, TPC and SPEC benchmarks. The rPerf model is not intended to represent any specific public benchmark results and should not be reasonably used in that way. The model simulates some of the system operations such as CPU, cache and memory. However, the model does not simulate disk or network I/O operations.

rPerf estimates are calculated based on systems with the latest levels of AIX and other pertinent software at the time of system announcement. Actual performance will vary based on application and configuration specifics. The IBM eServer™ pSeries® 640 is the baseline reference system and has a value of 1.0. Although rPerf may be used to approximate relative IBM UNIX commercial processing performance, actual system performance may vary and is dependent upon many factors including system hardware configuration and software design and configuration. Variations in incremental system performance may be observed in commercial workloads due to changes in the underlying system architecture. For additional information about rPerf, contact your local IBM office or an IBM authorized reseller.

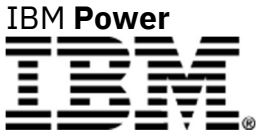
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<https://www.ibm.com/downloads/cas/LGMXGGPJ>

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For more details: [Power performance report](#)
SPEC – <http://www.spec.org>
TPC – <http://www.tpc.org>

More information

Contact your IBM sales representative or IBM Business Partner
Access the Power Systems Products and Services page on IBM’s World Wide Web server at ibm.com/systems/power and then select the appropriate hardware or software option
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More detailed benchmark and performance information is available at [IBM Power Performance Report February 14, 2023](#)



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When referring to storage capacity, total TB equals total GB divided by 1000; accessible capacity may be less.

The IBM home page on the Internet can be found at ibm.com.

This brochure provides detailed technical specifications of all IBM Power10 processor-based Power Systems servers in a tabular, easy to scan format for easy comparison between systems. These systems are UNIX (AIX), IBM i and Linux operating system servers. Not all features listed in this document are available on all three operating systems.

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