



IBM Power Systems Facts and Features:

Enterprise and Scale-out Systems with POWER8™ Processor Technology



IBM Power Systems™ servers and IBM BladeCenter® blade servers using IBM POWER7® and POWER7+® processors are described in a separate Facts and Features report dated July 2013 (POB03022-USEN-28).
IBM Power Systems™ servers and IBM BladeCenter® blade servers using IBM POWER6® and POWER6+™ processors are described in a separate Facts and Features report dated April 2010 (POB03004-USEN-14).

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Changes for the May 2015 document include the addition of Power E850

These notes apply to the description tables for the pages which follow:

Y	Standard / Supported
Optional	Optionally Available / Supported
N/A or -	Not Available / Supported or Not Applicable
SOD	Statement of General Direction announced
SLES	SUSE Linux Enterprise Server
RHEL	Red Hat Enterprise Linux
A	CoD capabilities include: Capacity Upgrade on Demand option – permanent processor or memory activation, Elastic Capacity on Demand – temporary processor or memory activation by the day, Utility Capacity on Demand – temporary processor activation by the minute, and Trial Capacity on Demand.
B	Elastic COD built-in to new Power E880 and includes a block of no-charge processor and memory days
a	For IBM Manufacturing processes, one PCIe slots must contain an Ethernet LAN available for client use.
b	Use of expanded function storage backplane uses one PCIe slot in 2U servers and optionally uses a PCIe slot in 4U servers
c	Backplane provides dual high performance SAS controllers with 1.8 GB write cache expanded up to 7.2 GB with compression plus Easy Tier function plus two SAS ports for running an EXP24S drawer. 4-core S814 does not support the attachment of an EXP24S to these ports
d	Full benchmark results are located at ibm.com/systems/power/hardware/reports/system_perf.html
e	Option is supported on IBM i only through VIOS.
f	For simplicity in calculating maximum and consistently describing the max across the Scale-out Servers, the 12-bay backplane is assumed. A higher max with the expanded function backplane is possible.
g	USB-2 ports have limited client usage compared to USB-3 ports. Clients can use a USB-2 port to communicate with a UPS
h	4-core Power S814 max capacity disk drive supported in system unit is 300 GB. 387GB SSD can be used for higher capacity.
j	Not available in PowerKVM environment
k	Maximum memory for 4.1GHz S822 and S822L is 512GB.
m	Not available in OPAL Bare-metal environment
o	Values for 64-, 96- and 128-core servers measured as multiples of 32-core partitions. Values for 96-, 144- and 192-core servers measured as multiples of 48-core partitions. Values for 80-core server measured as two 40-core partitions.
p	When no GPU installed in S824L
q	Slot total shown are all available PCIe slots for client use. PCIe slots in the system unit used to attach a PCIe Gen3 I/O drawer are excluded from total. Note one PCIe slots must contain an Ethernet LAN

Why Power Systems?

Powerful forces—mobile, cloud and big data & analytics—are redefining how business gets done. Leaders are leveraging these forces to deepen relationships with customers and partners, drive new efficiencies and expand business models. IBM is the right partner to help you:

Leverage systems that optimize big data and analytics performance.

Power Systems are designed for big data—from operational to computational to business and cognitive Watson solutions—are optimized for performance and can scale to support demanding and growing workloads. Capitalize on the currency of data by finding business insights faster and more efficiently. And gain the elasticity you need to handle the varying analytics initiatives your business requires.

Realize the true potential of enterprise cloud.

Power Systems will help you deliver on the promise of cloud and take advantage of superior cloud economics. With higher utilization and performance capabilities and the ability to scale out and up, you can reap the benefits of improved economics associated with fewer scale-out systems. Leveraging the robust security built into the foundation of Power Systems, you gain the confidence you need to move more workloads to the cloud, capitalize on greater efficiencies and do more.

Revolutionize the way IT is created and consumed.

POWER architecture is at the heart of the OpenPOWER Foundation, a community that's taking advantage of an open technology platform to help organizations create new opportunities and design next-generation applications to drive business success. The first to adopt open server technology, Power Systems help you more quickly and easily deliver a broader set of services and incorporate new technologies using the same technology footprint

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Power S812L and S822L

Product Line	IBM Power S812L	IBM Power S822L
Machine type	8247-21L	8247-22L
System packaging	19" rack drawer (2U)	19" rack drawer (2U)
Microprocessor type	64-bit POWER8	64-bit POWER8
# of processor sockets per server	1	2
Processor options GHz (cores/socket) # of cores	3.42 GHz (10) 10 3.02 GHz (12) 12	3.42 GHz (10) 20 3.02 GHz (12) 24 4.15 GHz (8) 16
EnergyScale	Y	Y
Level 2 (L2) cache per core	512 KB	512 KB
Level 3 (L3) cache per core	8 MB	8 MB
System memory (minimum – maximum) (1600 MHz DDR3)	16 GB – 512 GB	32 GB -1024 GB ^k
Active Memory Expansion	N/A	N/A
Reliability, availability, serviceability		
Chipkill memory	Y	Y
Service processor	Y	Y
Hot-swappable disks/ SSD	Y	Y
Dynamic Processor Deallocation	Y ^j	Y ^j
Processor Instruction Retry	Y ^j	Y ^j
Alternate Processor Recovery	Y ^j	Y ^j
Hot-plug concurrent maintenance	Y ^j	Y ^j
PCIe slots		
Redundant hot-plug power	Y	Y
Redundant hot-plug cooling	Y	Y
Node Add, Node Repair, Memory Upgrade	N/A	N/A
Dual VIOS	Optional ^j	Optional ^j
Capacity and expandability		
Capacity on Demand (CoD)	N/A	N/A
PowerVM PowerLinux Edition	Optional	Optional
PowerKVM Edition	Optional	N/A
PowerVM Standard Edition	N/A	N/A
PowerVM Enterprise Edition	N/A	Optional
Max logical partitions/micro-partitions	240	480
System unit PCIe Gen3 low profile slots ^a	4 PCIe x8 2 PCIe x16	5 PCIe x8 4 PCIe x16
Max PCIe Gen3 I/O Drawer ^{j,m}	½	1
Max PCIe Gen3 slots: system unit + PCIe I/O drawers ^{j,m,q}	10 (4 in system unit + 6 in I/O drawer)	17 (5 in system unit + 12 in I/O drawer)
System unit disk/SSD bays with standard or split backplane	12 SFF-3 or 6+6 SFF-3	12 SFF-3 or 6+6 SFF-3
System unit disk/SSD bays with expanded function backplane and dual IOA with 7.2GB write cache ^{b, c}	8 SFF-3 plus optional EXP24S attachment for an additional 24 SFF-2 bays	8 SFF-3 plus 6 1.8-inch SSD bays plus optional EXP24S attachment for an additional 24 SFF-2 bays
Slimline DVD bay	1	1
Maximum TB storage in system unit	21.6 TB (with 12x 1.8 TB disks)	21.6 TB (with 12x 1.8 TB disks)
Maximum EXP24S storage drawers ^m	28	28
Maximum EXP24S SAS bays ^m	672 SFF-2	672 SFF-2
Max TB storage EXP24S	1,209 TB with 1.8 TB disks	1,209 TB with 1.8 TB disks
Performance ^d		
AIX rPerf GHz (cores/socket): perf (# cores)	N/A	N/A
IBM i CPW GHz (cores/socket): perf (# cores)	N/A	N/A

Power S824L

Product Line	IBM Power S824L	IBM Power S824L ^P
Machine type	8247-42L	8247-42L
System packaging	19" rack drawer (4U)	19" rack drawer (4U)
Microprocessor type	64-bit POWER8	64-bit POWER8
# of processor sockets per server	2	2
Processor options	3.42 GHz (10) 20 3.02 GHz (12) 24	4.15 GHz (8) 8 or 16 3.52 GHz (12) 24
EnergyScale	Y	Y
Level 2 (L2) cache per core	512 KB	512 KB
Level 3 (L3) cache per core	8 MB	8 MB
System memory (minimum - maximum) (1600 MHz DDR3)	32 GB –2048 GB	32 GB –2048 GB
Active Memory Expansion	N/A	N/A
Reliability, availability, serviceability		
Chipkill memory	Y	Y
Service processor	Y	Y
Hot-swappable disks	Y	Y
Dynamic Processor Deallocation	Y	Y
Processor Instruction Retry	Y	Y
Alternate Processor Recovery	N/A	N/A
Hot-plug concurrent maintenance	N/A	N/A
PCIe slots	Y	Y
Redundant hot-plug power	Y	Y
Redundant hot-plug cooling	Y	Y
Node Add, Node Repair, Memory Upgrade	N/A	N/A
Dual VIOS	Optional	Optional
Capacity and expandability		
Capacity on Demand (CoD)	N/A	N/A
Active Memory Expansion	N/A	N/A
PowerVM PowerLinux Edition	N/A	Y
PowerKVM Edition	N/A	N/A
PowerVM Standard Edition	N/A	N/A
PowerVM Enterprise Edition	N/A	N/A
Max logical partitions/micro partitions	N/A	480
System unit PCIe Gen3 full high slots ^a	7 PCIe x8 4 PCIe x16	7 PCIe x8 4 PCIe x16
Max PCIe Gen3 I/O Drawers ^{l,m}	N/A	2
Max PCIe Gen3 slots: system unit + PCIe I/O drawers ^{l,m}	7 in system unit	31 (7 in system unit + 24 in I/O drawer) ^q
System unit disk bays with standard backplane	12 SFF-3	12 SFF-3
System unit disk/SSD bays with expanded function backplane and dual IOA with 7.2GB write cache ^{b, c}	N/A	18 SFF-3 plus 8 1.8-inch SSD bays plus optional EXP24S attachment for an additional 24 SFF-2 bays
Slimline DVD bay	1	1
Maximum TB storage in system unit	14.4 TB (with 12 ⁱ x 1.2TB disks)	21.6 TB (with 12 ⁱ x 1.8 TB disks)
Maximum EXP24S storage drawers	N/A	28 ^{j,m}
Maximum EXP24S SAS bays	N/A	672 SFF-2 ^{l,m}
Maximum TB storage in EXP24S	N/A	1,209 TB with 1.8 TB disks ^{j,m}
Performance^d		
AIX rPerf	N/A	N/A
GHz (cores/socket): perf (# cores)	N/A	N/A
IBM i CPW	N/A	N/A
GHz (cores/socket): perf (# cores)	N/A	N/A

Power S814, S822 and Power S824

Product Line	IBM Power S814	IBM Power S822	IBM Power S824
Machine type	8286-41A	8284-22A	8286-42A
System packaging	19" rack drawer (4U)	19" rack drawer (2U)	19" rack drawer (4U)
Microprocessor type	64-bit POWER8	64-bit POWER8	64-bit POWER8
# of processor sockets per server	1	2	2
Processor options GHz (cores/socket) # of cores	3.02 GHz (4) 4	3.89 GHz (6) 6 or 12	3.89 GHz (6) 6 or 12
	3.02 GHz (6) 6	3.42 GHz (10) 10 or 20	4.15 GHz (8) 8 or 16
	3.72 GHz (8) 8	4.15 GHz (8) 8 or 16	3.52 GHz (12) 24
EnergyScale	Y	Y	Y
Level 2 (L2) cache per core	512 KB	512 KB	512 KB
Level 3 (L3) cache per core	8 MB	8 MB	8 MB
System memory (minimum - maximum) (1600 MHz DDR3)	4-core: 16 GB – 64 GB 6/8-core: 16 GB – 1024 GB	32 GB – 512 GB (1 DCM) 32 GB – 1024 GB (2 DCM)	32 GB – 1 TB (1 DCM) 32 GB – 2 TB (2 DCM)
Active Memory Expansion	Optional	Optional	Optional
Reliability, availability, serviceability			
Chipkill memory	Y	Y	Y
Service processor	Y	Y	Y
Hot-swappable disks	Y	Y	Y
Dynamic Processor Deallocation	Y	Y	Y
Processor Instruction Retry	Y	Y	Y
Alternate Processor Recovery	Y	Y	Y
Hot-plug concurrent maintenance PCIe slots	Y	Y	Y
Redundant hot-plug power	Y	Y	Y
Redundant hot-plug cooling	Y	Y	Y
Node Add, Node Repair, Memory Upgrade	N/A	N/A	N/A
Dual VIOS	Optional	Optional	Optional
Capacity and expandability			
Capacity on Demand (CoD)	N/A	N/A	N/A
PowerVM PowerLinux Edition	N/A	N/A	N/A
PowerKVM Edition	N/A	Optional	N/A
PowerVM Standard Edition	Optional	Optional	Optional
PowerVM Enterprise Edition	Optional	N/A	Optional
Max logical partitions/micro-partitions	160	400	480
System unit PCIe Gen3 full high slots ^a	5 PCIe x8 2 PCIe x16	5 PCIe x8 4 PCIe x16	7 PCIe x8 4 PCIe x16
Max PCIe Gen3 I/O Drawer	1	1 ^j	2
Max PCIe Gen3 slots: system unit + PCIe I/O drawers ^q	17 (5 in system unit + 12 in I/O drawer) ^q	17 (5 in system unit + 12 in I/O drawer) ^{j,q}	31 (7 in system unit + 24 in I/O drawer) ^q
System unit disk/SSD bays with standard or split backplane	4-core: 10 SFF-3 or 5+5 SFF-3 6/8-core: 12 SFF-3 or 6+6 SFF-3	12 SFF-3 or 6+6 SFF-3	12 SFF-3 or 6+6 SFF-3
System unit disk/SSD bays with expanded function backplane and dual IOA with 7.2GB write cache ^{b, c}	4-core: 10 SFF (no EXP24S) 6/8-core: 18 SFF-3 plus optional EXP24S attachment for an additional 24 SFF-2 bays	8 SFF-3 plus 6 1.8-inch SSD bays plus optional EXP24S attachment for an additional 24 SFF-2 bays	18 SFF-3 plus 8 1.8-inch SSD bays plus optional EXP24S attachment for an additional 24 SFF-2 bays
Slimline DVD bay	1	1	1
Maximum TB storage in system unit	4-core : 3.0TB (with 10x300GB) 6/8-core 32.4TB (with 18x 1.8TB disl	21.6 TB (with 12x 1.8 TB disks)	35.4 TB (with 18x 1.8 TB disks plus 8x 387 GB SSD)
Maximum EXP24S storage drawers	4-core: 0 6/8-core: 28	28	28
Maximum EXP24S SAS bays	6/8-core: 672 SFF-2	672 SFF-2	672 SFF-2
Max TB storage EXP24S ^{f h}	4-core: n/a 6/8-core: 1,209 TB with 1.8 TB disks	1,209 TB with 1.8 TB disks	1,209 TB with 1.8 TB disks
Performance ^d			
AIX rPerf GHz (cores/socket): perf (# cores)	3.02 GHz (4) 66.9	3.89 GHz (6): 120.8 4.15 GHz (8): 155.1	3.89 GHz (6) : 120.8 4.15 GHz (8) : 166
	3.02 GHz (6): 97.5	3.42 GHz (10): 177.8 3.89 GHz (12): 235.6	3.89 GHz (12) : 235.6 4.15 GHz (16) : 323.6
	3.72 GHz (8): 143.9	4.15 GHz (16): 302.4 3.42 GHz (20): 346.7	4.15 GHz (16) : 323.6 3.52 GHz (24) : 421.9
			3.89 GHz (6) : 72,000 4.15 GHz (8) : 94,500
IBM i CPW GHz (cores/socket): perf (# cores)	3.02 GHz (4): 39,500		3.89 GHz (12) : 130,000
	3.02 GHz (6): 59,500	N/A	4.15 GHz (16) : 173,500
	3.72 GHz (8): 85,500		3.52 GHz (24) : 230,500

Power E850

Product Line	IBM Power E850
Machine type	8408-E8E
System packaging	19" rack drawer (4U)
Microprocessor type	64-bit POWER8
# of processor sockets per server	4
Processor options	3.7 GHz (8) 32
GHz (cores/socket) # of cores	3.35 GHz (10) 40
	3.02 GHz (12) 48
Minimum number of core activations	16 (3.7 GHz)
	20 (3.35 GHz)
	24 (3.02 GHz)
Energy Scale	Y
Level 2 (L2) cache per core	512 KB
Level 3 (L3) cache per core	8 MB
System memory: min / max / (min % active)	128 GB / 2 TB / (50%)
1600 MHz DDR3	SOD : max 4TB*
Active Memory Expansion	Optional
Reliability, availability, serviceability	
Chipkill memory	Y
Service processor	Y
Hot-swappable Time-of-Day battery	Y
Phase redundant, integrated sparing voltage regulator modules for processors, memory and I/O	Y
Hot-swappable disks	Y
Dynamic Processor Deallocation	Y
Processor Instruction Retry	Y
Alternate Processor Recovery	Y
Hot-plug PCIe slots	Y
Active Memory Mirroring	Optional
Redundant hot-plug power	Y
Redundant fans for SAS controllers and drive bays	Y
Redundant, hot swappable fans for processor, memory and PCIe slots	Y
Dual VIOS	Optional
Capacity and expandability	
Capacity on Demand (CoD) functions	Y ^A
Power Integrated Facility for Linux	Optional
Max logical partitions/micro-partitions	960 (20 per core)
System unit PCIe Gen3 full high slots	3 PCIe x8
	4-8 PCIe x16
	(2 per installed processor module)
Max PCIe Gen3 I/O Drawers	4
Max PCIe Gen3 slots:	51
Slimline DVD bay	1
Maximum TB storage in system unit	15.9 TB
	8 x 1.8TB disks +
	4 x 387GB SSD
Max EXP24S storage drawers	64
Max in EXP24S I/O drawers) disk drives Storage	1536 2764 TB with 1.8 GB disk
Performance*	
AIX rPerf	3.02 GHz (12): 383.0(24), 565.0(36), 746.9(48)
GHz (cores/socket): perf (# cores)	3.35 GHz (10): 347.8(20), 513.0(30), 678.3(40)
	3.72 GHz (8): 304.5(16), 449.2(24), 593.8(32)

*Statement of Direction. All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice.

IBM Power Systems
Power E870

Product Line	IBM Power E870 (1 node)	IBM Power E870 (2 node)
Machine type	9119-MME	9119-MME
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 POWER8	64-bit POWER8
# of processor sockets per server	4	8 (4 per system node)
Processor options	4.02 GHz (8) 32 4.19 GHz (10) 40	4.02 GHz (8) 64 4.19 GHz (10) 80
GHz (cores/socket) # of cores		
Minimum number of core activations	8	8
Energy Scale	Y	Y
Level 2 (L2) cache per core	512 KB	512 KB
Level 3 (L3) cache per core	8 MB	8 MB
System memory: min / max / (min % active) 1600 MHz DDR3	256 GB / 4 TB / (50%)	512 GB / 8 TB / (50%)
Active Memory Expansion	Optional	Optional
Reliability, availability, serviceability		
Chipkill memory	Y	Y
Service processor and clock	Redundant with failover	Redundant with failover
Hot-swappable disks	N/A	N/A
Dynamic Processor Deallocation	Y	Y
Processor Instruction Retry	Y	Y
Alternate Processor Recovery	Y	Y
Hot-plug PCIe slots	Y	Y
Blind-swap PCIe slots in system unit	Y	Y
Active Memory Mirroring	Y	Y
Redundant hot-plug power	Y	Y
Redundant hot-plug cooling	Y	Y
Dual VIOS	Optional	Optional
Capacity and expandability		
Capacity on Demand (CoD) functions	Y ^A	Y ^A
Power Enterprise Processor Pools	Optional	Optional
Power Integrated Facility for Linux	Optional	Optional
PowerVM Enterprise Edition	Standard	Standard
Max logical partitions/micro-partitions	800 (20 per core max)	1000
Max system node PCIe Gen3 x16 slots	8	16 (8 per node)
Max PCIe Gen3 I/O Drawers	4	8 (4 per node)
Max PCIe Gen3 slots: (all in PCIe Gen3 I/O drawers)	48 ^k	96 ^k
System Control Unit: media bay	1 optional DVD	1 optional DVD
Max disk storage in system node	N/A	N/A
Max EXP24S storage drawers	64	128
Max in EXP24S I/O drawers) disk drives Storage	1536 2764 TB with 1.8 GB disk	3072 5529 TB with 1.8 GB disk
Performance*		
AIX rPerf	4.02 GHz (8): 674.5(32), 4.19 GHz (10): 856.0(40),	4.02 GHz (8): 1,349.0(64) ^o 4.19 GHz (10): 1,711.9(80) ^o
GHz (cores/socket): perf (# cores)		
IBM i CPW	4.02 GHz (8): 359,000(32), 4.19 GHz (10): 460,000(40),	4.02 GHz (8): 711,000(64) ^o 4.19 GHz (10): 911,000(80) ^o
GHz (cores/socket): perf (# cores)		

Power E880 (3-node option also announced, but not shown to save space)

Product Line	IBM Power E880 (1 node)	IBM Power E880 (2 node)	IBM Power E880 (4 node)
Machine type	9119-MHE	9119-MHE	9119-MHE
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	19" rack drawer (22U) Four 5U system nodes & one 2U system control unit
Microprocessor type	64-bit POWER8	64-bit POWER8	64-bit POWER8
# of processor sockets per server	4	8 (4 per system node)	16 (4 per system node)
Processor options	4.35 GHz (8) 32 4.02 GHz (12) 48	4.35 GHz (8) 64 4.02 GHz (12) 96	4.35 GHz (8) 128 4.02 GHz (12) 192
GHz (cores/socket) # of cores			
Minimum number cores active	8	8	8
Energy Scale	Y	Y	Y
Level 2 (L2) cache per core	512 KB	512 KB	512 KB
Level 3 (L3) cache per core	8 MB	8 MB	8 MB
System memory: min / max / (min % active)	256 GB / 4 TB / (50%)	512 GB / 8 TB / (50%)	1 TB / 16 TB / (50%)
1600 MHz DDR3			
Active Memory Expansion	Optional	Optional	Optional
Reliability, availability, serviceability			
Chipkill memory	Y	Y	Y
Service processor and clock	Redundant with failover	Redundant with failover	Redundant with failover
Hot-swappable disks	N/A	N/A	N/A
Dynamic Processor Deallocation	Y	Y	Y
Processor Instruction Retry	Y	Y	Y
Alternate Processor Recovery	Y	Y	Y
Hot-plug PCIe slots	Y	Y	Y
Blind-swap PCIe slots in system unit	Y	Y	Y
Blind-swap PCIe slots in PCIe I/O drawer	Y	Y	Y
Active Memory Mirroring	Y	Y	Y
Redundant hot-plug power	Y	Y	Y
Redundant hot-plug cooling	Y	Y	Y
Dual VIOS	Optional	Optional	Optional
Capacity and expandability			
Capacity on Demand (CoD) functions	Y ^{A, B}	Y ^{A, B}	Y ^{A, B}
Power Enterprise Processor Pools	Optional	Optional	Optional
Power Integrated Facility for Linux	Optional	Optional	Optional
PowerVM Enterprise Edition	Standard	Standard	Standard
Max logical partitions/micro-partitions	960 (20 per core max)	1000	1000
Max system node PCIe Gen3 x16 slots	8	16 (8 per enclosure)	32 (8 per enclosure)
Max PCIe Gen3 I/O Drawers	4	8 (4 per node)	16 (4 per node)
Max PCIe Gen3 slots (all PCIe I/O drawers)	48	96	192
System Control Unit: media bay	1 optional DVD	1 optional DVD	1 optional DVD
Max disk storage in system unit	N/A	N/A	N/A
Max EXP24S storage drawers	64	128	168
Max in EXP24S I/O drawers: disk drives Storage	1536 2764 TB with 1.8 GB disk	4032 7257 TB with 1.8 GB disk	4032 7257 TB with 1.8 GB disk
Performance*			
rPerf	u		
4.35 GHz (8): 716.3(32),		4.35 GHz (8): 1,432.5(64) °	4.35 GHz (8): 2,865 (128) °
4.0 GHz (12): 976.4 (48)		4.0 GHz (12): 1,952.9(96)	4.0 GHz (12): 3,905.8 (192)
IBM i CPW		4.35 GHz (8): 755,000(64) °	4.35 GHz (8): 1,523,000 (128) °
4.02 GHz (12): 518,000(48)		4.02 GHz (12): 1,034,000(96)	4.02 GHz (12): 2,069,000 (192)

Note: A 3-node column is not shown above to save space and allow a larger font to be used. 4.35GHz 3-node 96-core rPerf = 2,148.8 ° and CPW = 1,144,000 ° 4.02GHz 3-node 144-core rPerf = ,2,929.3 ° and CPW = 1,551,000 °

System Unit Details (Power Systems S Class Servers)

System Unit Details	Power S812L	Power S822 Power S822L	Power S814	Power S824	Power S824L
POWER8 DCM sockets	1	2	1	2	2
Number of DCMs	1	1 or 2 for S822 2 for S822L	1	1 or 2	1 ^p or 2
Max memory DIMM slots	8	16 (with 2 DCM)	4-core: 4 usable 6/8-core: 8	16 (with 2 DCM)	16
Max memory bandwidth	192 GB/sec	384 GB/sec	4-core: 96 GB/sec 6/8-core: 192 GB/sec	384 GB/sec	384GB/sec
Integrated ports					
System/serial (RJ45)	1	1	1	1	1
USB-2 ports ^g	2	2	2	2	2
USB-3 ports	4 (2 front & 2 rear)	2 (2 front & 0 rear)	4 (2 front & 2 rear)	4 (2 front & 2 rear)	4 (2 front & 2 rear)
HMC ports (RJ45)	2	2	2	2	2
Ethernet adapter ports ^a	4x 1 Gb or 2x 10/1 Gb	4x 1 Gb or 2x 10/1 Gb	4x 1 Gb or 2x 10/1 Gb	4x 1 Gb or 2x 10/1 Gb	2 1 Gb
SAS bays in system unit					
2.5-inch (disk/SSD)	12 or 8 SFF-3	12 or 8 SFF-3	4-core: 10 usable 6/8-core: 12 or 18 SFF-3	12 or 18 SFF-3	12 SFF-3 or 18 SFF-3 ^p
1.8-inch (SSD)	0	0 or 6	0	0 or 8	0 or 8 ^p
Media bays					
DVD-RAM slimline	1	1	1	1	1
HH for tape	N/A	N/A	N/A	N/A	N/A
Integrated SAS storage controllers for disk/SSD/DVD	Y	Y	Y	Y	Y
Base backplane	1 (zero write cache)	1 (zero write cache)	1 (zero write cache)	1 (zero write cache)	1 (zero write cache)
Split backplane	2 (zero write cache)	2 (zero write cache)	2 (zero write cache)	2 (zero write cache)	2 (zero write cache) ^r
Expanded function backplane ^{b, c}	Dual IOA (7.2 GB write cache) ^{b, c}	Dual IOA (7.2 GB write cache) ^{b, c}	Dual IOA (7.2 GB write cache) ^{b, c}	Dual IOA (7.2 GB write cache) ^{b, c}	Dual IOA (7.2 GB write cache) ^{b, c, p}
Easy Tier function	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane ^p
Optional EXP24S ports	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane ^p
PCIe Gen3 adapter slots	6	9 (w/ 2 DCM)	7	11 (w/ 2 DCM)	11
PCIe x8	4	5	5	7	7
PCIe x16	2	4	2	4	4
Max PCIe bus speed (GHz)	10.0 (Gen3)	10.0 (Gen3)	10.0 (Gen3)	10.0 (Gen3)	10.0 (Gen3)
Max I/O bandwidth	96 GB/sec	96 GB/sec per DCM	96 GB/sec	96 GB/sec per DCM	192 GB/sec
Service indicator LEDs	Y	Y	Y	Y	Y

Storage backplane notes: Integrated SAS controllers are based on latest IBM patented SAS RAID adapter technology. All backplane options offer RAID 0, 1, 5, 6, 10 capabilities plus hot spare capability. Write cache is mirrored for protection and physically is two 1.8 GB DRAM caches offering up to 7.2 GB effective capacity with compression. One optional EXP24S storage drawer attachment is to two SAS ports on rear of server which is available with the expanded function backplane. The EXP24S is external to the system unit taking 2U rack space and attached via SAS cables and provides 24 SSF-2 SAS bays for disk or for SSD.

System Unit Details (Power Enterprise Servers)**Power E850 – System Unit Details**

System Unit Details	With 2 processor modules	With 3 processor modules	With 4 processor modules
POWER8 sockets	4 (2 filled)	4 (3 filled)	4 (4 filled)
Number of processor modules	2	3	4
Memory DIMM slots	16	24	32
Max memory bandwidth	384 GB/sec	576 GB/sec	768 GB/sec
Integrated ports			
System/serial (RJ45)	1	1	1
USB-2 ports ⁹	2	2	2
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 ^a	2-4 ports, 1Gb and/or 10Gb depending on PCIe adapter selected	2-4 ports, 1Gb and/or 10Gb depending on PCIe adapter selected	2-4 ports, 1Gb and/or 10Gb depending on PCIe adapter selected
SAS bays in system unit			
2.5-inch (disk/SSD)	8 SFF-3	8 SFF-3	8 SFF-3
1.8-inch (SSD)	4	4	4
Media bays			
DVD-RAM slimline	1	1	1
HH for tape	N/A	N/A	N/A
Integrated SAS storage controllers for disk/SSD/DVD			
Dual non-split backplane	Dual IOA (zero write cache)	Dual IOA (zero write cache)	Dual IOA (zero write cache)
Split backplane	2 (zero write cache)	2 (zero write cache)	2 (zero write cache)
Write cache backplane	Dual IOA (7.2 GB write cache)	Dual IOA (7.2 GB write cache)	Dual IOA (7.2 GB write cache)
Easy Tier function	Y with any backplane	Y with any backplane	Y with any backplane
Optional EXP24S ports	N	N	N
PCIe Gen3 adapter slots	7	9	11
PCIe x8	3	3	3
PCIe x16	4	6	8
Max PCIe bus speed (GHz)	10.0 (Gen3)	10.0 (Gen3)	10.0 (Gen3)
Max I/O bandwidth	192 GB/sec	256 GB/sec	320 GB/sec
Service indicator LEDs	Y	Y	Y

Storage backplane notes: Integrated SAS controllers are based on latest IBM patented SAS RAID adapter technology. All backplane options offer RAID 0, 1, 5, 6, 10 capabilities plus hot spare capability plus Easy Tier function assuming enough drives are physically installed to do so. Write cache is mirrored for protection and physically is two 1.8 GB DRAM caches offering up to 7.2 GB effective capacity with compression.

Power E870 and E880 -- System Node and System Control Unit Details

System Unit Details	Power E870 system node	Power E880 system node	System control unit (one per system)
POWER8 SCM sockets	4	4	N/A
Number of SCMs	4	4	N/A
Memory CDIMM slots	32	32	N/A
Max memory bandwidth	230 GB/sec	230 GB/sec	N/A
Integrated ports			
System/serial (RJ45)	N/A	N/A	N/A
USB ports	N/A	N/A	N/A
HMC ports (RJ45)	0	0	4
Ethernet adapter ports ^a	N/A	N/A	N/A
SAS bays in unit			
2.5-inch (disk/SSD)	N/A	N/A	N/A
1.8-inch (SSD)	N/A	N/A	N/A
Media bays			
DVD-RAM slimline	0	0	1
Integrated SAS storage controllers for disk/SSD/DVD			
PCIe Gen3 adapter slots	8	8	N/A
PCIe x8	0	0	N/A
PCIe x16	8	8	N/A
Max PCIe bus speed (GHz)	10.0 (Gen3)	10.0 (Gen3)	N/A
Max I/O bandwidth (peak)	256 GB/sec	256 GB/sec	N/A
Service indicator LEDs	Y	Y	Y
Operator panel	N/A	N/A	1

Server I/O Drawers

Drawer	Server Attachment	PCIe Slots per Drawer	SAS Bays per Drawer	Available to order	Drawer Footprint
EXP24S (#5887 / #EL1S)	via SAS	0	24 SFF-2 SAS	Y	19" rack 2U
PCIe Gen3 I/O Drawer (#EMX0 / ELMX)	via x16 PCIe slot	6 or 12	N/A	Y	19" rack 4U

Server I/O Drawer Attachment

Server Drawer ¹	Power S812L	Power S822	Power S814	Power S814	Power S824	Power S824L	Power E850	Power E870	Power E880
	-	Power S822L	4-core	6/8-core					
EXP24S	Max 28	Max 28	n/a	Max 28	Max 28	Max 28 ^P	Max 64	Max 128	Max 168
PCIe	Max 1/2	Max 1	n/a	Max 1	Max 2	Max 2 ^P	Max 4	Max 8	Max 16

EXP24S notes:

- Above values require PCIe Gen3 I/O Drawers to be present. For scale-out servers there is a max of 14 EXP24S if only a system unit is used.
- A maximum of 16 EXP24S can be attached to one PCIe Gen3 I/O drawer due to cable management considerations
- A Power E850 without any PCIe Gen3 I/O drawers can only attach up to 16 EXP24S. To support the maximum of 64 EXP24S I/O drawers, three or four PCIe drawers are needed.
- A single system node Power E870/E880 with 4 PCIe drawers has a maximum of 64 EXP24S drawers. A two-node Power E870/E880 with 8 PCIe drawers has a max of 128 EXP24S drawers. A three or four node Power E880 has a max of 168 EXP24S drawers.

PCIe Gen3 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 "1/2" 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 POWER8 server or in a 5U E870 or E880 node uses one PCIe slot. The attachment card in a 2U Scale-out server is a double-wide card using two PCIe slots.
- Each fan-out module provides 6 PCIe Gen3 slots. Two of the six slots are x16 and four are x8.
- Up to four drawers on an E850 and up to four drawers per each system node of an E870/E880 system
- PCIe Gen3 I/O drawers can not be shared between two servers
- For good cable management practices, a maximum of 4 PCIe Gen3 I/O drawers per 7014-T42/T00 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 Gen3 I/O drawers is recommended.

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

Physical Planning Characteristics

Note: More comprehensive information may be found in the IBM Site and Hardware Planning document at <http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/POWER8welcome.htm> . Plus, additional summary information can be found in the IBM Sales Manual for each server at ibm.com/common/ssi .

Server	Power S812L	Power S822 Power S822L	Power S814 (rack)	Power S814 (tower)	Power S824 Power S824L
Packaging	19" rack drawer (2U)	19" rack drawer (2U)	19" rack drawer (4U)	Tower	19" rack drawer (4U)
Power supplies used	Two 900W N + 1 standard	Two 1400W N+1 standard	Two 1400W N+1 standard	Two 900W N+1 standard	Four 900W N+1 standard
Voltage (AC) single phase	100 -120 or 200 - 240	200 – 240	100-120 or 200 - 240	100-120 or 200-240	100 – 120 or 200 - 240
Maximum altitude					
Feet	10000	10000	10000	10000	10000
Meters	3048	3048	3048	3048	3048

Server	Power E850	Power E870 / E880 System node	Power E870 / E880 System control unit
Packaging	19" rack drawer 4U	19" rack drawer 5U per node	19" rack drawer (one per 870/880) 2U
Power supplies used	Four 1400W N + 1 standard	Four 1720W per node N + 1 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	3048	3048

Racks	7014-S25 or #0555	7014-T00 or #0551	7014-T42 or #0553	7014-B42	7965-94Y Slim Rack
	25U	36U	42U	42U	42U
Height					
Inches	49.0	71.0 – 75.8	79.3	79.3	78.8
Millimeters	1344	1804 – 1926	2015	2015	2002
Width (can vary depending on use of side panels)					
Inches	23.8	24.5 – 25.4	24.5 - 25.4	24.5 - 25.4	23.6
Millimeters	605	623 – 644	623 – 644	623 - 644	600
Depth (can vary depending on door options selected)					
Inches	39.4	41.0 – 45.2	41.0 - 45.2	41.0 - 55.5	43.1 – 48.2
Millimeters	1001	1042 – 1098	1043 – 1098	1042 - 1409	1095 - 1224

Power E870 and E880 are supported by IBM Manufacturing only in the 7014-T42 or #0553.

Warranty¹ / Installation

Warranty Service Levels	Power S812L	Power S822 Power S822L	Power S814	Power S824 Power S824L
24x7 with two hour service objective ²	Optional	Optional	Optional	Optional
24x7 with four hour service objective	Optional	Optional	Optional	Optional
9x5 with four hour service objective	Optional	Optional	Optional	Optional
9x5 next-business-day	Standard ³	Standard ³	Standard ³	Standard ³
Warranty Period	3 years	3 years	3 years	3 years
Server install⁴	CSU	CSU	CSU	CSU

Warranty Service Levels	Power E850	Power E870	Power E880
24x7 with two hour service objective ²	Optional	Optional	Optional
24x7 with four hour service objective	Included*	Standard	Standard
9x5 with four hour service objective	-	-	-
9x5 next-business-day	Standard ³	-	-
Warranty Services Period	3 / 1 years ⁵	1 year	1 year
Server installation⁴	CSU	IBI	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. Available in selected cities.

3. Mandatory Customer Replaceable Unit (CRU) and On-site service.

4. CSU = Customer Set Up, IBI = Installation by IBM For server hardware only. Note except for 795 I/O, feature I/O drawers added later as MES are CSU.

5. This system is provided with a one year standard warranty 9x5 NBD. For your convenience, IBM has provided an upgrade to 24x7 coverage PLUS two additional years of extended warranty services (varies by country).

Power S Class Servers Software Support

Power Systems Software	Power S812L	Power S822	Power S822L	Power S814	Power S824	Power S824L
Software Tier	Small	Small	Small	Small	Small	Small
PowerVM™						N/A
PowerVM Linux Edition	Supported	N/A	Supported	N/A	N/A	Supported ⁴
PowerVM Express	N/A	N/A	N/A	N/A	N/A	N/A
PowerVM Standard and Enterprise Editions	N/A	Supported	N/A	Supported	Supported	N/A
PowerKVM	Supported	N/A	Supported	N/A	N/A	N/A
AIX						
AIX 6.1 *	N/A	Supported	N/A	Supported	Supported	N/A
AIX 7.1 *	N/A	Supported	N/A	Supported	Supported	N/A
IBM i						
IBM i Software Tier	N/A	N/A	N/A	Small 4-core: P05 ³ 6/8-core: P10 ³	Small P20 ³	N/A
IBM i 7.1 TR8 *	N/A	N/A	N/A	Supported	Supported	N/A
IBM i 7.2 *	N/A	N/A	N/A	Supported	Supported	N/A
Linux						
Red Hat Enterprise Linux 6.5 *	Supported	Supported	Supported	Supported	Supported	Supported ⁴
Red Hat Enterprise Linux 7.1	Supported	Supported	Supported	Supported	Supported	Supported ⁴
SUSE Linux Enterprise Server 11 *	Supported SP1	Supported SP1	Supported SP1	Supported SP1	Supported SP1	Supported SP1 ⁴
Ubuntu 14.04, 14.10	Supported	N/A	Supported	N/A	N/A	Supported,
Ubuntu 15.04	Supported	Supported	Supported	Supported	Supported	Supported ⁴
PowerHA™						
PowerHA SystemMirror for AIX 6.1 ² Standard and Enterprise Editions	N/A	Supported	N/A	Supported	Supported	N/A
PowerHA SystemMirror for AIX 7 ² Standard Edition	N/A	Supported	N/A	Supported	Supported	N/A
PowerHA SystemMirror for i 6.1	N/A	N/A	N/A	Supported	Supported	N/A
PowerHA SystemMirror for i 7.1 Standard and Enterprise Editions	N/A	N/A	N/A	Supported	Supported	N/A

* Or later version

1 – Note that AIX 6.1 and AIX 7.1 Express Edition may be used for partitions of up to 4 cores and 8 GB of memory per core.

2 – PowerHA SystemMirror for AIX 6.1 is supported on AIX 5.3, AIX 6.1 and AIX 7.1. PowerHA SystemMirror for AIX 7 is supported with both AIX 6.1 and AIX 7.1

3 – P05 and P10 requires user entitlements and includes 5250 Enterprise Enablement capability. P20 does not have user entitlements and 5250 Enterprise Enablement is ordered as an optional hardware feature code.

4. When no GPU installed

Power Enterprise Servers Software Support

Power Systems Software	Power E850	Power E870	Power E880
Software Tier	Small	Medium	Medium
PowerVM™			
PowerVM Linux Edition	With Power IFL	With Power IFL	With Power IFL
PowerVM Express	N/A	N/A	N/A
PowerVM Standard Edition	Supported	N/A	N/A
PowerVM Enterprise Editions	Supported	Standard	Standard
PowerKVM	N/A	N/A	N/A
AIX			
AIX 6.1	With TL9 * TL8 planned Sept	With TL8 *	With TL8 *
AIX 7.1	With TL3 * TL2 planned Sept	With TL2 *	With TL2 *
AIX 6.1 with virtual I/O only	With TL8 *	With TL8 *	With TL8 *
AIX 7.1 with virtual I/O only	With TL2 *	With TL2 *	With TL2 *
IBM i			
IBM i Software Tier	N/A	P30	P30
IBM i 7.1 TR9 * **	N/A	Supported	Supported
IBM i 7.2 TR1 * **	N/A	Supported	Supported
Linux			
Red Hat Enterprise Linux	6.6 *	6.5 *	6.5 *
SUSE Linux Enterprise Server 11 SP3*	12 *	11 SP3 *	11 SP3 *
Ubuntu	15.04	N/A	N/A
PowerHA™			
PowerHA SystemMirror for AIX 6.1 ² Standard and Enterprise Editions	Supported	Supported	Supported
PowerHA SystemMirror for AIX 7 ² Standard Edition	Supported	Supported	Supported
PowerHA SystemMirror for i 7.1 Standard and Enterprise Editions	N/A	Supported	Supported
PowerHA SystemMirror for i 7.2 Standard and Enterprise Editions	N/A	Supported	Supported

- Or later version

** IBM i 7.1 TR10 and IBM i 7.2 TR2 are required for 4-node or 4 PCIe I/O drawer per node configurations

Performance Notes

The performance information contained herein is current as of the date of this document. All performance benchmark values and estimates are provided "AS IS" and no warranties or guarantees are expressed or implied by IBM. Buyers should consult other sources of information, including system benchmarks, to evaluate the performance of a system they are considering.

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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www.ibm.com/systems/power/software/i/management/performance/resources.html

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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

Product announcement letters and Sales Manual containing more details on hardware and software offerings are available at ibm.com/common/ssj

More detailed benchmark and performance information is available at

ibm.com/systems/p/hardware/benchmarks , ibm.com/systems/p/hardware/system_perf.html and at ibm.com/systems/i/solutions/perfmgmt/resource.html .



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