



# IBM Power Systems Facts and Features: Enterprise and Scale-out Systems with POWER8™ Processor Technology

6 October 2014



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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Change log: This October 6<sup>th</sup> document adds the E870 and E880 and S824L,

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	One x8 PCIe slots must contain a 4-port 1Gb Ethernet LAN available for client use or contain a 2-port 10/1Gb Ethernet LAN. Use of the 2-port 10/1GbE adapter is available for AIX/Linux/VIOS configs.
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 <a href="http://ibm.com/systems/power/hardware/reports/system_perf.html">ibm.com/systems/power/hardware/reports/system_perf.html</a>
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. IBM i clients can use a 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	SOD announced in Oct 2014 indicating up to four PCIe Gen3 I/O Expansion Drawers per system node
m	SOD announced in Oct 2014 indicating larger memory max of E870
o	Values for 64-core servers measured as two 32-core partitions. Values for 80-core server measured as two 40-core partitions.

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

## 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**

<b>Product Line</b>	<b>IBM Power S812L</b>
Machine type	8247-21L
System packaging	19" rack drawer (2U)
Microprocessor type	64-bit POWER8
# of processor sockets per server	1
Processor options	3.42 GHz (10)   10
GHz (cores/socket)   # of cores	3.02 GHz (12)   12
EnergyScale	Y
Level 2 (L2) cache per core	512 KB
Level 3 (L3) cache per core	8 MB
System memory (minimum - maximum) (1600 MHz DDR3)	16 GB – 512 GB
Active Memory Expansion	N/A
<b>Reliability, availability, serviceability</b>	
Chipkill memory	Y
Service processor	Y
Hot-swappable disks/ SSD	Y
Dynamic Processor Deallocation	Y <sup>1</sup>
Processor Instruction Retry	Y <sup>1</sup>
Alternate Processor Recovery	Y <sup>1</sup>
Hot-plug concurrent maintenance	Y <sup>1</sup>
PCIe slots	
Redundant hot-plug power	Y
Redundant hot-plug cooling	Y
Node Add, Node Repair, Memory Upgrade	N/A
Dual VIOS	Optional <sup>1</sup>
<b>Capacity and expandability</b>	
Capacity on Demand (CoD)	N/A
PowerVM PowerLinux Edition	Optional
PowerKVM Edition	Optional
PowerVM Standard Edition	N/A
PowerVM Enterprise Edition	N/A
Max logical partitions/micro-partitions	240
System unit PCIe Gen3 low profile slots <sup>a</sup>	4 PCIe x8 2 PCIe x16
PCIe expansion I/O drawer	0, but SOD
System unit disk/SSD bays with standard or split backplane	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 <sup>b, c</sup>	8 SFF-3 plus optional EXP24S attachment for an additional 24 SFF-2 bays
Slimline DVD bay	1
Maximum TB storage in system unit	14.4 TB (with 12x 1.2 TB disks)
Maximum EXP24S storage drawers	14
Maximum EXP24S SAS bays	336 SFF-2
Maximum total SAS bays (system unit + EXP24S)	348
Max TB storage (system unit + EXP24s)	417 TB using 348x 1.2 TB disk drives
<b>Performance<sup>d</sup></b>	
AIX rPerf	N/A
GHz (cores/socket): perf (# cores)	
IBM i CPW	N/A
GHz (cores/socket): perf (# cores)	

**Power S822 and Power S822L**

<b>Product Line</b>	<b>IBM Power S822</b>	<b>IBM Power S822L</b>
Machine type	8284-22A	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	2	2
Processor options	3.89 GHz (6)   6 or 12 GHz (cores/socket)   # of cores	3.42 GHz (10)   20 3.02 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 – 512 GB (1 DCM) 32 GB – 1024 GB (2 DCM)	32 GB -1024 GB
Active Memory Expansion	Optional	N/A
<b>Reliability, availability, serviceability</b>		
Chipkill memory	Y	Y
Service processor	Y	Y
Hot-swappable disks	Y	Y
Dynamic Processor Deallocation	Y	Y <sup>1</sup>
Processor Instruction Retry	Y	Y <sup>1</sup>
Alternate Processor Recovery	Y	Y <sup>1</sup>
Hot-plug concurrent maintenance	Y	Y <sup>1</sup>
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 <sup>1</sup>
<b>Capacity and expandability</b>		
Capacity on Demand (CoD)	N/A	N/A
PowerVM PowerLinux Edition	N/A	Optional
PowerVM Standard Edition	Optional	N/A
PowerVM Enterprise Edition	Optional	N/A
PowerKVM Edition	N/A	Optional
Max logical partitions/micro-partitions	400	480
System unit max PCIe Gen3 low profile slots <sup>o</sup>	5 PCIe x8 4 PCIe x16	5 PCIe x8 4 PCIe x16
PCIe expansion I/O drawer	0, but SOD	0, but SOD
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 and Easy Tier function <sup>b,c</sup>	8 SFF-3 plus 6 1.8-inch SSD bays 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	14.4 TB (with 12x 1.2 TB disks)	14.4 TB (with 12x 1.2 TB disks)
Maximum EXP24S storage drawers	14	14
Maximum EXP24S SAS bays	336 SFF-2	336 SFF-2
Maximum total SAS bays (system unit + EXP24S)	348	348
Max TB storage (system unit + EXP24s)	417 TB using 348x 1.2 TB disk drives	417 TB using 348x 1.2 TB disk drives
<b>Performance<sup>d</sup></b>		
AIX rPerf	3.89 GHz (6): 120.8 3.42 GHz (10): 177.8 3.89 GHz (12): 235.6 3.42 GHz (20): 346.7	N/A
IBM i CPW	N/A	N/A
GHz (cores/socket): perf (# cores)		

## Power S814 and Power S824

Product Line	IBM Power S814	IBM Power S824
Machine type	8286-41A	8286-42A
System packaging	19" rack drawer (4U)	19" rack drawer (4U)
Microprocessor type	64-bit POWER8	64-bit POWER8
# of processor sockets per server	1	2
Processor options	3.02 GHz (4)   4	3.89 GHz (6)   6 or 12
GHz (cores/socket)   # of cores	3.02 GHz (6)   6 3.72 GHz (8)   8	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)	4-core: 16 GB – 64 GB 6/8-core: 16 GB – 512 GB	32 GB - 512 GB (1 DCM) 32 GB – 1024 GB (2 DCM)
Active Memory Expansion	Optional	Optional
<b>Reliability, availability, serviceability</b>		
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	Y	Y
Hot-plug concurrent maintenance	Y	Y
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
<b>Capacity and expandability</b>		
Capacity on Demand (CoD)	N/A	N/A
PowerVM PowerLinux Edition	N/A	N/A
PowerKVM Edition	N/A	N/A
PowerVM Standard Edition	Optional	Optional
PowerVM Enterprise Edition	Optional	Optional
Max logical partitions/micro-partitions	160	480
System unit PCIe Gen3 full high slots <sup>a</sup>	5 PCIe x8 2 PCIe x16	7 PCIe x8 4 PCIe x16
PCIe expansion I/O drawer	0, but SOD	0, but SOD
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
System unit disk/SSD bays with expanded function backplane and dual IOA with 7.2GB write cache <sup>b, c</sup>	4-core: 10 SFF (no EXP24S) 6/8-core: 18 SFF-3 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
Maximum TB storage in system unit	4-core : 3.0TB ( with 10x300GB ) 6/8-core 21.6 TB (with 18x 1.2 TB disks )	24.7 TB (with 18x 1.2 TB disks plus 8x 387 GB SSD )
Maximum EXP24S storage drawers	4-core: 0 6/8-core: 14	14
Maximum EXP24S SAS bays	6/8-core: 336 SFF-2	336 SFF-2
Maximum total SAS bays (system unit + EXP24S) <sup>f</sup>	4-core: 10 6/8-core: 348 <sup>f</sup>	348 <sup>f</sup>
Max TB storage (system unit + EXP24s) <sup>f, h</sup>	4-core: 3.0 TB using 300GB drives 6/8-core: 417 TB using 348x 1.2 TB disk drives <sup>i</sup>	417 TB using 348x 1.2 TB disk drives <sup>f</sup>
<b>Performance<sup>d</sup></b>		
AIX rPerf	3.02 GHz (4) : 66.9 3.02 GHz (6) : 97.5 3.72 GHz (8) : 143.9	3.89 GHz (6) : 120.8 4.15 GHz (8) : 166 3.89 GHz (12) : 235.6 4.15 GHz (16) : 323.6 3.52 GHz (24) : 421.9
IBM i CPW	3.02 GHz (4) : 39,500 3.02 GHz (6) : 59,500 3.72 GHz (8) : 85,500	3.89 GHz (6) : 72,000 4.15 GHz (8) : 94,500 3.89 GHz (12) : 130,000 4.15 GHz (16) : 173,500 3.52 GHz (24) : 230,500

**Power S824L**

Product Line	IBM Power S824L
Machine type	8247-42L
System packaging	19" rack drawer (4U)
Microprocessor type	64-bit POWER8
# of processor sockets per server	2
Processor options	3.42 GHz (10)   20
GHz (cores/socket)   # of cores	3.02 GHz (12)   24
EnergyScale	Y
Level 2 (L2) cache per core	512 KB
Level 3 (L3) cache per core	8 MB
System memory (minimum - maximum) (1600 MHz DDR3)	32 GB –1024 GB
Active Memory Expansion	N/A
<b>Reliability, availability, serviceability</b>	
Chipkill memory	Y
Service processor	Y
Hot-swappable disks	Y
Dynamic Processor Deallocation	Y
Processor Instruction Retry	Y
Alternate Processor Recovery	N/A
Hot-plug concurrent maintenance	N/A
PCIe slots	N/A
Redundant hot-plug power	Y
Redundant hot-plug cooling	Y
Node Add, Node Repair, Memory Upgrade	N/A
Dual VIOS	N/A
<b>Capacity and expandability</b>	
Capacity on Demand (CoD)	N/A
Active Memory Expansion	N/A
PowerVM PowerLinux Edition	N/A
PowerKVM Edition	N/A
PowerVM Standard Edition	N/A
PowerVM Enterprise Edition	N/A
Max logical partitions/micro-partitions	N/A
System unit PCIe Gen3 full high slots <sup>a</sup>	7 PCIe x8 4 PCIe x16
PCIe expansion I/O drawer	0
System unit disk bays with standard backplane	12 SFF-3
System unit disk/SSD bays with expanded function backplane and dual IOA with 7.2GB write cache <sup>b, c</sup>	N/A
Slimline DVD bay	1
Maximum TB storage in system unit	14.4 TB (with 12x 1.2TB disks)
Maximum EXP24S storage drawers	N/A
Maximum EXP24S SAS bays	N/A
Maximum total SAS bays (system unit + EXP24S)	N/A
Max TB storage (system unit + EXP24s)	14.4 TB using 12x 1.2TB disk drives
<b>Performance<sup>d</sup></b>	
AIX rPerf	N/A
GHz (cores/socket): perf (# cores)	N/A
IBM i CPW	N/A
GHz (cores/socket): perf (# cores)	N/A

**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	4.02 GHz (8)   64
GHz (cores/socket)   # of cores	4.19 GHz (10)   40	4.19 GHz (10)   80
Minimum number of core activations	8	8
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: min / max / (min % active) 1600 MHz DDR3	256 GB / 2 TB <sup>m</sup> / (50%)	512 GB / 4 TB <sup>m</sup> / (50%)
Active Memory Expansion	Optional	Optional
<b>Reliability, availability, serviceability</b>		
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
<b>Capacity and expandability</b>		
Capacity on Demand (CoD) functions	Y <sup>A</sup>	Y <sup>A</sup>
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 enclosure)
Max PCIe Gen3 I/O Drawers <sup>k</sup>	2 <sup>k</sup> (2 per node)	4 <sup>k</sup> (2 per node)
Max PCIe Gen3 slots: system node + PCIe I/O drawers <sup>k</sup>	4 in system node + 24 in I/O drawer <sup>k</sup>	8 in system node + 48 in I/O drawer <sup>k</sup>
System Control Unit: media bay	1 optional DVD	1 optional DVD
Max disk storage in system unit	N/A	N/A
Max disk drives in EXP24S I/O drawers)   Storage	1536   1843 TB with 1.2 GB drives	1536   1843 TB with 1.2 GB drives
<b>Performance*</b>		
AIX rPerf	4.02 GHz (8): 674.5(32),	4.02 GHz (8): 1,349.0(64) <sup>o</sup>
GHz (cores/socket): perf (# cores)	4.19 GHz (10): 856.0(40),	4.19 GHz (10): 1,711.9(80) <sup>o</sup>
IBM i CPW	4.02 GHz (8): 359,000(32),	4.02 GHz (8): 711,000(64) <sup>o</sup>
GHz (cores/socket): perf (# cores)	4.19 GHz (10): 460,000(40),	4.19 GHz (10): 911,000(80) <sup>o</sup>



**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 SOD xxx GHz (12)   48	4.35 GHz (8)   64 SOD xxx GHz (12)   96	4.35 GHz (8)   128 SOD xxx GHz (12)   192
Minimum number cores active	8	8	8
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: min / max / (min % active) 1600 MHz DDR3	256 GB / 4 TB / (50%)	512 GB / 8 TB / (50%)	1 TB / 16 TB / (50%)
Active Memory Expansion	Optional	Optional	Optional
<b>Reliability, availability, serviceability</b>			
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
<b>Capacity and expandability</b>			
Capacity on Demand (CoD) functions	Y <sup>A,B</sup>	Y <sup>A,B</sup>	Y <sup>A,B</sup>
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	640 (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 <sup>k</sup>	2 <sup>k</sup> (2 per node)	4 <sup>k</sup> (2 per node)	8 <sup>k</sup> (2 per node)
Max PCIe Gen3 slots: system node + PCIe I/O drawers <sup>k</sup>	4 in system node + 24 in I/O drawer <sup>k</sup>	8 in system node + 48 in I/O drawer <sup>k</sup>	16 in system node + 96 in I/O drawer <sup>k</sup>
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 disk drives in EXP24S I/O drawers)   Storage	1536   1843 TB with 1.2GB drives	1536   1843 TB with 1.2GB drives	1536   1843 TB with 1.2GB drives
<b>Performance*</b>			
AIX rPerf	4.02 GHz (8): 716.3(32), Xxx GHz (12) : xxxx(48)	4.02 GHz (8): 1,432.5(64) <sup>o</sup> Xxx GHz (12) : xxxx(96)	4.02 GHz (8): TBD (128) Xxx GHz (12): TBD (192)
IBM i CPW	4.02 GHz (8): 381,000(32) Xxx GHz (12): xxxxxx(48)	4.02 GHz (8): 755,000(64) <sup>o</sup> Xxx GHz (12) : xxxxxx(96)	4.02 GHz (8): TBD (128) Xxx GHz (12) : TBD (192)

Note : The 3rd and 4th nodes of the 32-core drawer announced Oct 2014, but not orderable until 2015. The 48-core drawer is a Statement of Direction (SOD). A 3-node column is not shown above to save space and allow a larger font to be used.

**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	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
<b>Integrated ports</b>					
System/serial (RJ45)	1	1	1	1	1
USB-2 ports <sup>9</sup>	2	2	2	2	2
USB-3 ports	4 (2 front & 2 rear)	4 (2 front & 2 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 <sup>a</sup>	4x 1Gb or 2x 10/1Gb	4x 1Gb or 2x 10/1Gb	4x 1Gb or 2x 10/1Gb	4x 1Gb or 2x 10/1Gb	2 1Gb
<b>SAS bays in system unit</b>					
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
1.8-inch (SSD)	0	0 or 6	0	0 or 8	0
<b>Media bays</b>					
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)	N/A
Expanded function backplane <sup>b, c</sup>	Dual IOA (7.2 GB write cache) <sup>b, c</sup>	Dual IOA (7.2 GB write cache) <sup>b, c</sup>	Dual IOA (7.2 GB write cache) <sup>b, c</sup>	Dual IOA (7.2 GB write cache) <sup>b, c</sup>	N/A
Easy Tier function	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane	N/A
Optional EXP24S ports	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane	Y with expanded function backplane	N
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	192GB/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 SFF-2 SAS bays for disk or for SSD.

**System Node and System Control Unit Details (Power Enterprise Servers )**

<b>System Unit Details</b>	<b>Power E870 system node</b>	<b>Power E880 system node</b>	<b>System control unit (one per system)</b>
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
<b>Integrated ports</b>			
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 <sup>a</sup>	N/A	N/A	N/A
<b>SAS bays in unit</b>			
2.5-inch (disk/SSD)	N/A	N/A	N/A
1.8-inch (SSD)	N/A	N/A	N/A
<b>Media bays</b>			
DVD-RAM slimline	0	0	1
<b>Integrated SAS storage controllers for disk/SSD/DVD</b>			
	N/A	N/A	N/A
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)	252 GB/sec	252 GB/sec	N/A
Service indicator LEDs	Y	Y	Y
Operator panel	N/A	N/A	1

## Server I/O Drawers

Drawer	Server Attachment	PCI Slots per Drawer	Bays per Drawer	Available to order	Max Drawers per server	Drawer Footprint
EXP24S (#5887 / #EL1S)	via SAS	0	24 SFF-2 SAS	Y	14	19" rack 2U
PCIe Gen3 I/O Drawer (#EMX0)	N/A	12	N/A	Y for E870 and E880	2 per node See SoD	19" rack 4U

## Server I/O Drawer Attachment

Server Drawer <sup>1</sup>	Power S812L	Power S822 Power S822L	Power S814 6/8-core	Power S824	Power S824L	Power E870	Power E880
EXP24S	Max 14	Max 14	Max 14	Max 14	N/A	Max 64	Max 64
EMX0	N/A	N/A	N/A	N/A	N/A	Max 4	Max 4

### PCIe Gen3 I/O Expansion Drawer notes

- Each I/O drawer provides 12 PCIe Gen3 slots, six through each 6-slot fan-out module. Four of the twelve slots are x16 and eight are x8. Note that two PCIe slots in the system node are used to attach the two fan-out modules.
- Zero or two drawers per E870/E880 system node in 2014
- With two system nodes in 2014, a max of four drawers per system
- See SOD for future expansion increase for E870/E880
- See also SOD for future PCIe Gen3 I/O drawer for Scale-out servers

## 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](http://ibm.com/common/ssi) .

Server	Power S812L	Power S822 Power S822L	Power S814	Power S824 Power S824L	Power E870 Power E880
Packaging	19" rack drawer (2U)	19" rack drawer (2U)	19" rack drawer (4U) + Tower	19" rack drawer (4U)	19" rack drawer (5U per node plus 2U system control unit)
Voltage (AC) single phase	100 - 127 200 - 240	200 - 240	Tower: 100-127 200-240 Rack: 200 - 240	200 - 240	200 - 240
Power supply	N +1 standard	N +1 standard	N +1 standard	N +1 standard	N +1 standard
Maximum altitude					
Feet	10000	10000	10000	10000	10000
Meters	3048	3048	3048	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.

## Warranty<sup>1</sup> / Installation

Warranty Service Levels	Power S812L	Power S822 Power S822L	Power S814	Power S824 Power S824L
24x7 with two hour service objective <sup>2</sup>	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 <sup>3</sup>	Standard <sup>3</sup>	Standard <sup>3</sup>	Standard <sup>3</sup>
<b>Warranty Period</b>	3 years	3 years	3 years	3 years
<b>Server install<sup>4</sup></b>	CSU	CSU	CSU	CSU

Warranty Service Levels	Power E870	Power E880
24x7 with two hour service objective <sup>2</sup>	Optional	Optional
24x7 with four hour service objective	Standard	Standard
9x5 with four hour service objective	-	-
9x5 next-business-day	-	-
<b>Warranty Period</b>	1 year	1 year
<b>Server installation<sup>4</sup></b>	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.

**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	
<b>PowerVM™</b>						N/A
PowerVM Linux Edition	Supported	N/A	Supported	N/A	N/A	N/A
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
<b>PowerKVM</b>	Supported	N/A	Supported	N/A	N/A	N/A
<b>AIX</b>						
AIX 6.1 *	N/A	Supported	N/A	Supported	Supported	N/A
AIX 7.1 *	N/A	Supported	N/A	Supported	Supported	N/A
<b>IBM i</b>						
IBM i Software Tier	N/A	N/A	N/A	Small 4-core: P05 <sup>3</sup> 6/8-core: P10 <sup>3</sup>	Small P20 <sup>3</sup>	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
<b>Linux</b>						
Red Hat Enterprise Linux 6.5 *	Supported	Supported	Supported	Supported	Supported <sub>4,5</sub>	N/A
SUSE Linux Enterprise Server 11 *	Supported SP1	Supported SP1	Supported SP1	Supported SP1	Supported <sub>4,5</sub> SP1	N/A
Ubuntu 14.04	Supported	N/A	Supported	N/A	N/A	Ubuntu 14.10
<b>PowerHA™</b>						
PowerHA SystemMirror for AIX 6.1 <sup>2</sup> Standard and Enterprise Editions	N/A	Supported	N/A	Supported	Supported	N/A
PowerHA SystemMirror for AIX 7 <sup>2</sup> 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.

**Power Enterprise Servers Software Support**

<b>Power Systems Software</b>	<b>Power E870</b>	<b>Power E880</b>
Software Tier	Medium	Medium
<b>PowerVM™</b>		
PowerVM Linux Edition	With Power IFL	With Power IFL
PowerVM Express and Standard Edition	N/A	N/A
PowerVM Enterprise Editions	Standard	Standard
<b>PowerKVM</b>	N/A	N/A
<b>AIX</b>		
AIX 6.1 TL9 * (TL8 Jan 2015)	Supported	Supported
AIX 7.1 TL3 * (TL2 Jan 2015)	Supported	Supported
AIX 6.1 TL8 * with virtual I/O only	Supported	Supported
AIX 7.1 TL2 * with virtual I/O only	Supported	Supported
<b>IBM i</b>		
IBM i Software Tier	P30	P30
IBM i 7.1 TR9 *	Supported	Supported
IBM i 7.2 TR1 *	Supported	Supported
<b>Linux</b>		
Red Hat Enterprise Linux 6.5 *	Supported	Supported
SUSE Linux Enterprise Server 11 SP3*	Supported SP1	Supported SP1
Ubuntu	N/A	N/A
<b>PowerHA™</b>		
PowerHA SystemMirror for AIX 6.1 <sup>2</sup> Standard and Enterprise Editions	Supported	Supported
PowerHA SystemMirror for AIX 7 <sup>2</sup> Standard Edition	Supported	Supported
PowerHA SystemMirror for i 7.1 Standard and Enterprise Editions	Supported	Supported
PowerHA SystemMirror for i 7.2 Standard and Enterprise Editions	Supported	Supported

\* Or later version



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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 IBM authorized reseller.

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[www.ibm.com/systems/power/software/i/management/performance/resources.html](http://www.ibm.com/systems/power/software/i/management/performance/resources.html)

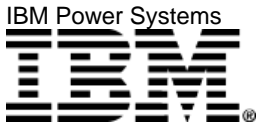
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