IBM Power Systems Facts & Features

Enterprise, Scale-out and Accelerated Servers with POWER9 Processor Technology
Table of Contents

3  Why Power Systems
4  IBM Power Systems LC921, LC922, AC922
5  System Unit Details (Power Systems S LC/AC Class Servers)
6  Scale-out LC Server Systems Software Support
8  IBM Power System S914, S924, S922
9  System S Class System Unit Details
11 System S Class Systems Software Support
12 IBM Power System E950
15 System Unit Details E950
16 IBM Power System E980
19 System Unit Details E950
20 Enterprise Systems Software Support
21 Server I/O Drawers & Attachment
24 Physical Planning Characteristics
27 Warranty / Installation
28 Performance Notes & More Information
IBM Power Systems

Why Power Systems?

If anything is certain about the future, it’s that there will be more complexity, more data to manage and greater pressure to deliver instantly. The hardware you buy should meet today’s expectations and prepare you for whatever comes next.

Power Systems are built for the most demanding, data-intensive, computing on earth. Our cloud-ready servers help you unleash insight from your data pipeline — from managing mission-critical data, to managing your operational data stores and data lakes, to delivering the best server for cognitive computing.

With industry leading reliability and security, our infrastructure is designed to crush the most data-intensive workloads imaginable, while keeping your business protected.

Simplified multicloud
Rethink how data, applications and services move across a hybrid cloud environment. With IBM POWER9™ based Power Systems, you can dynamically scale compute and memory on demand and build a cloud designed for the most data intensive workloads.

Built-in end-to-end security
IBM Power Systems have security built in at all layers in the stack — processor, systems, firmware, OS and Hypervisor. With accelerated encryption built into the chip, your data is protected in motion and at rest. And PowerVM® is the only hypervisor amongst major competitors with no reported vulnerabilities.

Proven reliability
Today’s always-on world requires resilient, mission-critical servers that deliver continuous operations. IBM servers ranked the most reliable for the 10th straight year (1) and are industry leaders for enterprise servers (1) with a maximum uptime of 99.996% (2.1 minutes/server/annum unplanned downtime) of any non-mainframe Linux platforms.

Industry-leading value and performance
Did you know that the IBM POWER9 processor drives the world’s fastest supercomputers? That is the same processor that is ready to accelerate your enterprise. Whether you’re moving from an older Power server or x86, the performance gain can be significant.

Follow us @IBMpowersystems
Learn more at www.ibm.com/power

1. ITIC 2017 - 2018 Global Server Hardware, Server OS Reliability Survey
IBM Power Systems

Power LC921, Power LC922, and Power AC922

These servers provide the fastest, simplest way to deploy deep learning frameworks — with enterprise-class support — to fuel new thinking and capabilities across your organization.

<table>
<thead>
<tr>
<th>Product Line</th>
<th>IBM PowerLC921</th>
<th>IBM Power LC922</th>
<th>IBM Power AC922</th>
<th>IBM Power AC922</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine type</td>
<td>9006-12P</td>
<td>9006-22P</td>
<td>8335-GTH</td>
<td>8335-GTX</td>
</tr>
<tr>
<td>System Packaging</td>
<td>19” rack drawer (1U)</td>
<td>19” rack drawer (2U)</td>
<td>19” rack drawer (2U)</td>
<td>19” rack drawer (2U)</td>
</tr>
<tr>
<td>Microprocessor type</td>
<td>64-bit POWER9</td>
<td>64-bit POWER9</td>
<td>64-bit POWER9 with NVLink</td>
<td>64-bit POWER9</td>
</tr>
<tr>
<td># of processor sockets per server</td>
<td>1 or 2</td>
<td>1 or 2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>GHz (cores/socket)</td>
<td>2.2 GHz (2)</td>
<td>2.70 GHz (2)</td>
<td>3.0 GHz (2)</td>
<td>3.45 GHz (2)</td>
</tr>
<tr>
<td># of cores</td>
<td>32</td>
<td>40</td>
<td>32</td>
<td>16</td>
</tr>
<tr>
<td>Max boost frequency is 3.8 GHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2 (L2) cache per core</td>
<td>512 KB</td>
<td>512 KB</td>
<td>512 KB</td>
<td>512 KB</td>
</tr>
<tr>
<td>Level 3 (L3) cache per core</td>
<td>10 MB</td>
<td>10 MB</td>
<td>10 MB</td>
<td>10 MB</td>
</tr>
<tr>
<td>System Memory (minimum - maximum)</td>
<td>32 GB – 1024 GB</td>
<td>32 GB – 1024 GB</td>
<td>256 GB – 2048 GB</td>
<td>256 GB – 2048 GB</td>
</tr>
<tr>
<td>Memory Type</td>
<td>2666 MHz DDR4 (with 1x RDIMM per port up to 8x RDIMM total)</td>
<td>2133 MHz DDR4 (with 2x RDIMM per port)</td>
<td>2666 MHz DDR4</td>
<td>2666 MHz DDR4</td>
</tr>
<tr>
<td>Translational Memory</td>
<td>Y</td>
<td>N/A</td>
<td>Up to 4 NVIDIA Tesla V100 GPUs with NVLink</td>
<td>Up to 6 NVIDIA Tesla V100 GPUs with NVLink</td>
</tr>
<tr>
<td>Acceleration</td>
<td>N/A</td>
<td>N/A</td>
<td>Up to 4 NVIDIA Tesla V100 GPUs with NVLink</td>
<td>Up to 6 NVIDIA Tesla V100 GPUs with NVLink</td>
</tr>
<tr>
<td>Water Cooling</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
</tr>
<tr>
<td>Reliability, Availability, Serviceability</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Chipkill memory</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Baseboard Management Controller</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Hot-swappable disk/SSD bays</td>
<td>Y</td>
<td>Y</td>
<td>Y (HDD/SSD only)</td>
<td>Y (HDD/SSD only)</td>
</tr>
<tr>
<td>Processor Instruction Retry</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Redundant hot-plug power</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Redundant hot-plug cooling</td>
<td>Redundant but not hot-plug</td>
<td>N/A</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

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

Y - Standard /Supported
| Optional - Optionay Available / Supported |
| N/A - Not Available / Supported |
| SOD - Statement of General Direction announced |
| SLES - SUSE Linux Enterprise Server |
| RHEL - Red Had Enterprise Linux |
### Power LC921, Power LC922, and Power AC922

**System Unit Details (Power Systems S LC/AC Class Servers)**

<table>
<thead>
<tr>
<th>IBM Power LC921</th>
<th>IBM Power LC922</th>
<th>IBM Power AC922</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Unit Details</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POWER9 SCM sockets (Number of SCMs)</td>
<td>1 or 2</td>
<td>1 or 2</td>
</tr>
<tr>
<td>Max memory DIMM slots</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Max peak memory bandwidth to DIMMs</td>
<td>170 GB/sec</td>
<td>170 GB/sec per socket</td>
</tr>
<tr>
<td><strong>Integrated ports</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System/serial (RJ45)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>USB-3</td>
<td>2 (rear)</td>
<td>2 (2 rear)</td>
</tr>
<tr>
<td>VGA</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>BMC</td>
<td>Part of the base / not Feature coded</td>
<td>Part of the base / not Feature coded</td>
</tr>
<tr>
<td>IPMI</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>USB-1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Ethernet for general use</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>HMC ports</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PCIe Ethernet adapter</td>
<td>optional</td>
<td>1 optional</td>
</tr>
<tr>
<td><strong>SATA bays in system unit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5-inch (SFF) only</td>
<td>4 - LFF/SFF SAS/SATA bays (4 bays can support NVMe)</td>
<td>12 - LFF/SFF SAS/SATA bays (4 bays can support NVMe)</td>
</tr>
<tr>
<td>3.5-inch (LFF) or SFF</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td><strong>Media bays</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVD-RAM slimlin</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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

- **Y** - Standard / Supported
- **Optional - Optionally Available / Supported**
- **N/A** - Not Available / Supported
- **SOD** - Statement of General Direction announced
- **SLES** - SUSE Linux Enterprise Server
- **RHEL** - Red Hat Enterprise Linux
## IBM Power Systems
### System Unit Details (Power Systems S LC/AC Class Servers)

<table>
<thead>
<tr>
<th>Feature</th>
<th>IBM Power LC921</th>
<th>IBM Power LC922</th>
<th>IBM Power AC922</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH for tape</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SATA storage controllers for disk/SSD</td>
<td>Y</td>
<td>Y</td>
<td>N/A</td>
</tr>
<tr>
<td>Base backplane</td>
<td>Y, integrated</td>
<td>Y, integrated</td>
<td>Y, integrated</td>
</tr>
<tr>
<td>Split backplane</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>RAID adapter</td>
<td>Y</td>
<td>Y</td>
<td>N/A</td>
</tr>
<tr>
<td>Hybrid RAID function</td>
<td>0/1/10/5</td>
<td>0/1/10/5</td>
<td>N/A</td>
</tr>
<tr>
<td>Optional EXP24S ports</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PCIe Gen4 adapter slots</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>PCIe x4</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>PCIe x8</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>PCIe x16</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Max PCIe bus speed (GHz)</td>
<td>16.0 (Gen4)</td>
<td>16.0 (Gen4)</td>
<td>16.0 (Gen4)</td>
</tr>
<tr>
<td>Max I/O bandwidth*</td>
<td>192 GB/sec</td>
<td>256 GB/sec</td>
<td>176 GB/sec</td>
</tr>
<tr>
<td>Service indicator LEDs</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

## IBM Power Systems
### Power S LC Class Servers Software Support

<table>
<thead>
<tr>
<th>Feature</th>
<th>Power LC921</th>
<th>Power LC922</th>
<th>Power AC922 GTG</th>
<th>Power AC922 GTX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Systems Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software Tier</td>
<td>Small</td>
<td>Small</td>
<td>Small</td>
<td>Small</td>
</tr>
<tr>
<td><strong>PowerVM™</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PowerVM Linux Edition</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PowerVM Enterprise Editions</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td><strong>AIX</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIX</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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

- **Y** - Standard / Supported
- **Optional - Optionally Available / Supported**
- **N/A** - Not Available / Supported
- **SOD** - Statement of General Direction announced
- **SLES** - SUSE Linux Enterprise Server
- **RHEL** - Red Hat Enterprise Linux
# IBM Power Systems

## Power S LC Class Servers Software Support

<table>
<thead>
<tr>
<th></th>
<th>Power LC921</th>
<th>Power LC922</th>
<th>Power AC922 GTG</th>
<th>Power AC922 GTX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IBM i</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM i</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Linux</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6.6 (BE)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7.1 (BE and LE)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7.5 (LE)</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported SUSE</td>
</tr>
<tr>
<td>Linux Enterprise Server 11 (BE)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 12 (LE)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Ubuntu 16.04 (LST)</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>PowerHA™</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PowerHA SystemMirror for AIX 6.1 Standard and Enterprise Editions</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PowerHA SystemMirror for AIX 7 Standard Edition</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PowerHA SystemMirror for IBM i Version 7.2 Standard and Enterprise Editions</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Y - Standard / Supported</th>
<th>Optional - Optionally Available / Supported</th>
<th>N/A - Not Available / Supported</th>
<th>SOD - Statement of General Direction announced</th>
<th>SLES - SUSE Linux Enterprise Server</th>
<th>RHEL - Red Hat Enterprise Linux</th>
</tr>
</thead>
</table>
## IBM Power Systems

**Power S914, Power S924, Power S922, and Power L922**

Powerful, flexible servers built to deliver value for diverse workloads and mission-critical applications in AIX, IBM i and Linux environments.

<table>
<thead>
<tr>
<th>Product Line</th>
<th>IBM Power S914</th>
<th>IBM Power S924</th>
<th>IBM Power S922</th>
<th>IBM Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine type</td>
<td>9009-41A</td>
<td>9009-42A</td>
<td>9009-22A</td>
<td>9008-22L</td>
</tr>
<tr>
<td>System Packaging</td>
<td>19&quot; rack drawer (2U)</td>
<td>19&quot; rack drawer (2U)</td>
<td>19&quot; rack drawer (2U)</td>
<td>19&quot; rack drawer (2U)</td>
</tr>
<tr>
<td>Microprocessor type</td>
<td>64-bit POWER9</td>
<td>64-bit POWER9</td>
<td>64-bit POWER9</td>
<td>64-bit POWER9</td>
</tr>
<tr>
<td># of processor sockets per server</td>
<td>1</td>
<td>1 upgradable or 2</td>
<td>1 upgradable or 2</td>
<td>1 upgradable or 2</td>
</tr>
<tr>
<td>GHz (cores/socket) # of cores</td>
<td>2.3 to 3.8 GHz (1)</td>
<td>3.8 to 4.0 GHz (2)</td>
<td>2.8 to 3.8 GHz (2)</td>
<td>3.4 to 3.9 GHz (2)</td>
</tr>
<tr>
<td>EnergyScale</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Level 2 (L2) cache per core</td>
<td>512 KB</td>
<td>512 KB</td>
<td>512 KB</td>
<td>512 KB</td>
</tr>
<tr>
<td>Level 3 (L3) cache per core</td>
<td>10 MB</td>
<td>10 MB</td>
<td>10 MB</td>
<td>10 MB</td>
</tr>
<tr>
<td>Level 4 (L4) cache per core</td>
<td>Up to 128 MB</td>
<td>Up to 128 MB</td>
<td>Up to 128 MB</td>
<td>Up to 128 MB</td>
</tr>
<tr>
<td>System Memory (minimum - maximum)</td>
<td>32 GB – 1024 GB</td>
<td>32 GB - 4096 GB</td>
<td>32 GB - 4096 GB</td>
<td>32 GB - 4096 GB</td>
</tr>
</tbody>
</table>

### Reliability, Availability, Serviceability

| Chipkill memory | Y | Y | Y | Y |
| Service processor | Y | Y | Y | Y |
| Hot-swappable disks/ SSD | Y | Y | Y | Y |
| Dynamic Processor Deallocation | Y | Y | Y | Y |
| Processor Instruction Retry | Y | Y | Y | Y |
| Alternate Processor Recovery | 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 |

### Capacity and Expandability

| PowerVM Linux Edition | N/A | N/A | N/A | Y |
| PowerVM Enterprise Edition | Y | Y | Y | Y |
| Max logical partitions/micro-partitions | 480 | 480 | 480 | 480 |

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

Y - Standard / Supported  
Optional - Optionally Available / Supported  
N/A - Not Available / Supported  
SOD - Statement of General Direction announced  
SLES - SUSE Linux Enterprise Server  
RHEL - Red Had Enterprise Linux
### IBM Power Systems

#### Power S914, Power S924, Power S922, and Power L922

<table>
<thead>
<tr>
<th>System unit PCIe Gen3 low profile slots</th>
<th>IBM Power S914</th>
<th>IBM Power S924</th>
<th>IBM Power S922</th>
<th>IBM Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 PCIe x8</td>
<td>8 PCIe x8</td>
<td>6 PCIe x8</td>
<td>6 PCIe x8</td>
</tr>
<tr>
<td></td>
<td>1 PCIe x16</td>
<td>3 PCIe x16</td>
<td>3 PCIe x16</td>
<td>3 PCIe x16</td>
</tr>
<tr>
<td>Max PCIe Gen3 I/O Drawer</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Max PCIe slots: system unit + PCIe I/O drawers</td>
<td>13 (7 in system unit + 6 in I/O drawer)</td>
<td>26 (8 in system unit + 18 in I/O drawer)</td>
<td>24 (6 in system unit + 18 in I/O drawer)</td>
<td>24 (6 in system unit + 18 in I/O drawer)</td>
</tr>
<tr>
<td>System unit disk/SSD bays with standard or split back-plane</td>
<td>12 SFF-3 or 6+6 SFF-3</td>
<td>12 SFF-3 or 6+6 SFF-3</td>
<td>8 SFF-3</td>
<td>8 SFF-3</td>
</tr>
<tr>
<td>System unit disk/SSD bays with expanded function back-plane and dual IOA with 7.2GB write cache</td>
<td>18 SFF-3 plus optional EXP24SX attachment for an additional 24 SFF-2 bays</td>
<td>18 SFF-3 plus optional EXP24SX attachment for an additional 24 SFF-2 bays</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Slimline DVD bay</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Maximum TB storage in system unit</td>
<td>32.4 TB (with 18x 1.8 TB disks)</td>
<td>32.4 TB (with 18x 1.8 TB disks)</td>
<td>14.4 TB (with 8x 1.8 TB disks)</td>
<td>14.4 TB (with 8x 1.8 TB disks)</td>
</tr>
<tr>
<td>Maximum EXP24SX/EXP24S/EXP12SX storage enclosures</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Maximum in EXP24SX/EXP24S</td>
<td>672 drives</td>
<td>672 drives</td>
<td>672 drives</td>
<td>672 drives</td>
</tr>
<tr>
<td></td>
<td>1209 TB w/ 1.8 TB disk</td>
<td>1209 TB w/ 1.8 TB disk</td>
<td>1209 TB w/ 1.8 TB disk</td>
<td>1209 TB w/ 1.8 TB disk</td>
</tr>
<tr>
<td>Maximum in EXP12SX</td>
<td>N/A</td>
<td>336 drives</td>
<td>336 drives</td>
<td>336 drives</td>
</tr>
<tr>
<td></td>
<td>2593 TB w/ 7.72 TB disk</td>
<td>2593 TB w/ 7.72 TB disk</td>
<td>2593 TB w/ 7.72 TB disk</td>
<td>2593 TB w/ 7.72 TB disk</td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM i CPW GHz (cores/socket): perf (# cores)</td>
<td>2.3 – 3.8 GHz (4): 52500</td>
<td>3.8 – 4.0 GHz (8): 145500</td>
<td>3.4 – 3.9 GHz (4): 68000</td>
<td>2.9 – 3.8 GHz (4): 60000</td>
</tr>
<tr>
<td></td>
<td>2.3 – 3.8 GHz (6): 78500</td>
<td>3.8 – 4.0 GHz (16): 268500</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.3 – 3.8 GHz (8): 122500</td>
<td>3.5 – 3.9 GHZ (10): 174500</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.5 – 3.9 GHZ (20): 318000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.4 – 3.9 GHZ (24): 370700</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### IBM Power Systems

#### System Unit Details (Power Systems S Class Servers)

<table>
<thead>
<tr>
<th>System Unit Details</th>
<th>IBM Power S914</th>
<th>IBM Power S924</th>
<th>IBM Power S922</th>
<th>IBM Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER9 SCM sockets (Number of SCMs)</td>
<td>1</td>
<td>1 or 2</td>
<td>1 or 2</td>
<td>1 or 2</td>
</tr>
<tr>
<td>Max memory DIMM card slots</td>
<td>16</td>
<td>32 (with 2 SCM)</td>
<td>32 (with 2 SCM)</td>
<td>32 (with 2 SCM)</td>
</tr>
</tbody>
</table>

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

| Y - Standard / Supported | Optional - Optionally Available / Supported | N/A - Not Available / Supported | SOD - Statement of General Direction announced | SLES - SUSE Linux Enterprise Server | RHEL - Red Had Enterprise Linux |
## System Unit Details (Power Systems S Class Servers)

<table>
<thead>
<tr>
<th>IBM Power S914</th>
<th>IBM Power S924</th>
<th>IBM Power S922</th>
<th>IBM Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max sustained memory bandwidth to L4 cache from SCM</td>
<td>Up to 128 MB</td>
<td>Up to 128 MB</td>
<td>Up to 128 MB</td>
</tr>
<tr>
<td>Max peak memory bandwidth to DIMMs from L4 cache</td>
<td>210 GB/sec</td>
<td>410 GB/sec</td>
<td>410 GB/sec</td>
</tr>
</tbody>
</table>

### Integrated ports

<table>
<thead>
<tr>
<th></th>
<th>IBM Power S914</th>
<th>IBM Power S924</th>
<th>IBM Power S922</th>
<th>IBM Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td>System/serial (RJ45)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>USB-2 ports (g)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>USB-3 ports</td>
<td>3 (1 front &amp; 2 rear)</td>
<td>3 (1 front &amp; 2 rear)</td>
<td>4 (2 front &amp; 2 rear)</td>
<td>4 (2 front &amp; 2 rear)</td>
</tr>
<tr>
<td>HMC ports (RJ45)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Ethernet adapter ports</td>
<td>4 x1 Gb or 1 x10 Gb</td>
<td>4 x1 Gb or 1 x10 Gb</td>
<td>4 x1 Gb or 1 x10 Gb</td>
<td>4 x1 Gb or 1 x10 Gb</td>
</tr>
</tbody>
</table>

### SAS bays in system unit

<table>
<thead>
<tr>
<th></th>
<th>IBM Power S914</th>
<th>IBM Power S924</th>
<th>IBM Power S922</th>
<th>IBM Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5-inch (disk/SSD)</td>
<td>18 or 12 SFF-3</td>
<td>18 or 12 SFF-3</td>
<td>8 SFF-3</td>
<td>8 SFF-3</td>
</tr>
<tr>
<td>1.8-inch (SSD)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Media bays</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVD-RAM slimline</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>HH for tape</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Integrated SAS storage controllers for disk/SSD/DVD</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Base backplane</td>
<td>1 (zero write cache)</td>
<td>1 (zero write cache)</td>
<td>1 (zero write cache)</td>
<td>1 (zero write cache)</td>
</tr>
<tr>
<td>Split backplane</td>
<td>2 (zero write cache)</td>
<td>2 (zero write cache)</td>
<td>2 (zero write cache)</td>
<td>2 (zero write cache)</td>
</tr>
<tr>
<td>Expanded function backplane</td>
<td>Dual IOA (7.2 GB write cache)</td>
<td>Dual IOA (7.2 GB write cache)</td>
<td>Dual IOA (7.2 GB write cache)</td>
<td>Dual IOA (7.2 GB write cache)</td>
</tr>
<tr>
<td>Easy Tier function</td>
<td>N/A</td>
<td>N/A</td>
<td>Y with expanded function backplane</td>
<td>Y with expanded function backplane</td>
</tr>
<tr>
<td>Optional EXP24SX or EXP12SX ports</td>
<td>N/A</td>
<td>N/A</td>
<td>Y with expanded function backplane</td>
<td>Y with expanded function backplane</td>
</tr>
<tr>
<td>PCIe Gen4 adapter slots</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>PCIe x8</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>PCIe x16</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PCIe Gen3 adapter slots</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>PCIe x8</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Y - Standard / Supported</th>
<th>Optional - Optionally Available / Supported</th>
<th>N/A - Not Available / Supported</th>
<th>SOD - Statement of General Direction announced</th>
<th>SLES - SUSE Linux Enterprise Server</th>
<th>RHEL - Red Hat Enterprise Linux</th>
</tr>
</thead>
</table>
IBM Power Systems

System Unit Details (Power Systems S Class Servers)

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 EXP24SX storage drawer attachment is to two SAS ports on rear of server which is available with the expanded function backplane. The EXP24SX 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.

IBM Power Systems

Power S Class Servers Software Support

<table>
<thead>
<tr>
<th>Software Systems Software</th>
<th>Power S914</th>
<th>Power S924</th>
<th>Power S922</th>
<th>Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software Tier</strong></td>
<td>Small</td>
<td>Small</td>
<td>Small</td>
<td>Small</td>
</tr>
<tr>
<td><strong>PowerVM™</strong></td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>PowerVM Linux Edition</strong></td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>PowerVM Enterprise Editions</strong></td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>AIX</strong></td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>N/A</td>
</tr>
<tr>
<td>AIX 6.1 *</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>N/A</td>
</tr>
<tr>
<td>AIX 7.1 *</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>N/A</td>
</tr>
<tr>
<td>AIX 7.2 *</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>IBM i</strong></td>
<td>P05/P10</td>
<td>P20</td>
<td>P10</td>
<td>P10</td>
</tr>
<tr>
<td>IBM i 7.2 TR9*</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported with VIOS</td>
<td>N/A</td>
</tr>
<tr>
<td>IBM i 7.3 TR5*</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported with VIOS</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Linux</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6.6 (BE)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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

- **Y - Standard / Supported**
- **Optional - Optionally Available / Supported**
- **N/A - Not Available / Supported**
- **SOD - Statement of General Direction announced**
- **SLES - SUSE Linux Enterprise Server**
- **RHEL - Red Hat Enterprise Linux**
**IBM Power Systems**

### Power S Class Servers Software Support

<table>
<thead>
<tr>
<th>Software</th>
<th>Power S914</th>
<th>Power S924</th>
<th>Power S922</th>
<th>Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Linux 7.1 (BE and LE)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7.5 (LE)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 11 (BE)</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 12 (LE)</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>Ubuntu 16.04 (LST)</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
</tbody>
</table>

**PowerHA™**

| PowerHA SystemMirror for AIX 6.1 Standard and Enterprise Editions | Supported | Supported | Supported | N/A        |
| PowerHA SystemMirror for AIX 7 Standard Edition | Supported | Supported | Supported | N/A        |
| PowerHA SystemMirror for IBM i Version 7.2 Standard and Enterprise Editions | Supported | Supported | Supported | N/A        |

* Or later version

---

**IBM Power Systems**

### Power E950

Blazing performance, extreme agility and industry-leading reliability in a compact 4-socket system.

#### IBM Power E950

<table>
<thead>
<tr>
<th>Product Line</th>
<th>9040-MR9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine type</td>
<td>19&quot; rack drawer (4U)</td>
</tr>
<tr>
<td>System Packaging</td>
<td>64-bit POWER9</td>
</tr>
<tr>
<td>Microprocessor type</td>
<td>2 or 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GHz (cores/socket)</th>
<th>max # of cores</th>
<th>min # of cores</th>
<th>min # of activations</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6 to 3.8 GHz (8)</td>
<td>32 max</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>3.4 to 3.8 GHz (10)</td>
<td>40 max</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>3.2 to 3.8 GHz (11)</td>
<td>44 max</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>3.15 to 3.8 GHz (12)</td>
<td>48 max</td>
<td>24</td>
<td>12</td>
</tr>
</tbody>
</table>

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

- Y - Standard / Supported
- Optional - Optionally Available / Supported
- N/A - Not Available / Supported
- SOD - Statement of General Direction announced
- SLES - SUSE Linux Enterprise Server
- RHEL - Red Hat Enterprise Linux
### IBM Power E950

#### EnergyScale
- Level 2 (L2) cache per core: 512 KB
- Level 3 (L3) cache per core: 10 MB
- Level 4 (L4) cache per socket: Up to 128 MB
- System memory: min / max / (min % active) 1600 MHz DDR4: 128 GB / 16 TB / (greater of 128 GB or 50% of installed memory)

#### Active Memory Expansion
- Optional

#### Reliability, availability, serviceability
- First failure data capture (FFDC): Y
- Processor Instruction Retry: Y
- L2 and L3 cache error correction code (ECC) protection with cache line delete: Y
- Integrated power and cooling monitor function in processor-on-chip controller: Y
- Fabric bus retry with spare data lane: Y
- Extended cache line delete: Y
- Core contained checkstops: Y
- IBM memory buffer and spare dynamic random access memory (DRAM) module capability with x4 DIMMs: Y
- Selective dynamic firmware updates: Y
- Chipkill memory: Y

#### Memory dual in-line memory module (DIMM) support with ECC checking supporting x4 Chipkill

#### Service processor
- Y

#### Hot-swappable disks
- Y

#### Phase redundant voltage regulators
- Y

#### Regulator modules for processors, memory and I/O and standby voltage
- Y

#### Hot-swappable disks
- Y

#### Dynamic Processor Deallocation
- Y

#### Alternate Processor Recovery
- Y

#### Hot plug PCIe slots
- Y

#### Active Memory Mirroring for Hypervisor
- Optional

---

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

| Y - Standard / Supported | Optional - Optionally Available / Supported | N/A - Not Available / Supported | SOD - Statement of General Direction announced | SLES - SUSE Linux Enterprise Server | RHEL - Red Hat Enterprise Linux |}

---

13
### IBM Power Systems

#### Power E950

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redundant hot-plug power supplies</td>
<td>Y</td>
</tr>
<tr>
<td>Redundant, hot swappable fans for processor, memory and PCIe slots</td>
<td>Y</td>
</tr>
<tr>
<td>Dual VIOS</td>
<td>Optional</td>
</tr>
</tbody>
</table>

#### Cloud Mgmt and Deployment

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Cloud PowerVC Manager</td>
<td>Included (separately priced)</td>
</tr>
<tr>
<td>Cloud Management Console</td>
<td>No charge (36 months)</td>
</tr>
<tr>
<td>IBM API Connect and WebSphere Connect</td>
<td>Included</td>
</tr>
<tr>
<td>Open source cloud automation and configuration tooling for AIX</td>
<td>Included</td>
</tr>
<tr>
<td>Power-to-Cloud Rewards</td>
<td>5,000 points</td>
</tr>
</tbody>
</table>

#### Capacity and expandability

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity on Demand (CoD)</td>
<td>Y</td>
</tr>
<tr>
<td>Power Enterprise Pools</td>
<td>N/A</td>
</tr>
<tr>
<td>Power Integrated facility for Linux</td>
<td>Optional</td>
</tr>
<tr>
<td>PowerVM Enterprise Edition</td>
<td>Enterprise</td>
</tr>
<tr>
<td>Max logical partitions/micropartitions</td>
<td>960 (20 per core)</td>
</tr>
<tr>
<td>System unit PCIe Gen4 full high slots</td>
<td>Up to 10 - 8 x16 slots, 2 x8 slots (two x16 slots per installed processor module)</td>
</tr>
<tr>
<td>System unit PCIe Gen3 full high slots</td>
<td>1</td>
</tr>
<tr>
<td>Max PCIe Gen3 I/O Drawers</td>
<td>4</td>
</tr>
<tr>
<td>Max PCIe Gen3 slots</td>
<td>51 (System unit and external I/O drawers)</td>
</tr>
<tr>
<td>Slimline DVD USB port</td>
<td>4</td>
</tr>
<tr>
<td>NVMe bays</td>
<td>4</td>
</tr>
<tr>
<td>Maximum TB storage in system unit</td>
<td>42.56 TB (8 x 3.72TB read intensive SAS SSD + 4 x 3.2 TB NVMe SSD)</td>
</tr>
<tr>
<td>Maximum EXP24SX/EXP12SX storage enclosures</td>
<td>64</td>
</tr>
<tr>
<td>Max in EXP12SX</td>
<td>768 drives</td>
</tr>
<tr>
<td>Max in EXP24SX</td>
<td>1536 drives</td>
</tr>
</tbody>
</table>

#### Performance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX rPerf GHz (cores/socket): perf (# cores) (*est)</td>
<td>3.15 to 3.8 GHz (12): 587.8 (24) : 1,146.4 (48)</td>
</tr>
<tr>
<td></td>
<td>3.2 to 3.8 GHz (11): 549.6 (22) : 1,071.9 (44)</td>
</tr>
<tr>
<td></td>
<td>3.4 to 3.8 GHz (10): 530.2 (20) : 1,034.1 (40)</td>
</tr>
<tr>
<td></td>
<td>3.6 to 3.8 GHz (8): 446.3 (16) : 870.4 (32)</td>
</tr>
</tbody>
</table>

---

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

- **Y** - Standard / Supported
- **Optional** - Optionally Available / Supported
- **N/A** - Not Available / Supported
- **SOD** - Statement of General Direction announced
- **SLES** - SUSE Linux Enterprise Server
- **RHEL** - Red Hat Enterprise Linux
## IBM Power Systems

### System Unit Details (Power Enterprise Servers) Power E950

<table>
<thead>
<tr>
<th>System Unit Details</th>
<th>With 2 Processor Modules</th>
<th>With 4 Processor Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power9 Sockets</td>
<td>4 (2 filled)</td>
<td>4 (4 filled)</td>
</tr>
<tr>
<td>Number of processor modules</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Memory DIMM slots</td>
<td>64</td>
<td>128</td>
</tr>
<tr>
<td>Max sustained memory bandwidth to L4 cache from SCM</td>
<td>230 GB/sec</td>
<td>230 GB/sec</td>
</tr>
<tr>
<td>Max peak memory bandwidth to DIMMs from L4 cache</td>
<td>820 GB/sec</td>
<td>1640 GB/sec</td>
</tr>
<tr>
<td><strong>Integrated ports</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System/serial (RJ45)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>USB-2 ports</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>USB-3 ports</td>
<td>4 (2 front &amp; 2 rear)</td>
<td>4 (2 front &amp; 2 rear)</td>
</tr>
<tr>
<td>HMC ports (RJ45)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Ethernet adapter ports</td>
<td>2-4 ports, 1Gb and/or 10Gb depending on PCIe adapter selected</td>
<td>2-4 ports, 1Gb and/or 10Gb depending on PCIe adapter selected</td>
</tr>
<tr>
<td><strong>SAS bays in system unit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5-inch (disk/SSD)</td>
<td>8 SFF-3</td>
<td>8 SFF-3</td>
</tr>
<tr>
<td>NVMe U.2</td>
<td>4 bays</td>
<td>4 bays</td>
</tr>
<tr>
<td><strong>Media bays</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVD-RAM slimline</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>HH for tape</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Integrated SAS storage controllers for disk/SSD/DVD</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>DASD Backplane with no HDD/SSD</td>
<td>Dual IOA (zero write cache)</td>
<td>Dual IOA (zero write cache)</td>
</tr>
<tr>
<td>Base DASD backplane together</td>
<td>Dual IOA (7.2 GB write cache)</td>
<td>Dual IOA (7.2 GB write cache)</td>
</tr>
<tr>
<td>Split DASD backplane</td>
<td>2 (zero write cache)</td>
<td>2 (zero write cache)</td>
</tr>
<tr>
<td>Easy Tier function</td>
<td>Y with any backplane</td>
<td>Y with any backplane</td>
</tr>
<tr>
<td>Optional EXP24SX ports</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>PCIe Gen3 adapter slots</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PCIe x8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PCIe x16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PCIe Gen4 adapter slots</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Y - Standard / Supported</th>
<th>Optional - Optionally Available / Supported</th>
<th>N/A - Not Available / Supported</th>
<th>SOD - Statement of General Direction announced</th>
<th>SLES - SUSE Linux Enterprise Server</th>
<th>RHEL - Red Had Enterprise Linux</th>
</tr>
</thead>
</table>

15
### System Unit Details (Power Enterprise Servers) Power E950

<table>
<thead>
<tr>
<th>PCIe x8</th>
<th>PCIe x16</th>
<th>Max PCIe bus speed (GHz)</th>
<th>Max I/O bandwidth</th>
<th>Service indicator LEDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>8.0 (Gen3)</td>
<td>192 GB/sec</td>
<td>Y</td>
</tr>
</tbody>
</table>

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.

### IBM Power Systems

**Power E980**

The most powerful, reliable, secure and scalable POWER9 server designed for mission critical applications.

<table>
<thead>
<tr>
<th>Product Line</th>
<th>IBM Power E980 (1 NODE)</th>
<th>IBM Power E980 (2 NODE)</th>
<th>IBM Power E980 (3 NODE)</th>
<th>IBM Power E980 (4 NODE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine type</td>
<td>9080-M9S</td>
<td>9080-M9S</td>
<td>9080-M9S</td>
<td>9080-M9S</td>
</tr>
<tr>
<td>System Packaging</td>
<td>19” rack drawer (7U)</td>
<td>One 5U system node &amp; one 2U system control unit</td>
<td>19” rack drawer (12U)</td>
<td>Two 5U system nodes &amp; one 2U system control unit</td>
</tr>
<tr>
<td>Microprocessor type</td>
<td>64-bit POWER9</td>
<td>64-bit POWER9</td>
<td>64-bit POWER9</td>
<td>64-bit POWER9</td>
</tr>
<tr>
<td># of processor sockets per server</td>
<td>4</td>
<td>8 (4 per system node)</td>
<td>12 (4 per system node)</td>
<td>16 (4 per system node)</td>
</tr>
<tr>
<td>Processor Options: GHz (cores/socket)</td>
<td>3.9 to 4.0 GHz (8)</td>
<td>3.7 to 3.9 GHz (10)</td>
<td>3.58 to 3.9 GHz (11)</td>
<td>3.55 to 3.9 GHz (12)</td>
</tr>
<tr>
<td># of cores</td>
<td>32</td>
<td>40</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>Minimum number cores active</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Energy Scale</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Level 2 (L2) cache per core</td>
<td>512 KB</td>
<td>512 KB</td>
<td>512 KB</td>
<td>512 KB</td>
</tr>
<tr>
<td>Level 3 (L3) cache per core</td>
<td>10 MB</td>
<td>10 MB</td>
<td>10 MB</td>
<td>10 MB</td>
</tr>
<tr>
<td>Level 4 (L4) cache per socket</td>
<td>Up to 128 MB</td>
<td>Up to 128 MB</td>
<td>Up to 128 MB</td>
<td>Up to 128 MB</td>
</tr>
<tr>
<td>System memory: min / max / (min % active)</td>
<td>1600 MHz DDR3 or DDR4</td>
<td>256 GB / 16 TB / (50%)</td>
<td>512 GB / 32 TB / (50%)</td>
<td>768 GB / 48 TB / (50%)</td>
</tr>
</tbody>
</table>

These notes apply to the description tables for the pages which follow:
## IBM Power Systems

### Power E980

<table>
<thead>
<tr>
<th>Feature</th>
<th>IBM Power E980 (1 NODE)</th>
<th>IBM Power E980 (2 NODE)</th>
<th>IBM Power E980 (3 NODE)</th>
<th>IBM Power E980 (4 NODE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NVMe bays</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Active Memory Expansion</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>Reliability, availability, serviceability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First failure data capture (FFDC)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>L2 and L3 cache error correction codes (ECC) protection with cache line delete</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Extended cache line delete</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Core contained checkstops</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Processor fabric bus retry with data lane sparing</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Guided FSP and SMP cable installation</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Redundant phase and spare phase for voltage regulator modules (VRMs) supplying processors and DIMMS</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Concurrent add/repair of I/O drawers</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Extended error handling on PCIe slots</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Concurrent repair of op-panel</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Selective dynamic firmware updates</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Chipkill memory</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Service processor and clock</td>
<td>Redundant with failover</td>
<td>Redundant with failover</td>
<td>Redundant with failover</td>
<td>Redundant with failover</td>
</tr>
<tr>
<td>Hot-swappable disks</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Dynamic Processor Deallocation</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Processor Instruction Retry</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Alternate Processor Recovery</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Hot-plug PCIe slots</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Blind-swap PCIe slots in system unit</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Blind-swap PCIe slots in PCIe I/O drawer</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Active Memory Mirroring for Hypervisor</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Redundant hot-plug power</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Redundant hot-plug cooling</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

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

- **Y** - Standard / Supported
- **Optional** - Optionally Available / Supported
- **N/A** - Not Available / Supported
- **SOD** - Statement of General Direction announced
- **SLES** - SUSE Linux Enterprise Server
- **RHEL** - Red Hat Enterprise Linux
# IBM Power Systems

## Power E980

<table>
<thead>
<tr>
<th></th>
<th>IBM Power E980 (1 NODE)</th>
<th>IBM Power E980 (2 NODE)</th>
<th>IBM Power E980 (3 NODE)</th>
<th>IBM Power E980 (4 NODE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dual VIOS</strong></td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>Cloud Mgmt and Deployment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM Cloud PowerVC Manager</td>
<td>Included (separately priced)</td>
<td>Included (separately priced)</td>
<td>Included (separately priced)</td>
<td>Included (separately priced)</td>
</tr>
<tr>
<td>Cloud Management Console</td>
<td>No charge (36 months)</td>
<td>No charge (36 months)</td>
<td>No charge (for 36 months)</td>
<td>No charge (for 36 months)</td>
</tr>
<tr>
<td>Convert Power server resources to cloud</td>
<td>Y</td>
<td>Y</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>IBM API Connect and WebSphere Connect</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Open source cloud automation and configuration tooling for AIX</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Power-to-Cloud Rewards</td>
<td>10,000 points per system</td>
<td>10,000 points per system</td>
<td>10,000 points per system</td>
<td>10,000 points per system</td>
</tr>
<tr>
<td><strong>Capacity and expandability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity on Demand (CoD) functions</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Power Enterprise Processor Pools</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Power Integrated Facility for Linux</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PowerVM Enterprise Edition</td>
<td>Enterprise</td>
<td>Enterprise</td>
<td>Enterprise</td>
<td>Enterprise</td>
</tr>
<tr>
<td>Max logical partitions/micro-partitions</td>
<td>960 (20 per core max)</td>
<td>1920 (20 per core max)</td>
<td>2,880 (20 per core max)</td>
<td>3,840 (20 per core max)</td>
</tr>
<tr>
<td>Max system node PCIe Gen4 x16 slots</td>
<td>8</td>
<td>16 (8 per system node)</td>
<td>24 (8 per system node)</td>
<td>32 (8 per system node)</td>
</tr>
<tr>
<td>Max PCIe Gen3 I/O Drawers</td>
<td>4</td>
<td>8 (4 per node)</td>
<td>12 (4 per node)</td>
<td>16 (4 per node)</td>
</tr>
<tr>
<td>Max PCIe Gen3 slots (all PCIe I/O drawers)</td>
<td>48</td>
<td>96</td>
<td>144</td>
<td>192</td>
</tr>
<tr>
<td>System Control Unit: Media USB ports: System node / System Control Unit</td>
<td>2 / 1</td>
<td>5 / 1</td>
<td>5 / 1</td>
<td>5 / 1</td>
</tr>
<tr>
<td>Max disk storage in system unit</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Max EXP24SX/EXP12SX</td>
<td>42</td>
<td>84</td>
<td>126</td>
<td>168</td>
</tr>
<tr>
<td>Maximum in EXP12SX</td>
<td>504 drives</td>
<td>1008 drives</td>
<td>1,512 drives</td>
<td>2,016 drives</td>
</tr>
<tr>
<td>Maximum in EXP24SX/EXP24S</td>
<td>1008 drives</td>
<td>2016 drives</td>
<td>3,024 drives</td>
<td>4,032 drives</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Y - Standard / Supported</th>
<th>Optional - Option ally Available / Supported</th>
<th>N/A - Not Available / Supported</th>
<th>SOD - Statement of General Direction announced</th>
<th>SLES - SUSE Linux Enterprise Server</th>
<th>RHEL - Red Hat Enterprise Linux</th>
</tr>
</thead>
</table>

18
# IBM Power Systems

## Power E980

### Performance*

<table>
<thead>
<tr>
<th>rPerf GHz (cores/socket): perf (# cores)</th>
<th>3.9 to 4.0 GHz (32): 910.0</th>
<th>(64): 1,820.0</th>
<th>3.9 to 4.0 GHz (32): 910.0</th>
<th>(64): 1,820.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7 to 4.0 GHz (40): 1,098.1</td>
<td>2,196.2</td>
<td>3.7 to 3.9 GHz (40): 1,098.1</td>
<td>(80): 2,196.2</td>
<td></td>
</tr>
<tr>
<td>3.58 to 3.9 GHz (44): 1,181.4</td>
<td>2,362.9</td>
<td>3.58 to 3.9 GHz (44): 1,181.4</td>
<td>(88): 2,362.9</td>
<td></td>
</tr>
<tr>
<td>3.55 to 3.9 GHz (48): 1,270.2</td>
<td>2,540.4</td>
<td>3.55 to 3.9 GHz (48): 1,270.2</td>
<td>(96): 2,540.4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBM i CPW GHz (cores/socket): perf (# cores)</th>
<th>3.9 to 4.0 GHz (32): 508,900</th>
<th>(64): 1,012,000</th>
<th>3.9 to 4.0 GHz (32): 508,900</th>
<th>(64): 1,012,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7 to 4.0 GHz (40): 611,300</td>
<td>(80): 1,216,000</td>
<td>3.7 to 3.9 GHz (40): 611,300</td>
<td>(80): 1,216,000</td>
<td></td>
</tr>
<tr>
<td>3.58 to 3.9 GHz (44): 639,000</td>
<td>(88): 1,271,000</td>
<td>3.58 to 3.9 GHz (44): 639,000</td>
<td>(88): 1,271,000</td>
<td></td>
</tr>
<tr>
<td>3.55 to 3.9 GHz (48): 687,500</td>
<td>(96): 1,368,000</td>
<td>3.55 to 3.9 GHz (48): 687,500</td>
<td>(96): 1,368,000</td>
<td></td>
</tr>
</tbody>
</table>

### System Unit Details (Power Enterprise Servers) Power E980

#### System Unit Details

<table>
<thead>
<tr>
<th>POWER9 SCM sockets</th>
<th>4</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory CDIMM slots</td>
<td>32</td>
<td>N/A</td>
</tr>
<tr>
<td>Max peak memory bandwidth to L4 cache from SCM</td>
<td>230 GB/sec per socket, 920 G/sec per node</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### Integrated ports

<table>
<thead>
<tr>
<th>System/serial (RJ45)</th>
<th>N/A</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB ports</td>
<td>2 or 3</td>
<td>1</td>
</tr>
<tr>
<td>HMC ports (RJ45)</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Ethernet adapter ports</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### SAS bays in system unit

<table>
<thead>
<tr>
<th>2.5-inch (disk/SSD)</th>
<th>N/A</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8-inch (SSD)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### Media bays

<table>
<thead>
<tr>
<th>DVD-ROM slimline</th>
<th>N/A</th>
<th>Attached via USB port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated SAS storage controllers for disk/SSD/DVD</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PCIe Gen4 adapter slots</td>
<td>8</td>
<td>N/A</td>
</tr>
<tr>
<td>PCIe x8</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>PCIe x16</td>
<td>8</td>
<td>N/A</td>
</tr>
<tr>
<td>Max I/O bandwidth (peak)</td>
<td>545 GB/sec</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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

| Y - Standard / Supported | Optional - Optionally Available / Supported | N/A - Not Available / Supported | SOD - Statement of General Direction announced | SLES - SUSE Linux Enterprise Server | RHEL - Red Had Enterprise Linux |
### IBM Power Systems

#### System Unit Details (Power Enterprise Servers) Power E980

<table>
<thead>
<tr>
<th>Service indicator LEDs</th>
<th>Y</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator panel</td>
<td>N/A</td>
<td>1</td>
</tr>
</tbody>
</table>

#### IBM Power Systems

#### Power Enterprise Servers Software Support

<table>
<thead>
<tr>
<th>Power Systems Software</th>
<th>Power E950</th>
<th>Power E980</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Systems Software</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software Tier</td>
<td>Small</td>
<td>Medium</td>
</tr>
<tr>
<td>PowerVM™</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PowerVM Linux Edition</td>
<td>With Power IFL</td>
<td>With Power IFL</td>
</tr>
<tr>
<td>PowerVM Enterprise Editions</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td><strong>AIX</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIX 6.1</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>AIX 7.1</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>AIX 7.2</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>IBM i</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM i Software Tier</td>
<td>N/A</td>
<td>P30</td>
</tr>
<tr>
<td>IBM i 7.2 TR9 *</td>
<td>N/A</td>
<td>Supported</td>
</tr>
<tr>
<td>IBM i 7.3 TRS*</td>
<td>N/A</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>Linux</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 7.5 LE (p8 compatible)</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 12 Service Pack 3</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 11 Service Pack 4</td>
<td>N/A</td>
<td>Supported</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 15</td>
<td>Supported</td>
<td>Supported</td>
</tr>
</tbody>
</table>

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

| Y - Standard / Supported | Optional - Optionally Available / Supported | N/A - Not Available / Supported | SOD - Statement of General Direction announced | SLES - SUSE Linux Enterprise Server | RHEL - Red Hat Enterprise Linux |
IBM Power Systems

Power Enterprise Servers Software Support

<table>
<thead>
<tr>
<th>PowerHA™</th>
<th>Power E950</th>
<th>Power E980</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerHA SystemMirror for AIX 6.1² Standard and Enterprise Editions</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PowerHA SystemMirror for AIX 7² Standard Edition</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>PowerHA SystemMirror for IBM i Version 7.2 Standard and Enterprise Editions</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* Or later version

IBM Power Systems

Server PCIe I/O Drawers

<table>
<thead>
<tr>
<th>Server Attachment</th>
<th>PCIe Slots per Drawer</th>
<th>SAS Bays per Drawer</th>
<th>Available to Order</th>
<th>Drawer Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCIe Gen3 I/O Drawer (#EMX0)</td>
<td>via x16 PCIe slot</td>
<td>6 or 12</td>
<td>0</td>
<td>Y</td>
</tr>
</tbody>
</table>

IBM Power Systems

Server PCIe I/O Drawer Attachment

<table>
<thead>
<tr>
<th>Server Drawer</th>
<th>Power LC921</th>
<th>Power LC922</th>
<th>Power AC922</th>
<th>Power S914</th>
<th>Power S924</th>
<th>Power S922</th>
</tr>
</thead>
</table>
| PCIe | N/A | N/A | N/A | Max 1/2 | Max 1 

<table>
<thead>
<tr>
<th>Server Drawer</th>
<th>Power E950</th>
<th>Power E980</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCIe</td>
<td>Max 4</td>
<td>Max 16</td>
</tr>
</tbody>
</table>

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

| Y - Standard / Supported | Optional - Optionally Available / Supported | N/A - Not Available / Supported | SOD - Statement of General Direction announced | SLES - SUSE Linux Enterprise Server | RHEL - Red Had Enterprise Linux |
**PCIe Gen3 I/O Expansion Drawer notes**

- PCIe Gen3 I/O drawer is not supported on the LC921, LC922, AC922, or L922 models.

- 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 POWER9 server or in a 5U E980 Enterprise system 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 E950 and up to four drawers per each system node of an E980 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 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 drawer 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 Systems**

**Server I/O SAS Encloser Units**

<table>
<thead>
<tr>
<th>Drawer</th>
<th>Server Attachment</th>
<th>PCIe Slots per Drawer</th>
<th>SAS Bays per Drawer</th>
<th>Available to Order</th>
<th>Drawer Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXP12SX (#ESLL / #ELLL)</td>
<td>Via SAS</td>
<td>0</td>
<td>12 LFF-1 SAS</td>
<td>Y</td>
<td>19” rack 2U</td>
</tr>
<tr>
<td>EXP24SX (#ESLS / #ELLS)</td>
<td>Via SAS</td>
<td>0</td>
<td>24 SFF-2 SAS</td>
<td>Y</td>
<td>19” rack 2U</td>
</tr>
</tbody>
</table>

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

| Y - Standard / Supported | Optional - Optionally Available / Supported | N/A - Not Available / Supported | SOD - Statement of General Direction announced | SLES - SUSE Linux Enterprise Server | RHEL - Red Had Enterprise Linux |
### IBM Power Systems

#### Server I/O Drawer Attachment

<table>
<thead>
<tr>
<th>Power LC921</th>
<th>Power LC922</th>
<th>Power AC922</th>
<th>Power S914</th>
<th>Power S924</th>
<th>Power S922</th>
<th>Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server Drawer</td>
<td>EXP12SX</td>
<td>N/A</td>
<td>N/A</td>
<td>Max 28</td>
<td>Max 28</td>
<td>Max 28</td>
</tr>
<tr>
<td></td>
<td>EXP12SX</td>
<td>N/A</td>
<td>N/A</td>
<td>Max 28</td>
<td>Max 28</td>
<td>Max 28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power E950</th>
<th>Power E980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server Drawer</td>
<td>EXP12SX</td>
</tr>
<tr>
<td></td>
<td>EXP24SX</td>
</tr>
</tbody>
</table>

**EXP12SX/EXP24SX storage enclosure notes:**

- The maximum drawer attachment is shown above per type of drawer. But it is also a “combined” server maximum. For example, if the maximum shown above is for 14 drawers, it would be combined total of EXP12SX and EXP24SX which would be 14. It would not be 14+14 for a combined total of 28.

- The EXP12SX and EXP24SX are designed for 12Gb throughput. Currently no 12Gb SAS adapters are announced.

- The EXP12SX and EXP24SX are attached to PCIe3 SAS adapters or to integrated POWER9 SAS controllers. They are not attached to older PCIe SAS adapters.

- The EXP12SX supports large capacity 3.5-inch (LFF) disk drives which are 7200 rpm. 4k byte sector drives are supported. Big data applications are its primary usage.

- The EXP12SX is not supported by IBM i.

- The EXP24SX supports 2.5-inch (SFF) SSD and 10k/15k rpm disk drives. 4k and 5xx byte sector drives are supported.

- A Power S914, S924, S922, and L922 Scale-out server has a maximum of 14 storage enclosures if only a system unit is used. The maximum of 28 requires one or more PCIe Gen3 I/O Drawer to be present.

- A Power E950 has a maximum of 16 storage enclosures if only a system unit is used. To support the maximum of 64, three or four PCIe Gen3 drawers are needed.
**IBM Power Systems**

**Server I/O Drawer Attachment**

- A single system node Power E980 with 4 PCIe drawers has a maximum of 64 storage enclosures. A two-node Power E980 with 8 PCIe drawers has a max of 128 storage enclosures. A three or four node Power E980 has a max of 168 storage enclosures. PCIe Gen3 drawers are required to attain this maximum.

- A maximum of 16 storage enclosures can be attached to one PCIe Gen3 I/O drawer due to cable management considerations.

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

**IBM Power Systems**

**Physical Planning Characteristics**

Note: More comprehensive information may be found in the IBM Site and Hardware Planning document at http://blaze.aus.stglabs.ibm.com/kc20E-cur/. Plus, additional summary information can be found in the IBM Sales Manual for each server at ibm.com/common/ssi.

<table>
<thead>
<tr>
<th>Server</th>
<th>Power LC921</th>
<th>Power LC922</th>
<th>Power AC922 8335-GTH</th>
<th>Power AC922 8335-GTX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging</td>
<td>19&quot; rack drawer (2U)</td>
<td>19&quot; rack drawer (2U)</td>
<td>19&quot; rack drawer (2U)</td>
<td>19&quot; rack drawer (2U)</td>
</tr>
<tr>
<td>Power supplies used</td>
<td>Two 1000 or 800W N + 1 standard</td>
<td>Two 1600 or 1000W N+1 standard</td>
<td>Two 2200W N+1 standard</td>
<td>Two 2200W N+1 standard</td>
</tr>
<tr>
<td>Voltage (AC)</td>
<td>100 - 120 or 200 - 240</td>
<td>100 - 120 or 200 - 240</td>
<td>200 - 240</td>
<td>200 - 240</td>
</tr>
<tr>
<td>single phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Maximum Altitude**

<table>
<thead>
<tr>
<th></th>
<th>Power LC921</th>
<th>Power LC922</th>
<th>Power AC922 8335-GTH</th>
<th>Power AC922 8335-GTX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet</td>
<td>10000</td>
<td>10000</td>
<td>10000</td>
<td>10000</td>
</tr>
<tr>
<td>Meters</td>
<td>3048</td>
<td>3048</td>
<td>3048</td>
<td>3048</td>
</tr>
</tbody>
</table>

These notes apply to the description tables for the pages which follow:
### IBM Power Systems

#### Physical Planning Characteristics

<table>
<thead>
<tr>
<th>Server</th>
<th>IBM Power S914</th>
<th>IBM Power S924</th>
<th>IBM Power S922</th>
<th>IBM Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Packaging</strong></td>
<td>19&quot; rack drawer (2U)</td>
<td>19&quot; rack drawer (2U)</td>
<td>19&quot; rack drawer (4U)</td>
<td>Tower</td>
</tr>
<tr>
<td><strong>Power supplies used</strong></td>
<td>Four 900W tower or rack, Two 900W rack, N + 1 standard</td>
<td>Four 1400W rack, N + 1 standard</td>
<td>Two 1400W rack, N + 1 standard</td>
<td>Two 1400W rack, N + 1 standard</td>
</tr>
<tr>
<td><strong>Voltage (AC) single phase</strong></td>
<td>100 - 127 or 200 - 240</td>
<td>200 – 240</td>
<td>200 - 240</td>
<td>200 - 240</td>
</tr>
</tbody>
</table>

**Maximum Altitude**

<table>
<thead>
<tr>
<th>Feet</th>
<th>Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000</td>
<td>3048</td>
</tr>
<tr>
<td>10000</td>
<td>3048</td>
</tr>
<tr>
<td>10000</td>
<td>3048</td>
</tr>
<tr>
<td>10000</td>
<td>3048</td>
</tr>
</tbody>
</table>

### IBM Power Systems

#### Physical Planning Characteristics

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).
### IBM Power Systems

#### Physical Planning Characteristics

<table>
<thead>
<tr>
<th></th>
<th>7014-S25 or #0555</th>
<th>7014-T00 or #0551</th>
<th>7014-T42 or #0553</th>
<th>7014-B42</th>
<th>7965-94Y Slim Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Racks</strong></td>
<td>25U</td>
<td>36U</td>
<td>42U</td>
<td>42U</td>
<td>42U</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inches</td>
<td>49.0</td>
<td>71.0 – 75.8</td>
<td>79.3</td>
<td>79.3</td>
<td>78.8</td>
</tr>
<tr>
<td><strong>Width (can vary depending on use of side panels)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inches</td>
<td>23.8</td>
<td>24.5 – 25.4</td>
<td>24.5 - 25.4</td>
<td>24.5 - 25.4</td>
<td>23.6</td>
</tr>
<tr>
<td><strong>Depth (can vary depending on door options selected)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inches</td>
<td>39.4</td>
<td>41.0 – 45.2</td>
<td>41.0 - 45.2</td>
<td>41.0 - 55.5</td>
<td>43.1 – 48.2</td>
</tr>
<tr>
<td>Millimeters</td>
<td>1001</td>
<td>1042 – 1098</td>
<td>1043 – 1098</td>
<td>1042 - 1409</td>
<td>1095 - 1224</td>
</tr>
</tbody>
</table>

*Power E980 are supported by IBM Manufacturing only in the 7965-94Y.*

#### IBM Power Systems

##### Warranty² / Installation

<table>
<thead>
<tr>
<th>Warranty Service Levels</th>
<th>Power LC921</th>
<th>Power LC922</th>
<th>Power AC922</th>
<th>Power S914</th>
<th>Power S924</th>
<th>Power S922</th>
<th>Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td>24x7 with two hour service objective²</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>24x7 with four hour service objective</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>9x5 with four hour service objective</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>9x5 next-business-day</td>
<td>Standard ⁶</td>
<td>Standard ³</td>
<td>Standard ³</td>
<td>Standard ⁶</td>
<td>Standard ³</td>
<td>Standard ³</td>
<td>Standard ³</td>
</tr>
</tbody>
</table>

*These notes apply to the description tables for the pages which follow:*
# IBM Power Systems

## Warranty / Installation

<table>
<thead>
<tr>
<th></th>
<th>Power LC921</th>
<th>Power LC922</th>
<th>Power AC922</th>
<th>Power S914</th>
<th>Power S924</th>
<th>Power S922</th>
<th>Power L922</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Warranty Service Levels</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty Period</td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
<td>3 years</td>
</tr>
<tr>
<td>Server install⁴</td>
<td>CSU</td>
<td>CSU</td>
<td>CSU</td>
<td>CSU</td>
<td>CSU</td>
<td>CSU</td>
<td>CSU</td>
</tr>
<tr>
<td><strong>Power E950</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24x7 with two hour service objective²</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24x7 with four hour service objective</td>
<td>Included*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9x5 with four hour service objective</td>
<td>Standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power E980</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optional = Warranty Service Upgrade available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9x5 next-business-day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty Services Period</td>
<td>3 / 1 years⁵</td>
<td></td>
<td>3 / 1 years⁵</td>
<td></td>
<td>1 year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Server installation⁶</td>
<td>CSU</td>
<td>CSU</td>
<td>CSU</td>
<td>CSU</td>
<td>IBI</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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. Optional = Warranty Service Upgrade available.

3. 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.

4. CSU = Customer Set Up, IBI = Installation by IBM. For server hardware only. Note for IBI severs, server feature codes such as an EXP24SX I/O drawer or PCIe Gen3 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.

5. 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).

6. Mandatory Customer Replaceable Unit (CRU). With an upgrade to a higher support service level, mandatory CRU becomes optional CRU.

---

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

- **Y** - Standard / Supported
- **Optional** - Optionally Available / Supported
- **N/A** - Not Available / Supported
- **SOD** - Statement of General Direction announced
- **SLES** - SUSE Linux Enterprise Server
- **RHEL** - Red Hat Enterprise Linux
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.

Commercial Processing Workload (CPW) is a relative measure of performance of systems running the IBM i operating system. Performance in client environments may vary. The value is based on maximum configurations. For a complete description Please refer to the “IBM Power Systems Performance Capabilities Reference - IBM i operating system” at the following Web site of CPW and the CPW rating for IBM Power Systems: www.ibm.com/systems/power/ software/i/management/ performance/resources.html

All performance 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 and application sizing guides to evaluate the performance of a system they are considering buying. Actual system performance may vary and is dependent upon many factors including system hardware configuration and software design and configuration.

IBM recommends application-oriented testing for performance predictions. Additional information about the performance benchmarks, values and systems tested is available from your IBM marketing representative or IBM Authorized Reseller or access the following on the Web:

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/ssi

This brochure provides detailed technical specifications of all IBM POWER9 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.