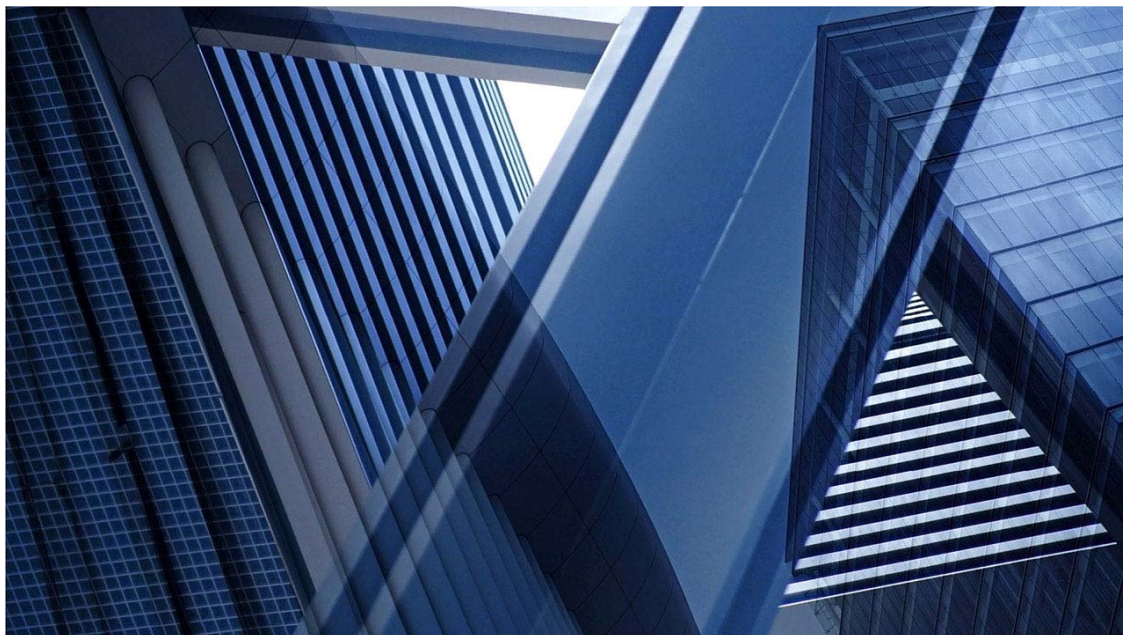# IBM Systems MEDIA

POWER9 Scale Out Servers Refreshed

AIX expert Jaqui Lynch gives technical specs on the latest POWER9 servers.

By Jaqui Lynch

08/18/2020
On July 28, 2020 IBM announced the refresh of the scale out POWER9 servers, the S914, S922 and S924. These models have refreshed cores and all internal slots are now PCIe 4 slots.

Technical Specifications for the New G model POWER9 Scale-Out Servers

9009-41G - S914

This is a 1 socket 4U system that has either 4, 6 or 8 cores. The 4 and 6 core options are 2.3 to 3.8GHz cores and the 8 core option is 2.8 to 3.8GHz cores. By default, the system runs in max performance mode which uses the fastest GHz setting.

The S914 has 16 DIMM slots, providing for up to 1TB of memory. The 6 core and 8 core systems support up to 1TB 16GB, 32GB or 64GB DIMMs). The 4 core is limited to 64GB (2 or 4 x 16GB or 2 x 32GB DIMMs). DIMM speed varies between 2133, 2400, and 2666 Mbps depending on the size of the DIMMs.
The S914 comes with 8 full height PCIe Gen4 slots. One slot is for the required base LAN adapter. Two of the remaining slots are CAPI-capable.

There are multiple backplane options available and these affect the number of disk bays available. If you plan to boot your VIO servers from internal disk then it is important to get either the EJ1C 12 disk backplane with the optional split EJ1E card so that each VIO owns half the disks, or the four NVMe drives. Make sure each VIO has 2 drives so they can be cloned prior to maintenance.

9009-42G - S924

The S924 is a 1 or 2 socket 4U system that supports up to 24 cores. The core options are 8 or 16 cores at 3.8 - 4.0 GHz, 10 or 20 cores at 3.5 - 3.9 GHz, 11 or 22 cores at 3.45 - 3.9 GHz, or 12 or 24 cores at 3.4-3.9 GHz.

The S924 has 16 DDR4 RDIMM slots per socket for a maximum of 32. It supports 16GB, 32GB, 64GB and128GB DIMMs providing for a maximum of 2TB per socket or a maximum total of 4TB for the system. If both sockets are

populated the S924 comes with 11 full height PCIe Gen4 slots. One slot is for the required base LAN adapter. Four of the remaining slots are CAPI-capable. If only one socket is populated there are 8 slots of which two are CAPI capable.
As with the S914 there are multiple backplane options including the split backplane and NVME options.

9009-22G - S922

The S924 is a 1 or 2 socket 2U system that supports up to 22 cores. There's an option to have one socket with a single core or 4 cores (2.8 to 3.8GHz).
The other core options are one or two sockets each with 11 cores at 2.8-3.8 GHz, 10 cores at 2.9-3.8 GHz, or 8 cores at 3.4-3.9 GHz. The single core option is designed to be a cost effective IBM i system that runs IBM i natively with no VIO server and has a maximum of 64GB of memory. It cannot be upgraded later to add cores or memory and it does not support I/O expansion drawers. For the 8, 10 or 11 core processor IBM i is only supported when running under VIOS. Each IBM i partition is limited to 4 cores.

The S922 has 16 DDR4 RDIMM slots per socket (32 slots maximum). It supports 16GB, 32GB, 64GB and128GB DIMMs providing for a maximum of 2TB per socket or a maximum total of 4TB for the system. If both sockets are populated the S922 comes with 11 low profile PCIe Gen4 slots. One slot is for the required base LAN adapter. Four of the remaining slots are CAPI-capable. If only one socket is populated there are 8 slots of which two are CAPI capable.
As with the S914 there are multiple backplane options including the split backplane and NVME options.

Commonality

The 4U servers come with a service processor, hot swap and redundant cooling, one USB 3.0 port in front and two in the back, two HMC 1Gbe RJ45 ports, the 19" rack mounting hardware and four hot plug, redundant power supplies. None of the systems has an internal DVD so it is recommended that you add the external DVD drive (Feature EUA5) if you are unable to use USB flash drives. While VIOS can be installed from flash drives, they are not supported for VIO backup which is where the DVD can be useful.

The 2U S922 differs in that it has two USB 3.0 ports in front and two hot plus, redundant power supplies.

Power and Cooling

The S924 has four 1400W 200-240V AC power supplies. The S914 offers a 900W power supply option that can be 100-127V or 200-240V or the 1400W option. The S914 requires either 4 x 900W power supplies or 2 x 1400W power supplies. The S922 has 2 x 1400W power supplies. All three servers use the 6458 power cord, which is C14 at the server

and C13 at the PDU.

Maximum operating environment information for each server is:
S922

> 6416 BTU/hour
> 1880 watts
> 1.94KVa
> Single phase 200-240V

S914

> 5461 BTU/hr
> 1600 watts

1.65KVa
Single phase 100-127V or 200-240V

S924

> 9386 BTU/hr
> 2750 watts
> 2.835 KVa
> Single phase 200-240V

All three servers fit in a 19-inch rack and come with the rack mounting hardware. It is critical that you use the rails that come with the server.

When planning for power you should plan for the maximum draw on any of the PDUs. As an example, a typical L6-30P PDU is allowed to draw up to 24 amps or 4.99KVa. When planning for the S924 that means you should plan for 2.835KVa on each of two PDUs—t hat means that if a PDU fails you still have sufficient capacity for the server to fail over to it.

Operating System

Section 2.9 of the Technical Overview redbook lists all the supported levels of IBM i, AIX, VIO servers and Linux for these three servers. The supported levels are very current so older LPRs may need to be upgraded. VIO server minimum levels are 2.2.6.65 and 3.1.1.25. Since all 2.2.6 levels of the VIO server go out of support on 9/30/2020 it is recommended you install the new servers at 3.1.1.25.

Private Cloud and Dynamic capacity

As part of the scale out refresh announcement, IBM also announced the Power Systems Private Cloud Solution which expands Enterprise Pools 2.0 to allow for a pool of S924 and S922 systems that can share processors and AIX and IBM i entitlements. Metered resource minutes are used to determine how many core activations need to be debited against the pool's capacity credits. A pool can have up to 32 S924 nad/or S922 systems with a maximum of 1000 LPARs (if CMC) or 512 LPARs (if HMC managed). Additionally, all processors must be in the shared processor pool – dedicated processor partitions are not allowed. The announcement provides more detail on how this actually works.

Summary

If you are looking for a scalable, powerful server platform in a small package then the new G model scale out POWER9 servers

are well worth looking at. If you are planning a server refresh from POWER7 or POWER8 these new servers offer great

performance and lots of options to assist in consolidation and private cloud deployments. The move to PCIe 4 slots across the

board provides for higher data transfer rates to address the I/O demands as you consolidate more LPARs to the system. This can

both save money and improve performance if planned correctly.

About the author
Jaqui Lynch has over 38 years of experience working with a projects and OSes across vendor platforms, including IBM Z, UNIX systems and more.

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