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Midrange 750 and 760 Join the POWER7+ Line of Servers

April 2013 | by Jaqui Lynch

In October 2012, IBM announced the first POWER7+ servers, the 770 and 780 D models. This announcement provided for more cores and significantly more performance in those two servers. The Feb. 6, 2013, follow-on announcement covered the low- and mid-range servers, refreshing the 710-740, updating the 750 into a new form factor and adding a new server to the line, the 760.

Both the 750 and 760 now require 5U in the rack. Additionally, two new PowerLinux servers (7R1 and 7R2) were added, and PowerVM was updated to support some of the new features. Specifications for all of these servers can be found in the Facts and Features document as well as the individual Technical Overviews at the IBM Redbooks site.

Power 750

The Power 750 POWER7+ server has four sockets and supports up to four dual chip modules (DCMs). Each DCM provides eight cores (2 x 4 core chips), which are either 3.5ghz or 4.0ghz, as well as 16 memory DIMMs per DCM, 10MB of L3 cache and 256KB of L2 cache per core. The maximum memory in the server is 1TB (256GB per socket). There's no capacity on demand (COD) so all of the installed cores and memory are active. The 750 no longer has PCI-X slots—instead it now provides six PCI Express (PCIe) Gen2 slots. An additional four 12X I/O drawers (#5802 or #5877) can be attached to add an additional 40 PCIe Gen1 slots, if needed. There are also six SAS Structure Functional Design (SFD) disk bays that can be used for disk or SSDs. These six bays can be split into two sets of three bays. Redundancy has been improved over the 750 with two new integrated POWER7+ I/O controllers. Finally, the new multifunction card provides four network ports (dual 10Gb and dual 1Gb).

Summarizing the key differences between the 750 Power7+ and the previous 750, the latest version has:

- Improved clock speed
- Double the memory (now 1TB)
- Two GX++ slots, instead of 5 slots (with two being PCI-x)
- Six PCIe Gen2 slots
- Six disk bays instead of eight, but the split backplane feature is now integrated into the server
- 5U rack space instead of 4U, and
- Support for 20 virtual machines per core instead of 10

Power 760

The Power 760 POWER7+ server is also a four-socket server that uses DCMs. Each DCM provides 12 cores (2 x 6 core chips), which are either 3.1ghz or 3.4ghz, as well as 10MB of L3 cache and 256KB of L2 cache per core. The maximum memory in the server is 2TB (512GB per socket). There's no COD for memory so all installed memory is active. However, a big differentiator between the 760 and the 750 is that the 760 provides for COD for the cores. A fully populated 760 can have 48 cores installed but is only required to have eight active. Additional cores can be activated one at a time.

Like the 750, the 760 provides six PCIe Gen2 slots, can attach an additional four 12X I/O drawers (#5802 or #5877), and has six SAS SFD disk bays that can be used for disk or SSDs. At least two sockets need to be populated in order to take advantage of the GX++ slots. Neither box provides support for PCI-X I/O drawers. Both of these new servers come standard with three-year, 7/24 hardware maintenance. The 750 is a customer setup server that doesn't require a Hardware Management Console (HMC), while the 760 is an IBM-installed server that does require an HMC. The 750 belongs to the small software tier, and the 760 is in the medium software tier. But both are assigned 100 PVU for IBM software purposes.

Both the 750 and 760 can take advantage of active memory expansion (AME) as well as the ability to define an LPAR with as little as 0.05 of a core, although the latter requires the HMC to be at the 777 level with the 760 firmware on the server. With POWER7+ there's an on-chip hardware accelerator that significantly reduces the processor overhead penalty associated with compression. This makes AME a very attractive solution for making more efficient use of memory. I recommend users run the amepat tool and then either try a 60-day trial or enable AME in order to use it permanently.

Currently, Virtual IO Server (VIOS) V2.2.2 is required to support the 750 or 760. Additionally, AIX V7.1 TL02 SP2 and AIX V6.1 TL08 Sp2 (or TL07 SP7 or TL06 SP11) are the minimum levels of AIX supported. A statement of direction was issued for support of AIX V5.3 TL12. VIOS 2.2.2 adds the functionality needed to support 20 VMs per core, and also has the VIOS Performance Advisor built into it.

Performance Boost

This announcement includes the next evolution for the 750 server, and the addition of the 760 server is a nice lead-in to the enterprise class servers. The 760 is the first server in the POWER7+ line to provide COD in a single-node server. All servers from the 710 to the 780 have now been refreshed with the POWER7+ chip and the features that come with that chip, providing users with a welcome boost in performance and capabilities.

Additionally, the move to all PCIe Gen2 slots in the central electronics complex ensures that I/O performance is also substantially increased. With the new features enabled by POWER7+ (such as AME acceleration) and the additional redundancy provided in the 750 and 760, these servers offer a powerful and reliable mid-range option for supporting production and other workloads.