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Power 520 Express and Power 550 Express Servers Capitalize on PowerVM

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[Power 520 Express](#)[Power 550 Express](#)

In the first quarter, IBM announced the latest entries in the POWER6* line of servers: the Power* 520 Express—AIX Edition and Power 550 Express—AIX Edition servers. IBM also renamed Advanced POWER* Virtualization (APV) to PowerVM*. This article outlines PowerVM and the new POWER6 technology-based servers.

PowerVM

With the renaming of APV, IBM now offers three editions of PowerVM. The Express edition is only available for the new Power 520 and 550 Express servers and is aimed at those who want an introduction to virtualization at a low cost. The Express edition is managed exclusively via Integrated Virtualization Manager (IVM) and won't function when connected to a Hardware Management Console (HMC). It also limits the server to three LPARs and the use of only one shared-processor pool (SPP).

Standard edition is the one with which most users are familiar. This provides the standard features of SEA (shared Ethernet adapter), shared SCSI, Micro-Partitioning* and multiple SPPs. On the 520 and 550 this edition works with either IVM or an HMC.

The most comprehensive edition is Enterprise edition, which has all the features in the standard edition and adds the functionality provided by Live Partition Mobility, the capability to move an LPAR live from one server to another without an outage. On the 520 and 550 this capability requires the use of an HMC and the Enterprise edition of PowerVM.

These three editions give customers the capability to start at a truly entry level and then upgrade through the various editions as they become more familiar with virtualization. The capability to select the edition that best fits one's needs is a bonus and the capability to upgrade between them makes it an attractive option.

New Power Systems

The new POWER6 technology takes everything that's great about the POWER5* and POWER5+* Power 520 and 550 and supplements it with the new PCI-E (express) adapters, SAS disks and the Integrated Virtual Ethernet (IVE) options. The hardware has also been updated to reduce power and cooling requirements while improving performance. The servers use 64-bit addressing and, when combined with JFS2 filesystems, can have files as large as 16 TB and filesystems as large as 32 TB, which should more than meet the needs of most users.

The two new servers share several traits. Both the 520 and 550 come with a standard warranty, that is, a one-year, 9 a.m. to 5 p.m. next-business-day warranty and they're customer installable. They both come in desktop or rack-mount, and certain models also offer either 110 or 220 volt power. Each has a total of five internal adapter slots, two are PCI-X 266 MHz and three are PCI-E 8X slots. They also have a media bay for a DVD-ROM or DVD-RAM and a second half-height bay for a tape drive. Slot allocation is as follows:

- Slot 1 is a PCIe x8 2.5 GHz short-length slot. A GX+ slot shares this slot.
- Slot 2 is a PCIe x8 2.5 GHz short-length slot.
- Slot 3 is a PCIe x8 2.5 GHz full-length slot.
- Slots 4 and 5 are PCI-X 266 MHz full-length slots.

For the 520, the first GX or RIO controller that's added doesn't take a slot. A second GX+ slot is available on the 520 with a 4-core configuration, but it uses slot 1 (PCI-X) for this card. For the 550 the first GX card goes in slot 1 and the second goes into slot 2, so a fully configured 550 requires 2 PCI-X slots for the GX/RIO connections. In a RAID configuration, the 5679 RAID enablement card doesn't take a slot.

Neither server comes with capacity on demand (COD), which means that all processors and memory in the servers are activated on installation. They both take 4U in a rack and have optional redundant power.

Each server uses the new POWER6 chip technology, which provides for 4 MB of L2 cache per core, something that speeds up memory interactions. They also include the new Altiavec processor, which helps with high-performance computing (HPC) processing.

As with the 570, the new POWER6 servers now use SAS disks for internal disks. At the time this was written, all six disk drives are attached to one controller and there's no split backplane option. This means that the disks, tape and DVD are all assigned to the same LPAR as they're on the same adapter. In the April 2008 announcement a split backplane option was unveiled and this support should be available by the time this article is published. There are two backplanes from which to choose. The default backplane (FC 8341) has a simple SAS adapter built in and provides a single path from the SAS controller to each disk drive. The alternate option (FC 8345) has a built-in SAS adapter with an external SAS port. This option provides dual paths from the SAS controller to the disk drives and is required if you want to add a single SAS drawer (FC 5886) or if you want to use internal RAID (also requires FC 5679). Additionally, FC 8345 backplane is required for a split backplane along with a special cable and card. Both servers can support up to nine of the new SAS drawers that are ordered as FC 5886. The SAS backplane in option two supports the first drawer and then you can add up to two x 5900 PCI-X SAS adapters, each capable of supporting up to four SAS drawers.

The new POWER6-based servers all have 266 MHz PCI-X slots and PCI-E slots. Many of the older PCI-X or PCI adapters are no longer supported in these servers so it's important to

double-check before transferring any adapter into the server from an older POWER5+ or earlier server. In particular, none of the 10/100 Ethernet cards is supported. Note that the minimum AIX* version supported is AIX v5.3 TL06 SP4 on the 550 and AIX v5.3 TL07 on the 520. There's no support for AIX v5.2 or earlier versions on these servers, so start those migrations from AIX v5.2 now. Full Linux* support is offered for SLES 10 SP1 (SUSE Linux Enterprise Server) and RHEL (Red Hat Enterprise Linux) v4.5 and v5.1. The latest information on prerequisites can be found online (www-912.ibm.com/e_dir/eserverprereq.nsf).

IVE

Both servers also introduce the new IVE option. Instead of the 10/100/1000 integrated dual Ethernet adapter that used to be on the planar of the previous 520 and 550, the new servers come with three options for the built-in Ethernet. The integrated Ethernet is an IVE and can be either a dual 10/100/1000 copper, a quad-port 10/100/1000 copper or a dual-port 10 GB Fibre SR. The IVE controller can control up to 32 logical IVE ports defined across the two or four ports on the adapter. Using the HMC these logical ports can be allocated to different LPARs and the ports include the accelerations and offloading functions that one expects from a dedicated Ethernet adapter, as well as providing multiple receive queues. Using the IVE does cause a memory overhead in the hypervisor—each active port adds 102 MB to the hypervisor size—but it's worth it for the savings in adapters that you no longer need to purchase. Since the IVE is on the planar it's not a hot-plug option.

I/O Drawers Supported

Both the 520 and the 550 support only four drawer types. The first option is the EXP12S I/O drawer or FC 5886 above which is a 2U 19-inch rack mount drawer that contains up to 12 hot-swappable SAS disk drives. Another option is the 7314-G30 adapter drawer. This is a 4U half-width drawer that attaches via the 12X GX slot—there are two per 4U enclosure and each has six PCI-X slots in it and can be configured with redundant power.

The third option is the 7311-D20 RIO attached drawer. This is a 4U full-width drawer that offers seven x PCI-X slots and 12 SCSI disks split into two six-packs. The final option is the 7031-D24 or T24. This is a SCSI DASD drawer or tower.

Neither the 7311-D20 nor the 7314-G30 is supported on the desk-side versions of the servers.

Power 520 Express

The Power 520 Express is the baby of the two servers announced. It has a new order code of 8203-E4A and doesn't have any L3 cache. It's designed as a high-performance, entry-level, virtualized server. The Power 520 comes as either a 1-core, 2-core or 4-core 4.2 GHz server and is listed as a processor group D5 server. This server isn't upgradeable as the processors are soldered onto the planar.

Memory, rPerf and drawers supported are listed in Table 1. The 1-core system doesn't support any I/O drawers and also doesn't support the SAS disk drawer.

Power 550 Express

The 550 (8204-E8A) is available as a 2-, 4-, 6- or 8-core server with either 3.5 GHz or 4.2 GHz cores and is in processor group E5. The maximum memory on the 3.5 GHz server is 128 GB and it's 256 GB on the 4.2 GHz server. Estimated performance is listed in Table 2.

The 550 differs from the 520 in terms of L3 cache, processor options, maximum memory and in that it requires one PCI-X slot for each GX or RIO adapter (with a maximum of two) that's added. If scalability beyond four cores and 64 GB of memory is needed, then this is the server of choice.

Server Editions

With the new Express servers IBM also introduced many software editions. The intent of these editions is to offer a reduced price on the primary OS, thus the AIX edition comes with a discounted price for AIX and the OpenPower* edition offers a discounted price on the Linux version chosen. Additional OSs can be added later as desired.

Capture New Technologies With New Servers

The new POWER6 servers combined with PowerVM offer a great deal of flexibility for the entry-level and mid-level servers. Proper planning is needed, however, to ensure that slots are kept free for GX or RIO cards that may be needed in the future. Additionally, a clear understanding of the various PowerVM editions is important to determine whether one needs an HMC. These servers have the performance, memory capacity and I/O bandwidth to run workloads that historically have only run on enterprise-level servers and are worth consideration as part of an integrated server strategy. They can easily consolidate many smaller servers into a single virtualized server (multi-LPAR) environment and, since they have all of the functionality of their big brothers, can take advantage of all of the new technologies such as Live Partition Mobility and workload partitions.

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