

IBM's "Not-Just-a-Chip" POWER7 Announcement

By Joe Clabby, President, Clabby Analytics

When IBM announces a new microprocessor version it typically concentrates on speeds and feeds. Such was not the case in New York City on Monday, February 8th when IBM announced the newest generation of its POWER microprocessor: POWER7. Instead of focusing primarily on chip characteristics such as performance improvements, increased memory availability, new virtualization capabilities, input/output (I/O) enhancements, and energy efficiency— IBM took a more holistic approach and focused on how POWER7 systems operate and how they relate to the company's strategic "Smarter Planet" initiative.

Smarter Planet/POWER7 Market Positioning

Clabby Analytics believes that the microprocessor market is consolidating around three architectures: Intel Xeon (x86) multi-cores and IBM's POWER, and System z (mainframe). POWER-based systems traditionally compete with Intel's Itanium as well as Sun's SPARC systems, but Intel's enhancements to Xeon processors now puts that chip in competition with its own Itanium technologies. We believe this is marginalizing Itanium, leading buyers to see the light and start moving off of the platform. Accordingly, both Itanium and SPARC buyers now have three choices should they choose to migrate: Intel Xeon, POWER or z. For more of this discussion, read *Clabby Analytics* "And Then There Were Three: POWER, x86, and z" report available for free at:

<http://www.clabbyanalytics.com/uploads/ServerMarketViewFinalFinal.pdf>

Power Systems Market Positioning

For those primarily interested in speeds and feeds, the characteristics of POWER7 are impressive. The microprocessor can run at up to 4.14 GHz — and can be expanded to 8 cores with integrated cache and memory controllers (it is available in 4 / 6 / 8 core options). It uses 45nm technology — so it is densely packed. It uses: 1) a 4th generation SMP fabric bus to pass data between processors, memory, and I/O subsystems; 2) 3rd generation multi-threading (and it features intelligent thread caching); 3) a new power bus; 4) energy optimized design; 5) multiple memory controllers; 6) DDR3 memory support; 7) enhanced GX system buses; 7) on-chip L2/L3 cache; 8) eDRAM L3 Cache; and, 9) industry standard I/O. All of these characteristics, when combined, make the POWER7 the most powerful processor architecture in the midrange.

Power Systems are primarily positioned as Unix server — although they do run the Linux operating environment (and a lot of the new workloads discussed later are expected to be hosted on Linux). During the past 5 years, IBM has become the dominant vendor in the marketplace, growing UNIX share at the expense of both Hewlett-Packard (HP) and Sun (now Oracle). The company reports that it did some \$600 million in migration business this year alone (mostly at Sun's expense) and that its Migration Factory program has generated over \$2 billion in revenues since its 2007 launch. For Sun/HP customers who choose to stick with UNIX but want more reliability, availability and security (RAS) along with highly-integrated virtualization, provisioning, and workload management — IBM's POWER is the logical choice.

As information technology (IT) buyers evaluate their migration options, IBM wants these buyers to consider microprocessor performance/energy characteristics (because POWER7 positions IBM as the UNIX performance leader; and because it also offers impressive energy usage and management facilities). But IBM also wants its prospective buyers to focus on the workloads that they will run on their new Power platforms. And this is where things get really interesting...

If you examine the characteristics of Power Systems, you'll observe that these systems:

- Focus to the extreme on RAS
- Offer new performance-boosting technologies
- Deliver new energy management features that add or throttle processors to maximize performance and utilization, and shut down unused processors to save energy. The new servers also utilize ED RAM that halves the number of transistors needed to achieve IBM's performance goals while lowering energy usage; and,
- Heavily emphasize enhanced management tools and solutions in order to drive down datacenter/staffing costs

Even closer examination shows that Power Systems are stellar at performing parallel processing tasks and perform very well when both running serial and data-intensive jobs. This is a critical point, as Power's parallel processing capabilities are very important as they relate to IBM's Smarter Planet initiative.

IBM's Smarter Planet

For those who have had trouble understanding what IBM's Smarter Planet initiative is all about, you're not alone (I attended four distinct IBM presentations from four different speakers before I finally got it). At a high level, IBM talks about the explosion in the number of devices that produce/utilize information — and the corresponding explosion in the amount of data being captured/utilized — and then shifts the discussion to how newly designed information systems can help deal with the resultant massive amounts of information. The link to a "Smarter Planet" is this: by using these new systems designs, people can do more data intensive work more efficiently, and thus serve Smarter Planet goals such as improved water usage (through intelligent metering), improved energy usage (again through metering), better health care analysis (30% of the data in the world is used in health care — and these new Power Systems designs are ideal when used as data-crunchers to perform better analysis or medical images (x-rays, CT scans, MRIs), or genome research, or cancer research) — and so on.

Power Systems are an instantiation of these new Smarter Planet designs. Yes, Power Systems can still be used to optimally run traditional enterprise resource planning, customer relationship management, and supply chain business applications, as well as a wealth of traditional independent software vendor (ISV) applications. But POWER7-based systems also excel at number-crunching on a massive scale — making them ideal for handling the very large databases that are typical in Smarter Planet applications.

Summary Observations

In the new "then there were three" world (POWER, x86, and z), substantial differences exist in each architecture. Each handles serial, data intensive, and parallel computing differently (headroom

limitations and differing levels of performance). Each has different virtualization, provisioning, and workload management features. And each has different energy usage and management characteristics. Accordingly, each system type processes workloads differently. And this introduces the concept of workload optimization.

From a workload perspective, POWER7-based systems have been designed to excel in four areas:

1. Database (including transaction processing);
2. Business analytics (on very large databases);
3. Traditional business applications; and,
4. Web infrastructure/collaborative applications (the new generation of Web 2.0 applications).

From a competitive perspective, POWER7 now defines the midrange marketplace occupied by UNIX systems. Oracle's plan to make Sun SPARC servers into appliances takes the company out of serious competition in this market. Itanium's dropping sales, Red Hat's dropping Linux development for the platform, and migrations from Itanium to IBM Power Systems are all indicators of Itanium's continuing marginalization. In short, POWER's most serious competitor will be Intel Xeon multi-cores — and this is a good thing because the computing market needs two forces competing in the midrange market in order to drive innovation and to create price pressures that benefit IT buyers.

We congratulate IBM on this "WOW!" POWER7 architecture. But it should be noted that POWER7 is just the company's first major server announcement to be made this year. A big IBM Intel Xeon multi-core server announcement is expected soon — with a major IBM System z announcement to follow later. We only hope that IBM is as clear in articulating the systems benefits and workload positioning of each of these respective architectures as it has been in its new POWER7-based systems.