

## Intel® Xeon® Processor E7 v4 Family Speeds Data, Transforms Business

### New Product Families Deliver Horsepower for Advanced Real-Time Analytics and In-Memory Computing

June 6, 2016 — Dramatic growth in the volume and variety of data is bringing unprecedented opportunities for businesses – healthcare to transportation, banking to manufacturing – to make new discoveries and to deliver improved services and customer experiences. The key opportunity is turning the massive amount of core business data plus new sources of unstructured data into actionable and timely insights. In fact, research is finding that companies that use data-driven insights are two times more likely to have top quartile financial performance and five times more likely to make decisions faster than their competition, so it is no surprise that many companies are investing in analytics<sup>1</sup>.

The Intel® Xeon® processor E7-8800/4800 v4 families offer robust performance, the industry's largest memory capacity per socket<sup>2</sup>, advanced reliability and hardware enhanced security for real-time analytics so that businesses can rapidly gain actionable insights from massive and complex data sets. They are optimal for scale-up platforms, delivering large in-memory computing for real-time analytics as well as data-intensive workloads such as online transaction processing (OLTP), supply chain management (SCM) and enterprise resource planning (ERP), among others. The Intel Xeon processor E7 v4 family delivers up to 1.4 times higher performance, up to 10 times better performance for dollar and half the system power compared to IBM Power8\*-based solutions<sup>3</sup>.

#### High Performance and In-Memory Capacity for Demanding Real-Time Analytics Workloads

The new processor family offers headroom for growth with traditional four- and eight-socket support, is designed for configurations up to 256 sockets via third-party node controllers, and is used in OEM system designs that currently feature up to 64 sockets. It also offers industry-leading memory capacity of up to 24TB in an eight-socket system, allowing massive datasets to be stored completely in memory, rather than on hard drives, to accelerate time to insight and decision-making.

#### Advanced Reliability for Critical Uptime of Services

The new processors include more than 70 reliability, availability and serviceability (RAS) features, including Intel® Run Sure Technology that is unique to the Intel Xeon processor E7 family. These RAS features offer advanced data integrity and mission-critical system readiness that reduces the frequency and cost of server downtime. In addition, improved error recovery mechanisms and features such as memory mirroring offer exceptional data reliability without driving up system-wide memory requirements.

#### Hardware Enhanced Security for Data Integrity and Improved Protection Against Malicious Attacks

New security features built into the processors protect the most mission-critical, data-rich applications by encrypting data much faster, improving detection of sophisticated threats and increasing protection against malicious attacks. The hardware-enhanced security capabilities in the processors provide up to 70 percent more encryption performance per core<sup>4</sup> meaning that organizations can better protect a growing amount of data with minimal impact to their system's performance, while delivering improved malware safeguards. In addition, the Intel® OS Guard now includes Supervisor Mode Access Protection

to enable privileged access implementations that offer IT more control over which users have access to sensitive system data and also help prevent a malicious user from extending those vulnerabilities and exploiting other systems across the data center.

## Hardware-Assisted Virtualization for Improved Efficiency of Enterprise Workloads

Enhanced hardware-assisted virtualization allows IT to virtualize mission-critical enterprise workloads and move them into cloud-scale environments for new levels of agility and efficiency. Improvements in virtualization performance and resource management include lower latencies when entering and exiting virtual machines (VMs), fewer VM interrupts via posted interrupts, and less overhead in fault-tolerant environments with page modification logging.

## Smarter Resource Orchestration

The Intel Xeon processor E7 v4 family enables great IT infrastructure controls by including advanced telemetry features and orchestration technologies such as the Intel® Resource Director Technology. These features provide deeper visibility and control over shared platform resources, resulting in efficient scheduling, load balancing and workload migration across virtual machines. As a result, IT is able to improve asset utilization to deliver optimal quality of service levels across multiple applications.

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<sup>1</sup> Source: Gartner, Survey Analysis: Practical Challenges Mount as Big Data Moves to Mainstream, September 2015

<sup>2</sup> Source: Xeon E7 v4 platform supports up to 3TB of memory per socket: [www.intel.com](http://www.intel.com). IBM POWER8\* platforms support up to 2TB of memory per socket: [http://www.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ST&infotype=SA&appname=STGE\\_PO\\_PO\\_USEN&htmlfid=POY03114USEN&attachment=POY03114USEN.PDF](http://www.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ST&infotype=SA&appname=STGE_PO_PO_USEN&htmlfid=POY03114USEN&attachment=POY03114USEN.PDF). Oracle SPARC M7\*-based platforms support up to 0.5TB of memory per socket: <https://www.oracle.com/servers/sparc/m7-16/comparisons.html>.

<sup>3</sup> "Up to 1.4 times higher performance' compared to IBM POWER8\*-based solutions" claim based on estimated SPECint\*\_rate\_base2006 performance of 8-socket server using Intel® Xeon® processor E7-8890 v4 scoring 6079 versus an 8-socket IBM Power E870 scoring 4830. "1/2 the system power" compared to IBM POWER8\*-based solutions' claim based on estimated system power of 8-socket server using Intel® Xeon® processor E7-8890 v4, 2,496 watts max power, versus an 8-socket IBM Power E870, 5,068 watts max power. "Up to 10X better performance per dollar" compared to IBM POWER8\*-based solutions' claims based on estimated SPECint\*\_rate\_base2006 performance of 8-socket server using Intel® Xeon® processor E7-8890 v4 scoring 6900 priced at an Intel estimated list price of \$165,000 to 8-socket IBM Power E870 scoring 4830 priced at public list price of \$1,592,788.

- SPECint\*\_rate\_base2006 benchmark results:
  - 8-chip IBM POWER8-based Power E870 (4830 baseline score) with 4TB of memory. Source: [http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=PM&subtype=RG&appname=STGE\\_PO\\_PO\\_USEN&htmlfid=POO03017USEN&attachment=POO03017USEN.PDF](http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=PM&subtype=RG&appname=STGE_PO_PO_USEN&htmlfid=POO03017USEN&attachment=POO03017USEN.PDF).
  - Intel estimate for 8-chip Intel Xeon processor E7-8890 v4 (6900 baseline score) with 2TB memory.
- Estimated power:

- 8-chip IBM Power E870 with 8 x 4.19 GHz POWER8\* processors, 4 TB memory, 2 HDDs. (5068 watts max power). Source: <http://www-912.ibm.com/see/EnergyEstimator>.
- Intel estimate for 8 x E7-8890 v4 processors/2 TB memory/ 2x146G 15K SAS drives. (2496 watts max power). Power estimate based on 8-chip Xeon® E7-8890 v4-based solution (Lenovo x3950 server). Source: <https://lenovopress.com/tips1251-system-x3950-x6-6241>.
- Estimated list pricing:
  - 8-chip IBM Power E870 Pricing of \$1,592,788: 8 x 4.19 GHz POWER8\* processors, 4 TB memory, 2 HDDs. Source: IBM United States Prices 114-160, dated October 6, 2014 (hardware list prices). Source: As of May 23, 2016, IBM System P Power Based Products List Price File – July 2015 <https://www-304.ibm.com/easyaccess3/fileserv?contentid=259221>
  - 8-chip Brickland-EX platform Intel estimated price of \$165,000 with 8x Intel Xeon processor E7-8890 v4 processors, 2 TB memory, 2 HDDs.

<sup>4</sup> “Up to 70 percent more encryption performance per core” claim based on RSA 4096 bits (Sign, testing by Intel) with 4x Intel Xeon processor E7-8890 v3 at 22M cycles/op compared to 4x Intel Xeon processor E7-8890 v4 at 13M cycles/op. Lower is better.

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