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Intel Powers the World's Fastest Supercomputer, Reveals New and Future High Performance Computing Technologies

NEWS HIGHLIGHTS

- The new world's fastest supercomputer is powered by Intel® Xeon Phi™ coprocessors and Intel® Xeon® processors, delivering twice the speed of the previous leader.
- Intel processors power more than 80 percent of all systems on Top500 list of world's most powerful supercomputers including 98 percent of new listed systems.
- Intel expands the portfolio of current generation coprocessors with new Intel® Xeon Phi™ 3100 and 7100 product families, providing a variety of cost and performance options.
- Intel also disclosed the next generation of Intel® Xeon Phi™ technology, codenamed "Knights Landing," promising to extend its supercomputing leadership.

INTERNATIONAL SUPERCOMPUTING CONFERENCE (ISC'13), Leipzig, Germany, June 17, 2013 – A system built with thousands of Intel® processors and co-processors was just named the most powerful supercomputer in the world in the 41st edition of the Top500 list of supercomputers.

The system, known as "Milky Way 2," includes 48,000 Intel® Xeon Phi™ coprocessors and 32,000 Intel® Xeon® processors and operates at a peak performance of 54.9 PFlops (54.9 quadrillion floating point operations per second) -- more than twice the performance of the top rated system from the last edition of the Top500 list in November 2012. This is the first exclusively Intel-based system to take the top spot on the list since 1997.

Intel also announced the expansion of the Intel Xeon Phi coprocessors portfolio and revealed details of the second generation of Intel Xeon Phi products code named "Knights Landing." The new products and technologies will continue to radically increase the energy efficiency and performance of supercomputers worldwide.

The worldwide high performance computing (HPC) server segment is expected to grow its annual revenue by 36 percent[1] from $11 billion to $15 billion over the next four years. The dramatic increase and growth of supercomputers continues to be driven by the need to quickly compute, simulate and make more informed decisions across a range of industries. Supercomputers are used to increase the accuracy of weather predictions, help to explore more efficient energy resources, develop cures for diseases, sequence the human genome and analyze big data.

"Intel is helping to blaze a path toward new innovation, discovery and competitiveness with its supercomputing vision and products," said Raj Hazra, vice president and general manager of Technical Computing Group. "There is an insatiable demand for more computing power while also achieving new levels of power efficiency. With the current and future generations of Intel Xeon Phi coprocessors, Intel Xeon processors, Intel® TrueScale fabrics and software, Intel is uniquely equipped to deliver a comprehensive solution for our customers without compromise."

Since the introduction of Intel Xeon Phi six months ago, Intel Xeon processors and Intel Xeon Phi co-processors have become a powerful combination now powering many of the world's fastest supercomputers. Intel Xeon Phi coprocessors based on the

Intel® Many Integrated Core (Intel MIC) architecture address the need for higher performing yet more energy efficient and user-friendly technology.

"Milky Way 2" - the World's Fastest Supercomputer

Built for the National Supercomputing Center in Guangzhou China, the "Milky Way 2" system is powered by 32,000 of the upcoming 12-core Intel Xeon processors E5-2600 v2 based on Ivy Bridge architecture, and 48,000 Intel Xeon Phi coprocessors, with a total system power of 17.8 MW. Not only is it the fastest, but also one of the most power-efficient systems on the Top500 list. The system uses "neo-heterogeneous architecture," whereby the hardware architecture has multiple classes of compute capabilities that are accessed by a common programming model, streamlining development and optimization processes – an advantage not possible when using a combination of CPUs and GPU accelerators.

The system's leading performance and energy efficiency were achieved by using the upcoming Intel Xeon processor E5-2600 v2 product family based on Intel's leading 22nm manufacturing process. In addition to powering the "Milky Way 2", these processors also power two other systems on the Top500 list from Bull*, the 54th ranked system with 557 TFlops and the 329th with 139 TFlops, as part of an "early ship" program Intel uses to equip supercomputer customers. The products will be generally available next quarter, and will feature up to 12 cores and up to 2.7GHz clock speeds, delivering 259 GFlops per socket, a 56 percent increase over the previous generation.

More than 80 percent (403 systems) of the supercomputers on the 41st edition of the Top500 list are powered by Intel processors. Of those systems making their first appearance on the list, Intel-powered installations account for 98 percent. The June edition of the list had recorded 11 systems based on the Intel Xeon Phi coprocessor, including the Petaflops class systems like "Milky Way 2" at 54.9 PFlops and "Stampede" at 8.5 PFlops of peak performance.

The semi-annual TOP500 list of supercomputers is the work of Hans Meuer of the University of Mannheim, Erich Strohmaier and Horst Simon of the U.S. Department of Energy's National Energy Research Scientific Computing Center, and Jack Dongarra of the University of Tennessee. The complete report is available athttp://www.top500.org/

New Intel® Xeon Phi™ Coprocessor 3000 and 7000 Product Families

Intel also announced the expansion of its current generation Intel Xeon Phi coprocessors with the addition of five new products that feature various performance options, memory capacity, power efficiency and form factors that are available today. The Intel Xeon Phi coprocessor 7100 family is designed and optimized to provide the best performance and offer the highest level of features, including 61 cores clocked at 1.23GHz, 16 GB of memory capacity support (double the amount previously available in accelerators or coprocessors) and over 1.2 TFlops of double precision performance. The Intel Xeon Phi coprocessor 3100 family is designed for high performance per dollar value. The family features 57 cores clocked at 1.1 GHz and 1TFlops of double precision performance.

Lastly, Intel added another product to the Intel Xeon Phi coprocessor 5100 family announced last year. Named the Intel Xeon Phi coprocessor 5120D, it is optimized for high-density environments with the ability to allow sockets to attach directly to a mini-board for use in blade form factors.

"Knights Landing" – A Choice of Coprocessor or CPU

Intel revealed details of its second generation Intel Xeon Phi products aimed to further increase their supercomputing capabilities. Codenamed "Knights Landing," the next generation of Intel MIC Architecture-based products will be available as a coprocessor or a host processor (CPU) and manufactured using Intel's 14nm process technology featuring second generation 3-D tri-gate transistors.

As a PCIe card-based coprocessor, "Knights Landing" will handle offload workloads from the system's Intel Xeon processors and provide an upgrade path for users of current generation of coprocessors, much like it does today. However, as a host processor directly installed in the motherboard socket, it will function as a CPU and enable the next leap in compute density and performance per watt, handling all the duties of the primary processor and the specialized coprocessor at the same time. When used as a CPU, "Knights Landing" will also remove programming complexities of data transfer over PCIe, common in accelerators today.

To further boost the performance for HPC workloads, Intel will significantly increase the memory bandwidth for all "Knights Landing" products by introducing integrated on-package memory. This will allow customers to take full advantage of available compute capacity without encountering memory bandwidth bottlenecks experienced today.

More information on Intel news from ISC'13 including Raj Hazra's presentation are available on the Intel Newsroom.

About Intel
Intel (NASDAQ: INTC) is a world leader in computing innovation. The company designs and builds the essential technologies that serve as the foundation for the world's computing devices. Additional information about Intel is available at newsroom.intel.com and blogs.intel.com.

1 Source: IDC: Worldwide Technical Computing Server 2013–2017 Forecast

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