Press Release

**HPC Systems Inc. Expands The Science Cloud Offering with The Latest Arm-based HPC**

**Dallas, Texas, November 12, 2018** – HPC Systems Inc., launched Science Cloud with Arm HPC. With this ARM-based Science Cloud, our customers including the scientists and engineers in many fields can have an alternative platform choice for their researches and applications that can be more efficient, better performance per watt and per dollar, and reduced TCO.



In big data analytics, machine Learning (ML), deep learning, and artificial intelligence (AI), as well as scientific computing, high performance computers with high-density processors are becoming more common, exceeding the power consumption of 2kW in one compute node. Additionally, the demand for cloud computing services in scientific computing across physics, chemistry, drug discovery, and engineering has increased in recent years.

In the United States, Europe, China, and Japan, the Exascale Computing Project is underway targeting 2021–2024 for its next generation supercomputer. In Japan, the Post-K next-generation supercomputer, which aims for the world's highest level of versatility and is based on the Arm®v8-A architecture, the application execution performance can outperform the K Computer up to 100 times, and a power consumption of 30-40 MW compared with 12.7 MW for the K computer.

HPC Systems, in cooperation with Arm, Marvell, and HiSilicon, carefully verified hardware operations, including the InfiniBand interconnect with the Armv8-A architecture, to ensure compatibility for a broad range of HPC applications. With verification and validation efforts including performance bench-marking on various discipline applications, such as simulation applications GAMESS, Gromacs, LAMMPS, OpenFOAM and more, the users can easily execute codes and data onto our Science Cloud platforms without any difficulty. HPC Systems now offers their Science Cloud with Arm HPC platform to the global market, and will announce availability at the Supercomputing Conference (SC18: https://sc18.supercomputing.org/ ) which will be held from November 12th − 15th 2018 in Dallas, Texas. We will continue to upgrade the hardware and middleware platform as well as optimize numerous applications and port them to our Science Cloud with Arm HPC.

"The HPC market is rapidly evolving and expanding with the continued adoption of the Arm architectures," said Brent Gorda, senior director of HPC, Infrastructure Line of Business, Arm. "The Science Cloud with Arm HPC is a step forward in enabling optimized compute capabilities, based on the Armv8-A architecture, and delivering powerful and efficient solutions for HPC."

"HPC Systems has demonstrated excellence in developing and deploying high performance and scientific solutions to leading customers in some of the most demanding compute segments," said Larry Wikelius, Vice President Ecosystem and Partner Enabling at Marvell Semiconductor, Inc. "Marvell's ThunderX2 64-bit Arm® V8 processor delivers the compute and memory performance that is fundamental to the Science Cloud with Arm HPC offering and we welcome HPC Systems to the growing Arm server ecosystem."

" IDC Frontier Inc. welcomes the launch of HPC Systems' Science Cloud with Arm HPC. The HPC environment specialized in leading Scientific Computing and IDC Frontier combining robust and reliable facilities and strong security, I am confident that the combination with the data center is the best for computational science solutions. IDC Frontier will continue to contribute to solving problems in research and development of universities, government agencies and companies along with HPC Systems. said Katsuhisa Suzuki, President & CEO of IDC Frontier Inc."

Main features of Science Cloud with Arm HPC:

| CPU | CPU Model | Marvell® ThunderX2® | HiSilicon Hi1616 |
|-----|-----------|---------------------|------------------|
|     | ISA | Armv8.1 64bit | Armv8-A 64bit |
|     | # Core | 28 | 32 |

|  |  | 56 | 64 |
|---|---|---|---|
|  | # Core/ Node | 56 | 64 |
|  | Clocks | 2.0GHz | 2.4GHz |
|  | # CPU | 2 | 2 |
|  | # Memory Channel/ Node | 16 | 8 |
| Memory | Memory Type | DDR4-2666 | DDR4-2133 |
|  | DIMM Sizes | 16GB | 16GB |
|  | # DIMM | 8 | 16 |
|  | Total Size | 128GB | 256GB |
| Storage |  | SATA3 480GB SSD x2 (Soft RAID1) | SATA3 300GB HDDx1 |
| OS |  | CentOS, Ubuntu | CentOS, Ubuntu, Red Hat Enterprise Linux |
| NIC |  | Dual 10 Gigabit Ethernet, Mellanox MT27700 ConnectX-4 Mellanox, MT27800 ConnectX-5 | Dual 10 Gigabit Ethernet, Mellanox MT27800 ConnectX-5 |
| Hardware Price/ Month |  | JPY150,000/node | JPY150,000/node |
| Ready-for-Setup Applications |  | GROMACS / LAMMPS / GAMESS / OpenFOAM / VMD etc. ※1. | |
| Compiler |  | Arm Compiler for HPC／GCC※2. | |
| Numerical Libraries |  | Arm Performance Libraries※2. | |
| MPI Library |  | Open MPI※2. | |
| Application Price/ Month ※3. |  | JPY100,000 | |
| Options Application Build Arm Allinea Studio, Others |  | Please contact for more detail | |

We support other system configuration such as memory HDD, SSD sizes by request.

※1. Please contact us for available applications. In some cases, it may be necessary for user to register and acquire a license in advance.

※2. Compilers and libraries are subject to register and acquire a license in advance.

※3. Price per Application.

About Marvell® ThunderX2®

The ThunderX2® family includes over 40 different SKUs for both scale up and scale out applications, ranging from top bin 32 core 2.5GHz parts to 16-core 1.6GHz parts, mapping directly across Intel's Xeon Skylake server CPUs from highest end Platinum to low end SKUs.

The ThunderX2® family offers 2-4X better performance per dollar compared to Xeon Skylake family of processors. The ThunderX2® family is fully compliant with Armv8-A architecture specifications as well as the Arm Server Base System Architecture and Arm Server Base Boot Requirements standards. The ThunderX2® SoC family is supported by a comprehensive software ecosystem, ranging from platform level systems management and firmware to commercial Operating Systems, Development Environments and Applications.

Marvell®, and ThunderX2®, are trademarks, or registered trademarks of Marvell Semiconductor, Inc. in the United States and/or other countries.

About HiSilicon Hi1616 Processor

HiSilicon second generation Arm processor is HiSilicon's latest CPU that implements Arm's high-end Cortex-A 72 microarchitecture. It supports Armv8-A 64-bit instruction set and 128-bit NEON SIMD extension instruction set. While installing 32 large number of cores, the operating frequency has been improved from 2.1 GHz to 2.4 GHz compared with the previous generation, contributing to high performance. In addition, the L2·L3 cache is comparatively large as 2MB/core, which is designed to be effective for speeding up applications that have lots of continuous access to the cache, such as fluid dynamics and quantum chemistry.

About HPC Systems Inc.

Established in July 2006, HPC Systems Inc. (www.hpc.co.jp) develops, manufactures, and sells high-performance computers that perform scientific and technological calculations conducted by research and development institutions in the public and private sectors. HPC Systems provides optimal cluster and parallel file systems, integration, tuning acceleration services, HPC cloud services, computational chemistry solutions, and research and development support.

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