Garuda, a multi-purpose research platform from the Systems Biology Institute (SBI) reaches new heights through InfiniCloud, a scalable High Performance Computing Cloud platform for Data-Intensive Workflows

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SINGAPORE – The Garuda Alliance, anchored by SBI in collaboration with two A*STAR's research institutes, the Institute for Infocomm Research (I^2R), which hosts the Singapore node of SBI, and the Genome Institute of Singapore (GIS), have successfully demonstrated the deployment of a high performance version of its community-driven, industry-wide standard software applications connectivity and analytics platform, called "Garuda" at a workshop at the 15th International Conference on Systems Biology (ICSB) held in Singapore from 23-26 Nov 2015.

SBI researchers have implemented the Garuda Analytics Platform on InfiniCloud, a new High Performance Computing (HPC) cloud environment set up on supercomputers in Singapore. This HPC environment is powered by the latest Intel Haswell chips, and connected by InfiniBand links for high speed/low latency data transfers.

"We are extremely pleased with the opportunity to work with SBI researchers to implement the Garuda Analytics platform on our HPC cloud system to accelerate data analysis by combining fast compute and high speed transfer of data within a virtual cluster. It has been a pleasure working with SBI researchers on this exciting collaborative project that will shape the future of big data analytics", said the principal investigator of this breakthrough HPC cloud platform, Assistant Professor Kenneth Ban from NUS.

Dr. Shyam Prabhakar, Associate Director, Integrative Genomics, GIS, added "We are excited to be able to incorporate our single cell analysis algorithms into the Garuda environment. Through working alongside with other A*STAR entities such as A*CRC and I^2R, the HPC implementation of Garuda in Singapore will greatly enhance our capabilities in big data analytics."

Dr. Hiroaki Kitano, President, SBI Tokyo, and a pioneer in systems biology and Artificial Intelligence (AI), remarked, "we are delighted that A*CRC and NSCC agreed to back us up in setting up a workshop to demonstrate HPC Garuda. Although the timeline was really tight, the teams managed to achieve such a tremendous acceleration in various pipelines which Garuda uses." Examples of Garuda-enabled applications, called Garuda gadgets, which benefited from such an HPC environment, include healthcare and wearable data analytics gadget, real-time notification processing and large-scale

data visualization gadgets.

The InfiniCloud platform combines high performance computing with the high speed/low latency InfiniBand network architecture linked to fast I/O storage systems to accelerate the processing of data-intensive workflows on Garuda.

SBI, GIS and I^2R intend to set up a research collaboration using A*CRC and NSCC's supercomputing resources to further investigate how advanced features of RDMA over InfiniBand in high performance clusters can be used to advantage, especially in workflows which are time-critical.

Dr. Samik Ghosh, Senior Scientist and principal investigator from SBI on this project, opined: "NSCC will be able to provide computer data storage with advanced I/O speed of up to 500GBytes per second, and it would be very interesting to see the acceleration in many I/O-bound applications. In addition, we hope to test out high memory requirement applications, including machine learning and big data analytics gadgets, which are often rate-limiting bottlenecks. The high memory requirement applications will be able to speed-up on A*CRC/NSCC's high memory fat nodes, of 1 to 12 TBytes RAM."

"Some of our steps," he added, "require large data flow across continents. We hope that NSCC will allow us to work on their recently acquired 100Gbits per second connection between Singapore and the US, as well as the 10Gbits per second connection between Singapore and the EU. What is interesting to us is that they are about the only people in the world testing out InfiniBand over trans-continental distances. This means that we can now contemplate deploying multiple Garuda environments in distributed locations worldwide and allowing them to interoperate over global distances. We look forward to explore and expand the opportunities to accelerate the platform in next generation research across our innovation network in academia as well as industry"

About SBI

The Systems Biology Institute (SBI) is a non-profit private research institution established in 2000 by Hiroaki Kitano, a pioneer in systems biology, with the aim of promoting systems biology research and its application to medicine and global sustainability. SBI focuses on rapid translation of basic research to practical outcomes including drug discovery, biomarker identification, medical decision making, healthcare applications, global sustainability, and a range of technology solutions supporting the field. SBI has been working closely with academic institutions around the globe as well as numerous pharmaceutical companies, technology providers, and biotechnology firms in order to fast track basic science into reality.

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