

Singapore researchers plug in to world's fastest supercomputer

New collaboration between Japan's RIKEN Center for Computational Science (R-CCS), Research Organization for Information Science and Technology (RIST) and National Supercomputing Centre (NSCC) Singapore, will allow Singapore scientists to directly tap on Japan's Fugaku supercomputer to do ground breaking research, enhance educational activities and develop talent in high performance computing (HPC).

Singapore, 30 November 2020 – A partnership between Singapore's national supercomputing resource, NSCC, Japan's RIKEN and RIST allows Singapore-based researchers to directly access the vast supercomputing resources of the world's fastest supercomputer, *Fugaku*. At 442 Petaflops (PFLOPS) of computing power, *Fugaku* is nearly three times more powerful than its nearest competitor and is at the top of the latest November 2020 edition of the global [TOP500 supercomputer listing](#). Singapore researchers will now be able to apply for *Fugaku*'s huge computing resources through regular project calls and connect directly via dedicated high-speed, high-bandwidth research optical fibre links of up to 100 Gbps. The accessibility to *Fugaku*'s computing resources is in addition to Singapore's petascale compute power that local researchers already have available at NSCC.

"Singapore researchers will have the honour of being one of the first in Asia to have access to the amazing compute power of *Fugaku*," said Associate Professor Tan Tin Wee, Chief Executive of NSCC. The broad spectrum of HPC cooperation between the two centres includes joint training, workshops and summer schools; talent exchange and student internship programmes; HPC support for research and talent capability building in areas like high-impact HPC-intensive national research projects and student competitions; and direct high-speed data transfer and storage linkages with both RIKEN and RIST. "The *Fugaku* access, in addition to the supercomputer resources already available at NSCC, will give local researchers the opportunity to think beyond the conventional and to perform research at much more complex and larger scales."

NSCC's national supercomputer is already functioning at more than 90% capacity with users from Singapore's research institutes, institute of higher learning (IHLs) and industry leveraging the resources for research, education and industry-based HPC projects. The demand for HPC is expected to increase exponentially in Singapore's drive towards a smart nation. The government announced a S\$200 million upgrade of the current supercomputer resources at the SupercomputingAsia 2019 (SCA19) conference in March 2019. "Singapore's national supercomputing resources are already stretched thin and the HPC upgrades will ensure local researchers and organisations are better enabled, equipped and prepared for a much more digitalised future," added A/Prof Tan Tin Wee who said that the current 1 PFLOPS system will be enhanced to a 10-15 PFLOPS system over the next few years. "In the meantime, local researchers can be assured of additional seamless, continued access to HPC resources in Singapore and through our partnership with RIKEN and RIST."

"Even before being fully commissioned, *Fugaku* has already made strides in providing solutions for the COVID-19 pandemic by speeding up the identification of potential drug candidates and developing simulations that demonstrate the spread of coronavirus in indoor settings and on trains," said Prof Satoshi Matsuoka, Director of R-CCS and one of the architects of the *Fugaku* supercomputer. "We hope that by sharing such examples and *Fugaku*'s resources we can inspire more of our researchers, and colleagues from other countries, to leverage the power of HPC in their own research work. This partnership between the top tier national HPC centres of Japan and Singapore is a significant step in that direction."

"RIST has been collaborating with NSCC by exchanging information on promotion of shared use of

supercomputers since 2016. Project calls for supercomputer *Fugaku* have started this year, and NSCC and RIST have been exploring cooperation on supercomputer *Fugaku*. I believe that the new establishment of the partnership between NSCC and RIKEN will promote the collaboration between Singapore and Japan and we can work together to produce amazing outcomes on *Fugaku*,” said Dr Hideyuki Takatsu, Managing Director of RIST.

Supercomputers have been instrumental in most of the world’s major scientific advancements. These include enabling complex computational and data-intensive tasks to be completed much more quickly in fields as diverse as advanced scientific modelling & simulations, artificial intelligence, weather forecasting, climate research, oil and gas exploration, chemical and biomolecular modelling, and quantum computing. The research has led to modern scientific achievements like deciphering the human genome, enhanced air travel, space exploration, biomedicine, unravelling the secrets of the universe and even research on solutions for pandemics like COVID-19.

A MoU was endorsed on 16th September 2020 between R-CCS and NSCC, and complements an existing MoU with RIST. The collaboration with RIKEN covers access and data sharing to *Fugaku* while RIST will work with NSCC on promoting HPC research utilisation by cooperating on HPC project research calls and shared supercomputing use. Singapore researchers who are interested to apply for HPC resources from Japan can do so at <https://www.nscg.sg/open-calls-hpc-resources-from-japan/>.

Glossary

- **PFLOPS** - Floating-point operations per second (FLOPS) is the measurement of the processing speed of supercomputers with Peta, or one quadrillion, referring to scale, or the number of calculations that can be performed in one second.
- **Gbps** – Gigabits per second or the measure of bandwidth on a digital data transmission medium such as optical fibre.

Chinese Translations

- National Supercomputing Centre (NSCC) Singapore - 新加坡国立超级电脑中心

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ANNEX attached - MoU signing between R-CCS and NSCC
- About NSCC, R-CCS and RIST

ANNEX



(Left) Professor Satoshi Matsuoka, Director of the RIKEN Center for Computational Science (R-CCS) and Associate Professor Tan Tin Wee, Chief Executive of the National Supercomputing Centre (NSCC) Singapore signing the Memorandum of Understanding (MoU) to kickstart the partnership between the two centres.

About the National Supercomputing Centre (NSCC) Singapore

The National Supercomputing Centre (NSCC) Singapore was established in 2015 and manages Singapore's first national petascale facility with available high performance computing (HPC) resources. As a National Research Infrastructure funded by the National Research Foundation (NRF), we support the HPC research needs of the public and private sectors, including research institutes, institutes of higher learning, government agencies and companies. With the support of its stakeholders, including Agency for Science Technology and Research (A*STAR), Nanyang Technological University (NTU), National University of Singapore (NUS), Singapore University of Technology and Design (SUTD), National Environment Agency (NEA) and Technology Centre for Offshore and Marine, Singapore (TCOMS), NSCC catalyses national research and development initiatives, attracts industrial research collaborations and enhances Singapore's research capabilities. For more information, please visit <https://www.nscg.sg/>.

About RIKEN Center for Computational Science (R-CCS)

As the leadership center of high-performance computing, we explore “the science of computing, the science by computing, and the science for computing.” We at the RIKEN Center for Computational Science (R-CCS) will carry out the following mission:

Develop and operate the supercomputer Fugaku efficiently and effectively to serve as a core of high performance computing research, and further expand the number of users, improve the ease-of-use, and promote educational activities.

Facilitate leading edge infrastructures for research based on K and Fugaku, and moreover conduct translational research to elevate the operational technologies for large-scale computing facilities to world-leading levels.

Conduct cutting-edge research on high performance computing, and promote the results through open-source software, allowing our deliverables to further incubate new values in world’s technological developments based on high-performance computing.

About Research Organization for Information Science and Technology (RIST)

Research Organization for Information Science and Technology (RIST) is a general incorporated foundation which has been carrying out usage promotion services of the Japanese flagship computers (first the K computer, then the successor supercomputer Fugaku since 2020), commissioned by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT), since 2014. Our scope includes project selection, user support, and help spreading research results of projects. In addition, since 2017, RIST has also taken a role as the operation office of the innovative High Performance Computing Infrastructure (HPCI). Within a framework of HPCI, we are in charge of managing computational resources and promoting usage.