National Supercomputing Centre (NSCC) Singapore e-newsletter

NEWSBYTES

October 2020

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LET'S BEGIN

CORPORATE NEWS

Supercomputing access is coming to the Institute of Technical Education (ITE) Singapore

ITE to leverage the power of high performance computing (HPC) for use in applied AI projects, workshops and training, and HPC-related student competitions in ITE-NSCC Singapore collaboration.

A Memorandum of Understanding (MoU) signed between NSCC and ITE in a virtual ceremony on 2 October 2020 kicked off a new collaboration that gives supercomputing access to ITE students and staff. The access enables them to leverage HPC for a host of ITE's AI-related projects, and covering ITE's pedagogy, training and student competitions.

“HPC will play a key role in the development of smart nation innovations as digitalisation accelerates and a greater number of complex technological applications come online,” said Associate Professor Tan Tin Wee, Chief Executive of NSCC. “Apart from providing local researchers with easy access to national supercomputing resources and capabilities to create new smart nation innovations, it is equally important to get our youth started early on HPC to nurture the next generation of data scientists, genomics researchers, advanced manufacturing technologists and AI scientists.”.

“Our partnership with NSCC plays a crucial role in enhancing the technological capabilities of ITE’s teaching and training programmes. The staff can leverage high computing power to experiment and innovate while the students will have access to this super computer for their learning and projects,” said Ms Low Khah Gek, Chief Executive Officer, ITE.

Some of the examples of ITE’s innovations for pedagogy and assessment include **In-Class Video Analytics of Students** to analyse emotions and non-verbal cues of students during lessons; and **Video Analytics and AI-enabled Assessment of Practical Skills** to assess students when they perform timed practical tasks such as servicing or operating machinery and equipment.

“With the supercomputers, speed, ease of use, accuracy and productivity of such AI-related innovations would be greatly improved,” added Ms Low.

ITE and NSCC will also explore co-organising HPC workshops for students and student competitions in areas like AI applications. Read more about the ITE-NSCC collaboration in the Media Release.

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Singapore Polytechnic is the first local polytechnic to sign MoU with NSCC for full access to supercomputers

The partnership will enable SP’s staff and students to develop AI innovations for local industries.

NSCC and Singapore Polytechnic (SP) have established a two-year Memorandum of Understanding (MoU) that will grant SP access to NSCC’s high performance computing (HPC) resources. SP will use the resources to

develop AI programmes for local enterprises in their digital transformation journey. These solutions could include the use of large and complex AI or big data analytics solutions, which are typically too resource-intensive to be done using regular computer servers.

The partnership will also see SP students tapping on NSCC's HPC expertise to participate in HPC and AI related competitions, and seed programmes for test-bedding new AI solutions.

The virtual signing ceremony was held in conjunction with the launch of SP and Transwarp's inaugural Singapore edition of the virtual Collegial Artificial Intelligence Innovation Competition (CAIIC) 2020 on 7 October 2020.

Associate Professor Tan Tin Wee, Chief Executive of the National Supercomputing Centre (NSCC), said: "High performance computing will be a key undergirding resource in a Smart Nation Singapore as increasingly advanced and complex technologies come online. Even though the national supercomputing resources at NSCC are already made available to all local research organisations, institutes of higher learning and companies, we want to expose youth to the HPC experience early on, and as part of their education journey. This is so that they are adequately equipped to contribute to the nation's next generation of innovations as they progress to higher education and out into the workforce."

Mr Soh Wai Wah, Principal & CEO of Singapore Polytechnic, said: "The battle for more AI talent has never been more critical and urgent as the pace with which businesses and nations are moving to adopt AI is accelerating. Our strategic partnership with NSCC will empower and challenge our students and staff to acquire the domain expertise and create cutting-edge AI solutions that will not only boost Singapore's capability to power its digital economy, but also contribute to our goal in becoming a Smart Nation."

Read more about the SP-NSCC collaboration in the Media Release.

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Getting a headstart on HPC

As high performance computing grows in relevance in various industries, Singapore Polytechnic is prepping its students for the future from the comfort of their classrooms.

First introduced in 1954 to meet the country's need for skilled labour, polytechnics have played a pivotal role in Singapore's successful industrialisation. But the world has profoundly changed since then, particularly following the invention of the integrated circuit in 1959.

Today, powerful supercomputers with tens of thousands of chips are nothing out of the ordinary. With governments and industries alike increasingly facing complex problems answerable only with high performance computing (HPC), polytechnics must quickly adapt to equip their students with the skills to meet the latest industry needs.

To help their students stay ahead, Singapore Polytechnic (SP) has launched a full-time Diploma in Data Analytics and Artificial Intelligence (DAAA) — the first of its kind among the five polytechnics in Singapore. But DAAA offered by the School of Computing (SoC) isn't your run-of-the-mill data science/AI program. HPC, for example, features quite prominently in DAAA's Practical AI module, enabling students to gain first-hand experience in a concept that had hitherto been thought inaccessible.

"Many industries, especially consumer companies, are deploying machine learning and deep learning for their production lines. For such applications, especially those that are computationally expensive, they won't be using normal servers and personal computers," said Dr Edna Chan, Centre Director of SP's Data Science and Analytics Centre in an interview with Supercomputing Asia. "It's important for SP students to understand how HPC can be used in such situations and applications and be ready to make use of HPC when they enter the workforce," she added.

The School of Computing is planning to build two AI and Analytics Colabs equipped with 50 deep learning graphics processor units (GPU)-powered workstations and servers. Meanwhile, the School of Electrical & Electronic Engineering's (SEEE) machine learning and AI laboratory will have 25 NVIDIA RTX GPU-powered workstations for training and modeling deep neural networks—an evolution of machine learning where brain-inspired artificial neural networks learn from large amounts of data.

"Students can leverage HPC resources graciously provided by the National Supercomputing Centre when far more intensive computation is required," Dr Chan said.

Head over to https://www.nscc.sg/supercomputing-asia-magazine/ to read the full interview piece published in the July issue of NSCC's Supercomputing Asia Magazine to find out more about how SP is building an HPC-ready workforce.

To find out more about the NSCC's HPC resources and how you can tap on them, please contact e-news@nscc.sg.

Visit www.nscc.sg/case-studies to learn more about how supercomputers are helping Singapore.

This article was first published in the print version of Supercomputing Asia, July 2020.
Credit: Kamila Navarro, Science Writer, Asian Scientist Magazine

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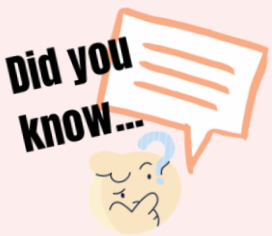
Tips on Lustre File Striping

Giving better performance for large files.



/scratch is on a Lustre filesystem, and Lustre allows users to stripe the data over multiple OSTs (Object Storage Targets)

For large files, we recommend to stripe it to multiple OSTs. Having only just one stripe for a very large file will fill up the sole OST quickly and cause imbalance to the overall file system's OSTs usage, and thus affect the file system performance. You can stripe your files to multiple OSTs by first setting the number of stripes to a directory where the files would be written to.

For example:
$ lfs setstripe -c 1 <dirname>
Files written into “dirname” will be striped to just one OST (this is the default).

$ lfs setstripe -c 2 <dirname>
Files written into “dirname” will be striped to two OSTs.

$ lfs setstripe -c 3 <dirname>
Files written into “dirname” will be striped to three OSTs.

$ lfs setstripe -c -1 <dirname>
Files written into “dirname” will be striped to all available OSTs. We have 200 OSTs for the /scratch file system.

Additional Tips:

To check the striping of an existing file system, use the below command
$ lfs getstripe <filename>

To stripe an existing large file across different OSTs
$ lfs_migrate -c <num_of_osts> <filename>

To know more about Lustre striping, do visit http://wiki.lustre.org/Configuring_Lustre_File_Striping.

For more information and FAQs on ASPIRE 1, please visit:

https://help.nscc.sg

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THE LAST BYTE...

<SHARED CONTENT>

Shared articles and news from the HPC world.

Paths to HPC Series - Janna Nugent

This computational biology specialist took the scenic route to high performance computing.

The Paths to HPC series, presented in collaboration with Women in HPC, showcases the women working in high performance computing. Our hope is that by highlighting these trailblazers—and the sometimes unique paths they followed into the field—other women will feel inspired to envision themselves in similar roles. Today we talk with Janna Nugent, senior computational biology specialist, Northwestern University. Read more at Science Node here.

Credit: Science Node

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For Utah Opera's return, engineers study how air can flow safely through Capitol Theatre

The research is helping organisations make performance spaces safer amid the COVID-19 pandemic.

Credit: The Salt Lake Tribune

James Sutherland and Tony Saad have gotten to know the stages of Capitol Theatre and Abravanel Hall quite well — but they haven't performed at those venues. The two chemical engineers, researchers at the University of Utah and experts in "computational fluid dynamics," are helping musicians of the Utah Symphony and Utah Opera perform with less risk of spreading COVID-19 to each other or their audiences. Read more at The Salt Lake Tribune here.

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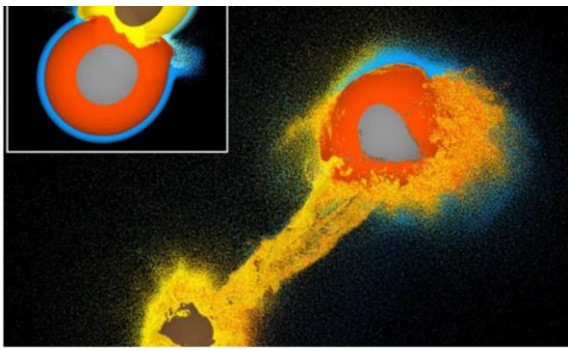
Planet collision simulations give clues to atmospheric loss from moon's origin

Earth could have lost anywhere between ten and 60 percent of its atmosphere in the collision that is thought to have formed the Moon.


Credit: Phys Org

New research led by Durham University, UK, shows how the extent of atmospheric loss depends upon the type of giant impact with the Earth. Researchers ran more than 300 supercomputer simulations to study the consequences that different huge collisions have on rocky planets with thin atmospheres. Read more at Phys Org here.

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