PARTNER WITH US

SCAsia
Supercomputing
Gathering the **Best of HPC** in Asia

sc-asia.org

SG NSCC National Supercomputing Centre
SINGAPORE

NSCC Singapore's flexible High Performance Computing (HPC) collaboration models are built for the diverse needs of businesses, government agencies, researchers, and educators to create a rich, diverse ecosystem of skills and infrastructure.

Industry: Leveraging HPC for a competitive edge

Explore a trial Proof-of-Concept collaboration with NSCC: a negotiated period of complimentary testing and proof-of-value as a starter kit. If you would like to continue using HPC to fuel innovation after the trial period and enjoy industry-competitive rates on services such as CPU / GPU or high performance storage resources, talk to us.

Stakeholders: Powering up your research

Stakeholder users or organisations affiliated to existing stakeholders (eg. A*STAR, NUS, NTU, SUTD) may be eligible to ride on the quotas already provided to our fee-paying stakeholders. Users can refer to their stakeholder representatives to check on the allocation and approval of usage of HPC resources.

Government and Academic Research Institutions: Transforming Singapore's research landscape

Singapore government agencies and research institutes have access to NSCC's advanced HPC-powered and enabled solutions. Organisations working on research and applications such as weather monitoring, virtual digital twin modelling, big data analytics, healthcare AI, precision medicine, and transport, can tap on NSCC resources via a collaborative model with competitive rates. Let us know if you are interested in conducting a complimentary Proof-of-Concept starter scheme with us.

Let's take this conversation further.

For more information about our collaboration models, talk to us at **bizdev@nscc.sg**.

Gathering the Best of HPC in Asia

SUPERCOMPUTING IN THE WORLD'S FASTEST GROWING REGION
SupercomputingAsia – Gathering the best of HPC in Asia

SupercomputingAsia (SCA) is an annual conference organised by NSCC Singapore that encompasses an umbrella of notable supercomputing and allied events in Asia. The key objective of SCA is to promote a vibrant and relevant HPC ecosystem where delegates gain access to visionary insights from thought leaders in academia and industry, as well as multiple networking opportunities with the supercomputing community in the region. Highlights of the conference include seminars and sessions covering current and future trends in HPC technology worldwide. These topics include AI, Quantum Computing, Exa and Hyperscale Infrastructure, HPC security, and HPC-enabled industry applications.

The conference has become a key networking and decision-making platform for regional and global supercomputing partners and collaborators. SCA has hosted or co-located key events and meetings that strengthened local, regional, and global cooperation in supercomputing technology. Examples include strategic meetings with regional and global HPC centre partners, workshops on HPC cloud and security, HPC in Precision Medicine workshops, Supercomputing Frontiers Asia, the Asia-Pacific Research Platform (APRP) and the ASEAN HPC Taskforce Meeting.

INDUSTRY
HPC technology updates & case studies

SCIENTIFIC
Paper presentations at Supercomputing Frontiers Asia

STRATEGIC SHOWCASE
Strategic verticals on the use of HPC

CO-LOCATED HPC EVENTS
Integrating the entire HPC ecosystem

TUTORIALS & EXHIBITIONS
Learn from the best in HPC

Organised by

SG NSCC National Supercomputing Centre
SINGAPORE

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SUPERCOMPUTING FOR ALL – POWERING DIGITAL INNOVATION

ASPIRE 1
Advanced
Supercomputer for
Petascale
Innovation
Research &
Enterprise

SINGAPORE'S SUPERCOMPUTING RESOURCE

The **National Supercomputing Centre (NSCC) Singapore** was established in 2015 and manages Singapore's national petascale facility. NSCC's supercomputing resources form a national research infrastructure. We support the research needs of the public and private sectors, including research institutes, institutes of higher learning, government agencies and companies.

ADDING VALUE TO RESEARCHERS AND BUSINESSES

Research:
Supercomputing helps make your research process quicker and more efficient by providing advanced high performance computing (HPC) and enabling solutions for your increasingly complex scientific research.

Business:
Supercomputing gives your business a competitive edge, reduces your time to market for products and services, increases productivity, helps lower costs, and enables the creation of higher value products by leveraging on the power of HPC.

Supercomputers empower researchers tackling the world's biggest challenges in data analytics, AI, quantum computing, biomedical sciences, manufacturing, e-commerce, finance, security, offshore & marine, healthcare, transportation, urban planning, and weather and climate change monitoring.

Transforming businesses – Offering that competitive edge

ERS Industries Pte Ltd, a local Singapore company specialising in data centre solutions, worked with NSCC and A*STAR's Institute of High Performance Computing (IHPC) to design and develop the E@Rack. This new product demonstrated a 33% improvement in thermal performance compared to normal data centre racks. With lower server temperatures, increased system reliability, longer device lifespan and reduced operating costs, the 'green' rack was also awarded a BCA Green Mark point.

Normal Rack E@Rack

WHAT CAN NSCC'S SUPERCOMPUTER DO FOR YOU?

Bring you closer to higher aspirations and more rewarding challenges
NSCC offers unique petascale computational power and dedicated support to give your extremely data-intensive, complex and potentially world-changing research projects that extra edge.

Faster and greater processing power
Our petascale system easily crunches massive amounts of data requiring millions of compute hours. This raw compute power is coupled with 100G Infiniband high-performance links across Singapore and globally, so you can work faster, larger, and more collaboratively.

Accessible and flexible
NSCC's infrastructure is open to all local public and private enterprises wanting to tap on the power of supercomputers. We welcome conversations with researchers, educators, and businesses to build flexible collaboration models and initiatives in order to maximise benefits of supercomputing.

Transformative
High performance computing (HPC) is vital to Singapore's innovation transformation in research and business. This includes powering high-resolution virtual modelling and simulation solutions, enabling digital twin technology, and supporting innovations in data-driven AI, as well as quantum technology initiatives across various sectors and industries, among others.

Technical Workshops and Talks

NSCC organises regular training workshops to equip users with the necessary skills to operate and navigate NSCC's supercomputer, ASPIRE 1. These workshops are tailored for varying levels of expertise.

INITIATIVES ENGAGED WITHIN THE HPC COMMUNITY

- Advanced Manufacturing and Engineering
- Aerospace
- Bioinformatics and Medical Informatics
- Climate Modelling and Weather Forecasting/Prediction
- Computational Finance/Fluid Dynamics/Material Science
- Data Analytics
- Data Centre and Networking

- Deep Learning/Machine Learning/Artificial Intelligence
- Genomics & Precision Medicine
- Immersive Media Production
- Life Sciences
- Offshore & Marine
- Quantum Physics/Chemistry
- Scientific Analysis

LOCAL AND GLOBAL CONNECTIVITY

Connectivity, ahead of the curve
NSCC's supercomputing power is augmented by a network of local and global connectivity resources that enable the quick, safe, and efficient transfer of large volumes of research data — an essential part of the equation in academia, research, and industry.

Islandwide networks
A dedicated high-speed, high-data Infiniband network fabric traversing Singapore enables seamless data sharing, and connects major research institutions across the island.

Enabling global collaborations
NSCC collaborates with the Singapore Advanced Research and Education Network (SingAREN) on high-performance local and global network connectivity to anticipate growing needs and enable links with international research platforms and partners.

Are you the best at moving huge amounts of research data across 100G links?

As science transforms and becomes increasingly data intensive, the need for higher speeds and better global coordination when moving large amounts of research data becomes crucial. The race is on to find solutions for sharing data quickly and securely between entities or computational resources around the world.
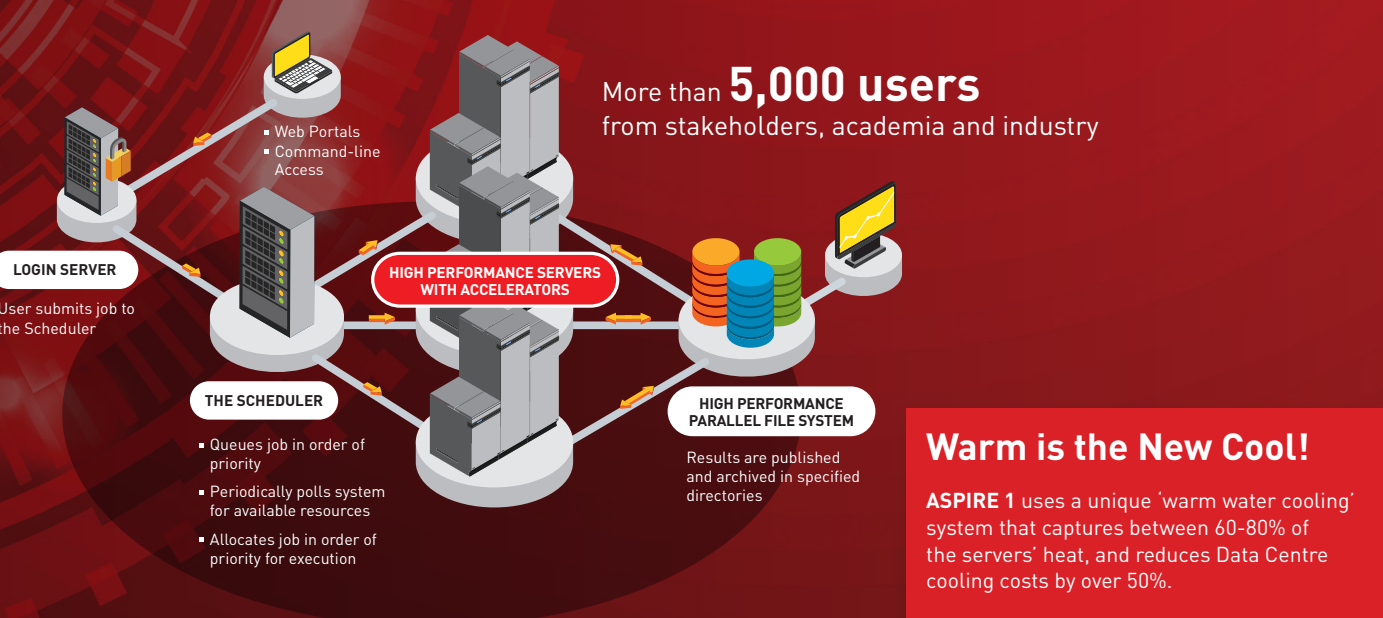
The NSCC-organised Data Mover Challenge is an annual international competition that challenges the brightest teams from around the world to solve complex and growing data-sharing challenges.

Think you can devise the most elegant, effective solution? Find out more at **www.sc-asia.org/dmc**.

SUPERCOMPUTING – FOR SCALE AND COMPLEXITY

Meet the ASPIRE 1 Supercomputer

A supercomputer is raw power. It is a million times more powerful than a commercial PC, and solves data-intensive problems and complex mathematical, analytical, and research challenges in a fraction of the time. **NSCC's Advanced Supercomputer for Petascale Innovation, Research & Enterprise (ASPIRE) 1** changes the way you do research. We have the expertise and tools for your HPC requirements. Our computational power supports and enables innovation in areas like Artificial Intelligence (AI), quantum computing, high-throughput computing, advanced virtual modelling and simulation, and beyond.

ASPIRE 1
Advanced
Supercomputer for
Petascale
Innovation
Research &
Enterprise

LOGIN SERVER
User submits job to the Scheduler

- Web Portals
- Command-line Access

THE SCHEDULER
- Queues job in order of priority
- Periodically polls system for available resources
- Allocates job in order of priority for execution

HIGH PERFORMANCE SERVERS WITH ACCELERATORS

HIGH PERFORMANCE PARALLEL FILE SYSTEM
Results are published and archived in specified directories

More than **5,000 users** from stakeholders, academia and industry

Warm is the New Cool!

ASPIRE 1 uses a unique 'warm water cooling' system that captures between 60-80% of the servers' heat, and reduces Data Centre cooling costs by over 50%.

Computing resources
- 1,288 compute nodes for CPU-based workloads
- 128 GPU nodes for scientific computing with accelerators
- 10 fat memory nodes for large memory calculations
- 6 DGX1 nodes for AI/ML/DL applications
- 2 visualisation nodes for rendering and scientific visualisation jobs.

Intra-connections (within the cluster) for computing
- Fully bisectional EDR InfiniBand
- Fat-tree topology

Inter-connections among A*STAR, NTU and NUS
- RDMA Long-Haul (10-80km) Connectivity

Storage
- 13PB GPFS and LUSTRE parallel file system
- Backup tier via DMF

Our Global 100Gbps Network

EUROPE JAPAN USA SINGAPORE AUSTRALIA