Thailand's Initiative concerning the development of environments for Research Infrastructure

Piyawut SRICHAIKUL, Ph.D.
NSTDA Supercomputer Center (ThaiSC),
National Electronics and Computer Technology Center,
National Science and Technology Development Agency

Japan-ASEAN Joint Online Workshop on
"The current situation and challenges concerning the development of research environments for advanced research equipment between Japan and ASEAN countries."
24 February 2023

Topics

Building an ASEAN Regional Research Infrastructure Strategy

Example: High Performance Computing Infrastructure

- **NSTDA Supercomputer Center (ThaiSC)**
- **ASEAN HPC Taskforce**

Building an ASEAN Regional Research Infrastructure Strategy

ASEAN COSTI Priority 2023

Copyright © All Right Reserved

01 Background

1. Researchers' Demand: supporting excellent science
2. Policymakers' Demand: knowledge transfer and innovation

- Major scientific equipment or sets of instruments such as synchrotrons, telescopes, and satellites
- Collections, archives or scientific data
- Computing systems and communication networks

To foster strong intra-regional cooperation ASEAN as well as increased cooperation with dialogue partners such as the EU

Copyright © All Right Reserved

02 Proposal

- Offer greater opportunities for interdisciplinary research both intra-ASEAN and between ASEAN and dialogue partners including the EU
- Address imbalances in research funding and research infrastructures among countries in ASEAN
- Meet the regional demand in ASEAN for knowledge transfer and capacity building
- Strengthen ASEAN's ability to respond to global challenges such as COVID-19provide the scientific community in ASEAN with access to state-of-the-art RI internationally

On 14 June 2022 a proposal to build an **ASEAN regional research infrastructure strategy**, which was sponsored by Thailand's Ministry of Higher Education, Science, Research and Innovation (MHESI), **was adopted as one of six ASEAN Annual Priorities 2023 at the 19th ASEAN Ministerial Meeting on Science, Technology and Innovation (AMMSTI-19)**

Copyright © All Right Reserved

03 Objectives

To build a regional research infrastructure strategy for ASEAN.

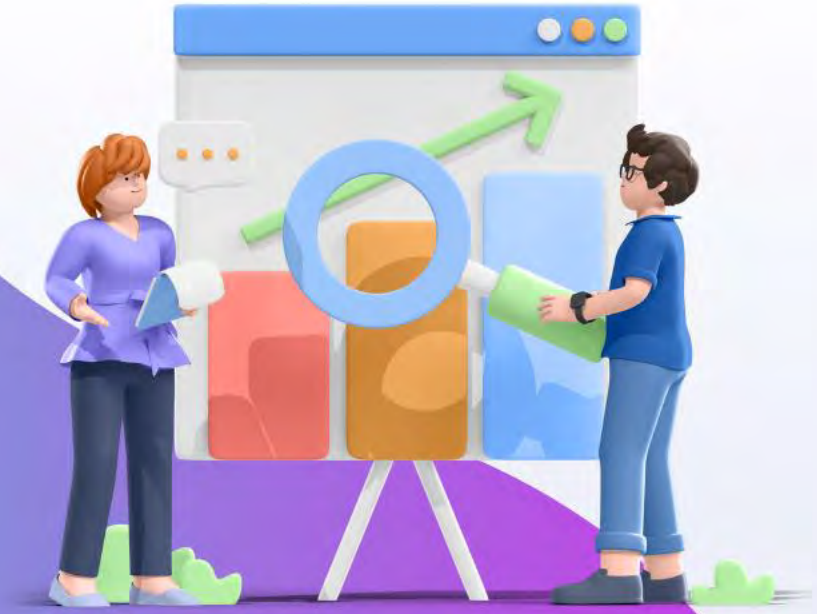
To strengthen cooperation among ASEAN RIs and their counterparts the European Union (EU) by establishing an ASEAN-EU Dialogue on Research Infrastructure.

Copyright © All Right Reserved

04 Project Funding

AMS :

- Mobility Support
- Technical Assistance Support



Potential Funding Source :

- E-READI
- ASTIF
- ASEAN Dialogue Partners

Copyright © All Right Reserved

05 Implementation

This implementation of this proposal will comprise three phases.

Phase I (2022-2023)

Strengthening an ASEAN-EU Policy Dialogue on Regional Research Infrastructure

Phase II (2023-2024)

Completing an ASEAN Research Infrastructure Landscape Study

Phase III (2024-2025)

Drafting the Roadmap for an ASEAN Research Infrastructure Strategy

Copyright © All Right Reserved

NSTDA Supercomputer Center

ThaiSC

Initiative Model For
Sharing HPC Infrastructure for ASEAN

NSTDA at Glance

National Science and Technology Development Agency

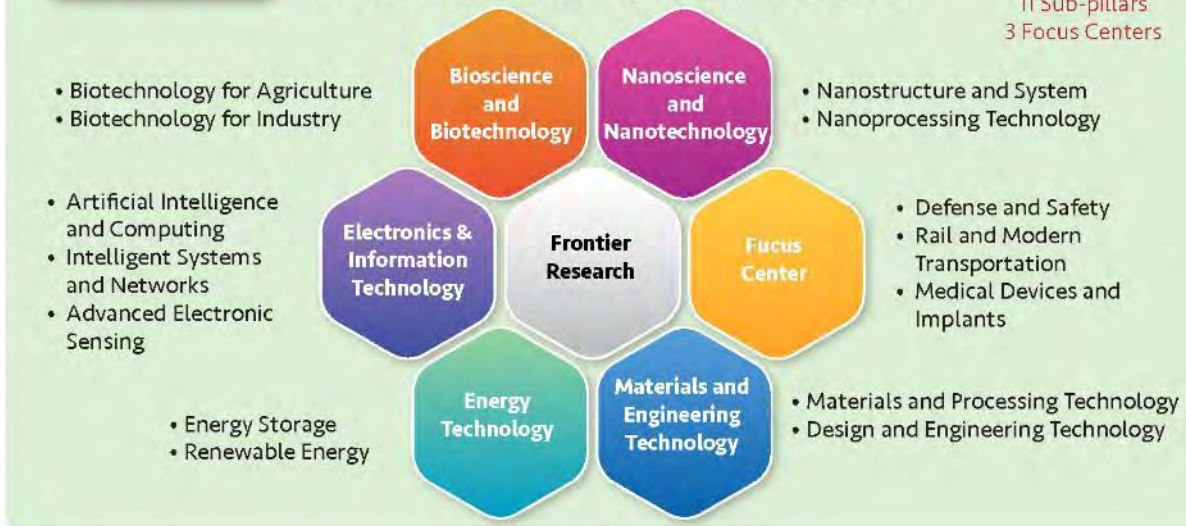
Organization Management

7 Functional Groups

RDDE

1 Science, Technology and Innovation

5 Pillars
11 Sub-pillars
3 Focus Centers



- Biotechnology for Agriculture
- Biotechnology for Industry
- Nanostructure and System
- Nanoprocessing Technology
- Artificial Intelligence and Computing
- Intelligent Systems and Networks
- Advanced Electronic Sensing
- Defense and Safety
- Rail and Modern Transportation
- Medical Devices and Implants
- Energy Storage
- Renewable Energy
- Materials and Processing Technology
- Design and Engineering Technology

3 Competitiveness Enhancement

TT

4 Capacity Development for Farmers and Communities

INFRA

5 Development and Management of Innovation Hubs

HRD

6 Human Resource Development

INFRA

National S&T Infrastructure

National Quality Infrastructure

2 Research Development Innovation (RDI) Management

7 Administration and Shared Services

Driving Thailand 4.0 with science, technology and innovation

NSTDA Supercomputer Center: ThaiSC

National S&T Infrastructure (NSTI)

NSTDA Supercomputer Center ThaiSC

National Science and Technology Development Agency (NSTDA)
missions include
the development of S&T infrastructure to support national STI development in Thailand

NSTDA Supercomputer Center (ThaiSC):
commissioned in 2019 to provide world-class supercomputer facility for

1. Supporting Thailand's R&D needs for computational power
2. Addressing important and urgent national agenda requiring advanced computing resources
3. Promoting high-tech industries through advanced AI & computing

HPC in Thailand Current Resource

TIER 1 NATIONWIDE SERVICE

- NSTDA supercomputer center (ThaiSC)

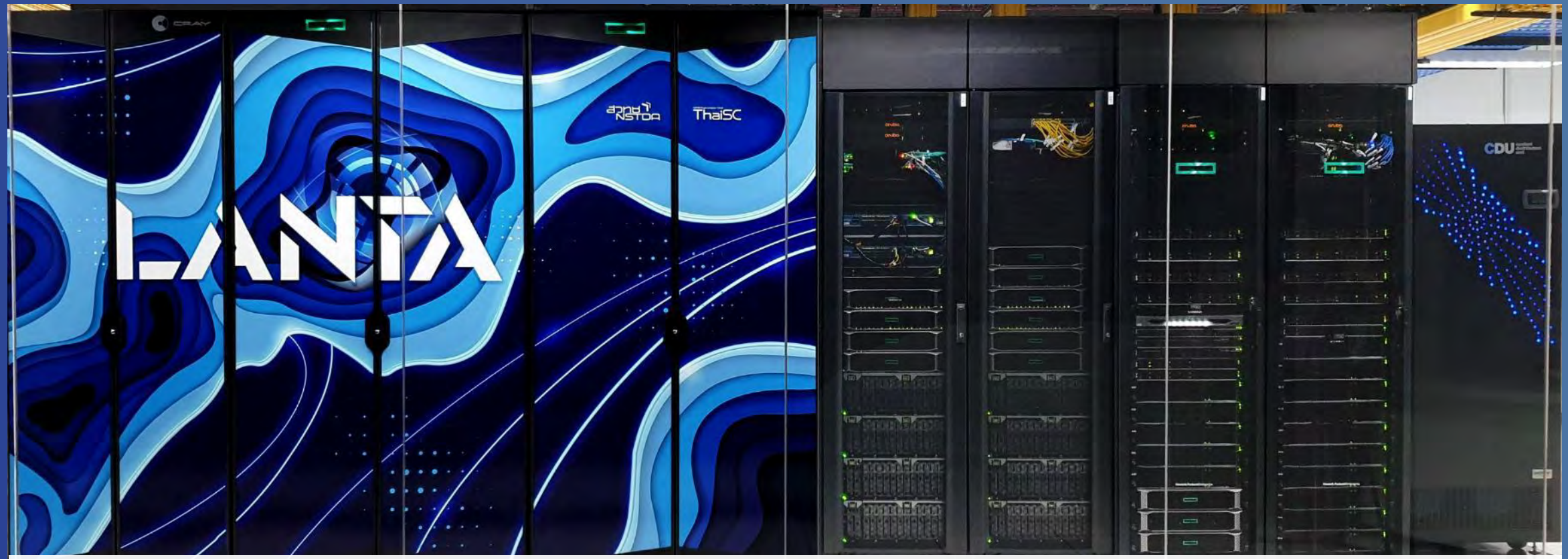
TIER 2 SPECIFIC FUNCTION SERVICE

- Thai Meteorological Department
- National Astronomical Research Institute of Thailand
- Hydro-Informatics Institute

TIER 3 IN HOUSE SERVICE

- University/Research Institute
- Private enterprise

ThaiSC



*Peak performance at 8.15 PFLOPS

Rank 70th

TOP 500 The List.

Rank 24th

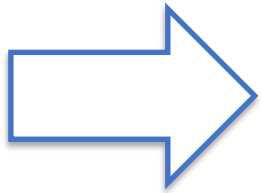
THE GREEN 500

- ✓ **346 nodes Heterogeneous HPE Cray EX cluster**
  - 176 GPU nodes with 704 NVIDIA A100 GPUs
  - 160 CPU nodes with 20,480 CPU-cores
  - 10 High-memory nodes, each containing 4TB of memory
- ✓ **10 PB of high-performance parallel storage**
- ✓ **High-performance interconnect using 200 Gbps**

2023

Pioneer Program

Big research projects (Thailand Only)



2024 +

Pioneer Program

Big research projects (collaborated with Thai PI)

Initiative Model

POC for Shared HPC Infra for ASEAN

Collaboration between R-CCS, RIKEN & ThaiSC/NECTE, NSTDA

MOU for Research Collaboration between Riken Center for Computational Science, RIKEN, Japan and National Electronics and Computer Technology Center, National Science and Technology Development Agency, The Kingdom of Thailand

- **Signed on 28 Dec 2021**

- **Collaborative Activities:**
  - **Exchange of researchers and staff involved in HPC projects**
  - **To support the human resource development in the field of HPC (e.g. training activities)**
  - **Exchange of scientific and technological information, including delivering lectures and holding join seminars and symposia**
  - **Exchange of scientific and technological research materials**
  - **Other cooperative activities as mutually determined by the Parties.**

NSTDA Supercomputer Center

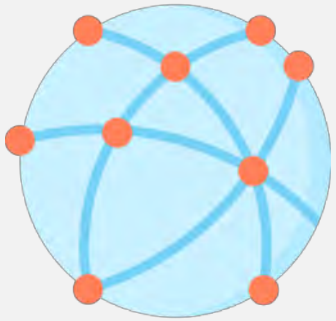
ThaiSC

Contact us

www.thaisc.io
thaisc@nstda.or.th

ASEAN HPC Taskforce

Create opportunities for growth of technological capabilities in ASEAN, by providing access to top-tier HPC resources and expertise (common platform for research and data sharing)



Deepen ASEAN digital connectivity, and enhance ASEAN's digital capabilities, both for the pursuit of science and for public-private partnership/ industry collaboration

Two Key Opinion Leaders (KOLs) per ASEAN Member States (AMS), appointed by respective National Committee on Science, Technology and Innovation (COSTI) Chairs.

ASEAN HPC Taskforce Activities

School website: https://www.hpcschool.net/

EU-ASEAN HPC School 2021 & 2022

Background:

- The EU-ASEAN HPC Schools were endorsed from ASEAN HPC Task Force (HPCTF), the European Union Delegation to ASEAN, ASEAN Secretariat, Thailand's Ministry of Higher Education, Science, Research and Innovation (MHESI), and the private sector. The schools were organised by the ASEAN HPCTF and carried out in the framework of Enhanced Regional EU-ASEAN Dialogue Instrument (E-READI).
- **2021 (5-9 July 2021):** the school was hosted virtually by the National Science and Technology Development Agency (NSTDA) Supercomputer Center (ThaiSC), Thailand
- **2022 (5 – 10 July 2022):** the school took place in person at Kasetsart University & Thailand Science Park, Thailand

Objectives: To facilitate the development of HPC skills and capacity growth in ASEAN and its applications to critical problems of major social and economic importance, such as the fight against COVID-19 and natural disaster prevention.

ASEAN HPC Fugaku trial application

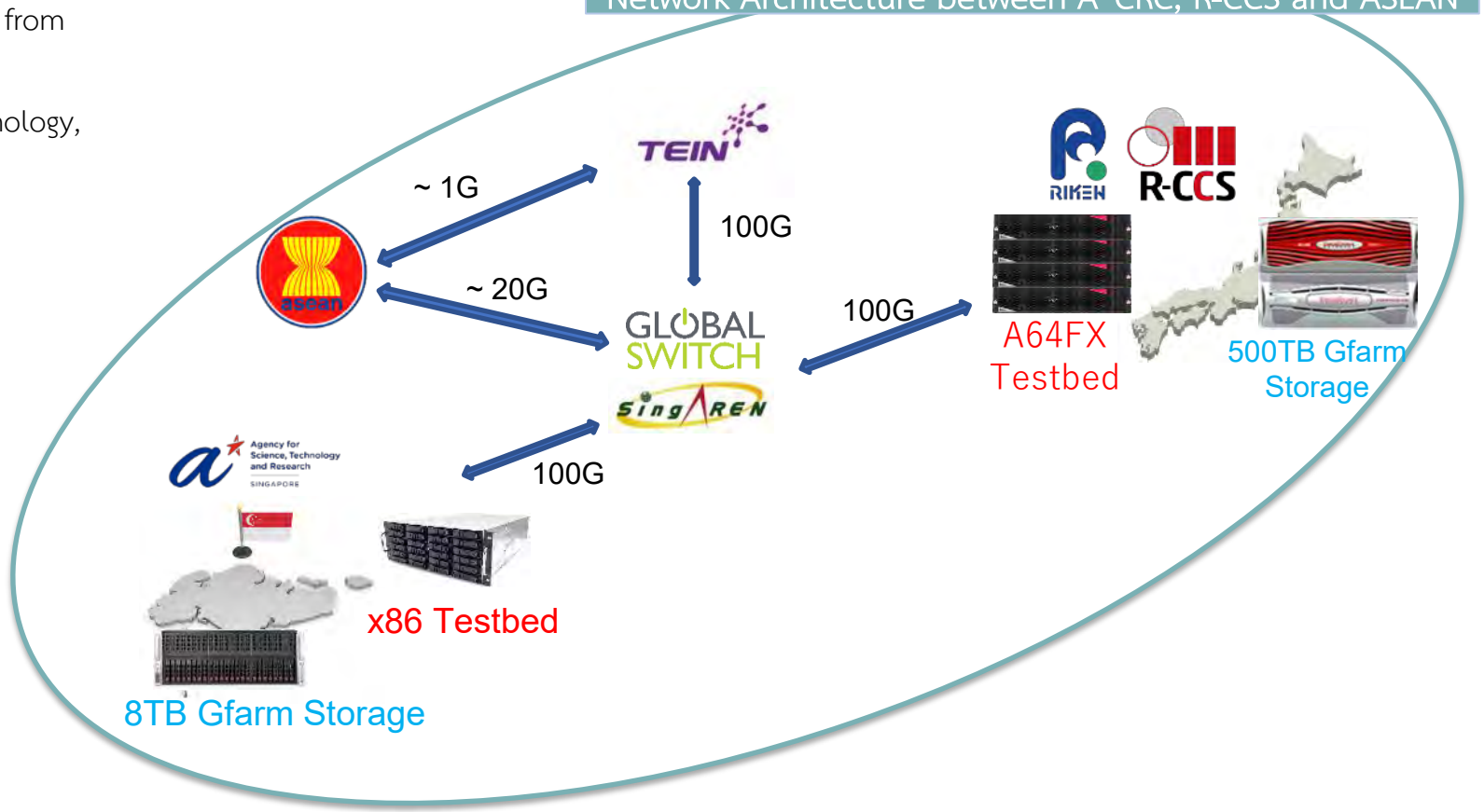
11 projects granted computing time on Fugaku

- A*CRC in Singapore submitted project proposals to RIST Japan on behalf of investigators from ASEAN Countries.
- **11 projects** granted computing time on Fugaku for full permitted 6 months from mid July 2022 to mid-Jan 2023. These include applicants from
  - **Malaysia (3**; University Malaya),
  - **Thailand (4**; Vidyasirimedhi Institute of Science and Technology, King Mongkut's Institute of Technology Ladkrabang, King Mongkut's University of Technology North Bangkok, National Nanotechnology Center, NSTDA & Suranaree University of Technology),
  - **Indonesia (2**; Politeknik Statistika STIS & LabMath), and
  - **Philippines (2**; University of the Philippines Los Baños & University of the Philippines Diliman).

Research Areas covered

- Research areas covered include Matter, Materials and Chemistry (7) and Information and Computer Science (4).
- Examples of application software include CP2K, Quantum ESPRESSO, Gaussian, VASP, GROMACS, TensorFlow, PyTORCH and other customised software.

Network Architecture between A*CRC, R-CCS and ASEAN



Thank you

www.nstda.or.th/en
icd@nstda.or.th