NECTEC
a member of NSTDA

# e-Sciences Activities in Asia-Pacific (Thailand)

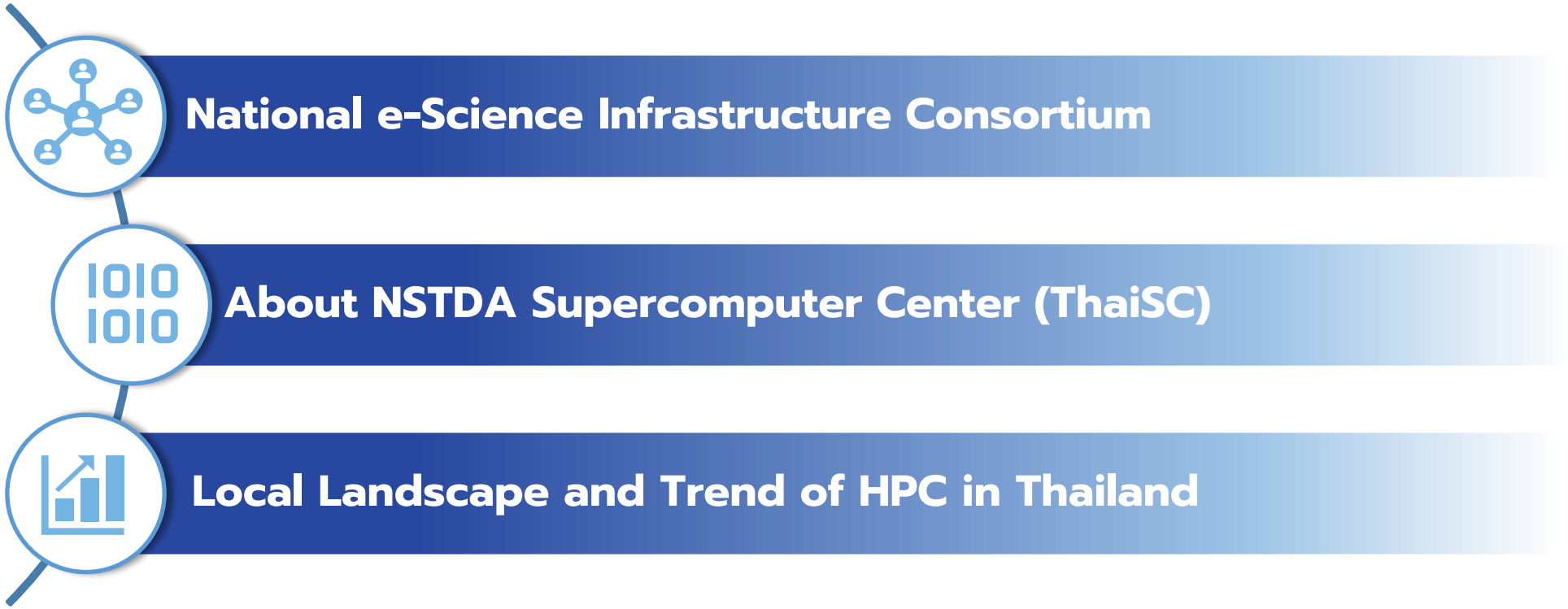
International Symposium on Grids & Clouds (ISGC) 2026
15-20 March 2026
BHSS, Academia Sinica


## Krich Nasingkun, Ph.D.

Director of NSTDA Supercomputer Center


March 18, 2026, 11:00 AM
Room 2 (BHSS, Academia Sinica)

# Agenda


National e-Science Infrastructure Consortium
About NSTDA Supercomputer Center (ThaiSC)
Local Landscape and Trend of HPC in Thailand

# National e-Science Infrastructure Consortium


New in 2026

BIG DATA INSTITUTE

## " Provides HPC Service for e-Science Research Project in Thailand "

National e-Science Infrastructure Consortium is a group of universities and research institutes to collaborative development of research infrastructure to help support computational science and engineering research in Thailand. To accomplish the consortium goal, it is necessary to provide computing systems which support High Performance Computing (HPC) storage system, scientific application and networking.

The consortium maintains e-Science-related research projects in general, but with an emphasis on high energy particle physics, drug design, material design, climate change, and fluid dynamic.

With the visionary leadership of **Her Royal Highness Princess Maha Chakri Sirindhorn**, who recognizes the importance of establishing a strong foundation for scientific research nationwide, the *National e-Science Infrastructure Consortium* was formed in collaboration with CERN. The consortium aims to support research projects in Thailand by providing advanced computing infrastructure services.

# E-Sciences Activities in Thailand


“With the great vision of **H.R.H. Princess Maha Chakri Sirindhorn** who see the importance in building strong foundation for scientific research across the nation. Collaborating with CERN, National e-Science Infrastructure Consortium was formed with the objectives to support research projects in Thailand by providing the computing infrastructure service.”

# e-Science Members

## Regular members

- **Develop&Provide computing resource to the consortium**
  - HPC and/or scientific application
  - big data, data platform
- **Contribute or Collaborate with the consortium**

New in 2026

## Associated members

Contribute or Collaborate with the consortium

# National e-Science Infrastructure Consortium

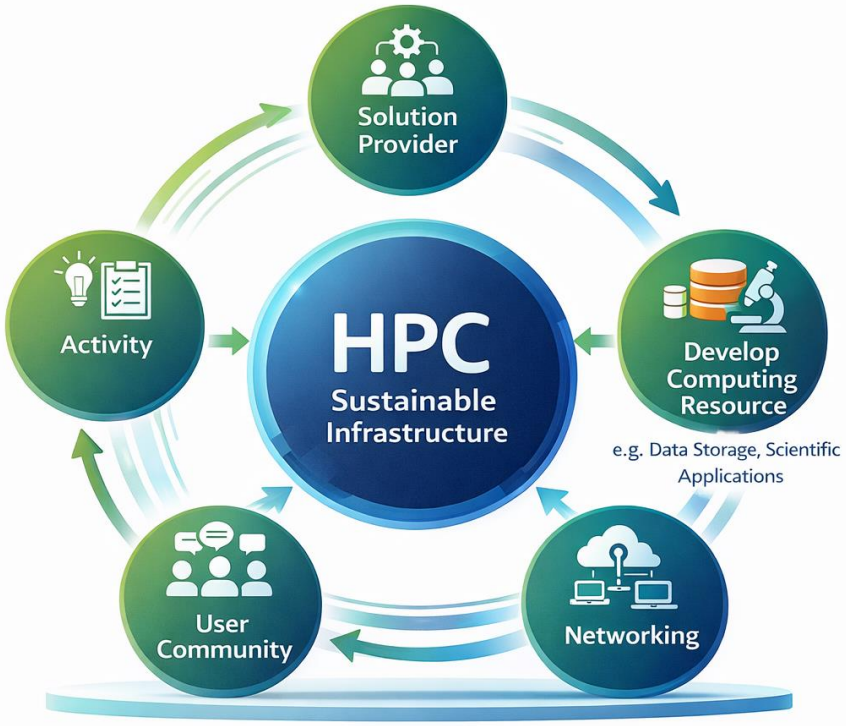
**Building Thailand's e-Science Ecosystem**

### Sustainable Resource

- HPC research facilities shared by the **Regular** members
- Collaboration with, CERN: Build Tier2 supercomputer center for WLCG in Thailand
  - T2-TH-CUNSTDA
  - T2-TH-SUT

### Community

- Support collaboration with the research network
- Organize activities to promote the use of HPC
- Establish a committee to supervise and oversee operations



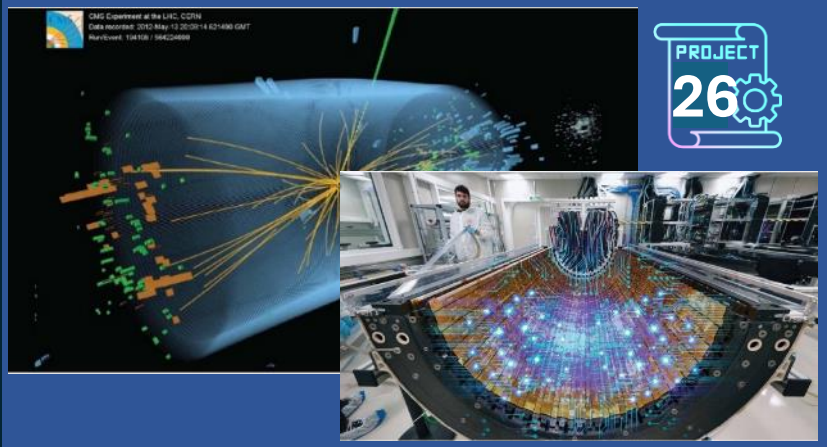

e-Science Ecosystem

# Resource contribution

| Members | CPU (cores) | Storage (TB) | GPU | Application |
|---|---|---|---|---|
| **Chula** | 708 | 405 | 12 nodes (T4 11 nodes, A2 1 node)<br>1 x DGX (8 card x A100) | High energy particle physic, Computational chemistry |
| **SUT** | 592 | 150 | - | High energy particle physic, Computational chemistry |
| **KMUTT** | 224 | 30 | - | Computer science and engineering<br>Computational chemistry, Biology |
| **HII** | 1,376 | 788 | - | Weather forecast (WRF-ROMS, SWAN, ROMS), Climate change, Machine learning |
| **NARIT** | 1,800 | 6,700 | Nvidia 12xV100 (32GB), 1xA100 (80GB), 4xAMD MI210 (64GB), + 4xNvidiaL40S + 8xNvidia H200 141GB (2025) | Computational Astrophysics and Cosmology, Astronomical data analysis and modeling, Weather Research<br>+**Virtual Infrastructure** for Scientific and Engineering Research computing |
| **SLRI** | 168 | 210 | - | Research using Synchrotron light, High energy particle physic, Computational chemistry |
| **TINT** | 64 | 3.8 | - | Computational related to Nuclear technology, agriculture product, germ, plant breeding) |
| **NSTDA** | 31,744 | 10,000 | 704 x Nvidia A100 (card) | Computational science, Computer engineering, Big data and AI |
| **DGA** | Open Data | | - | Data Lake, Open Data<br>Cloud, Big data, Government data |

# 3 main Application areas

## High Energy Particle Physic



PROJECT 26

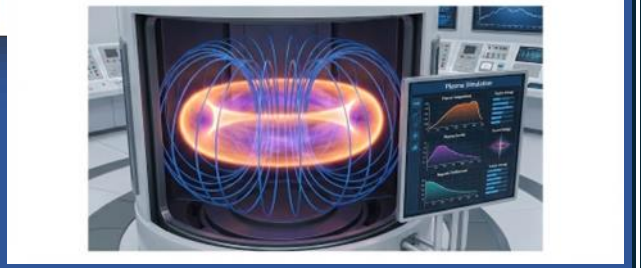
- Building Tier2 computer center services for CERN WLCG

Current status:

- Suranaree University of Tech. has collaborated and supported various activities from CERN Tier1 Center to strengthen Thai researchers and research capacity in particle physics
- Chulalongkorn University became the first site in Asia to run CMS workloads on an HPC cluster by shifting WLCG computing from a dedicated system to shared HPC resources, improving efficiency and reducing maintenance.

## Computational Science & Engineering


PROJECT 59

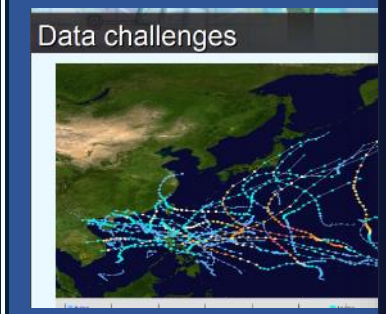


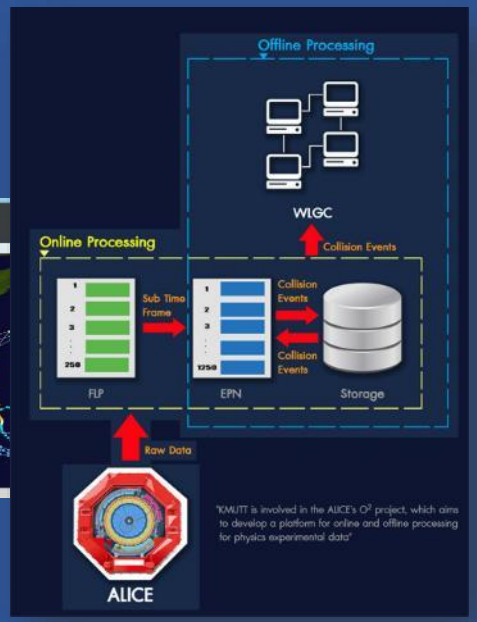

59 research projects per year by e-Science members and Thai researchers ex.

- Astro-Physic research and provide astronomical big data for Thailand
- Nanotechnology and Material Simulation
- Climate change and weather forecast
- Nuclear Technology Research
- Drug design/Pharmaceutical
- Social Science

## Computer Engineering

PROJECT 7

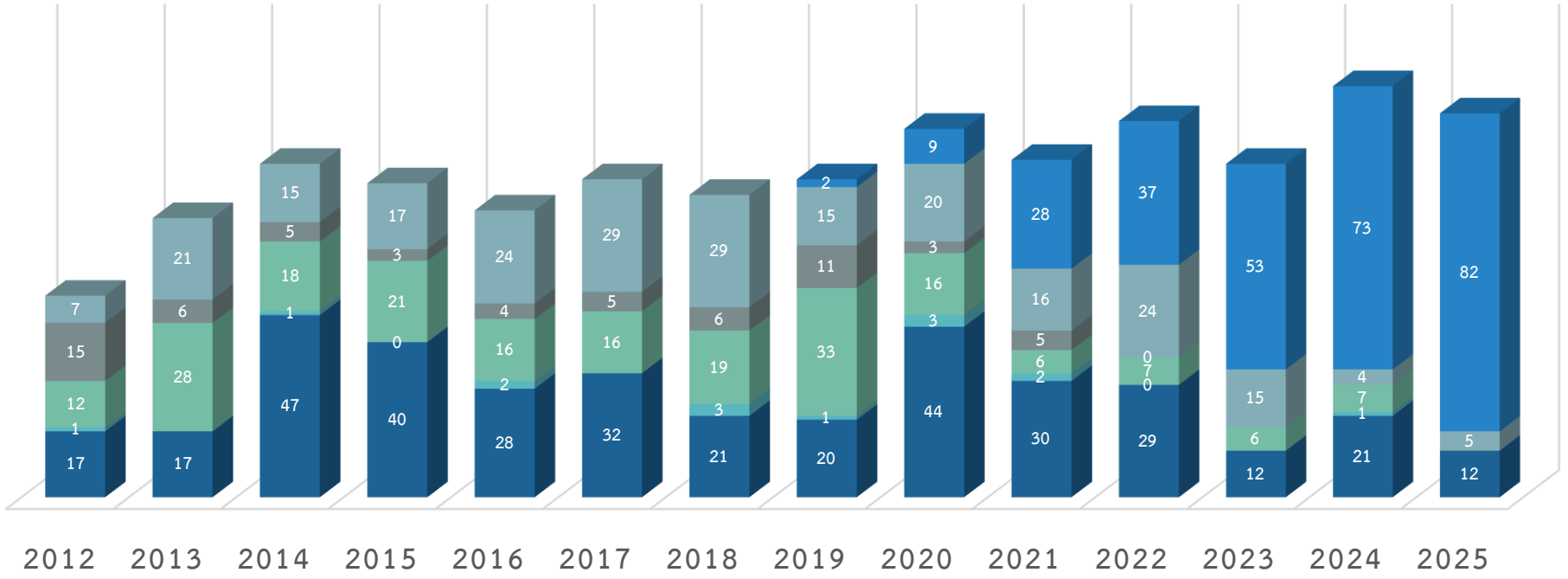



Research project relating to HPC, Big Data, and platforms that support the computing service and collaboration with the CERN experiment

- Distributed Collaboration and Online Learning Platform
- Parallel Optimization Framework
- Telemedicine
- AI and Machine Learning
- Enhance processing performance

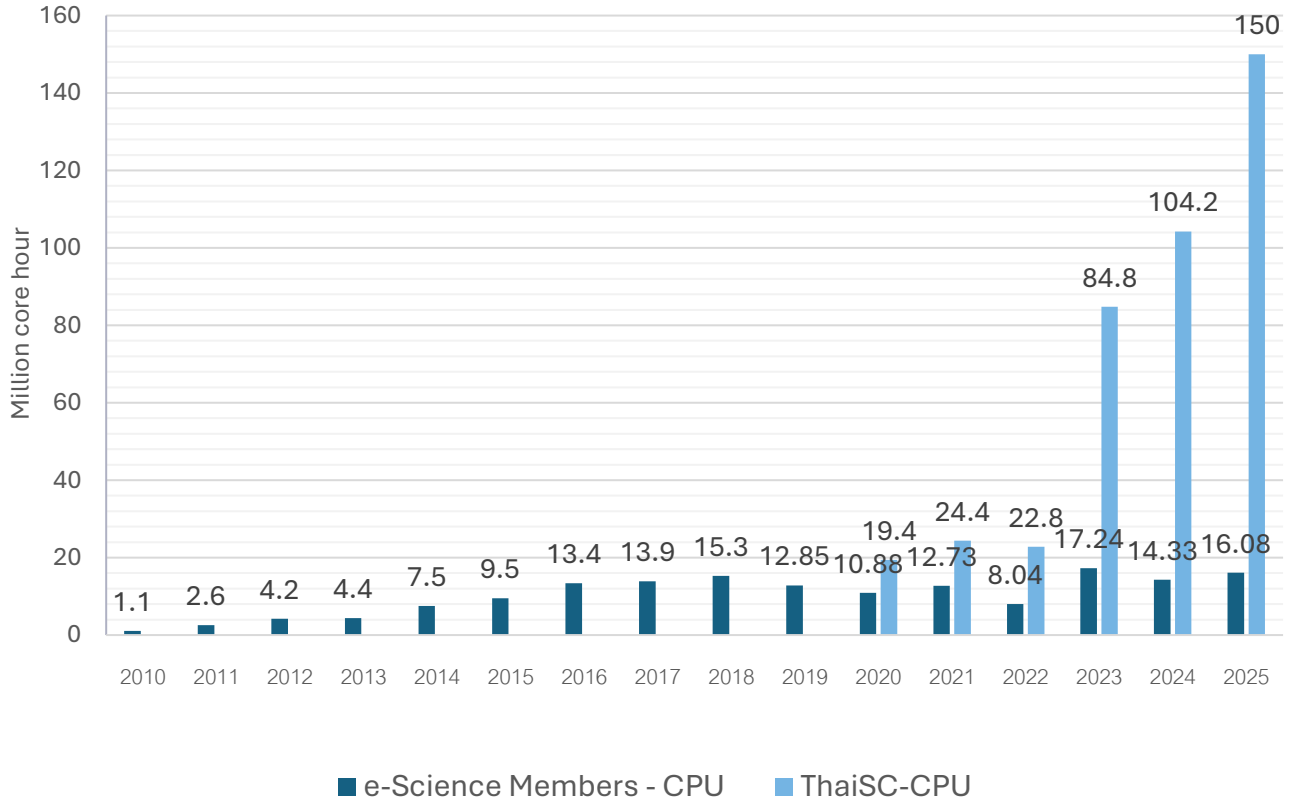
# Publication produces by Users

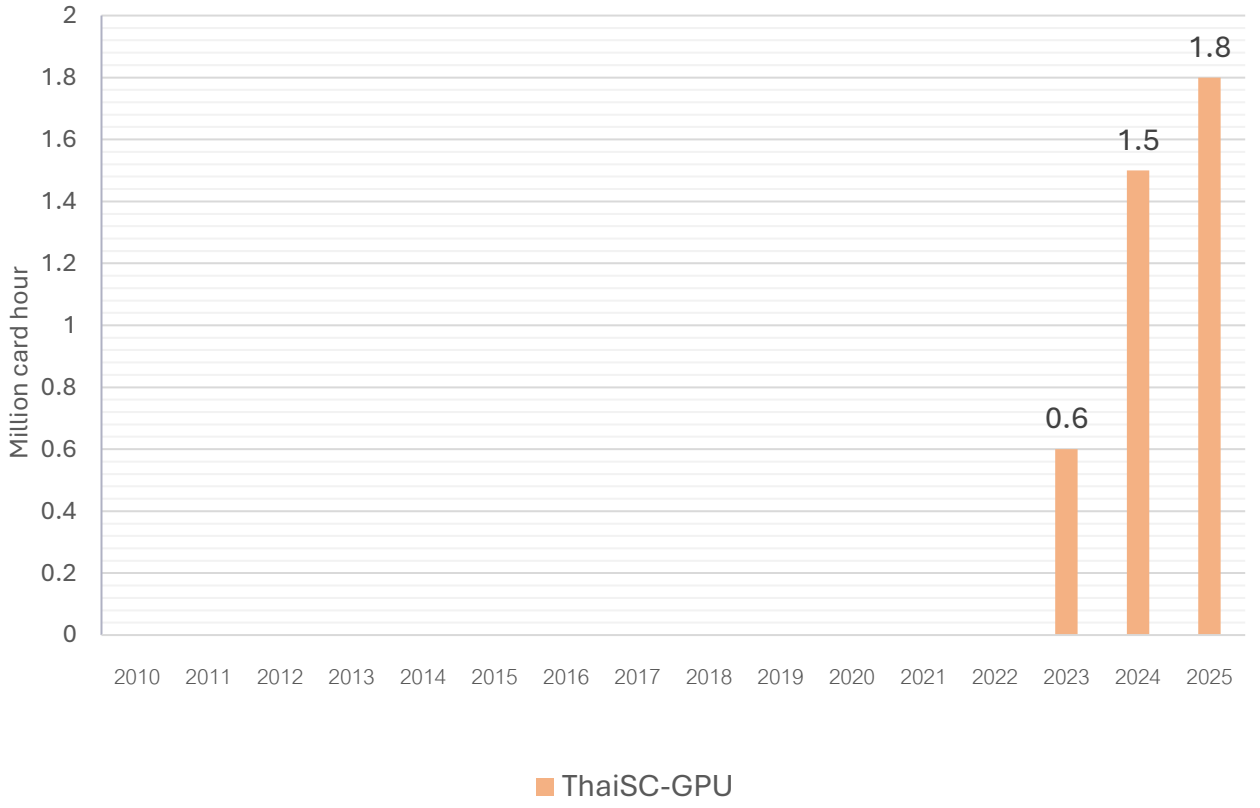



Updated: December 2025

# Computing service provisioning

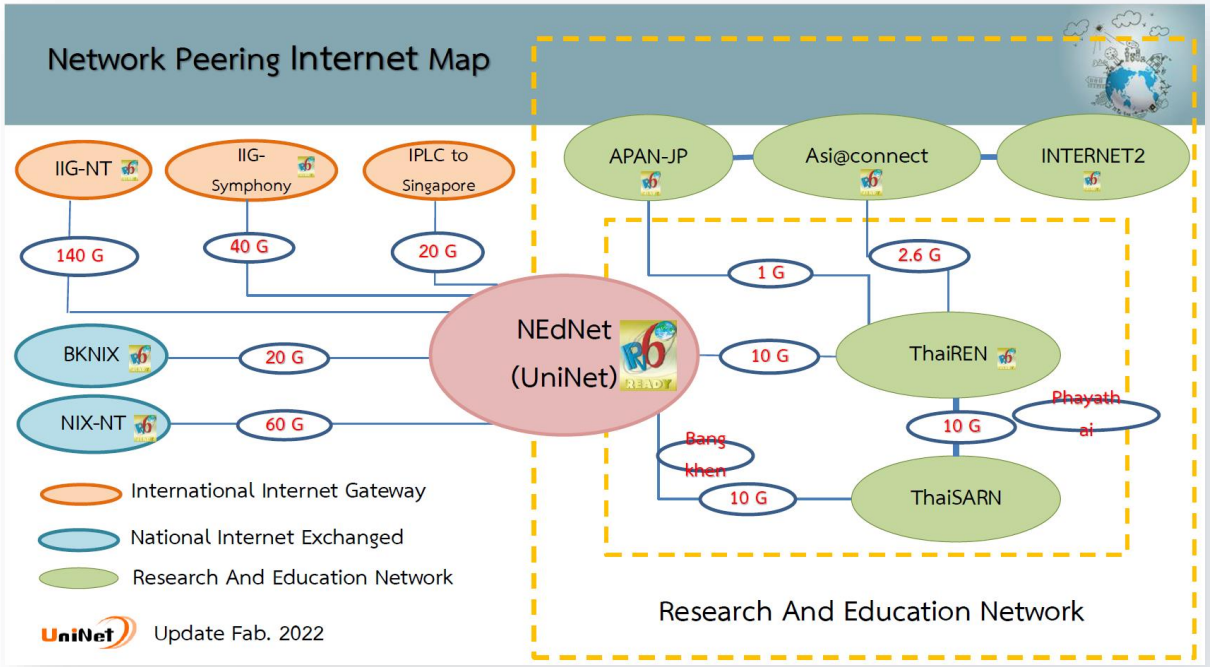
## CPU and GPU usages from 2010 - 2025

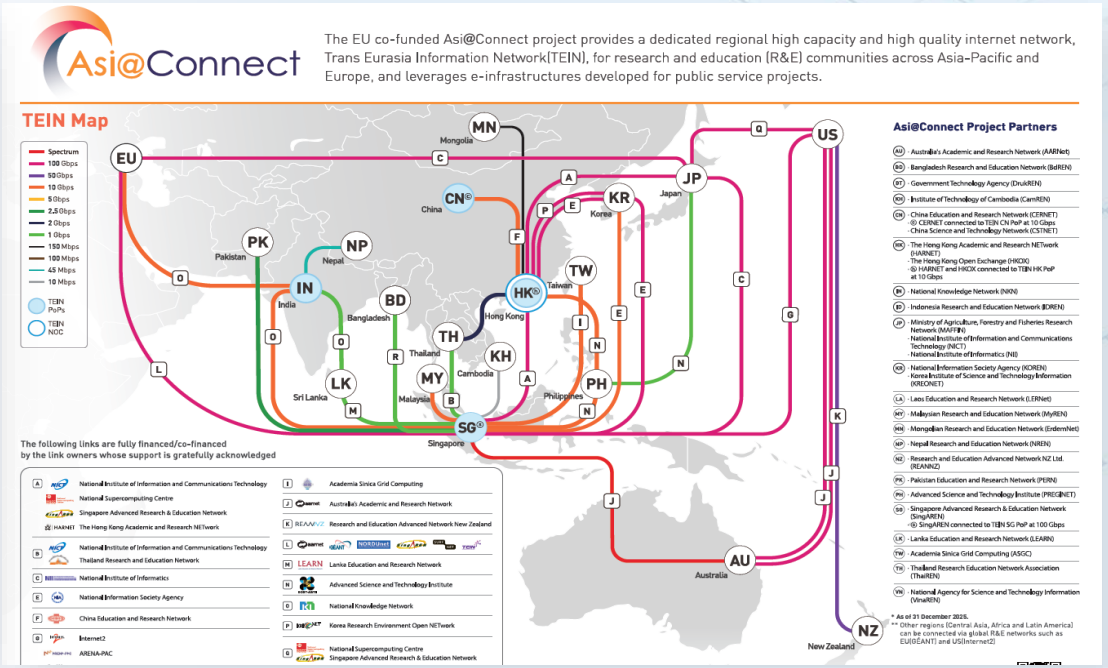



Updated: 5 March 2026

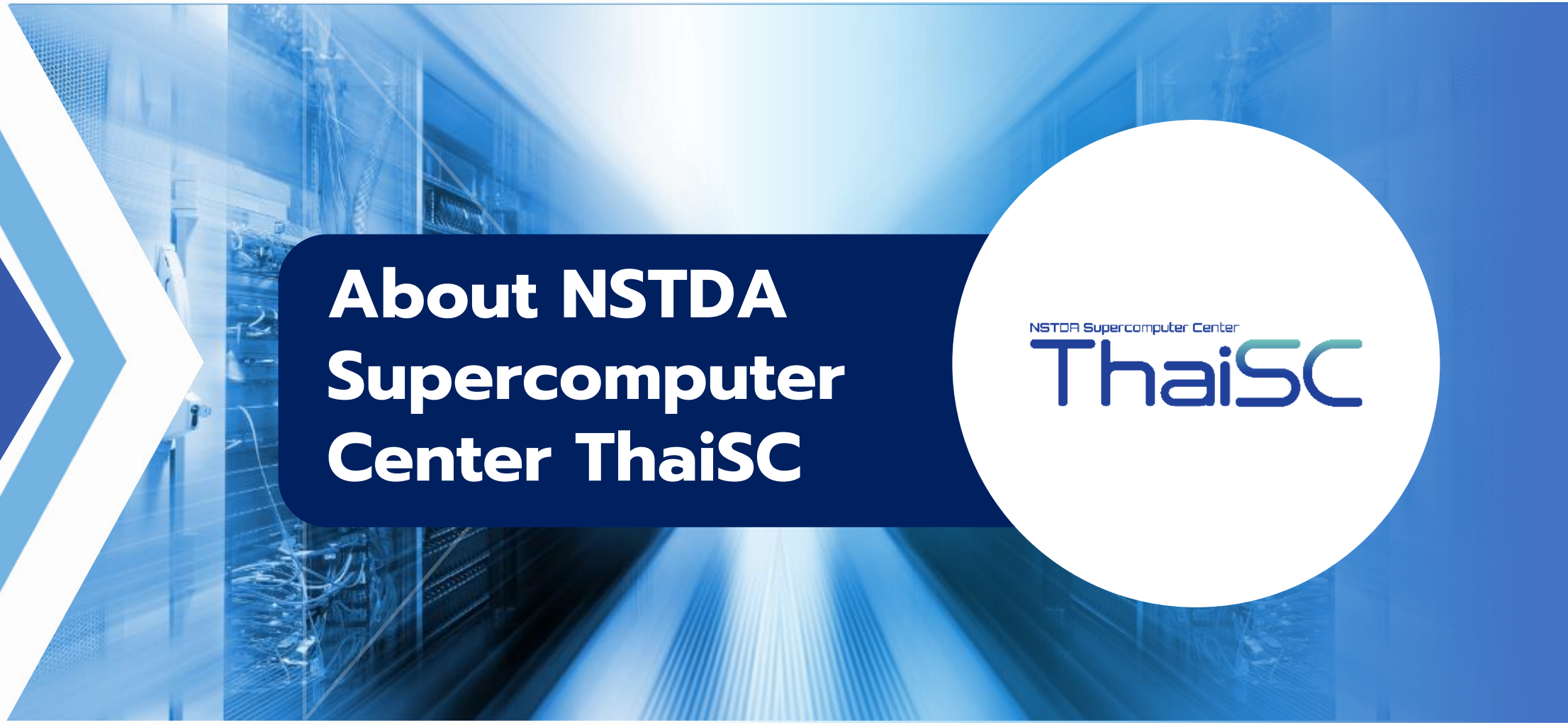
# Network by UniNet Thailand




**UniNet** is one of the e-Science consortium partners that plays a key role in developing a dedicated **Research and Education Network (Thai-REN)** in Thailand, separate from commercial networks, enabling researchers to utilize the network with high performance and efficiency

www.uni.net.th



# About NSTDA Supercomputer Center ThaiSC

# ThaiSC A National Science and Technology Infrastructure of NSTDA

Ministry of Higher Education, Science, Research and Innovation

National Science and Technology Development Agency

The National Electronics and Computer Technology Center

NSTDA Supercomputer Center*

*ThaiSC is one of the National Science and Technology Infrastructure (NSTI)

# ThaiSC Leadership

NSTDA Supercomputer Center ThaiSC

**Director**
Dr. Krich Nasingkun

**Technical Advisor**
Dr. Piyawut Srichaikul

**Technical Advisor**
Dr. Manaschai Kunaseth

**Technical Advisor**
Dr. Rattapoom Tuchinda

**Supercomputing Infrastructure and Operation Team (SIO)**
Dr. Putt Sakdhnagool

- HPC Setup & HPC Operation
- HPC Maintenance
- HPC Standardization
- (User portal & Helpdesk)

**Taking care of machines**

**Scientific Support and Domain Research Team (SSD)**
Dr. Viwan Jarerattanachat

- Workshop & Training
- Technical Training & Support
- Technical Sale Support

**Taking care of software/users**

**Supercomputing operation support and Business Development Team (SBD)**
Mr. Kirk Pandhumapol

- CRM
- Business plan
- Funding Ecosystem
- HPC Ecosystem

**Taking care of business**

# HPC Thailand Timeline

NECTEC a member of NSTDA

**1995**

HPCC

**first on-line supercomputing services**

CPU **8** MIPS-R10000
**1** GB memory
**50** GB disk storage

**2005**

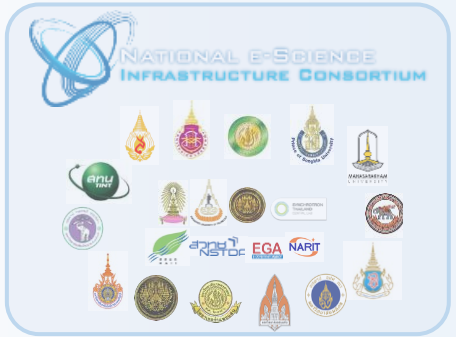
**Thai Grid**
**large-scale computing resource project** 14

members and expand to 22 members in 2008

**2011**

**National e-Science Infrastructure Consortium**
**H.R.H. Princess Maha Chakri Sirindhorn that collaborating with CERN**

**5,020** CPU core; **1,455** TB




**2019**

**ThaiSC (TARA)**
**0.2 petaFLOPS**

**4,320** compute cores
**28** NVIDIA V100


**2022**

**LANTA**
**8 petaFLOPS**

**31,744** compute cores
**704** NVIDIA A100

# The 70th spot, while ranking 1st in ASEAN with an HPL score of 8.15 PFlop/s.

November 2022


*Peak performance at 8.15 PFLOPS

TOP 500 The List.

**Rank 70th (Nov 2022)**

Rank 199th (Nov 2025)

THE GREEN 500

**Rank 24th (Nov 2022)**

Rank 91th (Nov 2025)

- 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 contains 4TB of memory
- 10 PB of high-performance parallel storage
- High-performance interconnect using 200 Gbps

# ThaiSC Resource: ASEAN-Leading Supercomputer System "LANTA"

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TOP500 The List.

***The TOP500 list of the world's most powerful supercomputers***


***The 70th spot, while ranking 1st in ASEAN with an HPL score of 8.15 PFlop/s.***

***November 2022***

| 31,744 Cores | 704 GPU | 168 TB | 10 PB | 200 Gbps |
|---|---|---|---|---|
| AMD EPYC™ 7713 | NVIDIA A100 GPUs | Total System Memory (RAM) | Cray Cluster Stor E1000 | HPE Slingshot Interconnect |

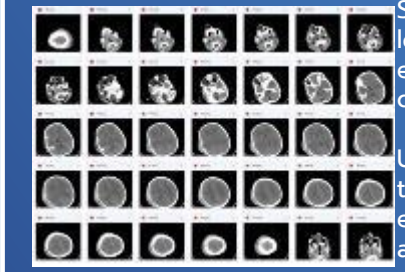
| TOP500 LIST - NOV 2025 | Holds Top 3 Supercomputers | | | Leaders in ASEAN | | | | |
|---|---|---|---|---|---|---|---|---|
| **HPC TOP500 Ranking** | **#1** | **#2** | **#3** | **#43** | **#120** | **#124** | **#127** | **#199** |
| **System** | **El Capitan** | **Frontier** | **Aurora** | **FPT AI** | **Hopper NUS** | **ASPIRE 2A+** | **THE CRUST 2.5** | **LANTA** |
| **Manufactured by** | HPE Cray | HPE Cray | Intel | ASUSTeK | DELL | NVIDIA | HPE Cray | **HPE Cray** |
| **Total Pflops** (TOP500) | **1,809.00** | **1,353.00** | **1,012.00** | **46.65** | **15.05** | **14.20** | **13.85** | **8.15** |
| **Green500 Ranking** | #23 | #34 | #90 | #221 | #264 | #267 | #270 | #91 |

# Some interesting projects portfolio

NECTEC a member of NSTDA

## 2023

### Deep Learning for Brain Hemorrhagic Stroke Detection



Stroke occurs suddenly and can lead to paralysis, disability, or even death. Rapid and accurate diagnosis is therefore crucial.

Utilizing Deep Learning techniques in Machine Learning enhances diagnostic accuracy and reduces the time required, enabling quicker advancements and applications.

TRL 4

Project by: Mahidol University

### OpenThaiGPT: Developed for all Thai people

OpenThaiGPT

Creating an LLM with capabilities similar to ChatGPT requires a significant investment in experts, datasets, and the number of GPUs used for processing.

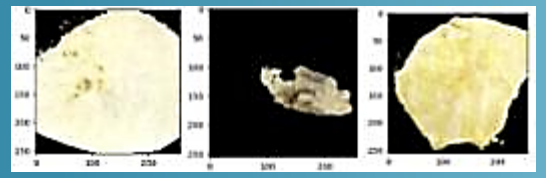
OpenThaiGPT will be developed as open-source software, available for free to everyone.

TRL 9

Project by: AIAT

## 2024

### Generative AI for Clinical Imaging (Infant pale stools)



The AI model for medical images can generate 256x256 resolution images of infant pale stools to assist in diagnosing Biliary Atresia in 1 in 10,000 children (aged 3-12 months), which signals a bile duct obstruction. Immediate treatment is required to prevent death and increase the chances of a complete recovery.

TRL 6

Project by: Looloo Technology Co., Ltd.

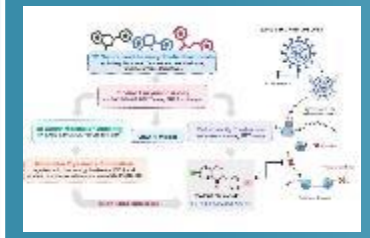
### Discovery of new anti-tuberculosis agents using virtual screening

Tuberculosis caused by *Mycobacterium tuberculosis* is a global health issue. Treatment lasts more than 6 months and involves multiple drugs, which is complicated by drug resistance. The goal is to discover new drugs that are more effective, reduce treatment duration, and have fewer side effects compared to current medications, which previously took years to develop.

TRL 3

Project by: Nakhon Phanom University

### SARS-CoV-2 3CLPro Inhibition by Thai Plant Flavonoids

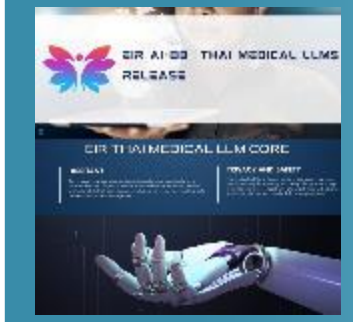


The SARS-CoV-2 virus spread rapidly worldwide, and existing antivirals like Favipiravir and Remdesivir have low efficacy and high side effects. Developing antiviral drugs from Thai herbs faces challenges in structure, mechanism, and synthesis, but this knowledge will help create more effective treatments in the future.

TRL 3

Project by: Chiang Mai University

### Thaimedical LLM




The application of AI in the medical field aims to integrate AI technology into workflows to help reduce the workload of healthcare professionals and add value, without affecting the treatment process timeline.

TRL x

Project by: Thonburi Thungsong Hospital

# Some interesting projects portfolio

## 2025

### SUPER AI ENGINEER SS5


Strengthening the AI ecosystem through the development of structured learning programs, the establishment of national and international collaborations, the promotion of AI entrepreneurship, and the organization of hands-on activities such as hackathons and workshops to enhance practical skills. Integration of HPC infrastructure supports AI training and research, enabling participants to develop and test AI models with large-scale data while fostering collaboration among academia, research institutions, and industry.

Project by: NECTEC

TRL x

### AI-Thailand Service Platform


Pathumma LLM is a large Thai language AI model developed in Thailand. It utilizes LANTA HPC to improve training efficiency, reduce reliance on foreign cloud services, and support domestic AI capabilities. The model has already been applied in real-world use cases, such as in the parliament to summarize meeting discussions and draft legislation, and is available for public testing through the AI for Thai platform.

Project by: NECTEC

TRL x

### SARS-CoV-2 3CLPro Inhibition by Thai Plant Flavonoids


The DMIND project uses AI to help screen incoming calls to the 1323 mental health hotline to identify individuals at higher risk of severe depression and suicide with greater accuracy, increasing the rate from 3.34% to 29%. However, the Automatic Speech Recognition (ASR) system still faces challenges in capturing nuances in tone of voice and keywords related to suicide.

Project by: Chulalongkorn University

TRL 9

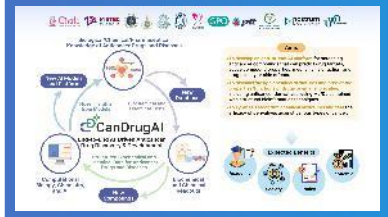
### High-Resolution Seasonal Forecasting System to Boost Smart Agriculture in Thailand

Current weather data are insufficient for early warning, agricultural planning, and water management. A 6-month seasonal forecasting model using 1 km resolution data and HPC has been developed, improving accuracy and enabling more proactive decisions.

Project by: AIT

TRL 8

### CanDrugAI: End-to-End AI-Driven Anticancer Drug Discovery & Development

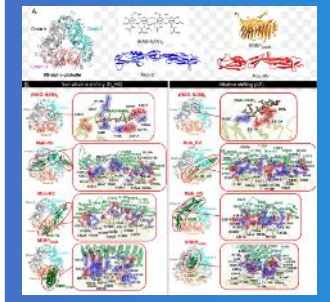



CanDrugAI is an AI-driven platform for anticancer drug discovery that integrates artificial intelligence, Thailand-specific databases, laboratory experimentation, and HPC. The platform aims to accelerate drug development, reduce costs, and improve the accuracy of identifying new therapeutic candidates for cancers prevalent in Thailand.

Project by: Chulalongkorn University

TRL 3

### HPC-Driven Design of Sustainable Plant-Based Synbiotics



Developing synbiotic products using plant-protein–based probiotic encapsulation technology to enhance stability, reduce the use of synthetic materials, and support the BCG Economy concept. HPC is used to simulate large biomolecular systems and build more realistic models, enabling more efficient formulation development and supporting further experimental studies and research publications.

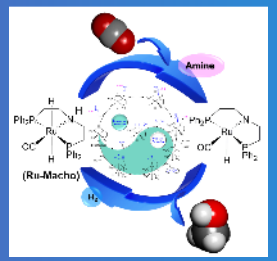
Project by: Kasetsart University

TRL 4

# Some interesting projects portfolio

## 2025

### Amine-Mediated $CO_2$-to-Methanol Conversion



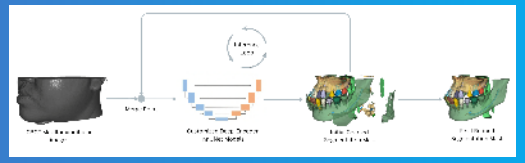

The effect of different amines on the conversion of $CO_2$ to methanol through ruthenium-catalyzed hydrogenation is studied using DFT to analyze reaction mechanisms and product selectivity.

LANTA HPC is required to perform extensive calculations of molecular structures, energies, and multiple reaction pathways.

Project by: Chulalongkorn University

TRL 9

### AI-Based Segmentation of Craniomaxillofacial Bones from CBCT

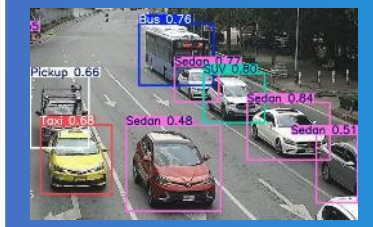


Development of an AI system for segmenting craniomaxillofacial (CMF) bone structures from CBCT images to improve patient-specific implant design. The study is currently a retrospective study with engineers from Meticuly to evaluate the model against the existing workflow, with plans for academic publication and further development for surgical planning.

Project by: Chulalongkorn University

TRL 4

### AI Platform for CCTV Management



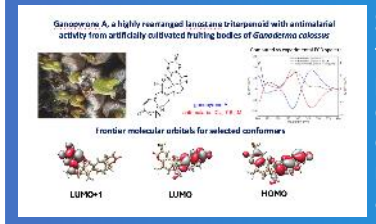

Develop a Computer Vision–based system for analyzing images from CCTV cameras, with improved datasets tailored to the Thai context, including local vehicle types such as Tuktuk, Saleng, and so on.

Stable Diffusion is also used to generate synthetic data to address data imbalance. LANTA HPC is utilized to train models efficiently with large-scale data and to support real-time video streaming analysis for practical deployment.

Project by: NECTEC

TRL 5

### Chemical Research on Thai Mushroom Resources for their Medicinal Utilization




Study the bioactive compounds from Thai mushrooms with potential for treating various diseases, such as malaria and cancer, with a primary focus on mushrooms exhibiting antimalarial activity.

This research requires substantial computational resources. Compared with the use of conventional computers, LANTA HPC)can reduce the computational time by up to 15 times compared with the previous system.

Project by: MSU & BIOTEC

TRL 5

### Shotgun Metagenomic Analysis of Corn and Soybean Phytobiome

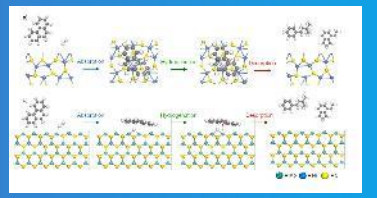
Corn and soybean crops have faced plant disease problems. Therefore, phytobiome studies have been conducted using high-throughput sequencing and metagenomics technologies to analyze microbial communities associated with plant health.

LANTA HPC are utilized to process large-scale datasets, enabling data analysis to be performed 5–10 times faster, reducing processing time from weeks to just a few days.

Project by: BIOTEC

TRL 4

### Hydrogen production for fuel cells using biogas from municipal waste



Catalyst modification was studied using computational modeling and experimental validation. Chelating agents (CA, MA) were found to influence catalyst structure and performance, leading to higher hydrogen yield. LANTA HPC reduced analysis time from 10 days to just 24 hours.

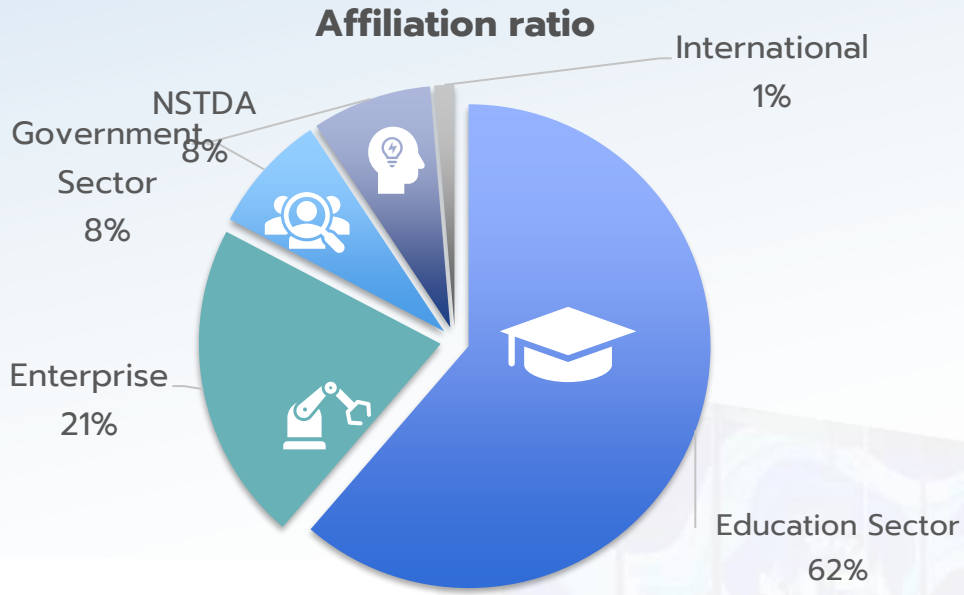
Project by: ENTEC

TRL 3

# User Profile: Stat Growth

| User group type/number of projects | | |
|---|---|---|
| **Affiliated** | **Number** | **Projects** |
| Education Sector | 46 | 272 |
| Enterprise | 16 | 23 |
| Government Sector | 6 | 8 |
| NSTDA | 6 | 104 |
| International | 1 | 1 |
| **Total** | **75** | **408** |

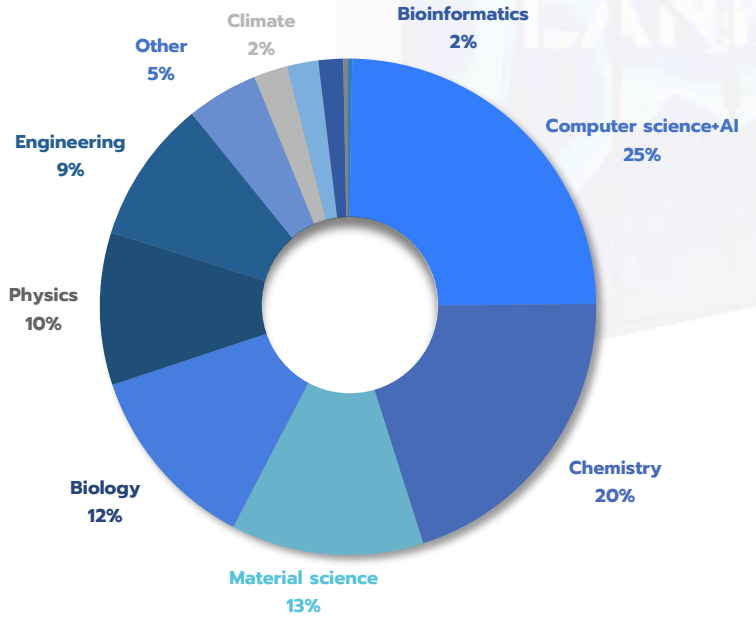
Updated: 16 January 2026



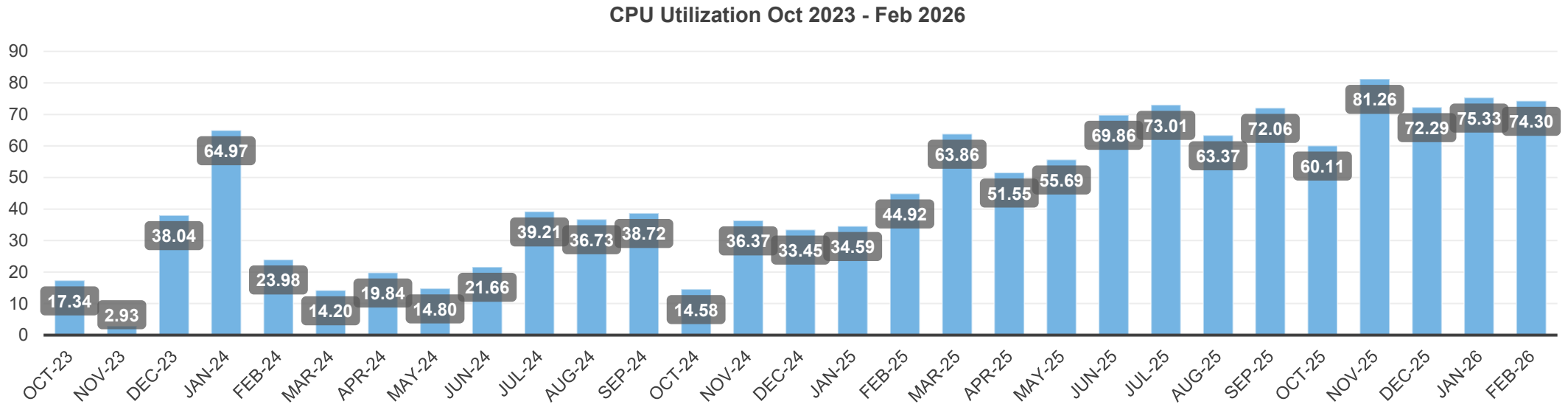

| Project type/project proportion | | | |
|---|---|---|---|
| **Domain** | **Projects** | **Domain** | **Projects** |
| Computer science + AI | 168 | Climate | 15 |
| Chemistry | 139 | Mathematics | 14 |
| Material science | 86 | Bioinformatics | 11 |
| Biology | 84 | Digital Service & Smart Electronics | 2 |
| Physics | 68 | Art and Architecture | 2 |
| Engineering | 64 | **Total** | **685** |
| Other | 32 | | |

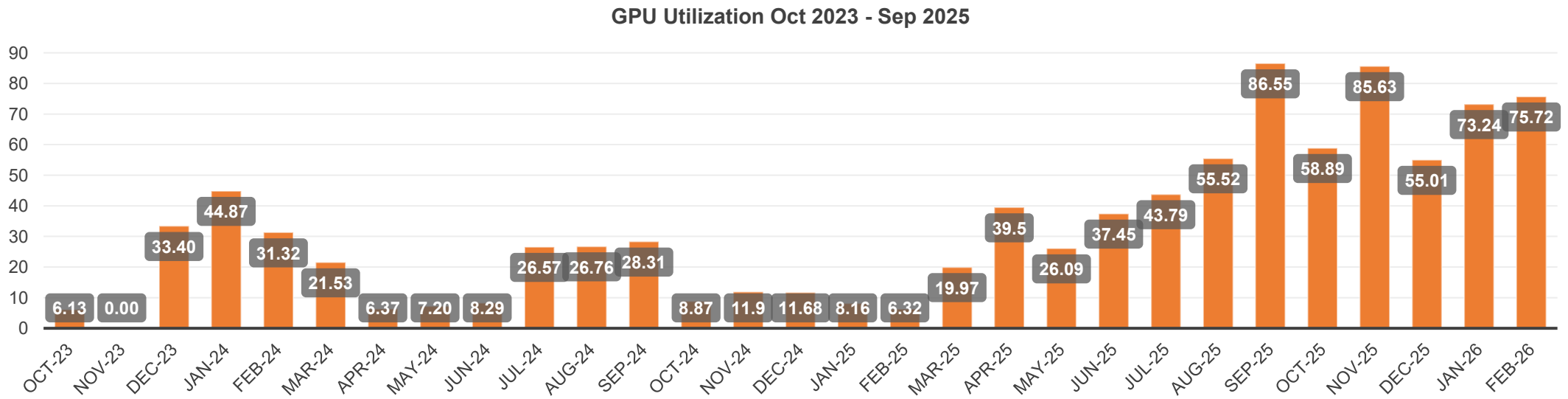
Updated: 16 January 2026

*หมายเหตุ: ยอดงานวิจัยสะสมข้างต้นบาง project ระบุวิจับความเกี่ยวข้องมามากกว่า 1 ประเภทงานวิจัย*



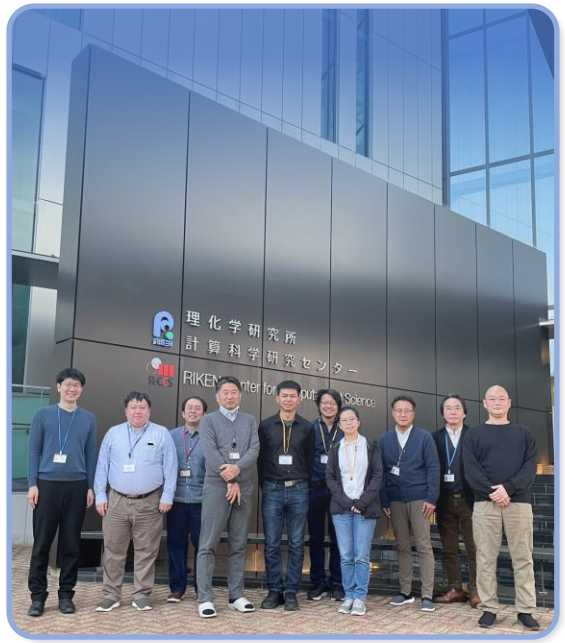
# LANTA Utilization (average)




Updated 28 February 2026

# Presence and Partnership






**Visit RIKEN Super Combined Cluster (RSCC) System & SCA 2026 Supercomputing Asia**




**Alliance of Supercomputing Centres (ASC) & SC25 Conference 2025**

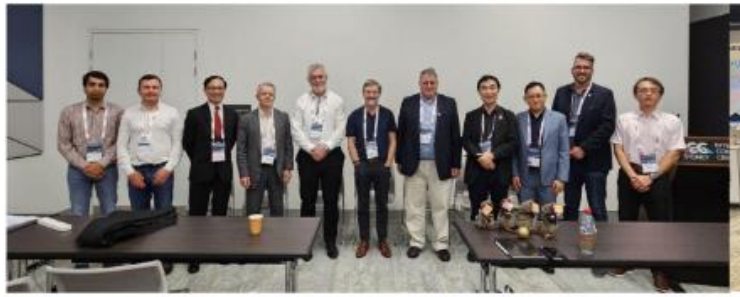
# HPC Centre Leaders Forum

Like-minded leaders from HPC Centres in Asia, Australia, Europe and USA provided updates on their respective centres and discussed common areas of interest as well as challenges faced.


An MoU was signed between NSCC and ThaiSC to explore further collaborations between the two HPC centres in the ASEAN region. The collaboration will explore promoting and nurturing HPC partnership in areas like HPC resource and capability development, joint training and staff upskilling.

**HPC Centre Leaders Forum**

Professor Satoshi Matsuoka (left), Associate Professor Tan Tin Wee (middle), and Mr Mark Stickells (right) presenting on the latest development of the respective HPC centres during HPC Leaders Forum.



HPC leaders from various global HPC centres at 2024 HPC Centre Leaders Forum.


Looking forward to SCA25 in Singapore

The 2024 edition of the HPC Centre Leaders Forum brought together global HPC Centre leaders from Australia, Finland, Japan, Poland, Singapore, Taiwan, Thailand, and the United States to discuss the latest updates from the respective centres and their regions. The leaders also expounded on the challenges faced and opportunities for collaboration, which leveraged HPC centre partners to foster the growth and cooperation. The track held on 20 February 2024 featured a four-hour session, which was Chaired in part by Professor Chennupati Jagadish, the President of the Australian Academy of Science, and Mr Eugene Low, Deputy Director at NSCC Singapore.

# EU ASEAN HPC School


Between 5 – 10 December 2022, Kasetsart University (KU), together with National Science and Technology Development Agency leading by NSTDA Supercomputer Center (ThaiSC), co-hosted the EU-ASEAN HPC School 2022 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. The school was endorsed by ASEAN HPC Task Force and funded by the EU through the Enhanced Regional EU-ASEAN Dialogue Instrument (E-READI).

## The ASEAN High-Performance Computing (HPC) School 2022

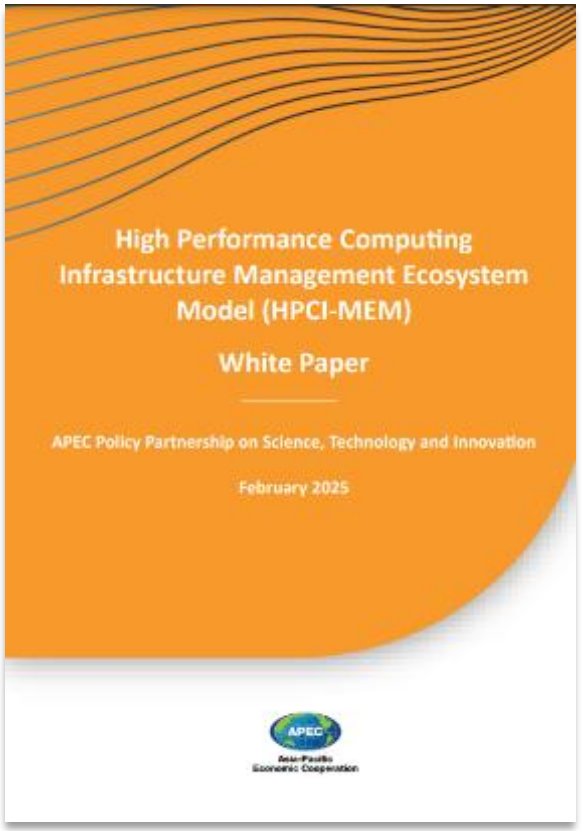

Bogor, Indonesia, 11 December 2023 – For the third year in a row, the week-long High-Performance Computing (HPC) School for South-East Asian researchers kicked-off, this time in Bogor, Indonesia. The Association of Southeast Asian Nations (ASEAN) is set to continue to inspire researchers in the region, following the HPC School's successful first two editions, organised by the European Union (EU) in collaboration with Japan and ASEAN.

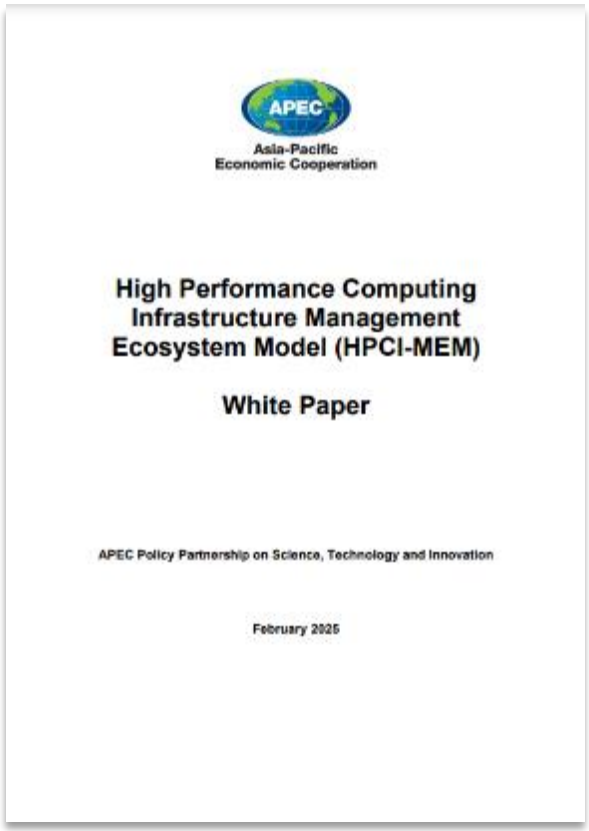
## The ASEAN High-Performance Computing (HPC) School 2023

# EU-ASEAN-Japan Symposium: HPC School Resumption


SINGAPORE, 1 March 2023 – The continuation of the High-Performance Computing (HPC) School in 2023 to be held in Jakarta, Indonesia was announced during the EU-ASEAN-Japan Symposium at the Supercomputing Asia Conference (SCA) 2023.

# Promoting: HPCI-MEM whitepaper (Funded by APEC)




**Description**

This publication, developed under APEC Project PPSTI 10 2022A, presents a comprehensive ecosystem model designed to support the effective management and utilization of High-Performance Computing (HPC) facilities. It emphasizes the dynamic interactions among key stakeholders, including policymakers and funding authorities, HPC facility providers and operators, end-users and application developers, regulatory and compliance bodies, research and academic institutions, industry partners, commercial vendors, and the broader HPC community.

The publication offers detailed guidance on critical ecosystem components that influence the utility and effectiveness of HPC facilities. These components include the setup, management, and operation of HPC facilities; public policies supporting HPC; and community-driven agendas for advancing HPC. Tailored recommendations are provided to address each of these key aspects, ensuring a holistic approach to maximizing the potential of HPC infrastructure.

# Presence and Partnership (2): International & Local

## International

AIST

NARLabs
National Applied Research Laboratories

SCAsia 2021
Supercomputing

Hewlett Packard Enterprise

NCHC

SG NSCC SINGAPORE
National Supercomputing Centre

RIKEN R-CCS

ISC High Performance
The HPC Event.

AMD

intel

uni.lu
UNIVERSITÉ DU LUXEMBOURG

LUMI

SEAIP

NVIDIA

NCI AUSTRALIA

PAWSEY supercomputing centre

## Local

NARIT

NSCSE 24

NSCSE 25

National e-Science Infrastructure Consortium

anu TINT

สมาคมวิทยาการและวิศวกรรมเชิงคอมพิวเตอร์

ANSCSE 26

สถาบันสารสนเทศทรัพยากรน้ำ
Hydro - Informatics Institute

กรมควบคุมมลพิษ
POLLUTION CONTROL DEPARTMENT

AI FOR THAI

Pathumma LLM

# Local Landscape and Trend of HPC in Thailand

# General Update & Cloud First Policy

## Thailand has another HPC system in TOP 500

| TOP500 LIST - NOV 2025 | Leaders in ASEAN | | | | |
|---|---|---|---|---|---|
| **HPC TOP500 Ranking** | **#43** | **#120** | **#124** | **#127** | **#199** |
| **System** | **FPT AI** | **Hopper NUS** | **ASPIRE 2A+** | **THE CRUST 2.5** | **LANTA** |
| **Manufactured by** | ASUSTeK | DELL | NVIDIA | HPE Cray | **HPE Cray** |
| **Total Pflops** | **46.65** | **15.05** | **14.20** | **13.85** | **8.15** |
| **Green500 Ranking** | #221 | #264 | #267 | #270 | #91 |

| List | Rank | System | Vendor | Total Cores | Rmax (PFlop/s) | Rpeak (PFlop/s) | Power (kW) |
|---|---|---|---|---|---|---|---|
| 11/2025 | 127 | HPE Cray XD665, AMD EPYC 9354 32C 3.25GHz, Nvidia H100 SXM5 94Gb, Infiniband NDR400, RHEL 8.9 | HPE | 47,360 | 13.85 | 21.68 | |

| List | Rank | System | Vendor | Total Cores | Rmax (PFlop/s) | Rpeak (PFlop/s) | Power (kW) |
|---|---|---|---|---|---|---|---|
| 11/2025 | 199 | HPE Cray EX235n, AMD EPYC 7713 64C 2GHz, NVIDIA A100 40GB, Slingshot-11 | HPE | 87,296 | 8.15 | 13.77 | 310.46 |

# General Update

## Thailand HPC ecosystem map

### National HPC

ThaiSC (LANTA)

### Research HPC

- Universities
- NARIT
- Hydro – Informatics Institute (HII)

### Industry HPC

- PTTEP
- Siam AI
- Cloud providers

# Thailand “Cloud First” Policy: Government Digital Policy

**Thailand has adopted a “Cloud First” policy, requiring government agencies to prioritize cloud-based infrastructure when deploying new IT systems.**

## Key objectives:

- Modernize digital government services
- Improve efficiency and scalability
- Strengthen cybersecurity and resilience
- Support thailand’s digital economy transformation
- Tentative start from 2026 Fiscal year budget

# Rapid Expansion of Hyperscale Infrastructure

**Thailand is currently experiencing a rapid expansion of global cloud infrastructure, including investments from:**


- **AWS – new Bangkok cloud region**


- **Microsoft – regional data center plans**


- **Google Cloud – data center and AI infrastructure investment**


- **Several international data center operators**

This marks a major shift in the national digital infrastructure landscape.

# Strategic Questions for Research Infrastructure

**The rise of cloud infrastructure raises important questions for national scientific computing:**

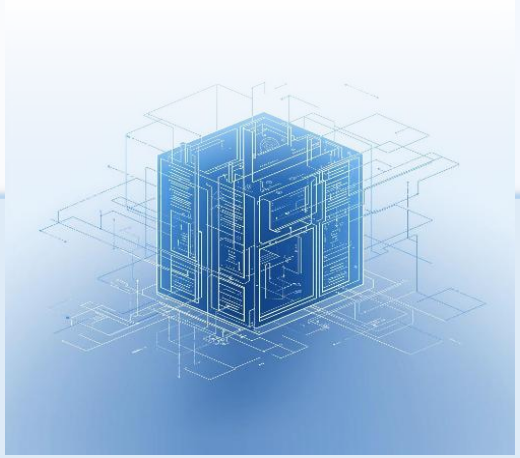
- How should HPC and cloud complement each other?
- What workloads should remain on national research infrastructure?
- How can we ensure data sovereignty for scientific data?
- How can national HPC integrate with AI and cloud ecosystems?

# Thailand's Direction

**Thailand is exploring a hybrid approach:**

## National HPC

National HPC infrastructure for large-scale scientific computing



## Cloud Platforms

Cloud platforms for elastic and service-oriented workloads

## Industry Synergy

Collaboration with industry to expand AI and data capabilities

The goal is to build a balanced and sustainable national computing ecosystem.

# Thailand is expanding its national research infrastructure

Thailand is expanding its national research infrastructure

## We welcome collaboration in:


e-Science

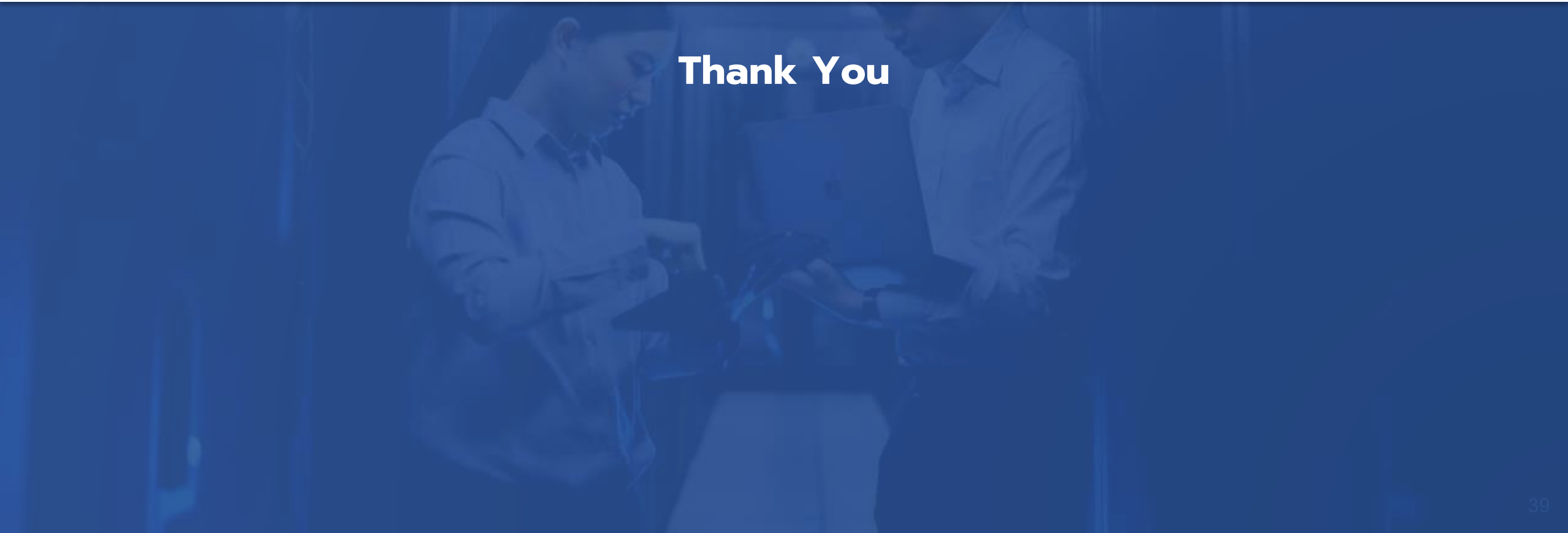

AI infrastructure

Distributed Computing

Regional research collaboration

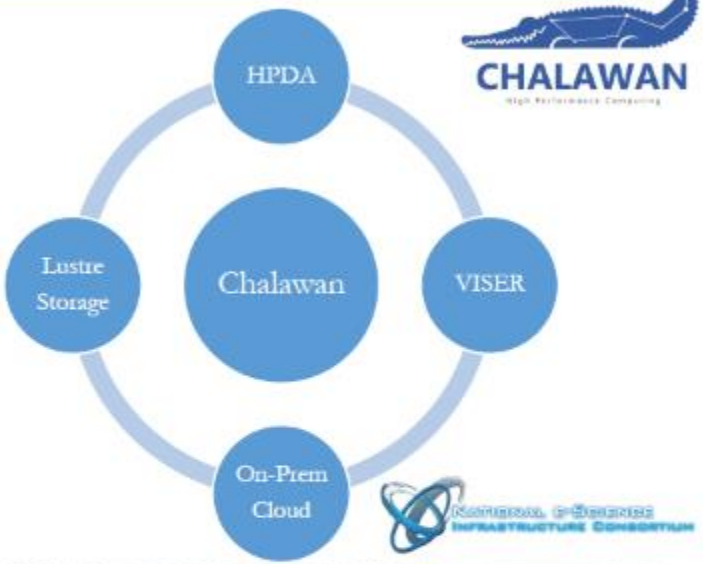
NECTEC
a member of NSTDA

# Thank You



# High-Performance Computing for Research and Engineering

- **HPDA Computes** (Gen1: Castor, Gen2: Pollux, Gen3: Spica, **Gen 4: Rigel**)
  - **1800 CPU cores** (2.5-2.7GHz, 28c, 64c per node, **+192c per node**)
  - **16TB memory** (128GB,512GB per node, **+2.2TB per node**)
  - **GPU**: Nvidia **12xV100** (32GB), **1xA100** (80GB), **4xAMD MI210 (64GB), + 4xNvidiaL40S + 8xNvidia H200 141GB (2025)**
  - **Interconnect**: 56Gbps IB, 100Gbps RoCE, **+400Gbps RoCE**
- **Lustre Storage**: **6.7 PB** (Parallel filesystem, **+0.7PB** in 2025)
- **Virtual Infrastructure for Scientific and Engineering Research computing (VISER)**
  - **VDI**: Horizon View 20CCU (**virtual workstation**: vWS)
  - **vGPU**: 2 x Nvidia A40, 2 x Nvidia A10, **+ 4 x Nvidia L40**
  - CPU: 16c @ 3.7GHz, 64c @ **3.0GHz**, RAM: 3TB
  - Storage: Local SSD and Lustre Storage




# KMUTT: E-SCIENCE

## Share resources

- **Current (temporary service suspension)**
- 232 cores of CPU
- 25 TB of RAM

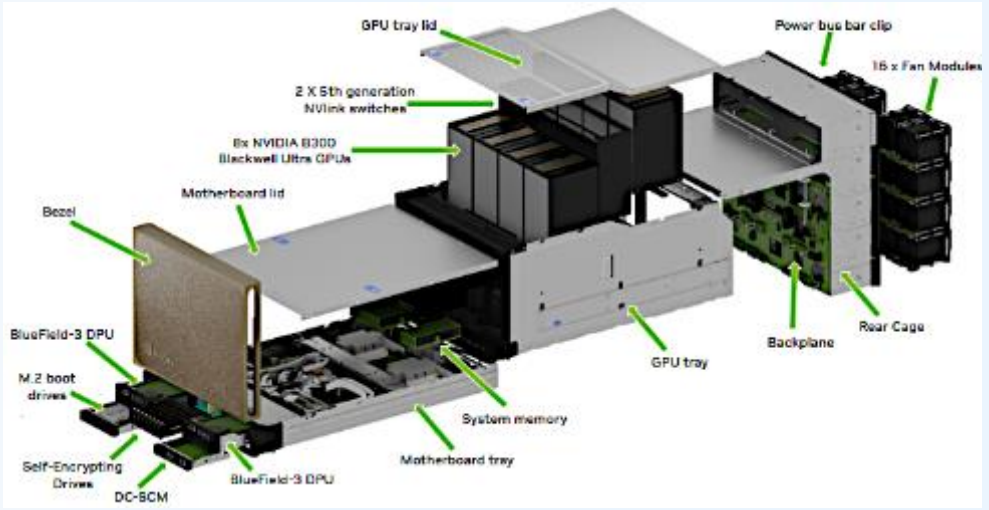
- **Next 3 Months (donate from PTT-digital)**
- 3072 cores of CPU
- 15 TB of RAM
- 749 TB of Raw Storage

# KMUTT: E-SCIENCE

## Limited Resources

- **Current**
- Intel(R) Xeon(R) CPU E7-4809 v4 @ 2.10GHz 8 cores * 4 CPU = 24 cores
- 3 TB of RAM
- 7 TB Storage

- **Next 4 Months (installation phase)**
- NVIDIA DGX B300
- 8 GPU-Cards of B300



# High Performance Computing

**HII Data Center**

linuxhpc-live2.hii.or.th (Production)

Compute Node : 28 nodes
CPU : 1008 cores
Memory : 10.75 PB
Storage : 740 TB

linuxhpc-dev2.hii.or.th (Development)

Compute Node : 20 nodes
CPU : 320 cores
Memory : 960 GB
Storage : 48 TB

linuxhpc-live4.hii.or.th (GPU)

Compute Node : 3 nodes
CPU : 96 cores
Memory : 576 GB
GPU : 6 x Tesla V100 PCIe 32GB(Node1,2)
GPU : 2 x Tesla A100 PCIe 32GB(Node3)
Storage : 19 TB

สถาบันสารสนเทศทรัพยากรน้ำ (องค์การมหาชน)

# TINT HPC

## RESOURCE & SOFTWARE

Compute
4 Node

CPU
64 Cores

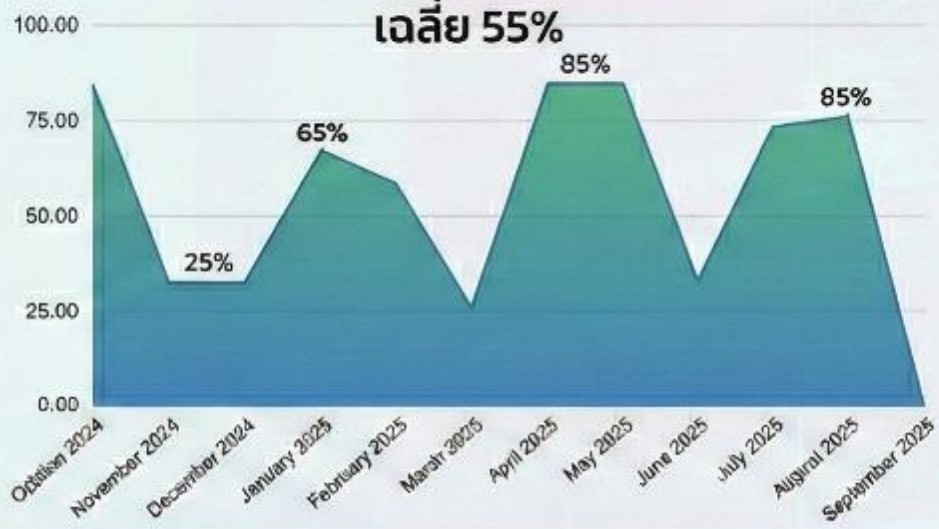
RAM
128 GB

Storage
25.6 TB

MCNP/MCNPX/MVP,
MATLAB

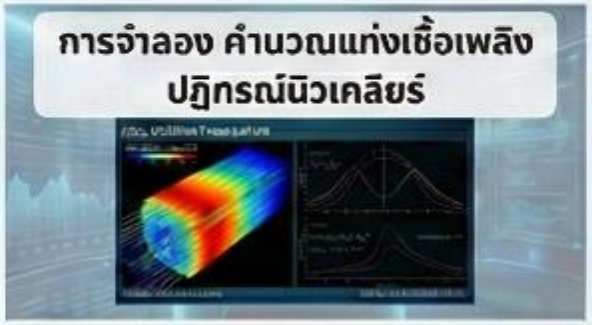
เปิดให้บริการเมื่อ ปี พ.ศ. 2559

## UTILIZATION (%)

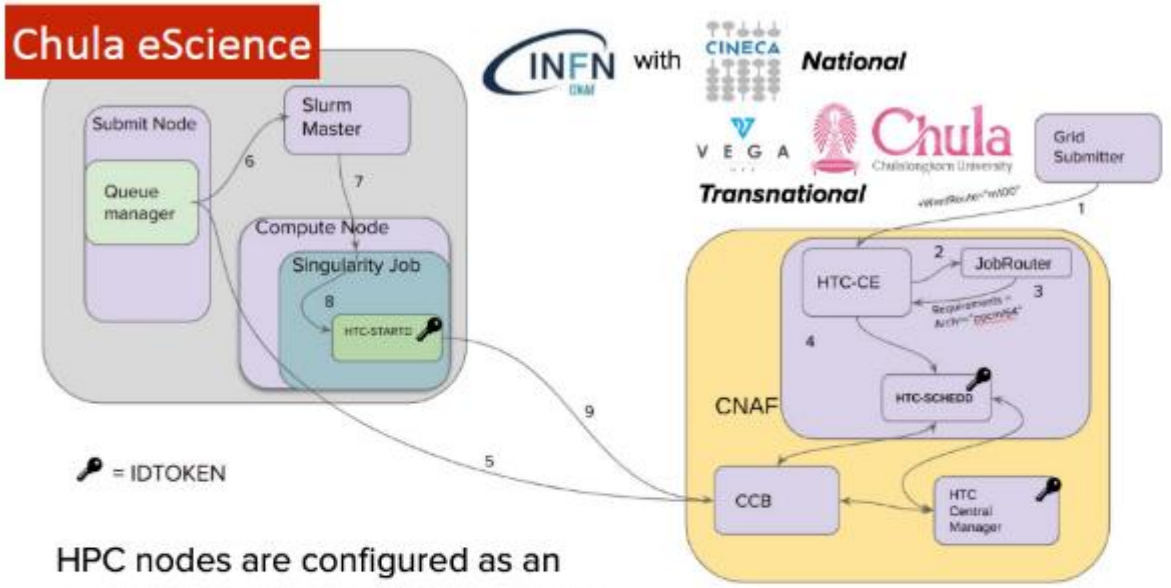



## ตัวอย่างโครงการ

งานเครื่องไทคาแมค: จำลองการเกิดพลาสมา




# Site extension + overlay batch model




HPC nodes are configured as an extension of WLCG receiving all the jobs targeted for the standard WLCG site.

- From HPC Login Node, submit a Slurm job.
- At start, it launches a Singularity container which
  - activates an HTCondor STARTD, which
  - authenticates to the Central Manager and join the pool
  - becomes available to execute jobs submitted to HTCondor-CE at CNAF. StartJobs expression to only accept proper jobs

- Would like to try with ThaiSC but some security concerns on need of network to the working node, and additional distributed storage system (EOS).

# Next

- Work is under Science and Technology Development Fund (ST)

- Budget 69
  - Prototype: completed and operational
  - Procure additional worker nodes
    - 768 CPU cores (AMD and Intel), enabling production workloads and floating-point precision studies. Total resource 1,500 CPU cores
    - L4 GPUs

- Budget 70: ST proposal to
  - Storage 2 (currently 160 TB): planned expansion to 1 PB
  - Storage 1 (currently 160 TB): Prototype cache storage for frequently accessed data and temporary CMS production outputs to mitigates limited network bandwidth to INFN

- Wish-list:
  - Different CPU types for software development
    - ARM server: CMS software support ARM
    - RISC-V server: : In line with EU priorities, effort to build CMS software stack on RISC-V

# ทรัพยากรการคำนวณ

## Resources

Computing
CPU = 144 cores
(2.1 GHz each)
Data Storage = 60 TB
(100TB more in plan)
Rmax = 4.5 TFLOPS

## HPC co-working space

6 x Virtual Desktop Infrastructure

Training, workshop and war room for digital work

## Software

VASP*, GAUSSIAN*,
FEFF, SATLEED
GROMACS†, GOLD†, FLUKA,
ELEGANT

### Calculation Techniques;

DFT, MD, Molecular Docking, Magnet, Radiation

### Support to SR-Techniques;

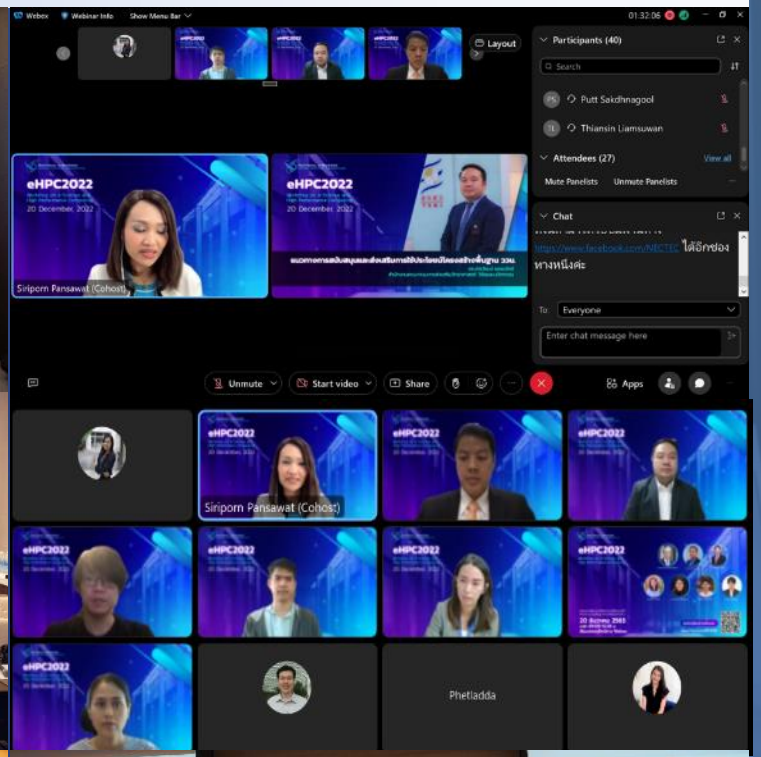
XAS, XPS, PEEM, Magnet Design

## Future Potential

- Storage (120 TB) → Large Data experiment (SYNAPES)
- AI for smart data interpretation
- Advanced Engineering → 3GeV synchrotron light source

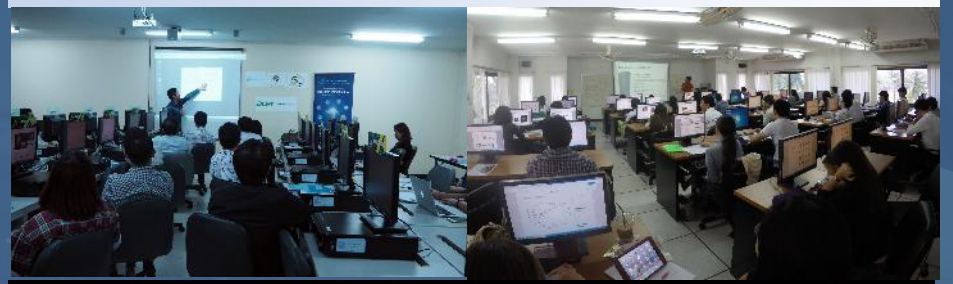
# Community

## Workshop on e-Science and High-Performance Computing (2013-2024)



## HPC User Training




## Promote/Encorage development of HPC and Community

## Exhibition, Promote use of HPC

# Active Project

## Form 2010 - 2025