



Korea Institute of  
Science and Technology Information



ALICE



# SUT – Thailand site report

Wachaloem Poonsawat  
Natthawut Laojamnongwong

7<sup>th</sup> Asia Tier Center Forum  
1 - 3 November 2023  
Jeju Island, South Korea



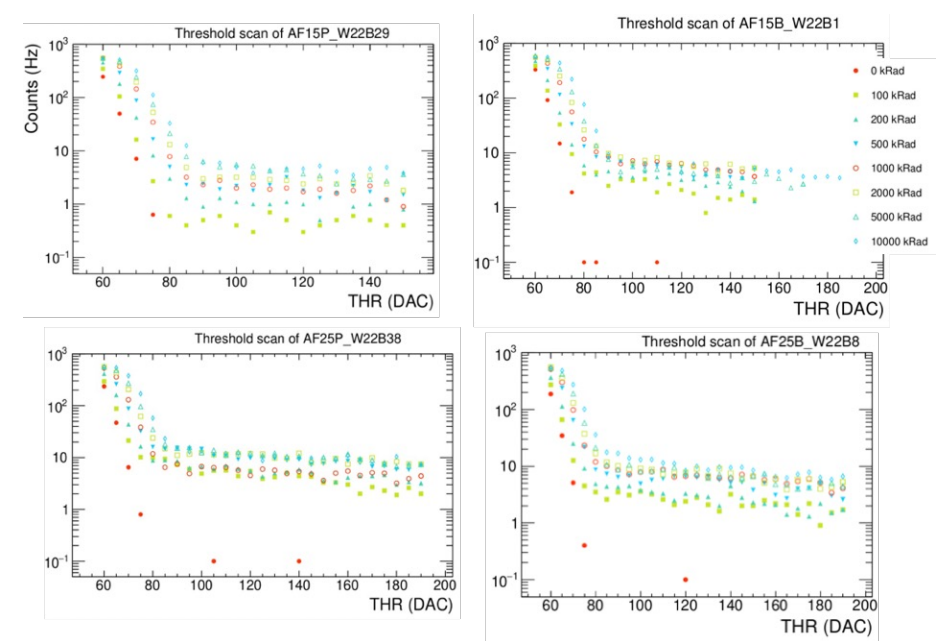
# Thailand duty to ALICE

- Join the sensor irradiation at NPI REZ, Czech Republic

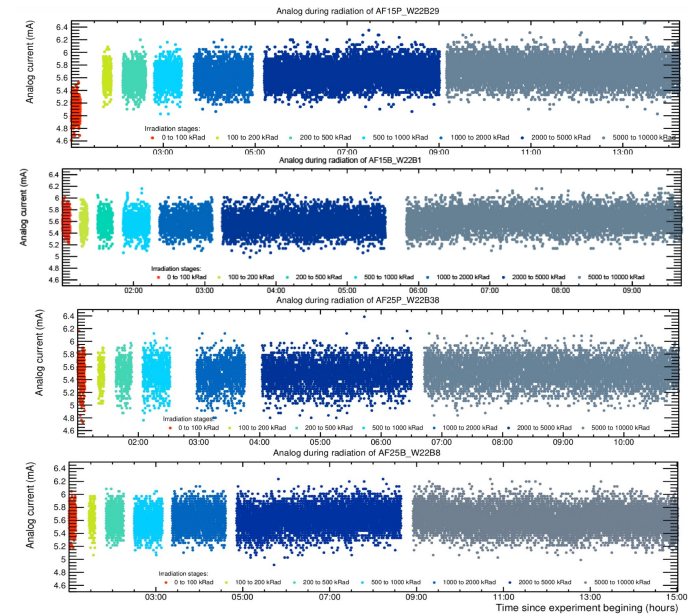


APTS chip was mount and irradiate with proton beam, 30 MeV and  $7 \times 10^8 - 1.5 \times 10^9$  proton/(cm<sup>2</sup>s)

The total absorbed TID for each chip is 10 Mrad



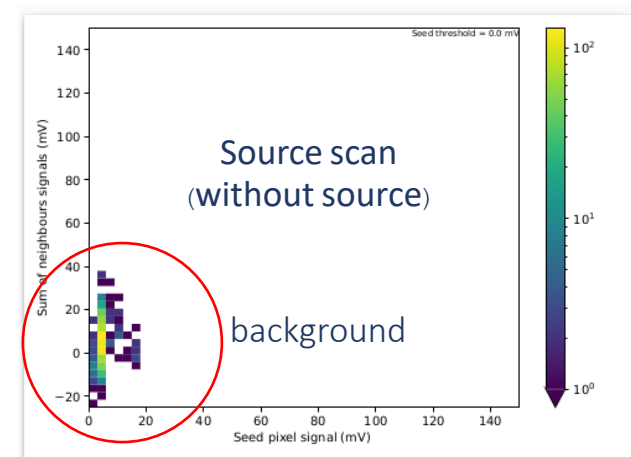
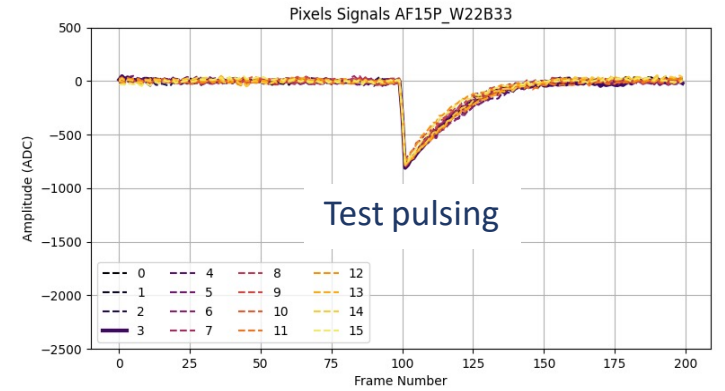
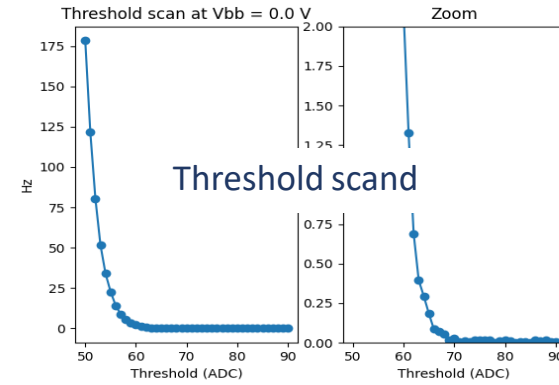
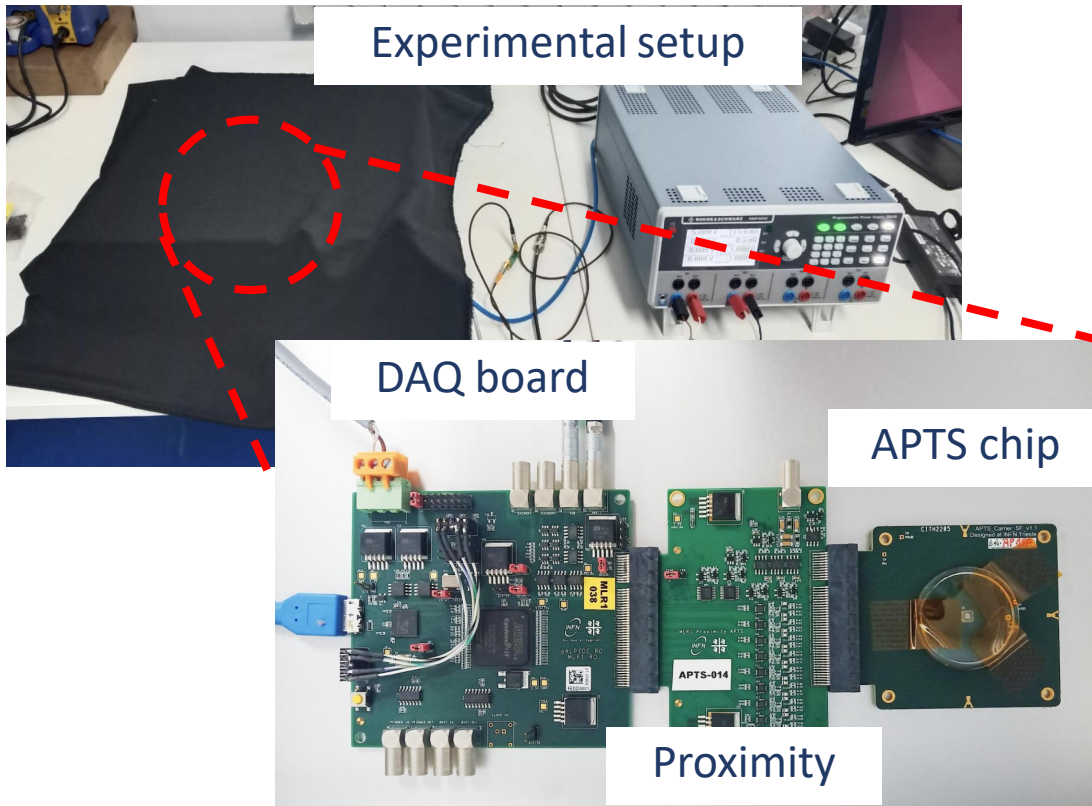
Relation of event rate and threshold of APTS



The distributions of current when chip was irradiated

# Thailand duty to ALICE

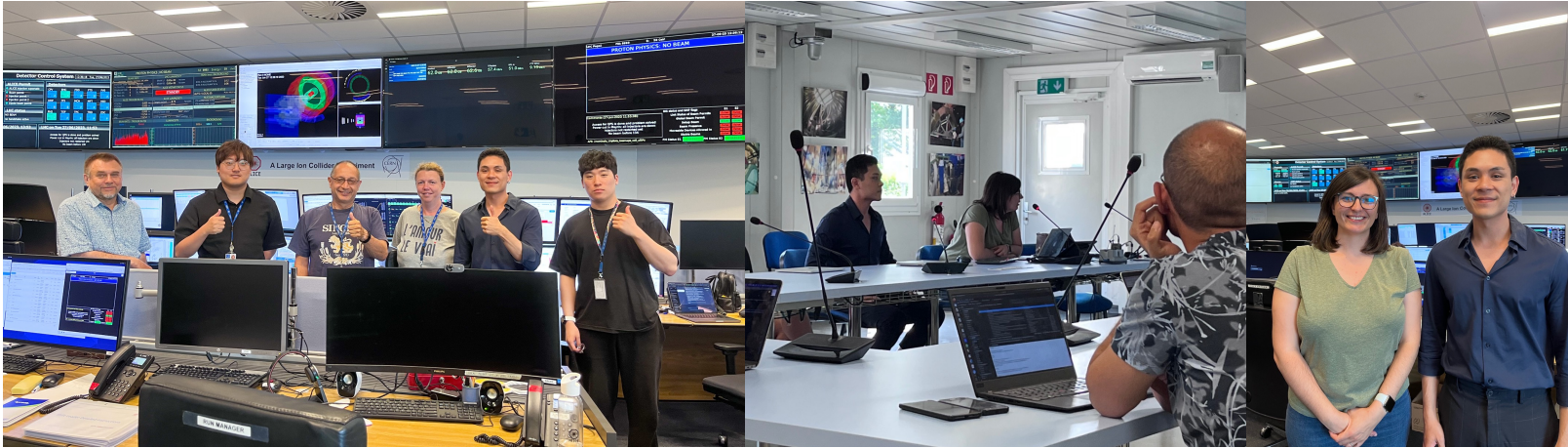
- APTS chip was delivered to Synchrotron Light Research Institute
- Experiment setup similar to CERN setup
- Laboratory chip test
- Radiation source chip test with Sr-90 (Low number of particle)





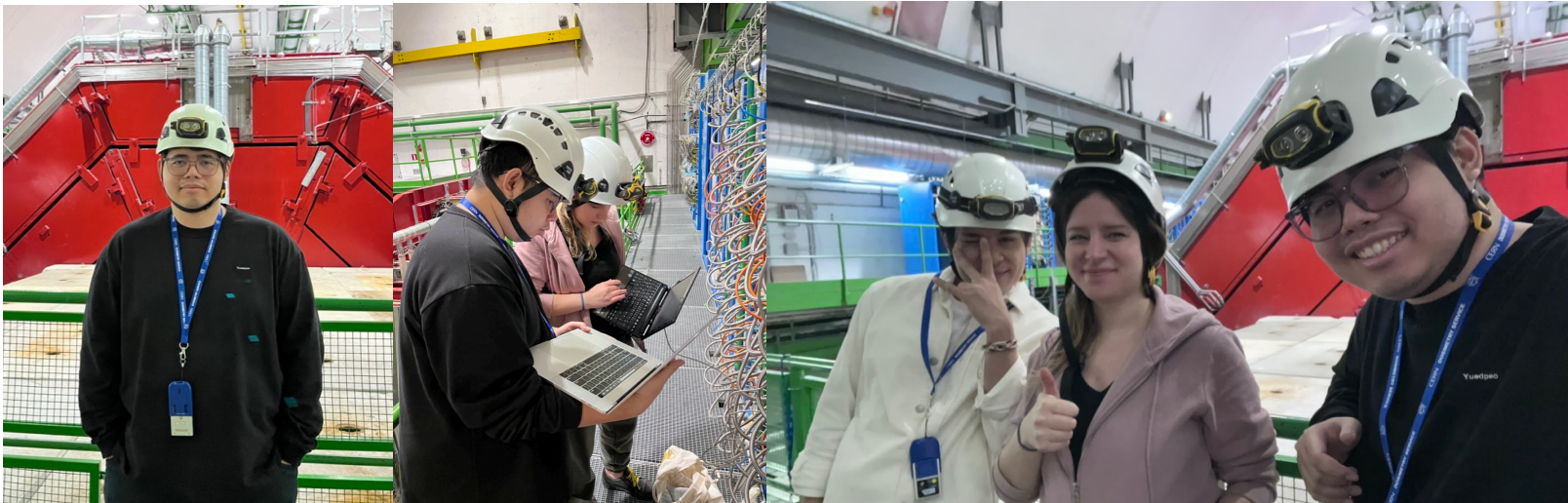
# Thailand duty to ALICE

- Role run manager at ALICE



- Run manager under RUN3, coordinated central system tests for consolidation and performances during machine development 1

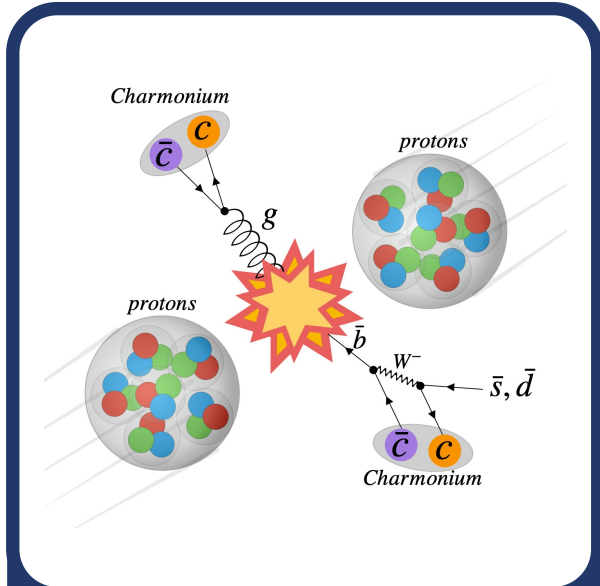
- Service Task For Ph.D. Student at ALICE



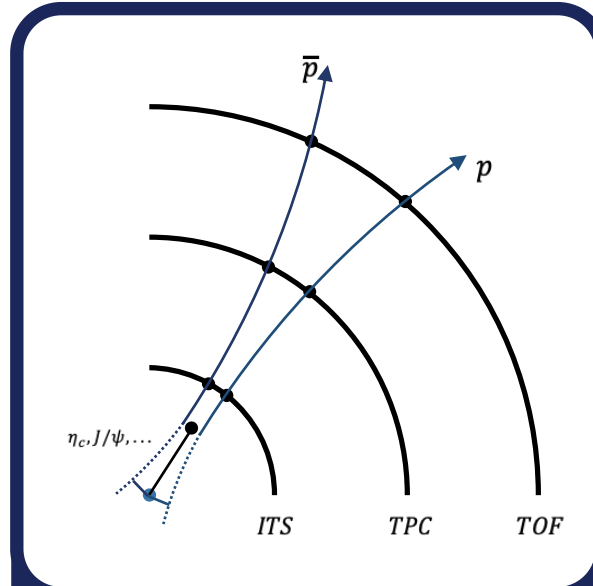
- The physicist have to full fill ALICE service task in order to be allow for publishing publication.
- Dr. Anastasia Berdnikova, the ALICE TRD coordinator, assigned me duty to replace damaged PSU during stopped beam.



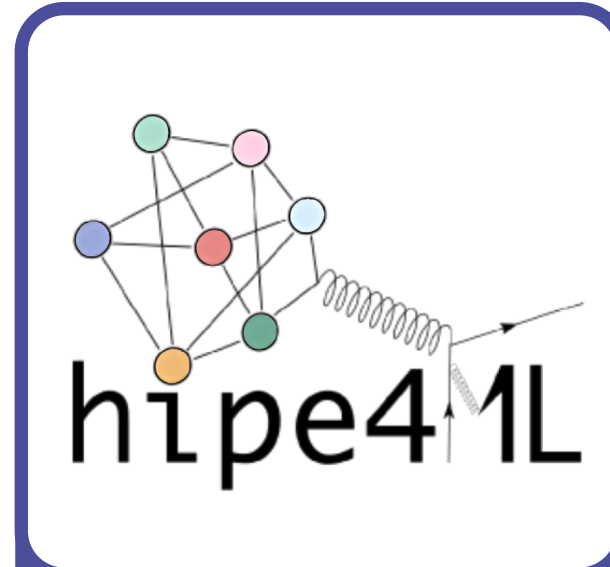
# Monte Carlo Simulation of $\eta_c \rightarrow p\bar{p}$ and $J/\psi \rightarrow p\bar{p}$ in Proton-Proton Collisions at $\sqrt{s} = 13$ TeV with ALICE at the LHC



Measure inclusive production of charmonia especially charmed eta meson ( $\eta_c$ ) from  $pp$  collision at  $\sqrt{s} = 13$  TeV in ALICE run 2 experiment.



The **invariant mass spectroscopy** is used for investigating charmonium decaying to proton-antiproton pairs which is the channel decaying by most of charmonia species.



To utilize **machine learning and Monte Carlo simulation** techniques to reduce the background and increase the efficiency of measurement.



ALICE



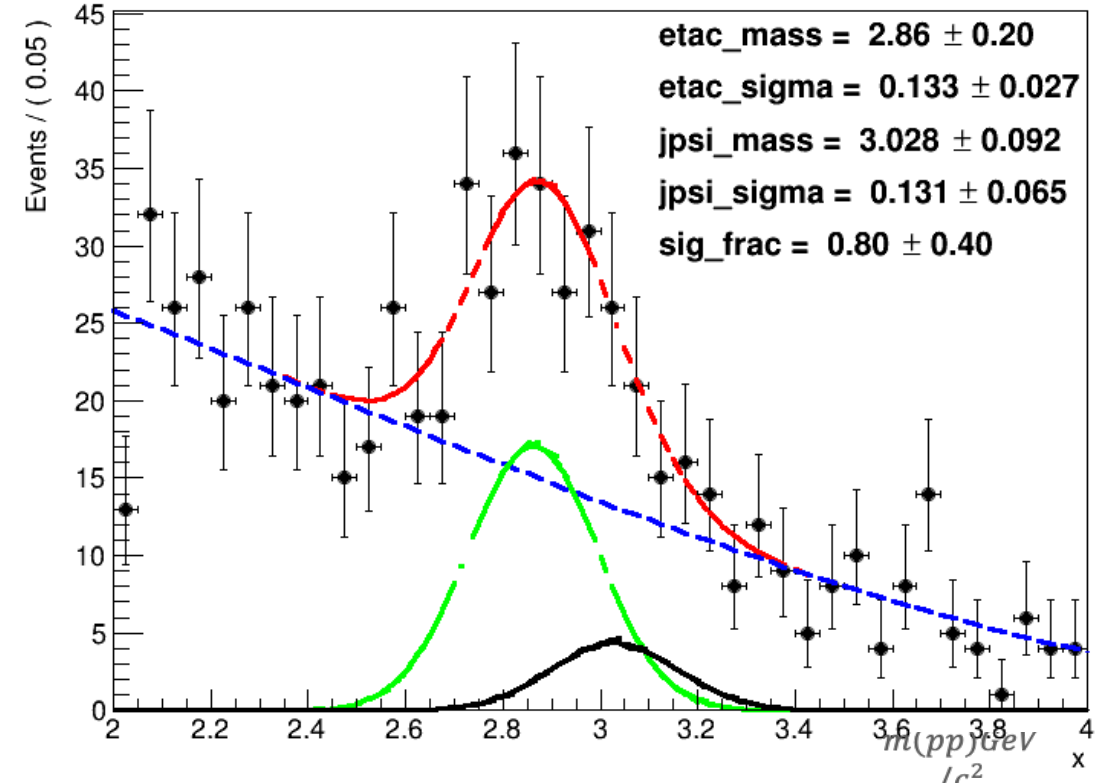
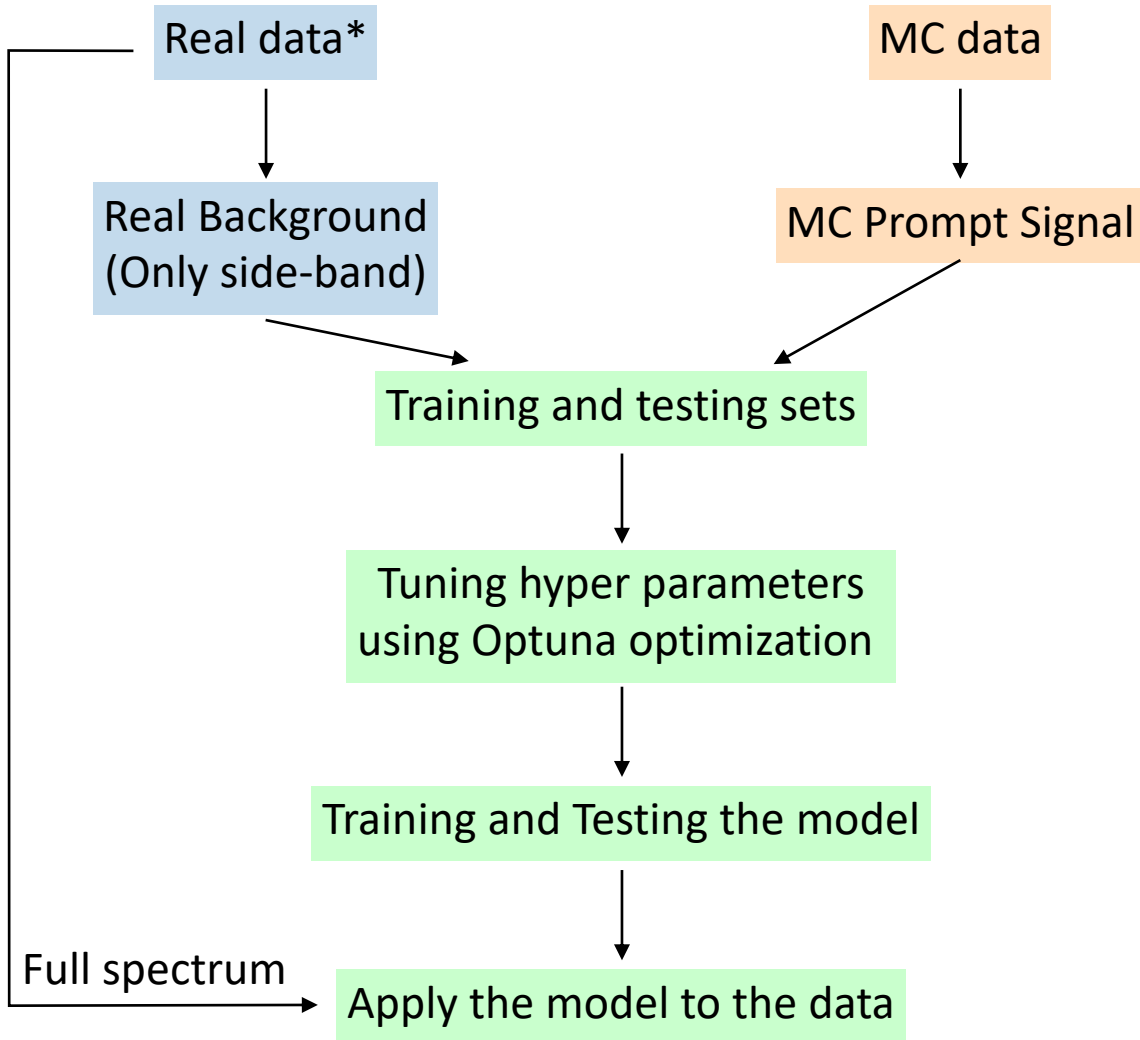
Tawanchat Simantathammakul<sup>1</sup>  
Asst. Prof. Dr. CHINORAT KOBDAJ<sup>1</sup>  
Dr. BENJAMIN DÖNIGUS<sup>2</sup>  
Omsap Jaronrak<sup>1</sup>

<sup>1</sup> Suranaree University of Technology, School of Physics, Institute of Science, Thailand

<sup>2</sup> Goethe University, Physics Department, Frankfurt, Germany



# Multivariate selection using machine learning



Fitted Invariant mass spectrum (red), polynomial background (blue),  $\eta_c$  signal (green), and  $J/\psi$  signal (black)



# Research Plan

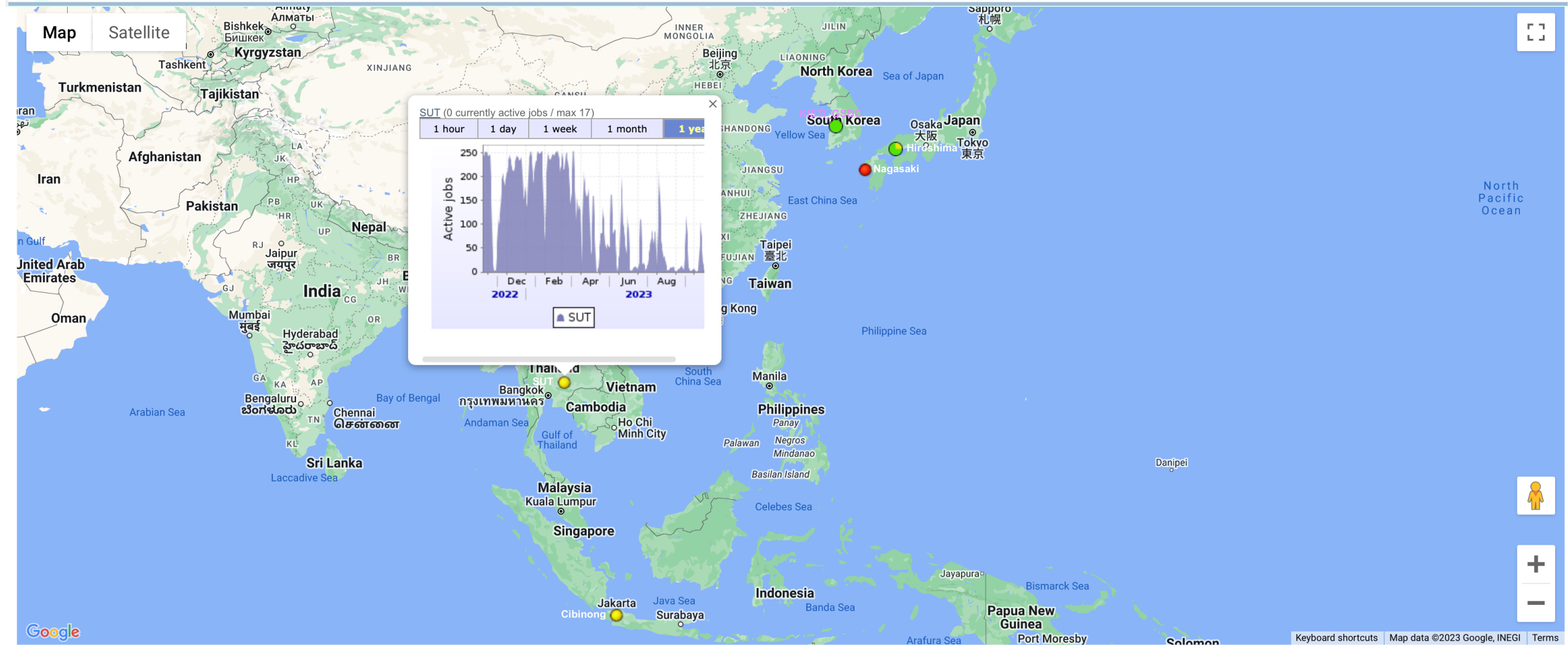
Activities	Months												Expected output	Annotation	
	1	2	3	4	5	6	7	8	9	10	11	12			
1) Study the ALIROOT/ALIPHYSICS framework for the Charmed particle	✓	✓	✓	✓	✓	✓	✓	✓						Understand and complete the installation of ALICE software framework at SUT	Fully utilize AliRoot, AliPhysics, AliDPG on SUT server.
2) Perform the Monte Carlo Simulation for $\eta_c$ and $J/\psi$		✓	✓					✓	✓	✓	✓			Monte Carlo simulation Data $\eta_c$ and $J/\psi$ in the AliESDs.root format	Data collecting and MC simulation has been done.
3) Write the analysis code for the ALICE data to find $\eta_c$ and $J/\psi$				✓	✓	✓	✓	✓	✓	✓	✓	✓		Analysis code for $\eta_c$ and $J/\psi$	Working on optimizing model and significance scanning.
<b>2566</b>															
4) Confirm the results to PWG and measure systematic uncertainty	✓	✓	✓	✓	✓	✓								Invariant mass spectrum of $\eta_c$ and $J/\psi$	
5) Prepare publication and submit to ALICE committee					✓	✓	✓	✓	✓	✓	✓	✓		1 publication	



# SUT ALICE site report



MonALISA Repository for ALICE



Google

Keyboard shortcuts | Map data ©2023 Google, INEGI | Terms



# SUT ALICE site report

## IN from

No.	ID	Site	When	Speed (Mbps)	Hops	RTT (ms)	Streams
1.	2315863	NECTEC	23 Oct 2015 23:17	864.07	8	5.48	1
2.	4889769	KISTI_GSDC	today 06:32	343.95	15	102.33	1
3.	1976476	KISTI-CREAM	19 Oct 2014 21:49	327.17	12	158.67	1
4.	4885249	Hiroshima	22 Oct 2023 01:33	302.01	14	129.05	1
5.	4315196	Moratuwa	22 Jan 2022 22:55	285.23	18	93.01	1
6.	4886136	Kolkata	23 Oct 2023 00:50	243.28			1

## OUT to

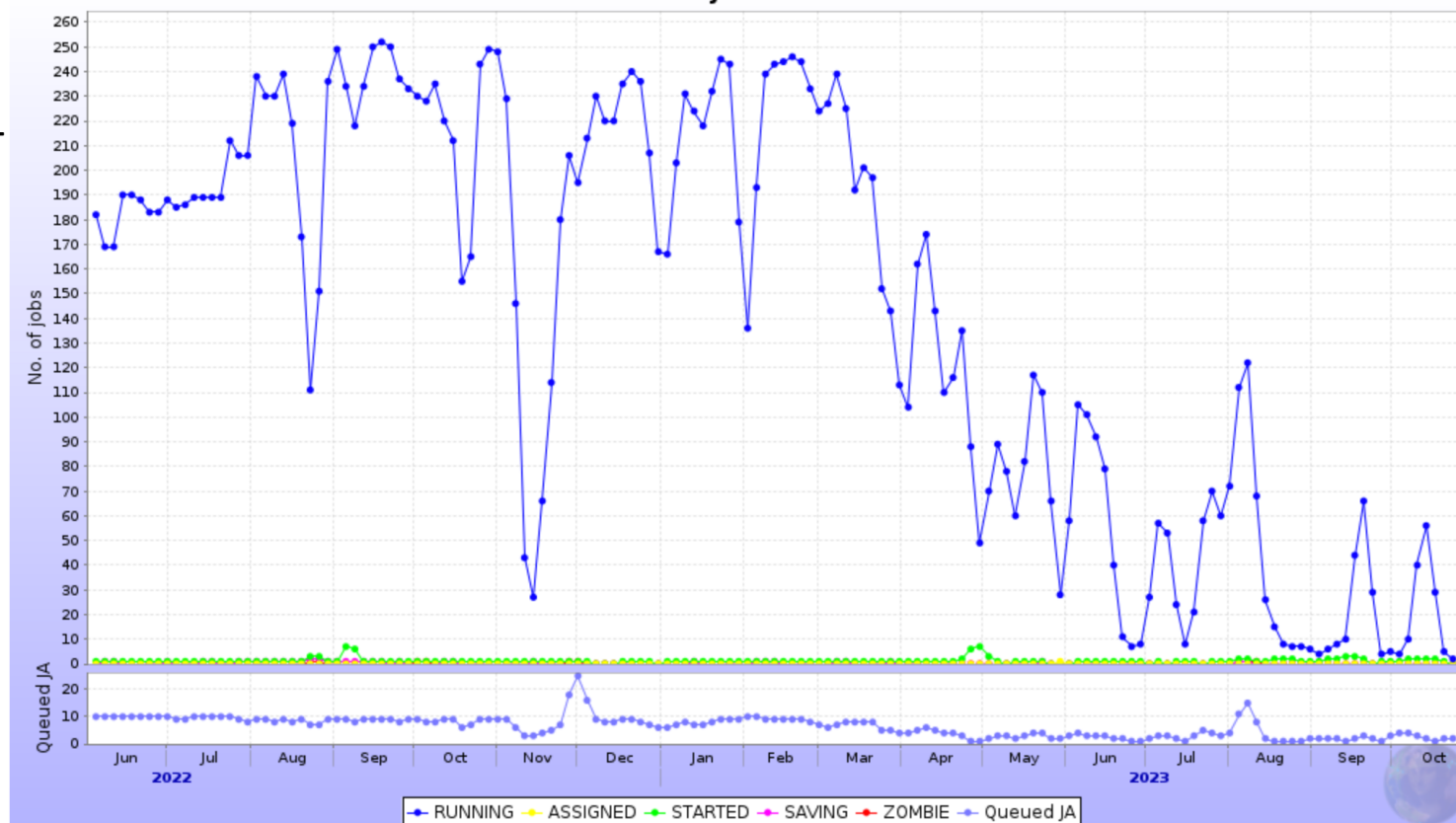
No.	ID	Site	When	Speed (Mbps)	Hops	RTT (ms)	Streams
1.	2313091	NECTEC	21 Oct 2015 00:12	738.24	8	5.41	1
2.	4316204	Moratuwa	24 Jan 2022 01:12	276.84			1
3.	4888813	Hiroshima	yesterday 04:25	218.12			1
4.	3946214	IPNL	26 Nov 2020 01:37	218.12	17	242.65	1
5.	4872777	Nagasaki	07 Oct 2023 23:32	218.12			1
6.	3946092	Legnaro	25 Nov 2020 22:19	209.73	18	254.18	1

## Top Bandwidth IN at SUT

- 1) NECTEC
- 2) KISTI\_GSDC
- 3) KISTI-CREAM
- 4) Hiroshima
- 5) Moratuwa
- 6) Kolkata

## Top Bandwidth OUT at SUT

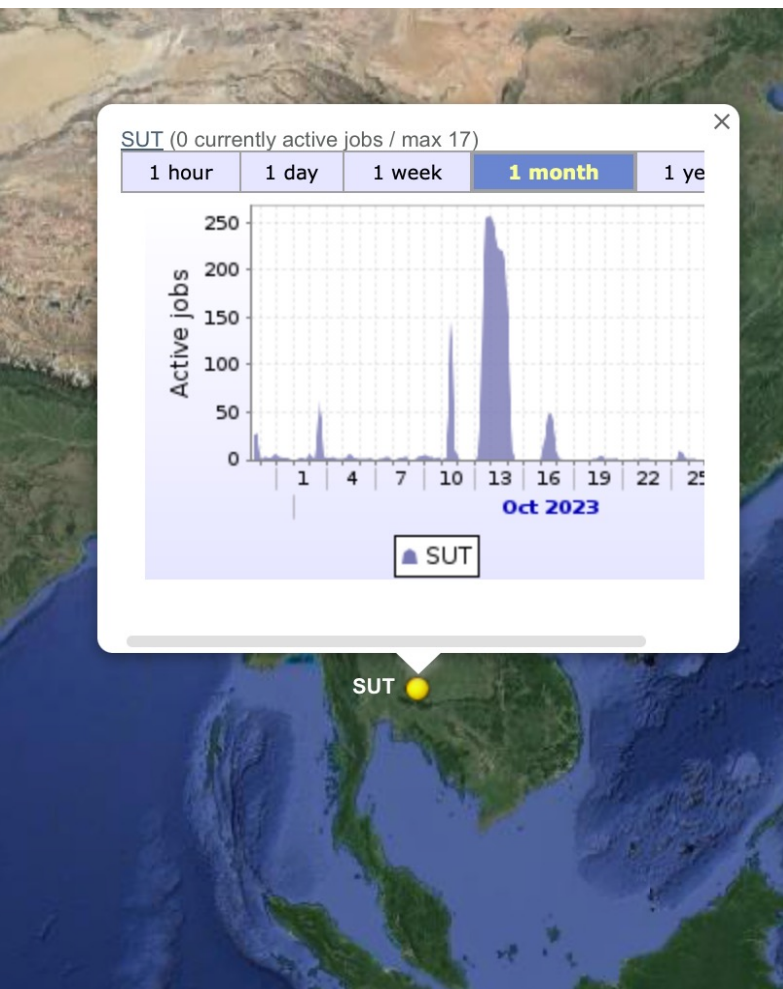
- 1) NECTEC
- 2) Moratuwa
- 3) Hiroshima
- 4) IPNL
- 5) Nagasaki
- 6) Legnaro



Active jobs at SUT since June 2022

# Report on ALICE sites' activity (26.04.2023 - 25.10.2023)

SUT	Thailand										
Site	Group	Tier	Pledged KSI2K	Delivered CPU	Wall	Occupancy Wall/Pledged	Missing KSI2K Pledged - Wall	Efficiency CPU/Wall	Job statistics		
									Assigned	Completed	Efficiency
1. SUT	Thailand	T2	-	-	-	-	-	-	12549	11997	95.6%
<b>Total</b>			<b>0</b>	<b>0</b>	<b>0</b>		<b>-</b>		<b>12549</b>	<b>11997</b>	



**MonALISA information** Version: 22.11.05 (JDK 12.0.1) **Service health** NTP: SYNC, offset: 0.002s  
 Running on: alice.sut.ac.th  
 Administrator: <Chinorat Kobdaj <kobdaj@sut.ac.th>>

**Services status** ClusterMonitor: n/a **Proxies status** AliEn proxy: OK (1 day, 23:45)  
 AliEn: PackMan: n/a Delegated proxy: n/a (n/a)  
 CE: n/a Proxy server: OK (196 days, 12:31)  
 CE info: Proxy of the machine: OK (21:56)  
 Max running jobs: 300  
 Max queued jobs: 10

**Current jobs status** Assigned: n/a **Accounting** (last 24h) Success jobs: 0 (profile)  
 Running: n/a Error jobs: 0 + 0 expired  
 Saving: n/a kSI2k units: 0 / pledged **Site averages** (last 24h) Active nodes: 30.98  
 Average kSI2k/core: 0

**Storages status**

Name	Status	Size	Used	Free	Usage	No of files	Type	ADD test
ALICE::SUT::SE		-	-	-	-	-		FAIL

**VoBox health** CPUs: x MHz **CPU usage** (last 1h avg) **Load:**  
 Mem usage: % of User: 2.911%  
 Processes: 147 System: 0.807%  
 Sockets: 32 TCP / 10 UDP IOWait: 0.009%  
 Uptime: Idle: 96.2%  
 Int: 0%  
 Soft int: 0.013%  
 Nice: 0%  
 Steal: 0.058%

AliEn LDAP var	VoBox path	Size	Used	Free	Use%
TMP		n/a	n/a	n/a	n/a
LOG		n/a	n/a	n/a	n/a
CACHE		n/a	n/a	n/a	n/a



# SUT ALICE site report

## WLCG - Tier-2 Accounting Report (Wallclock work in HEPSPEC06 Hours)

September 2023 - September 2023

COUNTRY	FEDERATION	Pledged Power (HEPSPEC06)	Pledged Wallclock Work (HEPSPEC06 Hours)	SITE	alice	atlas	cms	lhcb	Delivered Power (HEPSPEC06)	Total	used as % of pledge
		5,000.00	3,600,000	Total			10,972,554		15,239.66	10,972,554	304.79%
Taiwan	TW-FTT-T2			TW-FTT		3,620			5.03	3,620	
		10,896.00	7,845,120	Total		3,620			5.03	3,620	0.05%
Thailand	TH-Tier2			T2-TH-SUT	81,286				112.90	81,286	
		4,400.00	3,168,000	Total	81,286				112.90	81,286	2.57%

## WLCG - Tier-2 Accounting Report (Disk used in TBytes)

September 2023 - September 2023

Currently not all WLCG sites are instrumented for storage space reporting.

The report includes partial data, only for sites and VOs where storage space reporting is enabled.

COUNTRY	FEDERATION	Pledge (in TBytes)	SITE	alice	atlas	cms	lhcb	Disk used (in TBytes)	Disk allocated (in TBytes)	used as % of pledge
		1,060	Total							%
Thailand	TH-Tier2		T2-TH-SUT							
		300	Total							%

# SUT ALICE site report

## SUT particle server

T2-TH-SUT @computing center

- 256 CPU cores
- 896 GB of RAM
- 100 TB storage
- CentOS7
- Htcondor-CE version 5.1.1

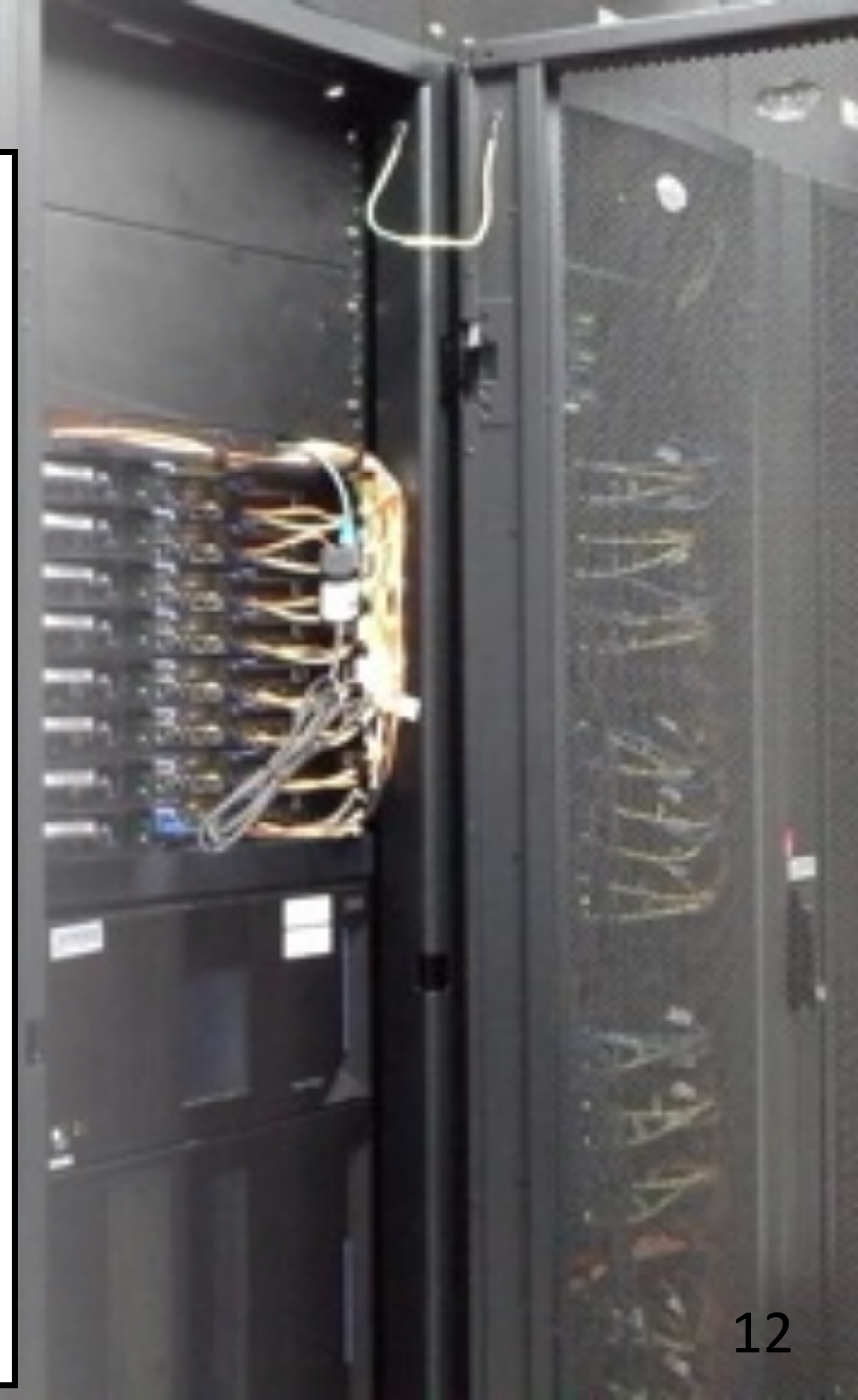
## Code Development

- Supermicro 32 cores 512 GB RAM 80 TB storage CentOS7, HT-Condor
- IBM 64 cores 128 GB RAM 8 TB storage CentOS7, HT-Condor
- IBM 32 cores 128 GB RAM 8 TB storage Ubuntu



# Chula site report (CUNSTDA)

- Locate at CU e-Science cluster, MHMK Building, Faculty of Science, Chulalongkorn University
- Storage
  - 1. IBM Storwize 3700: 160 TB
  - 2. Lenovo ThinkSystem DE2000H: 160 TB
- Total CPU: 676 cores



# Chula site report (CUNSTDA)

Machine	CPUs/node	Memory (GB)/node	No. of nodes	Note
<b>Frontend</b>				
Lenovo System X 3550 M5	20 (Intel Xeon CPU E5-2640 v4 2.40GHz) with HT on (40 threads)	32	1	escience1.sc.chula.ac.th
Lenovo System X 3550 M5	16 (Intel Xeon CPU E5-2620 v4 2.10GHz)	64	1	escience2.sc.chula.ac.th
Lenovo SR630	32 (Intel Xeon Gold 5218 2.3GHz)	8 x 32GB TruDDR4 2933MHz	1	1x Tesla T4 GPU escience3.sc.chula.ac.th
<b>Worker: Slurm</b>				
Lenovo SR630	32 (Intel Xeon Gold 5218 2.3GHz)	8 x 32GB TruDDR4 2933MHz	7	1x Tesla T4 GPU/node HPC, HTC
Lenovo x3850 X6	80 (Intel Xeon E7-8870v4 2.1 MHz)	512	1	HPC, HTC
Lenovo SR850	88 (Intel Xeon Gold 6152 2.10GHz)	324	1	escience4.sc.chula.ac.th
IBM BladeCenter HS22	16 (Intel Xeon CPU E5-2650 2.00GHz)	32	5	HTC
IBM iDataPlex DX360M4	16	128	2	gridMathematica
Lenovo SR635	16 (AMD EPYC 7313P 3.0 GHz)	256	2	1 machine with Nvidia T4, 1 machine with Nvidia A2
DGXStation			1	
<b>Worker: Kubernetes</b>				
Dell PowerEdge R740	24 (Intel Xeon Pentium 8268 2.9 GHz)	6 x 64GB DDR4 2933MHz	3	
Lenovo SR630	32 (Intel Xeon Gold 5218 2.3GHz)	8 x 32GB TruDDR4 2933MHz	2	1x Tesla T4 GPU/node
<b>TOTAL</b>	<b>676 CPUs</b>			

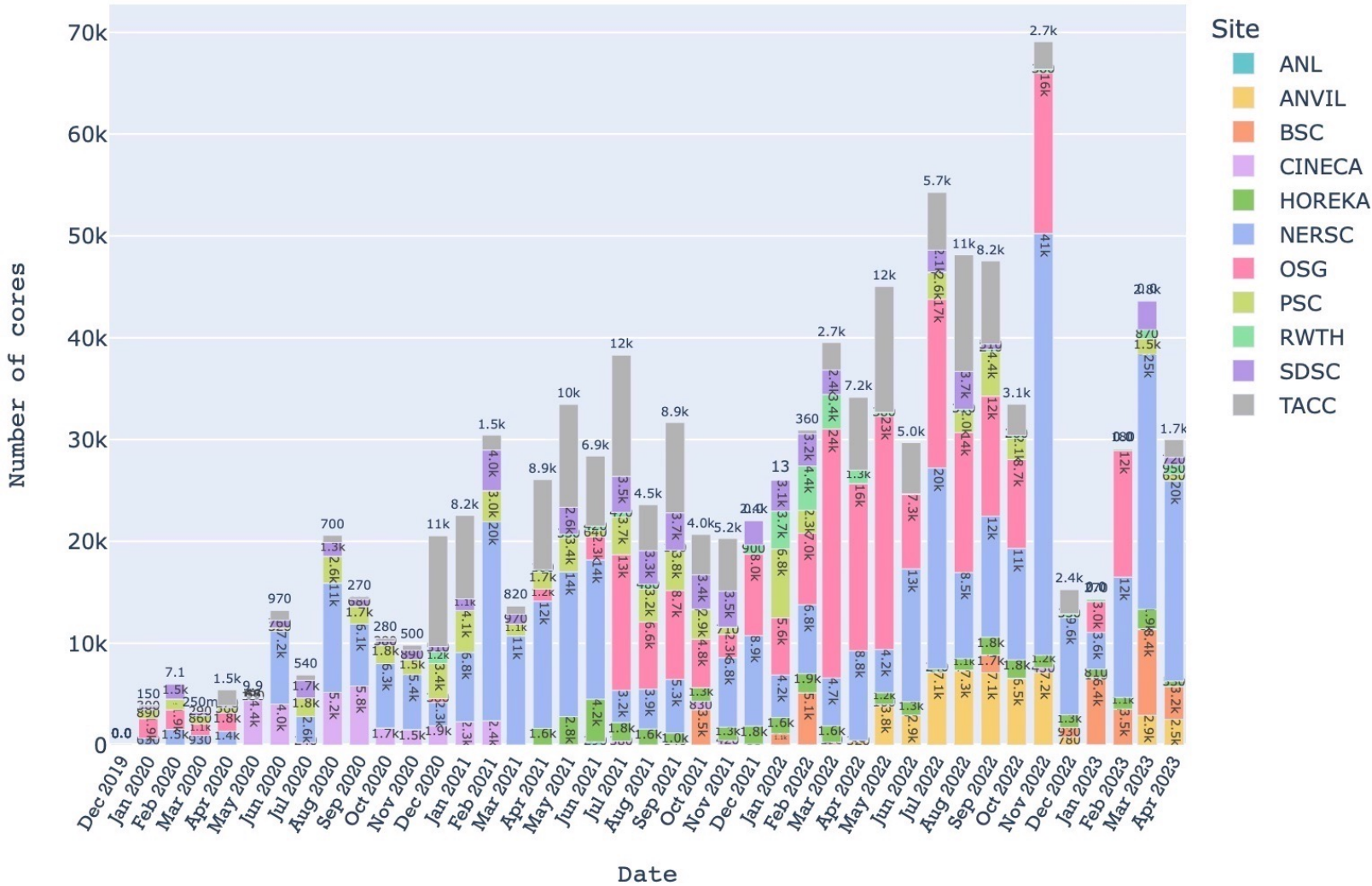




# Chula site report (CUNSTDA)

**CMS Public**

Number of Running CPU Cores on HPCs - Monthly Average



# CERN server donation

Discussed the CERN server donation program with Simone Campa (simone.campana@cern.ch).

Discussed the transportation and document of approval with Catharine Noble (catharine.noble@cern.ch).

Discussed SUT hardware requirement with Eric Sallaz (eric.sallaz@cern.ch)

List of hardware requested through the CERN server donation program

- 1,000 CPU cores
- 4,000 GB RAM
- 500 TB storage
- high-speed cable connection to server (LAN, Internet, etc.).

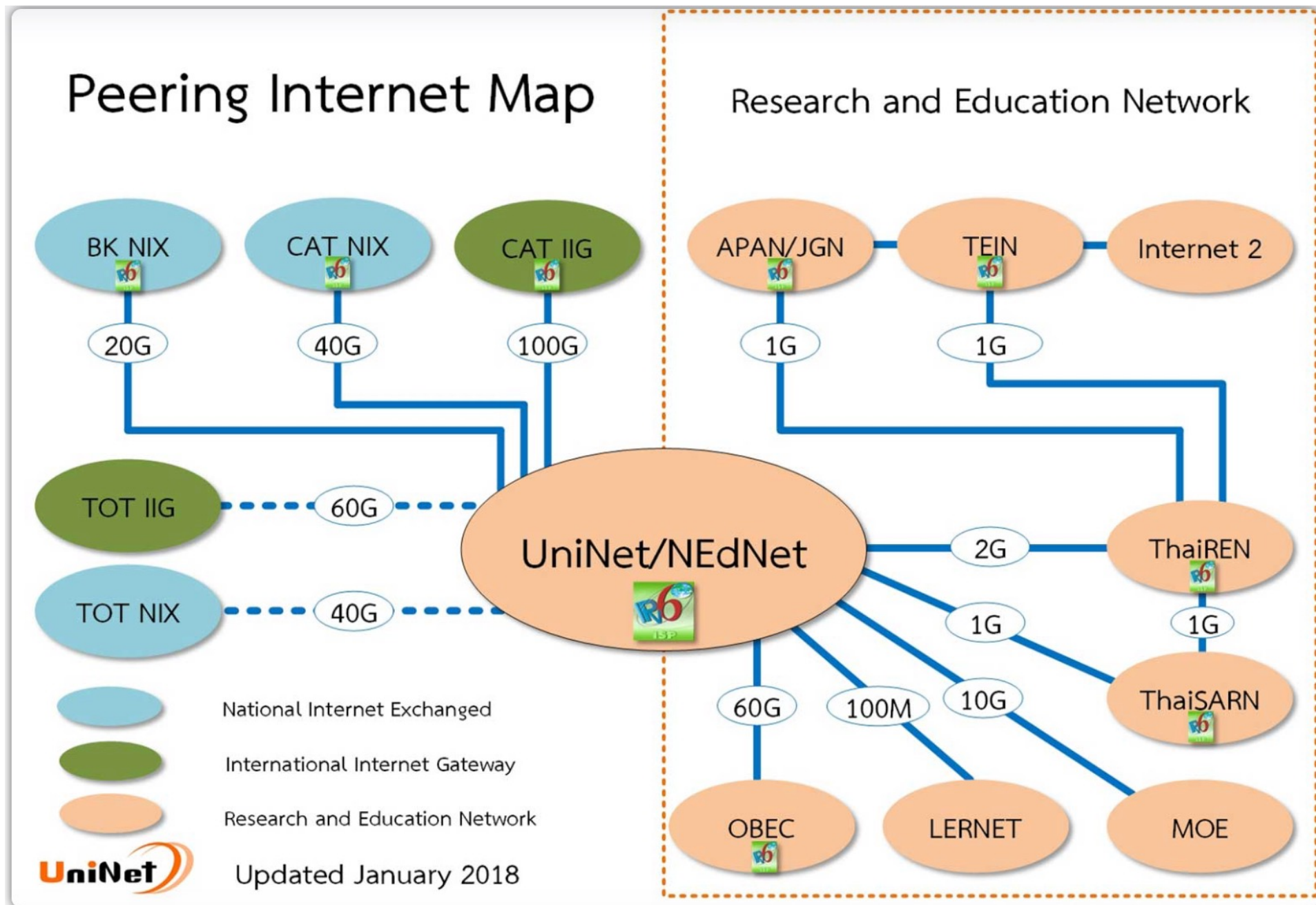
In progress



# Network status

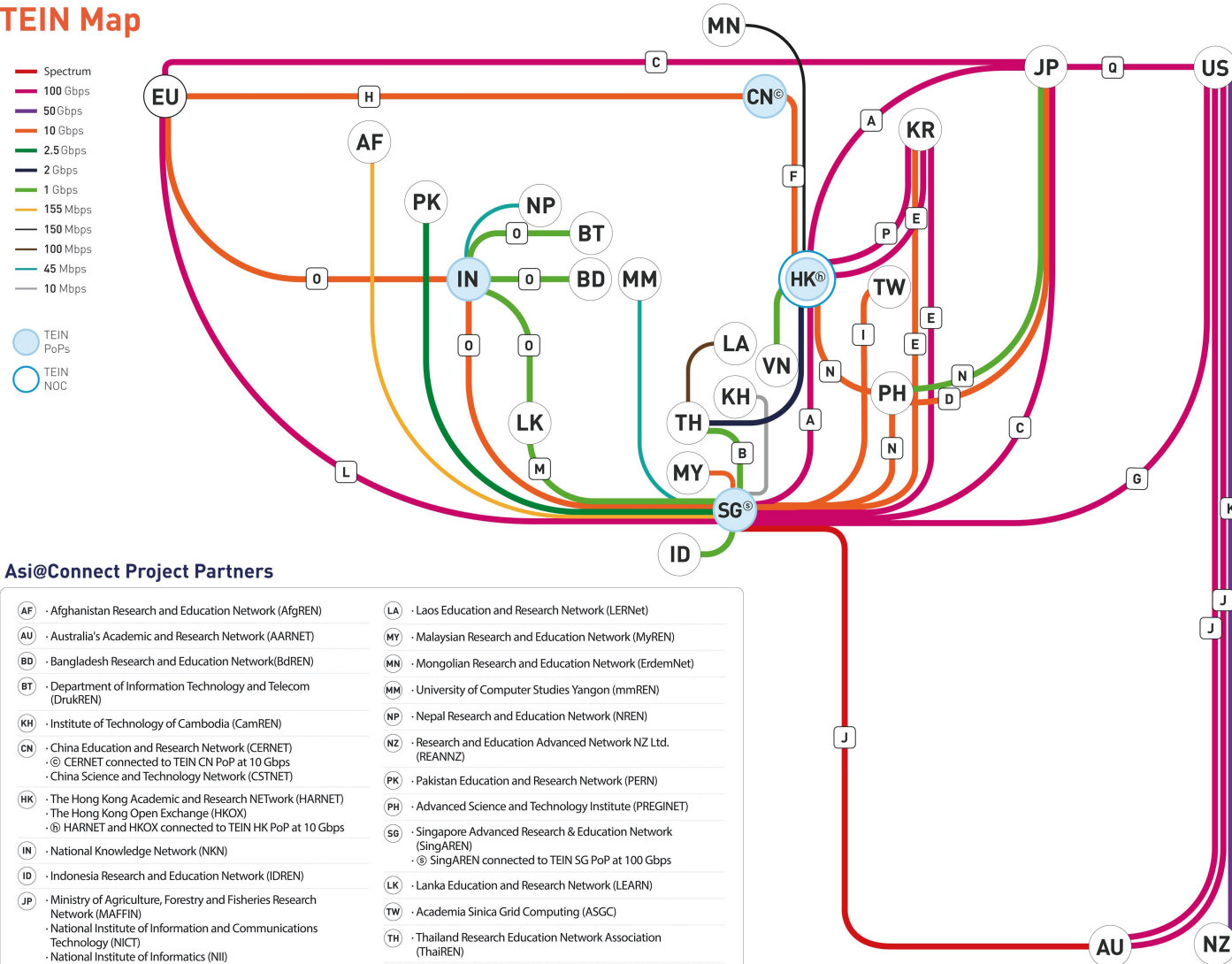


# UniNet



The EU co-funded Asi@Connect project provides a dedicated regional high capacity and high quality internet network, Trans Eurasia Information Network (TEIN), for Research and Education (R&E) communities across Asia-Pacific and Europe, and leverages e-infrastructures developed for public service projects.
































## TEIN Map



### Asi@Connect Project Partners

AF - Afghanistan Research and Education Network (AfgREN)	LA - Laos Education and Research Network (LERNet)
AU - Australia's Academic and Research Network (AARNET)	MY - Malaysian Research and Education Network (MyREN)
BD - Bangladesh Research and Education Network (BdREN)	MN - Mongolian Research and Education Network (ErdemNet)
BT - Department of Information Technology and Telecom (DrukREN)	MM - University of Computer Studies Yangon (mmREN)
KH - Institute of Technology of Cambodia (CamREN)	NP - Nepal Research and Education Network (NREN)
CN - China Education and Research Network (CERNET)	NZ - Research and Education Advanced Network NZ Ltd. (REANNZ)
© CERNET connected to TEIN CN PoP at 10 Gbps	PK - Pakistan Education and Research Network (PERN)
• China Science and Technology Network (CSTNET)	PH - Advanced Science and Technology Institute (PREGINET)
HK - The Hong Kong Academic and Research Network (HARNET)	SG - Singapore Advanced Research & Education Network (SingAREN)
• The Hong Kong Open Exchange (HKOX)	• SingAREN connected to TEIN SG PoP at 100 Gbps
• HARNET and HKOX connected to TEIN HK PoP at 10 Gbps	LK - Lanka Education and Research Network (LEARN)
IN - National Knowledge Network (NKN)	TW - Academia Sinica Grid Computing (ASGC)
ID - Indonesia Research and Education Network (IDREN)	TH - Thailand Research Education Network Association (ThaiREN)
JP - Ministry of Agriculture, Forestry and Fisheries Research Network (MAFFIN)	• National Institute of Informatics (NII)
• National Institute of Information and Communications Technology (NICT)	KR - National Information Society Agency (KOREN)
• National Institute of Informatics (NII)	• Korea Institute of Science and Technology Information (KREONET)
VN - National Agency for Science and Technology Information (VinaREN)	

The following links are fully financed/co-financed by the link owners whose support is gratefully acknowledged

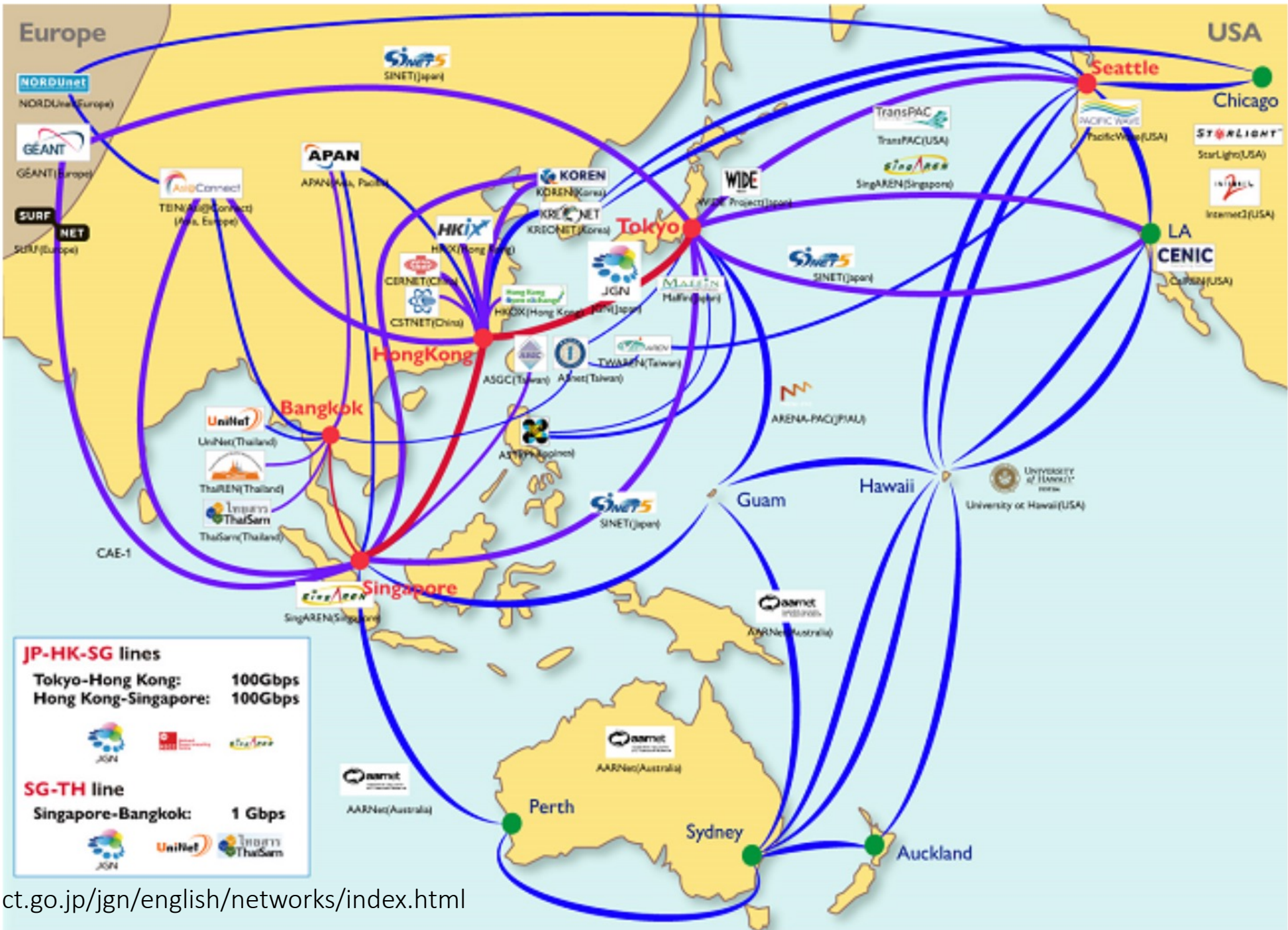
A	 National Institute of Information and Communications Technology
	 National Supercomputing Centre
	 Singapore Advanced Research & Education Network
	 Hong Kong Academic and Research NETWORK
B	 National Institute of Information and Communications Technology
	 Thailand Research and Education Network
C	 National Institute of Informatics
D	 Ministry of Agriculture, Forestry and Fisheries Research Network
E	 National Information Society Agency
F	 China Education and Research Network
	 TEIN' Cooperation Center
G	 Internet2
	 ARENA-PAC
	 TransPAC/Pacific Wave
	 Australia's Academic and Research Network
H	 Co-funded by China and EU
I	 Academia Sinica Grid Computing
J	 Australia's Academic and Research Network
K	 Research and Education Advanced Network New Zealand
L	     
M	 Lanka Education and Research Network
N	 Advanced Science and Technology Institute
O	 National Knowledge Network
P	 Korea Research Environment Open NETWORK
Q	 National Supercomputing Centre
	 Singapore Advanced Research & Education Network

\* As of 31 January 2022.

\*\* Other regions (Central Asia, Africa and Latin America) can be connected via global R&E networks such as EU(GEANT) and US(Internet2)

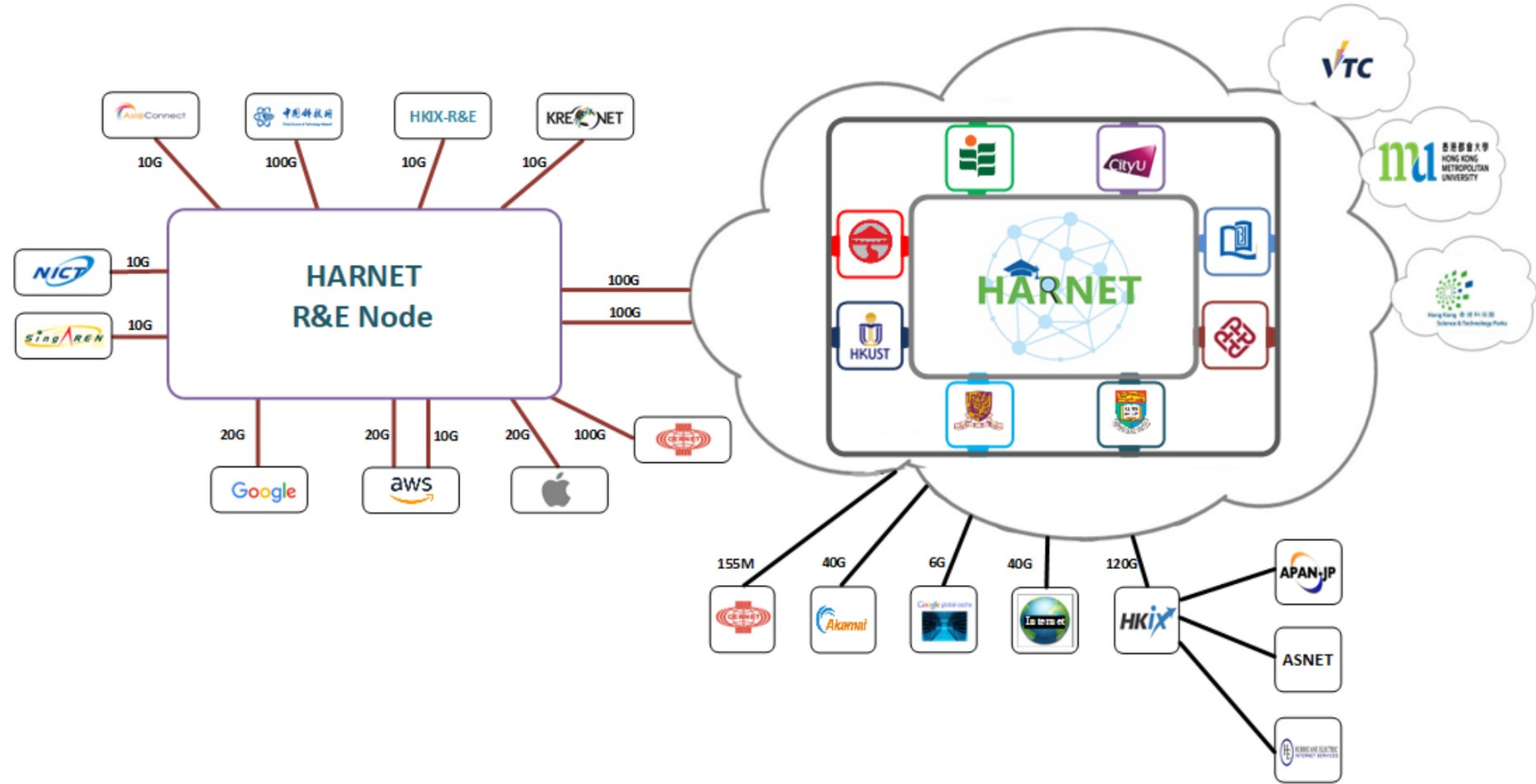


# JGN



## HARNET Infrastructure

Apr 2023



# ThaiSC

- Developing HPC technical Specialist to support the future expansion of the Thai digital industry.
- High Performance Computing (HPC) Administrator Trainee 2 months in Thailand
- Trainee abroad



# Future plan

## SUT ALICE site upgrade

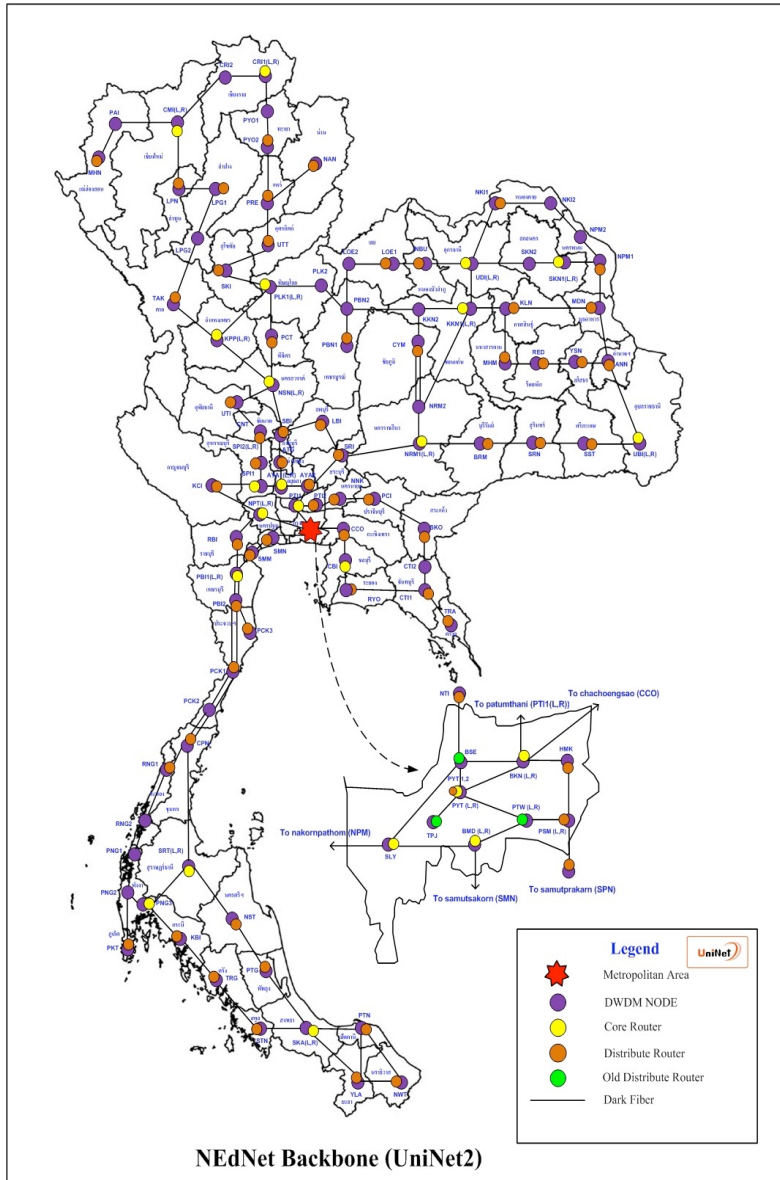
- At SUT, new server support from PMB-U will be launched in 2024.
- A server contributed by the CERN donation program will be installed on the SUT site.



**Korea Institute of  
Science and Technology Information**

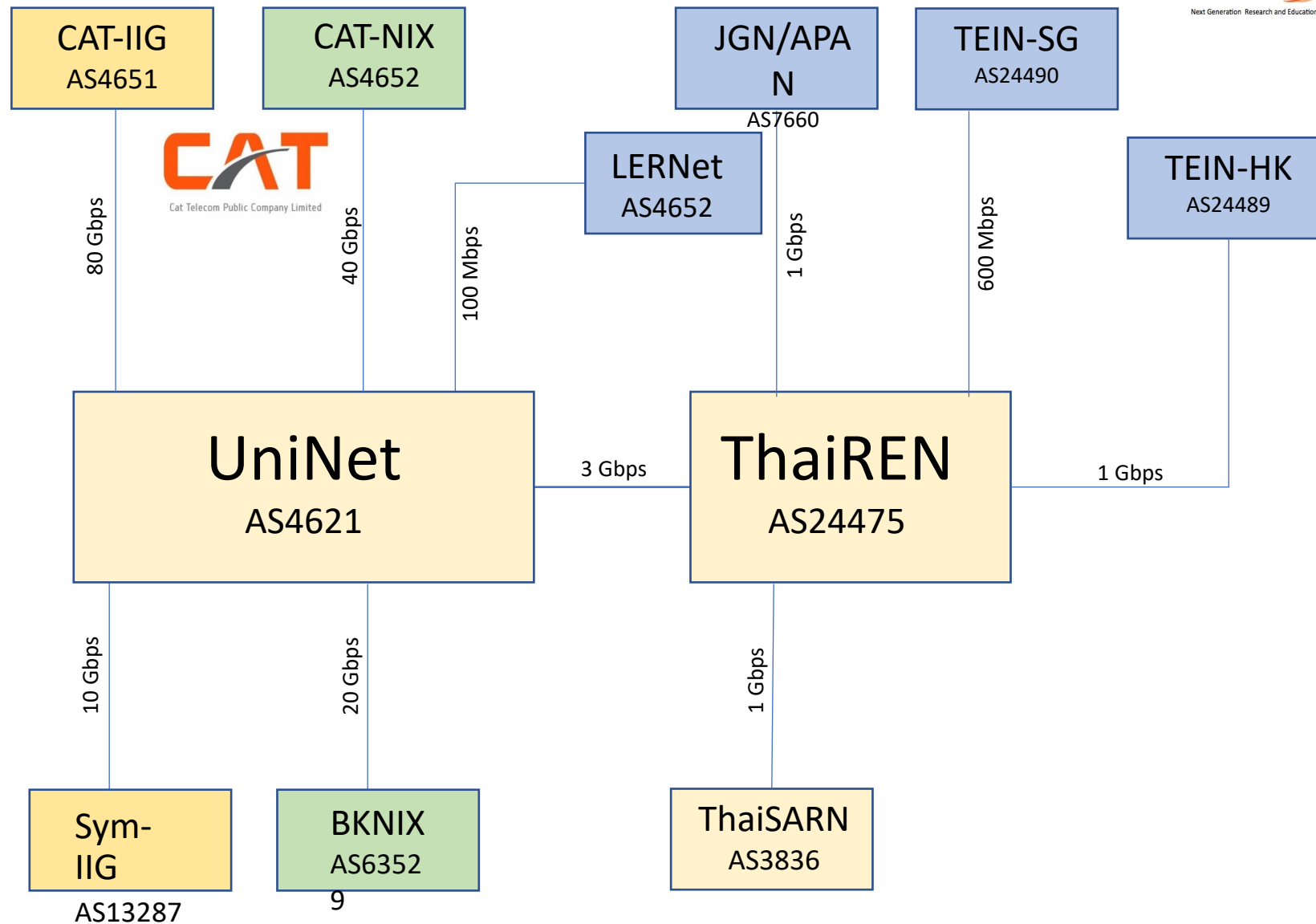


Q&A



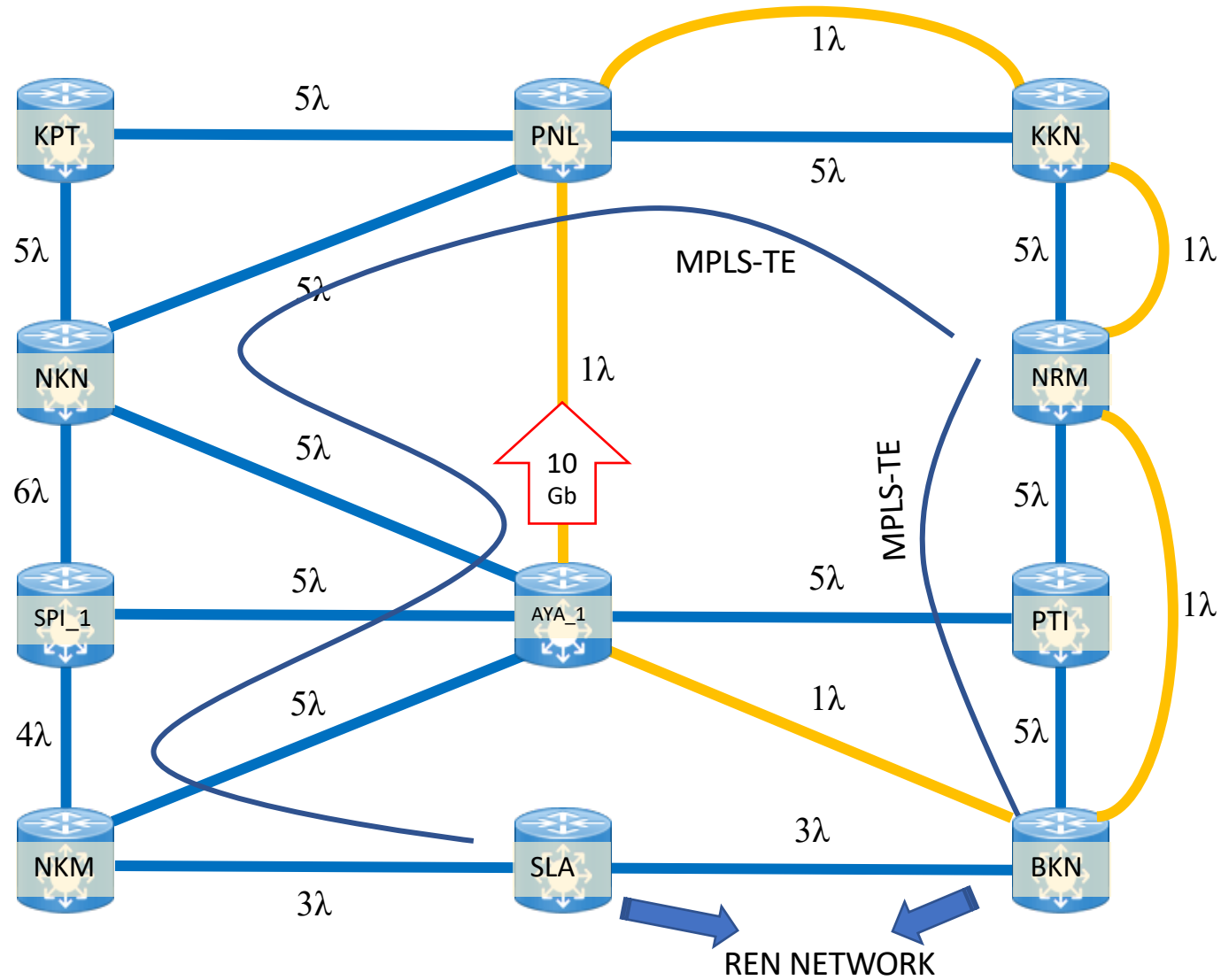
- Main Backbone
  - bandwidth 50 Gbps
- Distribute Backbone
  - bandwidth 10-20 Gbps
- Support IPv4/IPv6 Dual Stack and Native
- Support MPLS (L3 VRF)
- Support Traffic Engineering
- Support QoS

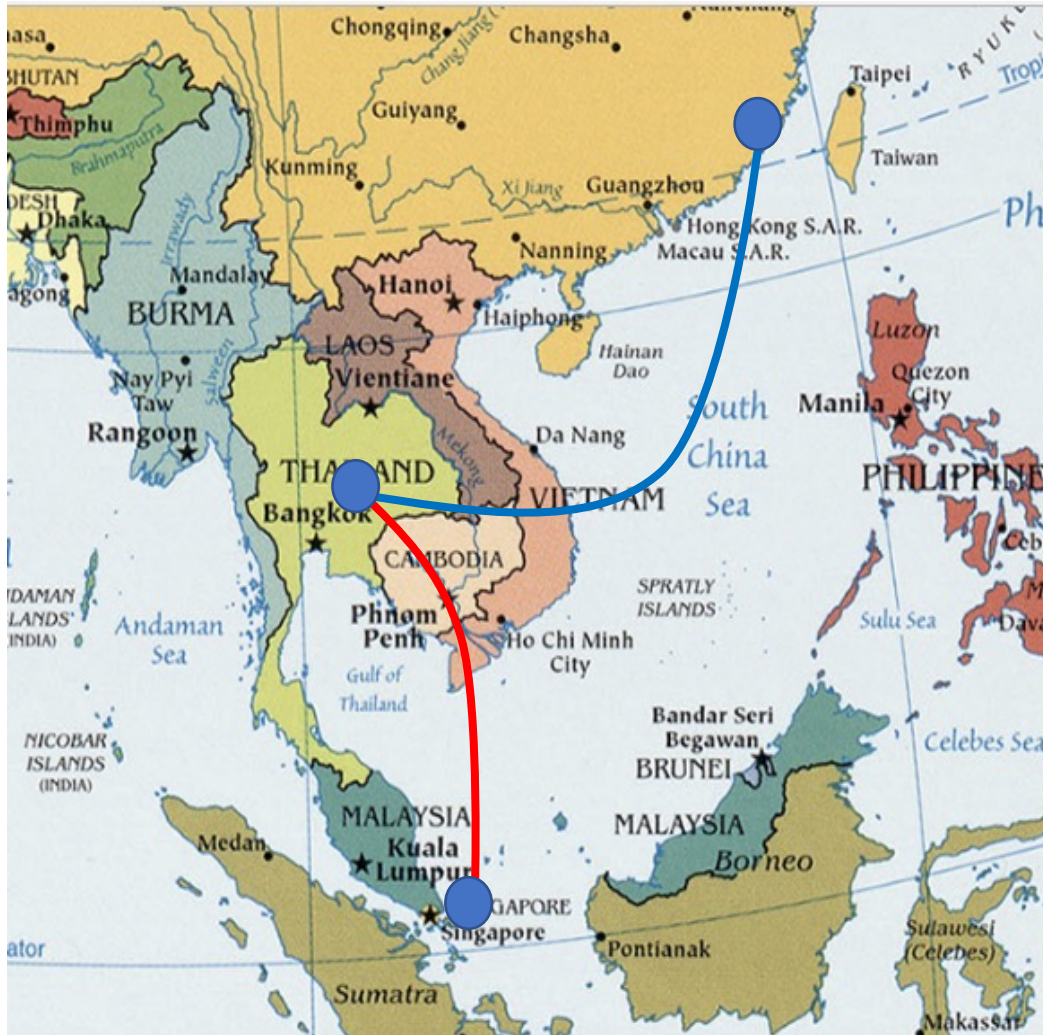




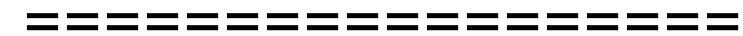
UniNet/ThaiREN International Peering

# Traffic flow with MPLS-TE





- Link ThaiREN to Singapore POP  
Bandwidth : 622 Mbps
- Link ThaiREN Hong Kong POP  
Bandwidth : 1000 Mbps

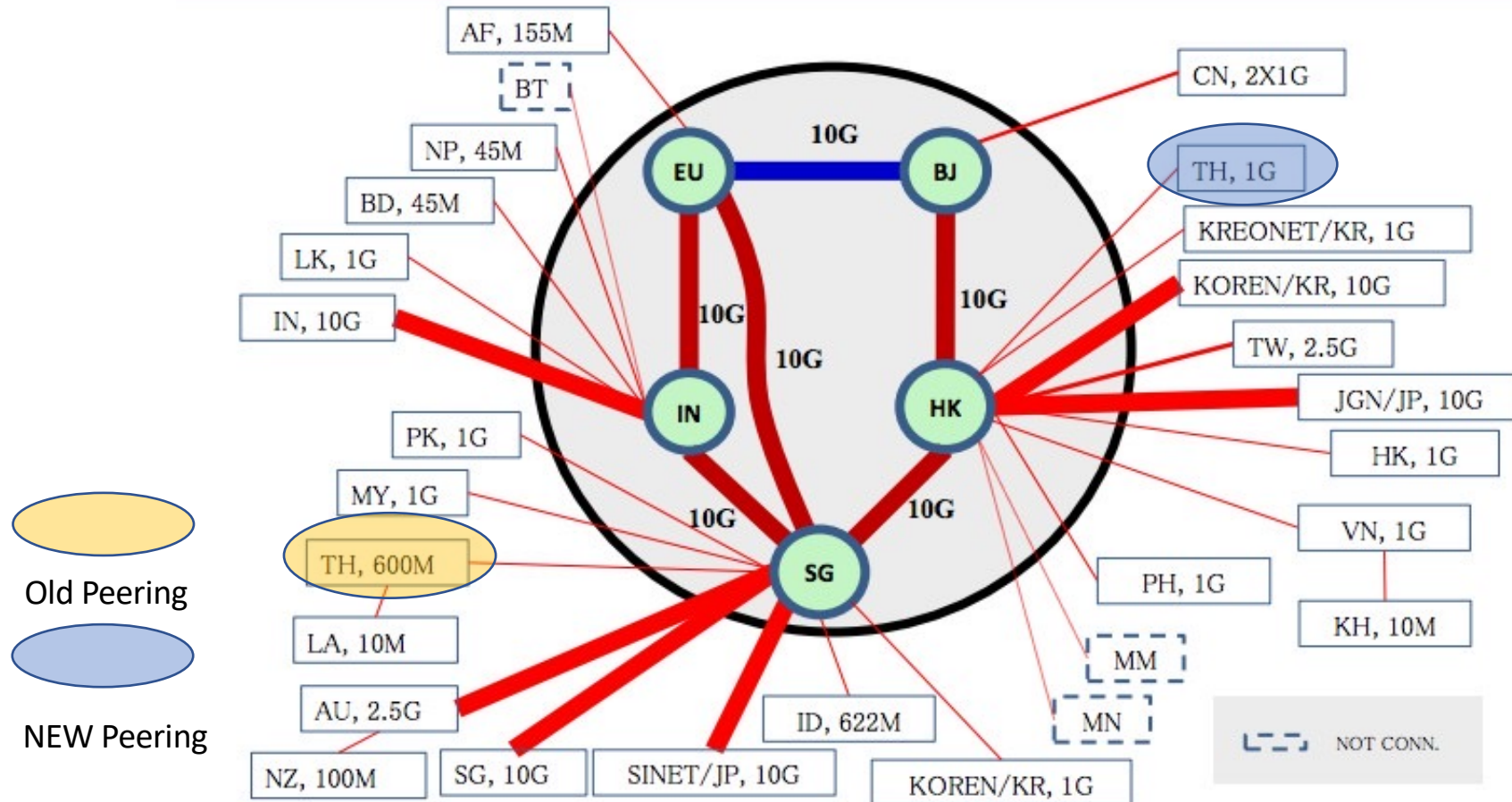


### Connectivity LHCONE

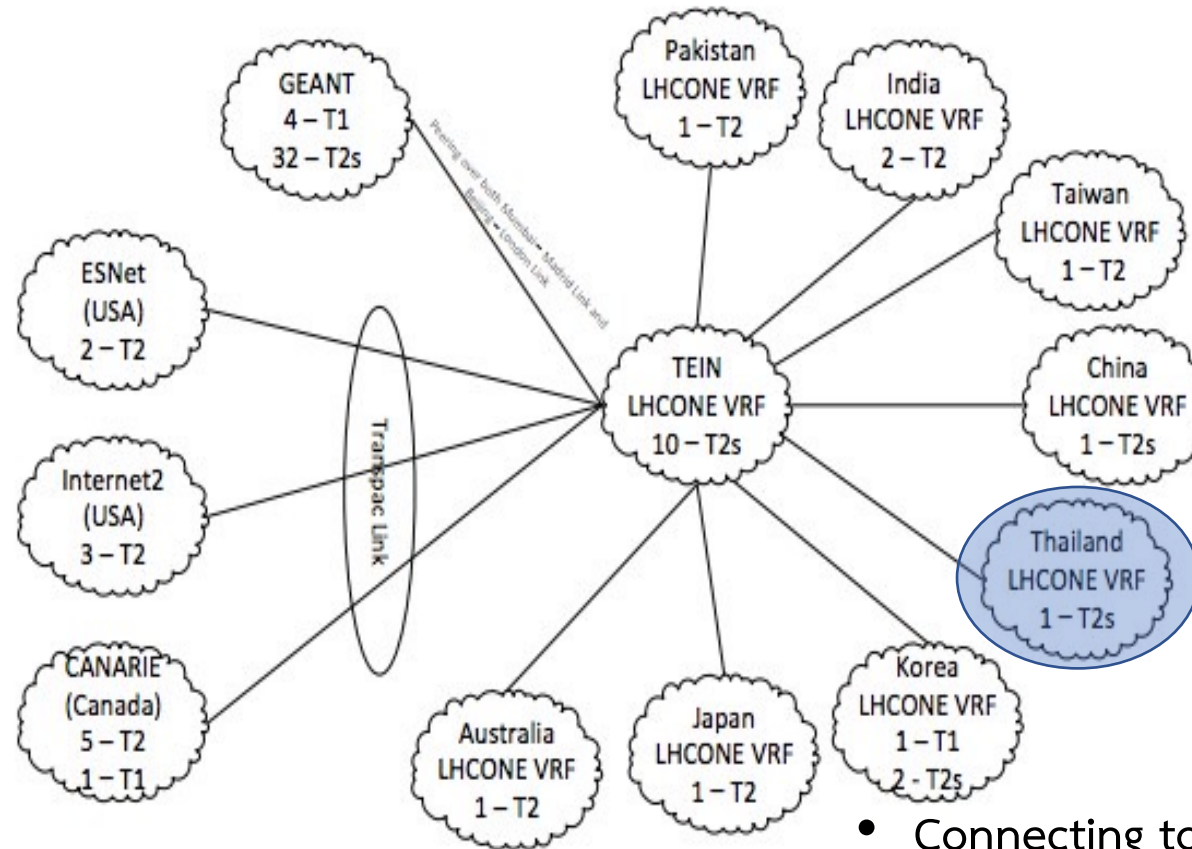
- L3-VPN @ Singapore POP
- L3-VPN @ Hong Kong POP



# 1. SUMMARY - Asi@Connect (DEC. 2016)



- Common platform for Network Service (LHCONE)



- Connecting to LHCONE with
  - L3-VPN @ Singapore POP
  - L3-VPN @ Hong Kong POP

# PerfsonAR Performance

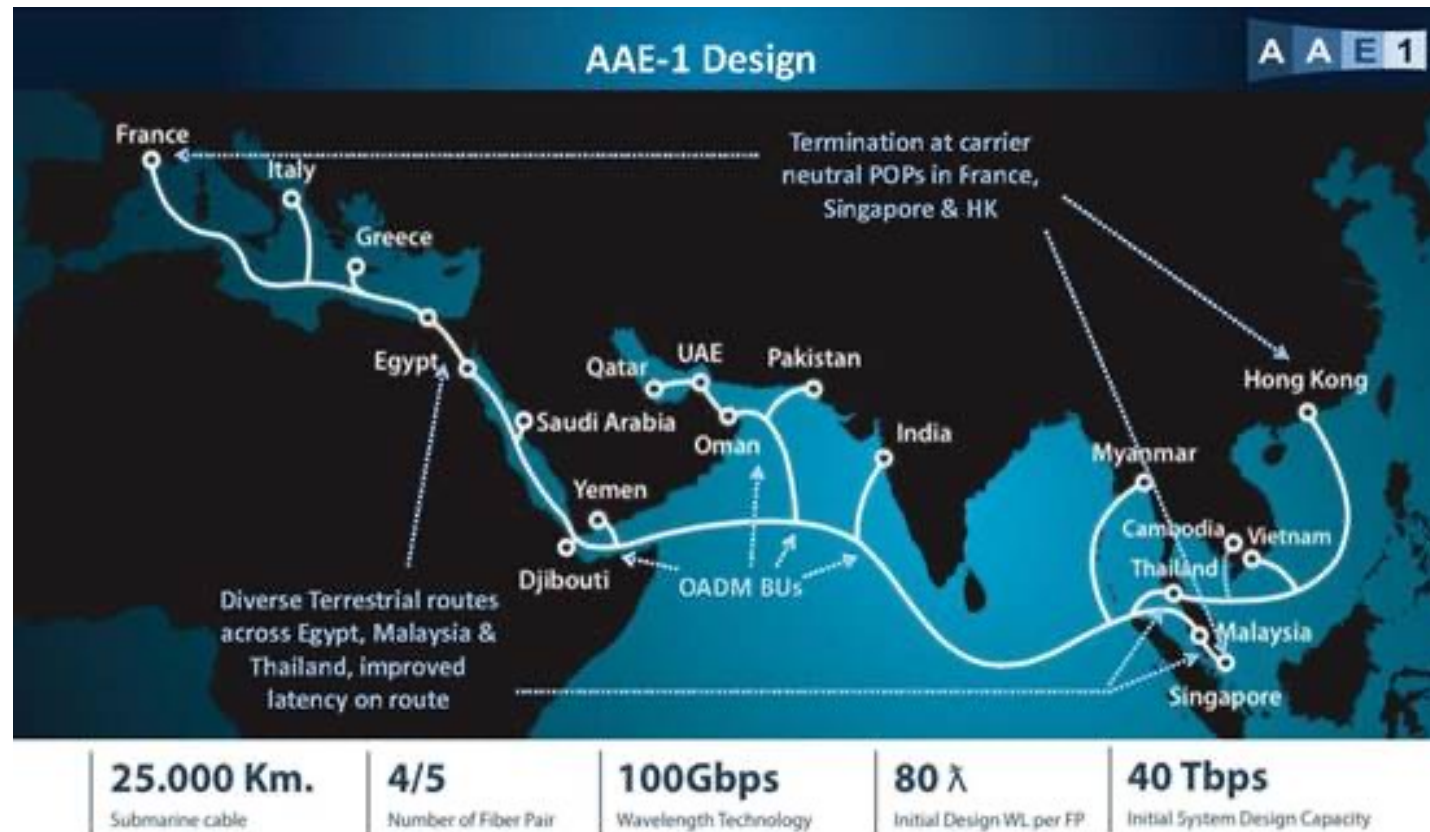


SOURCE	DESTINATION	THROUGHPUT	LATENCY (MS)	LOSS
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	nms1-10g.jp.apan.net 203.181.249.186	→ 401 Mbps ← 324 Mbps	→ n/a ← n/a	→ n/a ← n/a
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>   <a href="#">Traceroute</a>	203.158.118.200	→ 636 Mbps ← 588 Mbps	→ -0.412 ← 6.00	→ 1.444% ← 0.032%
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	14.139.5.218	→ 413 Mbps ← 369 Mbps	→ -27.4 ← 119	→ 0.025% ← 0.023%
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	202.28.231.123	→ 93.7 Mbps ← 54.6 Mbps	→ 219 ← 4.67	→ 0.174% ← 0.204%
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	203.30.39.13	→ 485 Mbps ← 510 Mbps	→ n/a ← n/a	→ n/a ← n/a
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	203.185.93.2	→ 871 Mbps ← 868 Mbps	→ 1.79 ← 5.35	→ 0.933% ← 0.013%
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	202.179.252.18	→ 447 Mbps ← 472 Mbps	→ 13.8 ← 20.5	→ 0.029% ← 0.011%
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	203.80.20.66	→ 334 Mbps ← 393 Mbps	→ 16.8 ← 23.6	→ 7.393% ← 5.994%
<a href="#">202.28.194.4</a> <a href="#">Details</a>	202.179.246.18	→ 312 Mbps ← 667 Mbps	→ 218 ← 29.1	→ 0.390% ← 0.000%
<a href="#">202.28.194.4</a> <a href="#">Details</a>	ps1.itsc.cuhk.edu.hk 137.189.192.25	→ 278 Mbps ← n/a	→ 29.7 ← 29.4	→ 0.006% ← 0.199%
<a href="#">2001:3c8:1501:298::1501:4</a> <a href="#">Details</a>	ps1.itsc.cuhk.edu.hk 2405:3000:3:c01:8137:189:192:25	→ 306 Mbps ← 143 Mbps	→ n/a ← n/a	→ n/a ← n/a
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	p-1p1.test.seat.transpac.org 192.203.115.2	→ 233 Mbps ← 287 Mbps	→ 93.6 ← 104	→ 0.014% ← 0.120%
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	perfonar-m1.twaren.net 211.79.61.148	→ 341 Mbps ← 301 Mbps	→ 41.9 ← 69.6	→ 0.006% ← 0.100%
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	ps-asti.pregi.net 202.90.158.247	→ 137 Mbps ← 35.6 Mbps	→ 46.7 ← 62.5	→ 0.151% ← 0.193%
<a href="#">perfonar.uni.net.th</a> 202.28.194.4 <a href="#">Details</a>	psnode1.it.chula.ac.th 161.200.254.1	→ 590 Mbps ← 919 Mbps	→ -3.55 ← 4.99	→ 0.003% ← 0.000%



# Future Network Infrastructure of Thailand

- **1) Asia-Africa-Europe 1 (AAE-1)** is a 25,000km submarine cable from South East Asia to Europe across Egypt, connecting Hong Kong, Vietnam, Cambodia, Malaysia, Singapore, Thailand, India, Pakistan, Oman, UAE, Qatar, Yemen, Djibouti, Saudi Arabia, Egypt, Greece, Italy and France.



- AAE-1 cable system has been finally launched for service as of June 23<sup>rd</sup>, 2017
- Crossing of the Thailand peninsula to minimize the latency for the landing sites situated east of Thailand.
- Main party in Thailand is



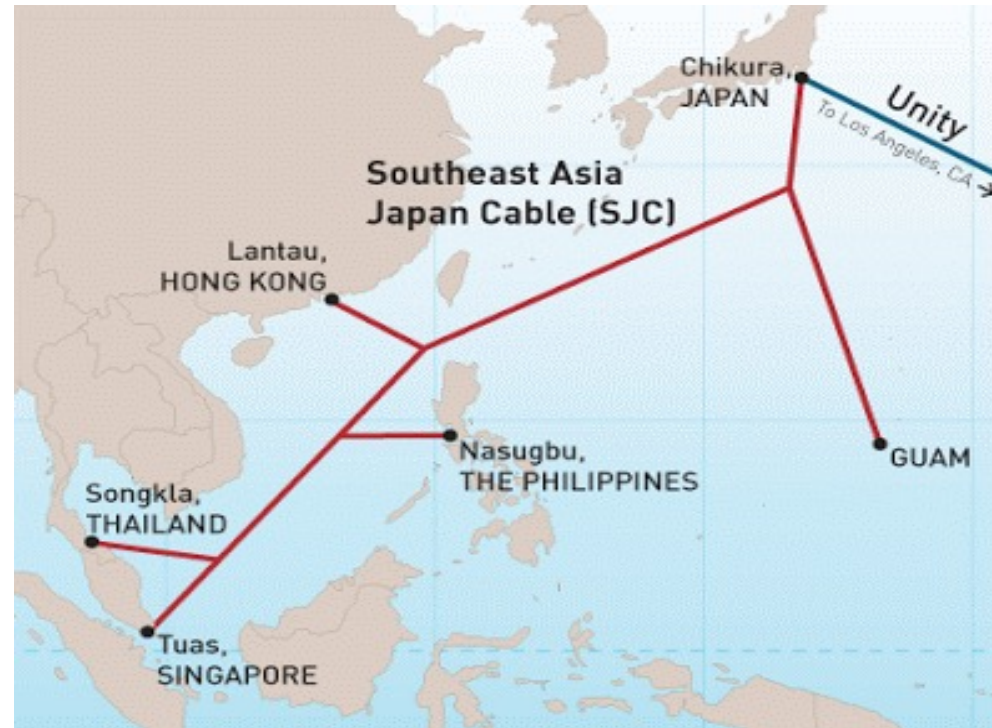
- 2) The Southeast Asia-Middle East-Western Europe (SEA-ME-WE 5) submarine cable system has been successfully connected to its landing station at Catania in Sicily total 20,000 km





### 3) Southeast Asia - Japan Cable System (SJC)

Cable length: 8,900km Chikura, Japan ; Chung Hom Kok, Hong Kong ; Nasugbu, Philippines ; Shantou, China ; Songkhla, Thailand ; Telisai, Brunei ; Tuas, Singapore



Southeast-asia Japan Cable (SJC) Plan (Source/Courtesy Telegeography)  
<http://soft-brain.blogspot.com/2008/09/>