



# Enabling Global HPC Collaboration through MYREN and NSRC

**PRAGMA 35 Meeting**

**October 5, 2018  
Penang, Malaysia**

# Malaysian Research and Education Network (MYREN)

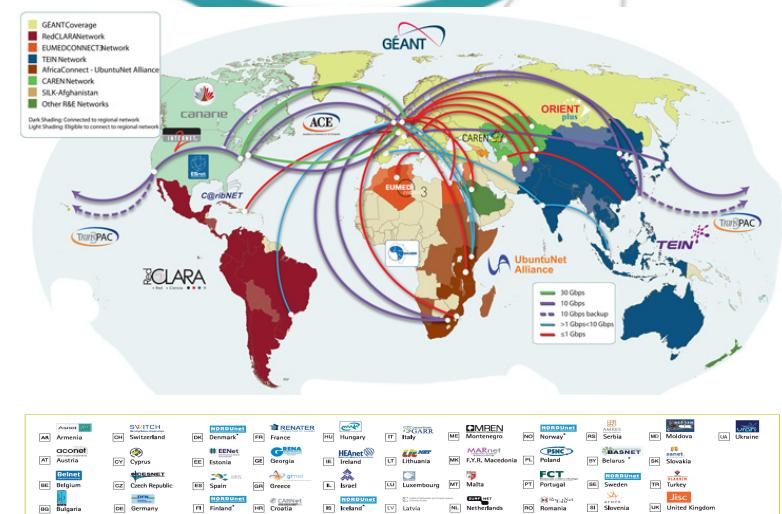


Launched in March 2005 by  
Ministry of Higher Education (MOHE) ,  
Ministry of Energy, Water &  
Communication (MEWC)  
and Ministry of Science, Technology  
and Innovation (MOSTI).

MYREN enables high speed  
dedicated connectivity to the  
research and education sectors.



20 Public Universities  
31 Polytechnics  
85 Community Colleges  
4 Government Agencies  
3 Private Universities  
3 Teaching Hospitals  
and with more than  
800,000 researchers,  
academicians and  
students



\*Connections between these countries are part of MYRENNet (the North regional network)



*The NSRC cultivates collaboration among a community of peers to build and improve a global Internet that benefits all parties. We facilitate the growth of sustainable Internet infrastructure via technical training and engineering assistance to enrich the network of networks.*

*Our goal is to connect people.*



Building international R&E connections...

A large, semi-transparent watermark of the Google logo is positioned in the center-left area of the slide.

...in more than 120 countries  
since 1992



# Enabling International R&E Cooperation

- NSRC's activities are global in scope
- Addresses and solves problems in the field with local partners
- Technical training with Universities, NRENs and regional NOGs
- Direct engineering assistance to improve networks
- Network security and performance monitoring
- Wireless infrastructure to improve both faculty and student access
- DNS stability, security and ccTLD technical assistance
- Assisting with creation of Internet Exchange Points
- Leveraging government, industry, and private investments
- Equipment donations improve core infrastructure and IP services
- Cyberinfrastructure enables international scientific collaborations

# NSRC On the Ground 2011-2017...

American Samoa

Argentina

Armenia

Bangladesh

Benin

Bhutan

Bolivia

Botswana

Brazil

Burkina Faso

Cambodia

Canada

China

Costa Rica

Czech Republic

Denmark

Djibouti

Ecuador

England

Fiji

Georgia

Germany

Gambia

Ghana

Guam

Guatemala

Haiti

Honduras

India

Indonesia

Ireland

Italy

Japan

Jordan

Kazakhstan

*kyrgyzstan*

Kenya

Korea

Laos

Lebanon

Lesotho

Madagascar

Malawi

Malaysia

Mali

Mexico

Micronesia

Mongolia

Morocco

Mozambique

Myanmar

Nepal

Netherlands Antilles

New Caledonia

New Zealand

Nicaragua

Nigeria

Panama

Peru

Philippines

Portugal

Rwanda

Samoa

Saudi Arabia

Senegal

Singapore

Solomon Islands

Sri Lanka

South Africa

Swaziland

Tanzania

Tahiti & French Polynesia

Thailand

Togo

Tonga

Trinidad & Tobago

Tunisia

Turkey

UAE

Uganda

USA

Vanuatu

Vietnam

Zambia

Zimbabwe

...85 countries

# Motivation

- Inter region capacity is reaching multiple 100 Gbps and so do the NREN Backbone Network

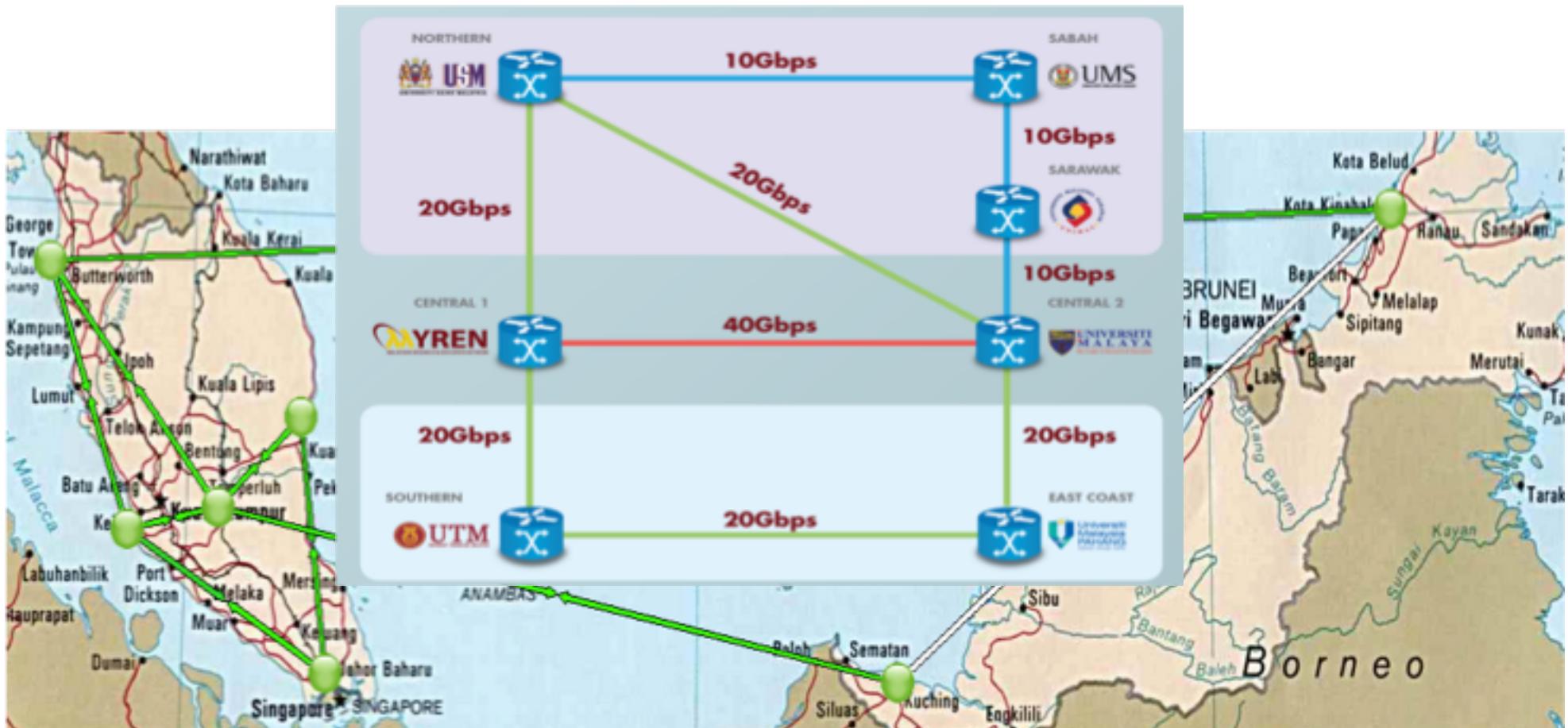


GLIF Map 2017 | Global Lambda Integrated Facility | Visualization by Robert Patterson, NCSA, University of Illinois at Urbana-Champaign | Data Compilation by Maxine Brown, University of Illinois at Chicago | Texture Retouch by Jeff Carpenter, NCSA | Earth Texture, visibleearth.nasa.gov | www.glif.is

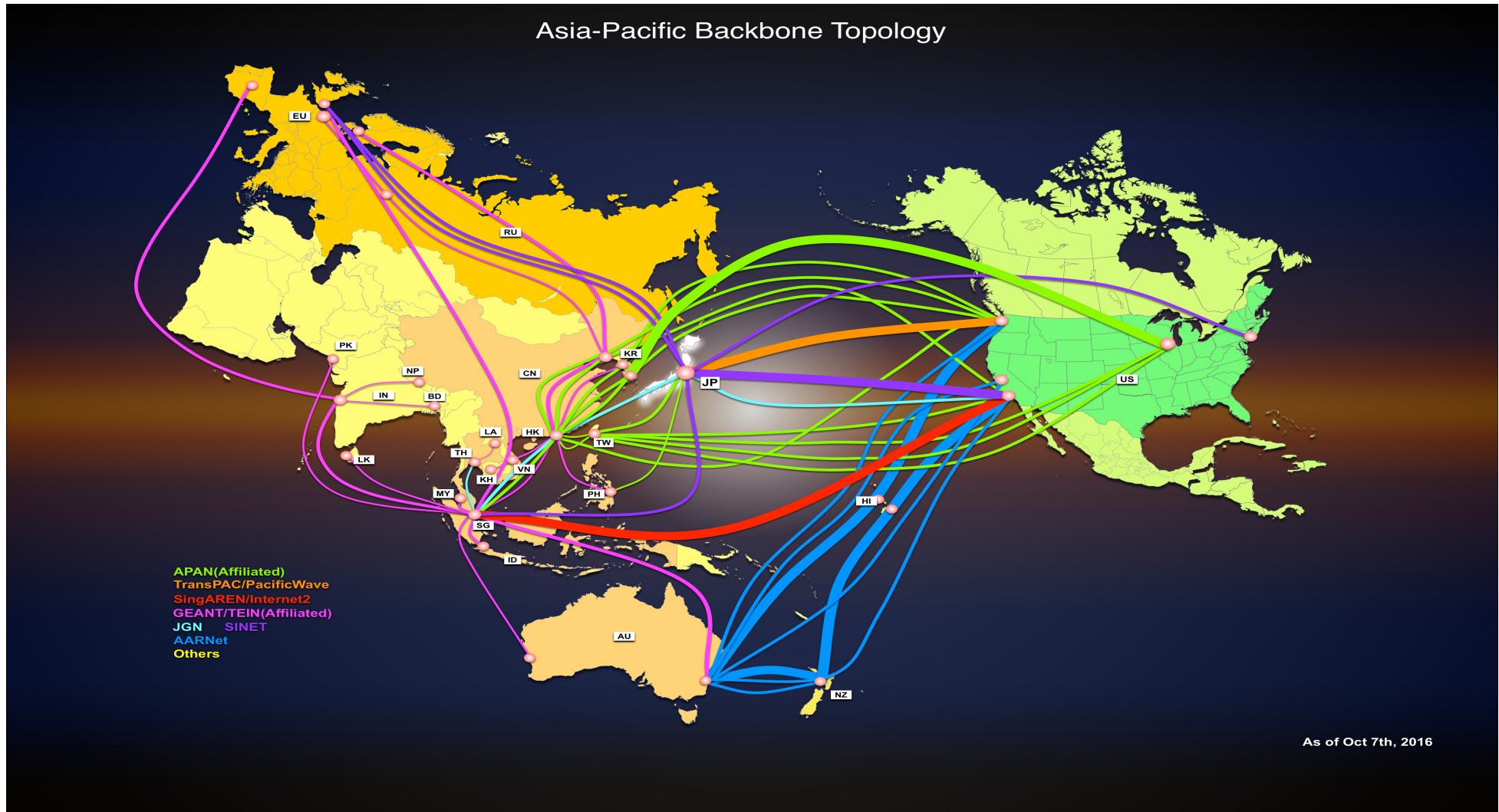


From: <https://www.glif.is/publications/maps/>

- In the case of MYREN, we have a 40 Gbps backbone, yet, our scientific community still struggling to get the required performance



- Major issues are still at the campus, preventing maximum performance for collaboration (including HPC) amongst scientific community

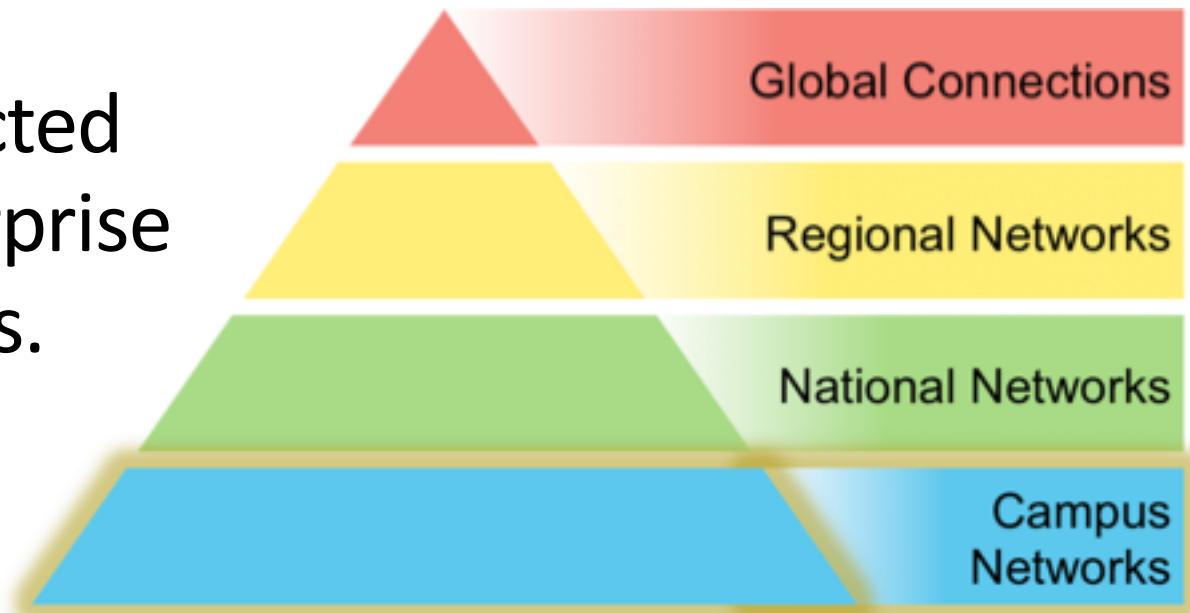


<https://apan.net/about/network>

# Why Focus on Campus Networks?

- Network is the transport layer
- The campus network is the foundation for research and education activities
- To optimally utilize network capacity, equipment and personnel
- No scientist is connected directly to a national R&E network.

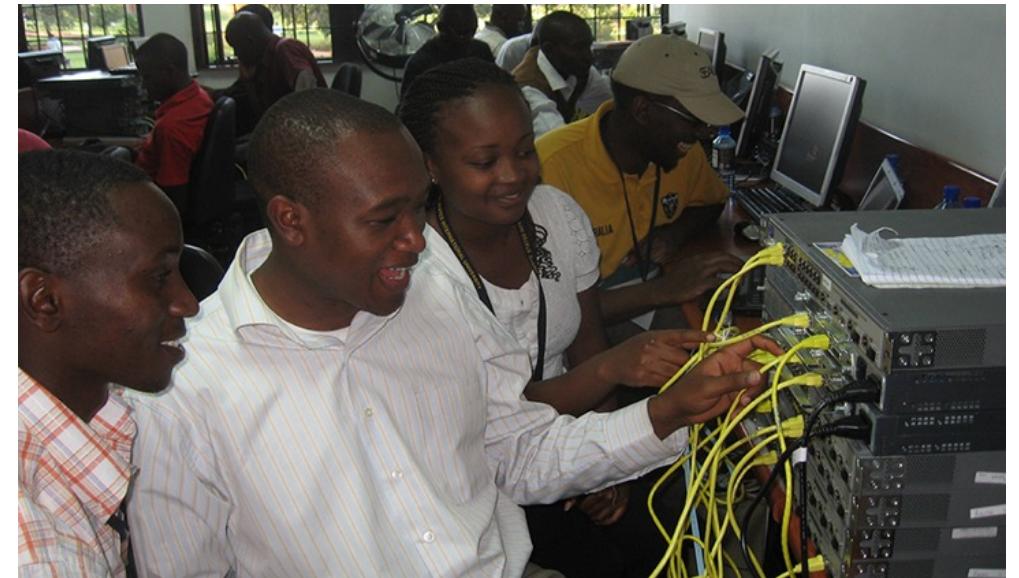
They are all connected to campus or enterprise networks for access.



- Campus LAN are **not optimally setup**
- Researcher have to go through **enterprise-kind of network**, thus putting more barriers to their work
- Most of the issues identified are fundamentals and **best-practice are not followed**
- With the **excellent course materials** developed by NSRC, together with their experienced trainers, MYREN and other emerging NREN community would benefit greatly

# The NSRC Model

- Technical training and human resource development activities
- Direct engineering assistance (DEA)
- Participatory development (request-driven)
- Local hands cultivating local expertise (scaling)



# Who is our target?

**Network operator engineer** – whose managing the NREN infrastructure

**Network administrator** – whose managing the institution campus

- These are **key individuals helping research & education team at campus**
- Getting a properly setup campus LAN will ensure **superior experience** for our scientific communities

# What have we done?



# Observation from this week workshop

- Overall 30 participants : 5 from universities, 12 from Polytechnics, 13 Community Colleges
- Unfortunately, we have to turn down 20+ request, as **seats were limited**
- Very **positive feedback** from our participants; we are now receiving request for a follow up workshop
- **New perspective**/thought on how do we best setup our R&E infrastructure
- **Improved human networking** amongst different user groups within MYREN

# Acknowledgement

- **NSRC** – Steven Huter, Philip Smith, Nimal Ratnayake
- **PRAGMA LOC** – Nurul Hashimah, Nadya Williams
- **USM PPKT** – Zulham, Irham
- **MYREN team** – Fazd, Sharizan & Hamid
- **ALL PARTICIPANTS!**



## Welcome

The LEARN web site of the NSRC provides educational content about technical Internet topics with a mix of video clips, accompanying reference documents and command line examples.

The first set of educational content has been developed with the Energy Sciences Network (ESnet) about perfSONAR, which is a set of networking tools for end-to-end monitoring and troubleshooting of multi-domain network performance. ESnet is a high-performance network built to support scientific research, managed by the Lawrence Berkeley National Laboratory, with funding from the U.S. Department of Energy's Office of Science (SC).



[Home](#) | [About](#) | [Contact](#)

<https://learn.nsrc.org>



Organization of American States  
RedHUCyT



The Andrew W. Mellon Foundation

THE KRESGE FOUNDATION



Vint and Sigrid Cerf  
James Forster  
Joel Jaeggli  
Randy Neals  
Jim Williams  
Suzanne Woolf

INSTITUTE OF  
INTERNATIONAL  
EDUCATION



THE NATIONAL ACADEMIES  
*Advisors to the Nation on Science, Engineering, and Medicine*



International Network INASP  
for the Availability of Scientific Publications



O'Reilly Foundation



MacArthur Foundation



FRENIA: Fostering Research &  
Education Networking in Africa



United Nations University  
*"Advancing knowledge for human security and development"*

THE UNIVERSITY OF EDINBURGH  
THE SCHOOL OF MATHEMATICS



Walnut Creek/FreeBSD Mall



Sears, Fram and Associates, LLC



The World Bank



NRF  
Foundation for Research Development  
National Research Foundation



NetworkTheWorld.org

Richard A. Karp Foundation



United Nations  
Development Programme

NTT/VERIO



AT&T Labs Research





# Thank you !

Email : [kamal@myren.net.my](mailto:kamal@myren.net.my)