



INFORMATION TECHNOLOGY

GOREX: Guam Open Research & Education eXchange

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University of Guam

GLIF 2017 – GLIF Americas Working Group

The University of Sydney, Australia

September 25th, 2017



U.S. Territory of Guam

- **Hafa Adai** : Hello, how are you?
- Population: ~ 172,365
- United States Territory since **1898**
- University of Guam (est. 1952): ~ 4,000 Students





Military Presence on Guam



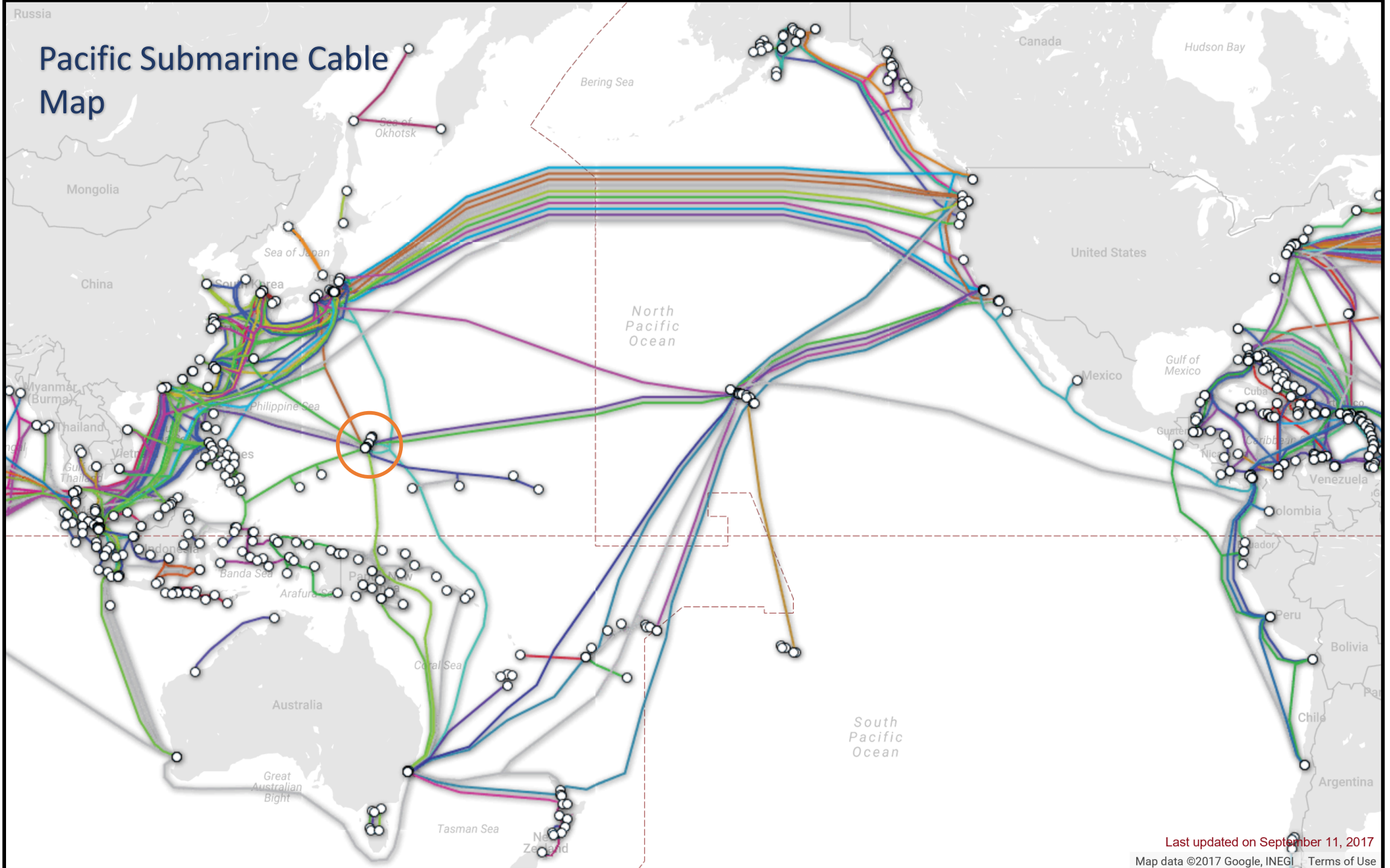
Guam

Department of Defense land





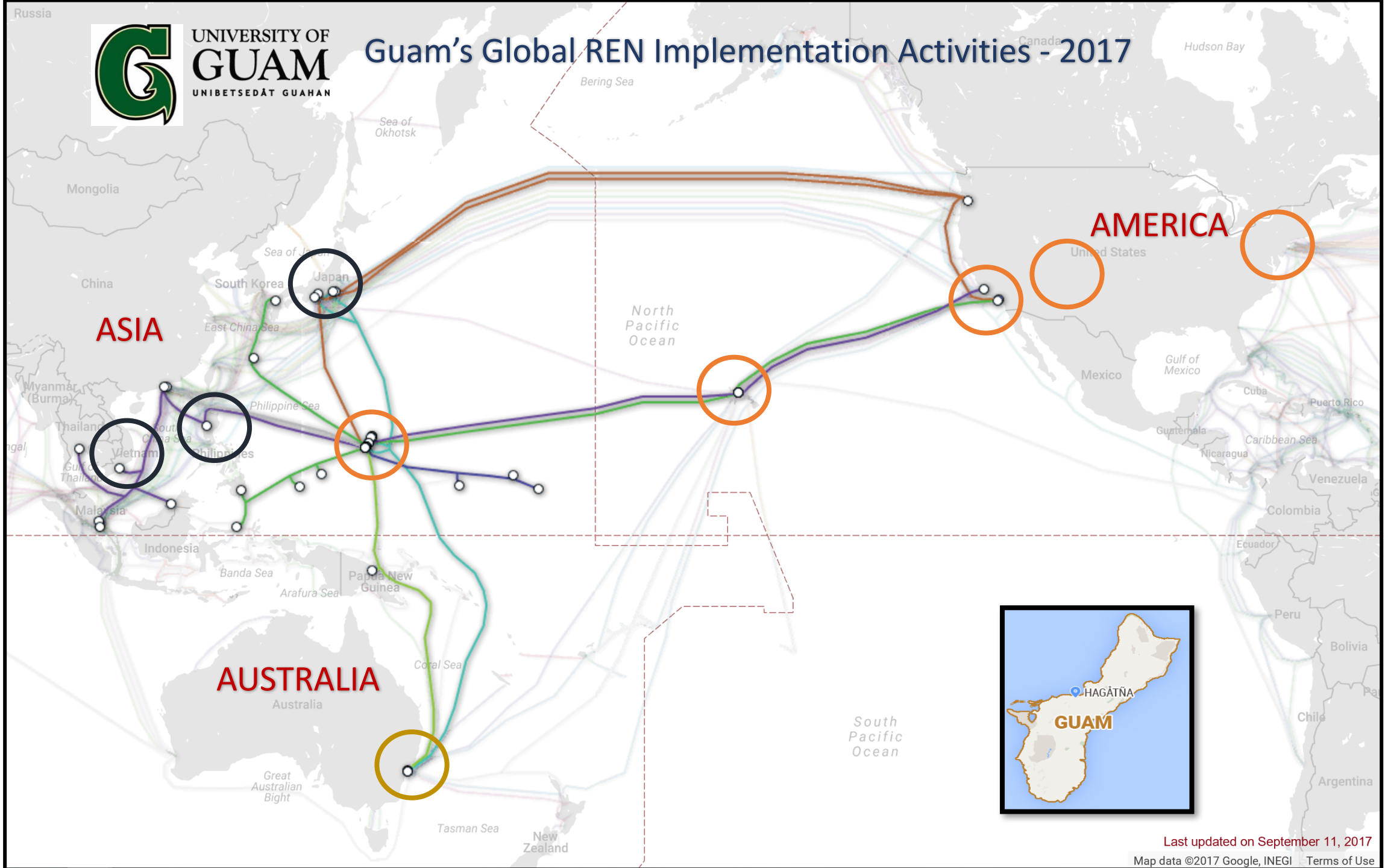
Pacific Submarine Cable Map





UNIVERSITY OF
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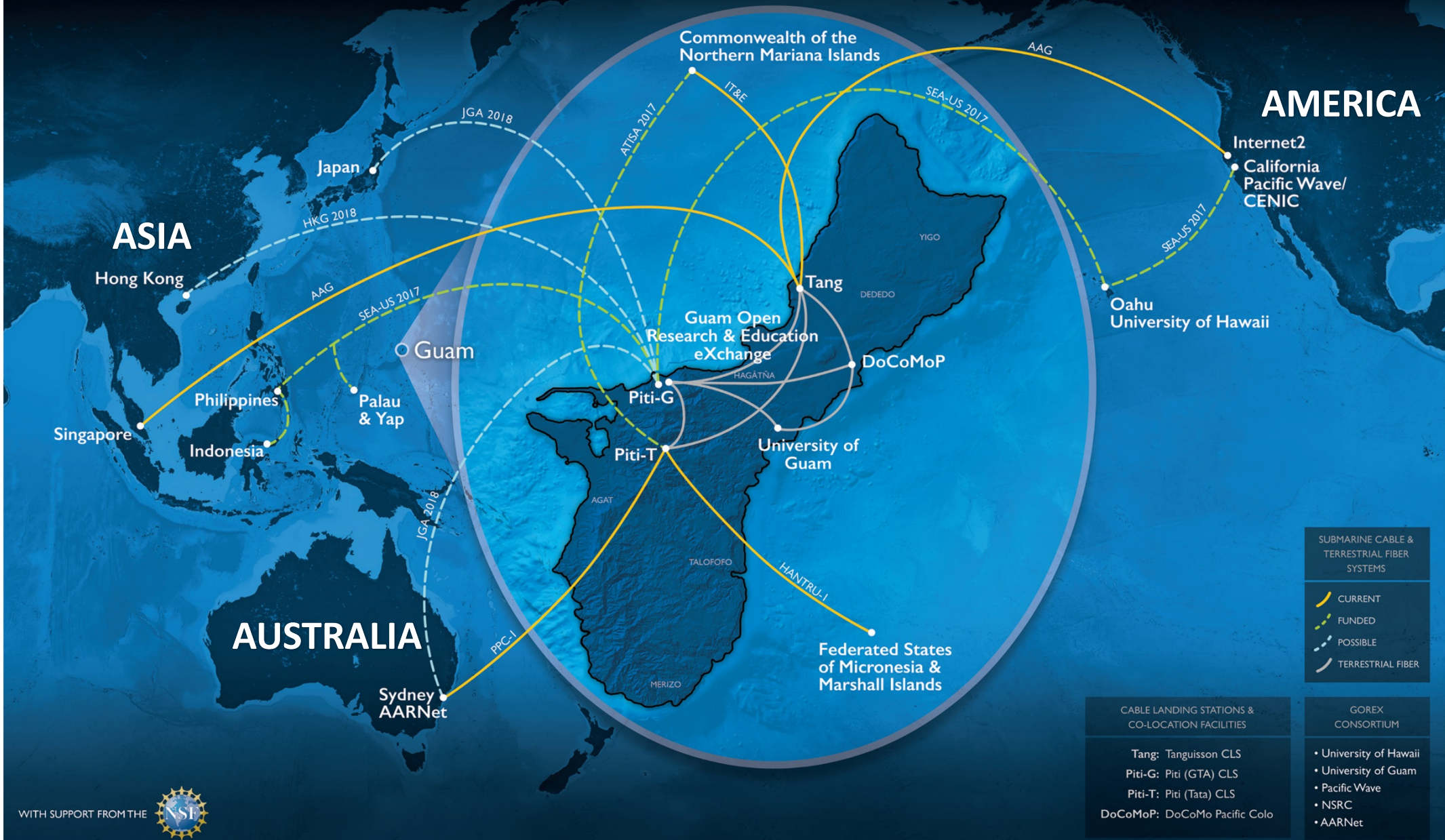
Guam's Global REN Implementation Activities - 2017



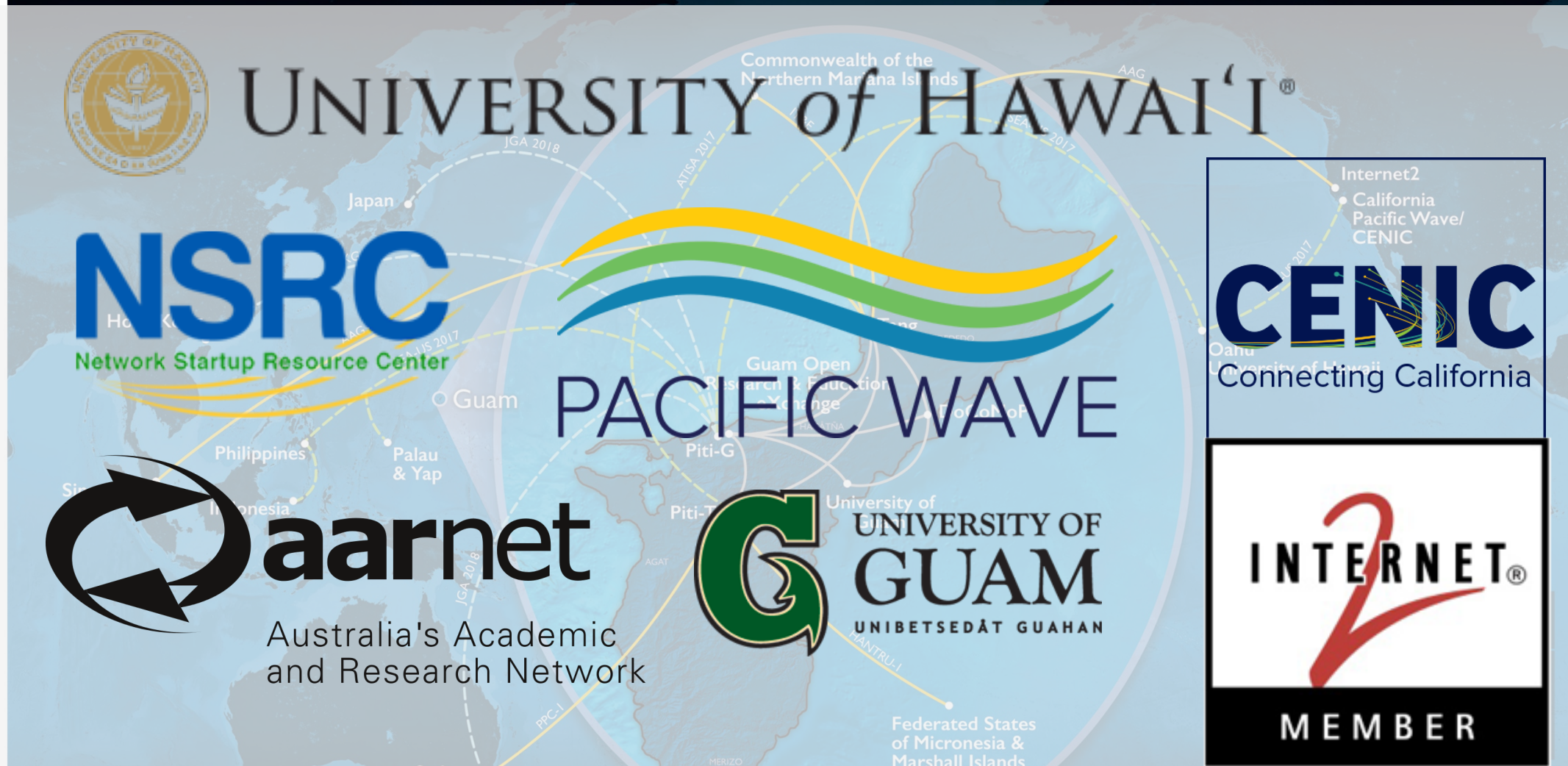
Last updated on September 11, 2017

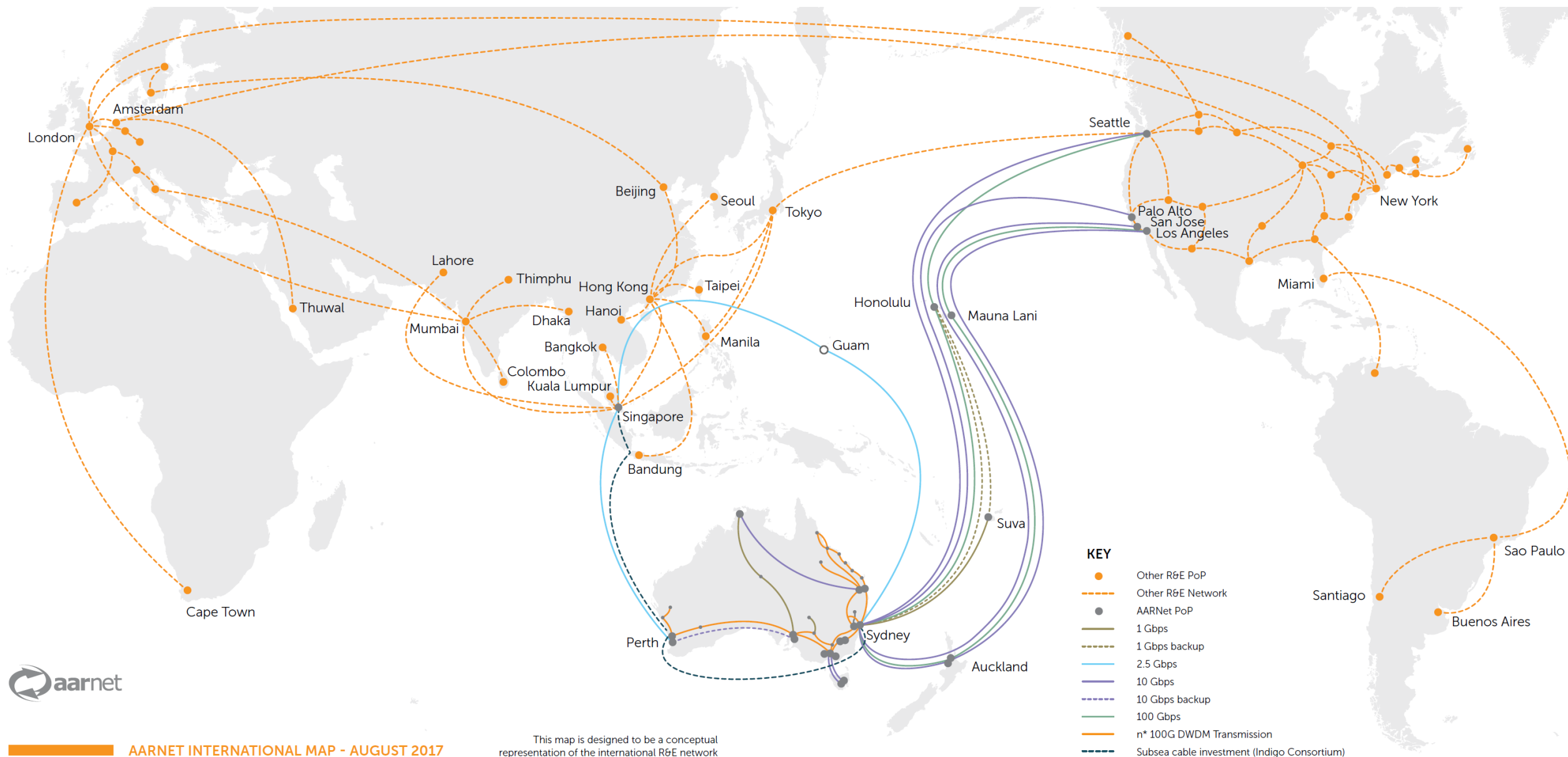
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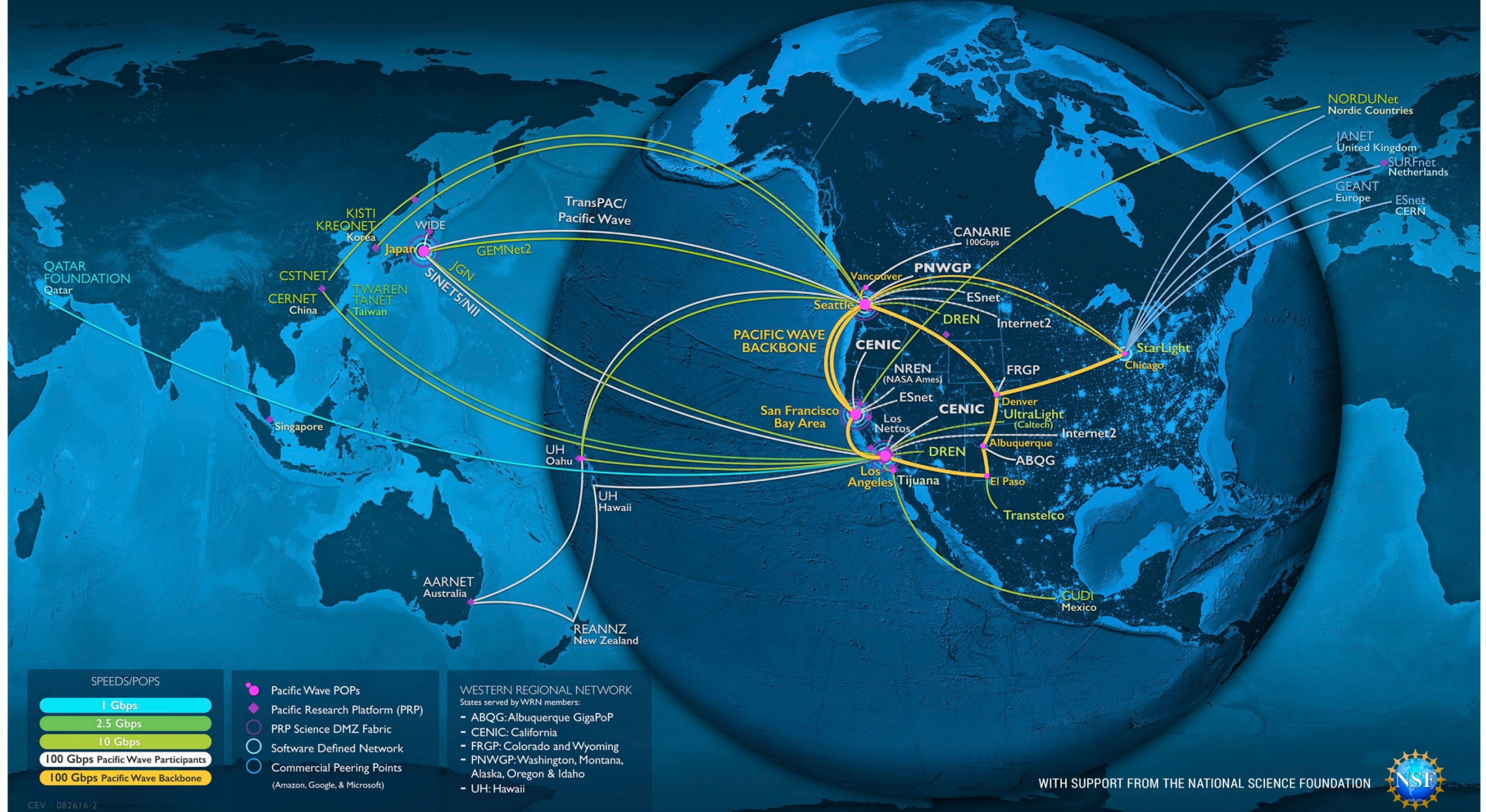
U.S. eXchange Network Topology

Legend:

- **Advanced Layer 3 Service**
(R&E = Research & Education IP; P = Peering IP)
- **Advanced Layer 2 Service**
(SDN Ethernet add/drop)
- **Advanced Layer 1 Service**
(Optical wave add/drop)

Network Partners:

- ciena
- CISCO
- INDIANA UNIVERSITY
- infinera
- JUNIPER NETWORKS



GOREX GOALS

- ❑ Leverage strategic geographic location of Guam
- ❑ Establish Open R&E Exchange
 - Inter-Connect existing, funded, and planned high capacity R&E trans-pacific circuits
- ❑ Improve Pacific-wide transport **diversity** and **resilience**
 - Support global R&E networks
 - Facilitate greater access to global R&E networks by Pacific Island nations and communities
- ❑ Overarching Goal:
 - Promote increased growth and effectiveness of data-intensive and highly collaborative research and education activities engaging the Asia-Pacific region with the global R&E community.

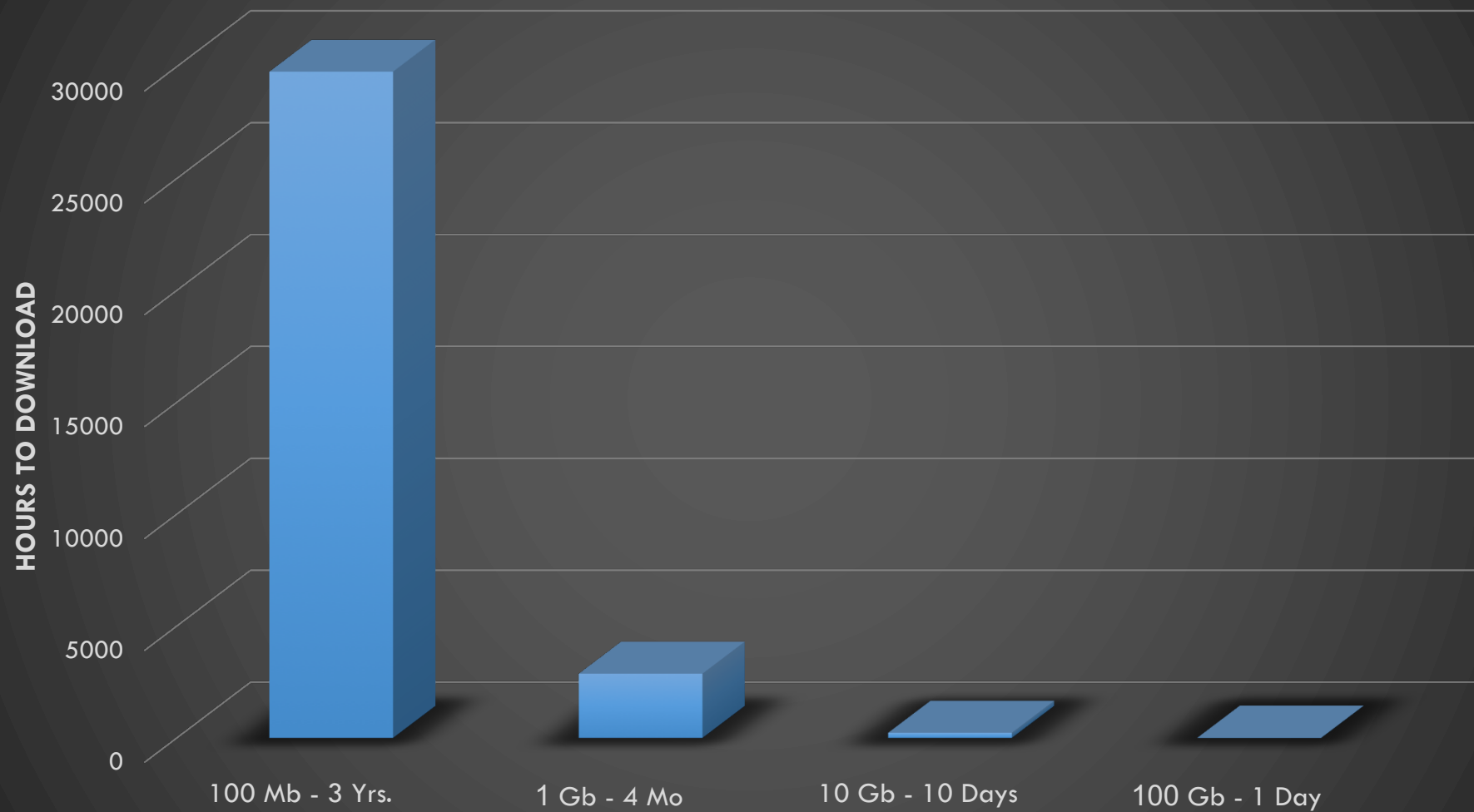


Turnaround Time: ~ **TWO WEEKS!!!**



IMPORTANCE OF 10Gb – 100Gb REN

1 Petabyte Transfer Time across different speeds



■ 1 Petabyte Transfer Time across different speeds

GOREX Implementation

- ❑ University of Hawai'i
 - 100Gb (SEA-US): Guam, Hawai'i, California – 25 year IRU
 - Approximately 4 racks in SEA-US Guam Co-Lo Facility
- ❑ Operated on a pure non-profit cost recovery basis
 - Costs will be shared fairly and transparently among participants
- ❑ Partners investing in GOREX will provide oversight and lead any governance activities
 - Initial costs to be borne by current consortium members: UH, Pacific Wave, CENIC, AARNet, and others
- ❑ Univ. of Guam CyberTeam will operate as local-hands for GOREX
 - UoG Data Center will be connected to GOREX Co-Lo Facility



Research & Education Network Activities

2016 - Network Startup Resource Center



Campus Network Design 5-day Workshop (July 25-30th, 2016)

- I. University of Guam
- II. Palau Community College and Palau Ministry of Education
- III. College of Micronesia – Federated States of Micronesia
- IV. College of Marshall Islands
- V. Northern Marianas College – CNMI
- VI. Guam Department of Education
- VII. Guam Community College
- VIII. Trainers:** University of Oregon, University of Hawaii, NSRC



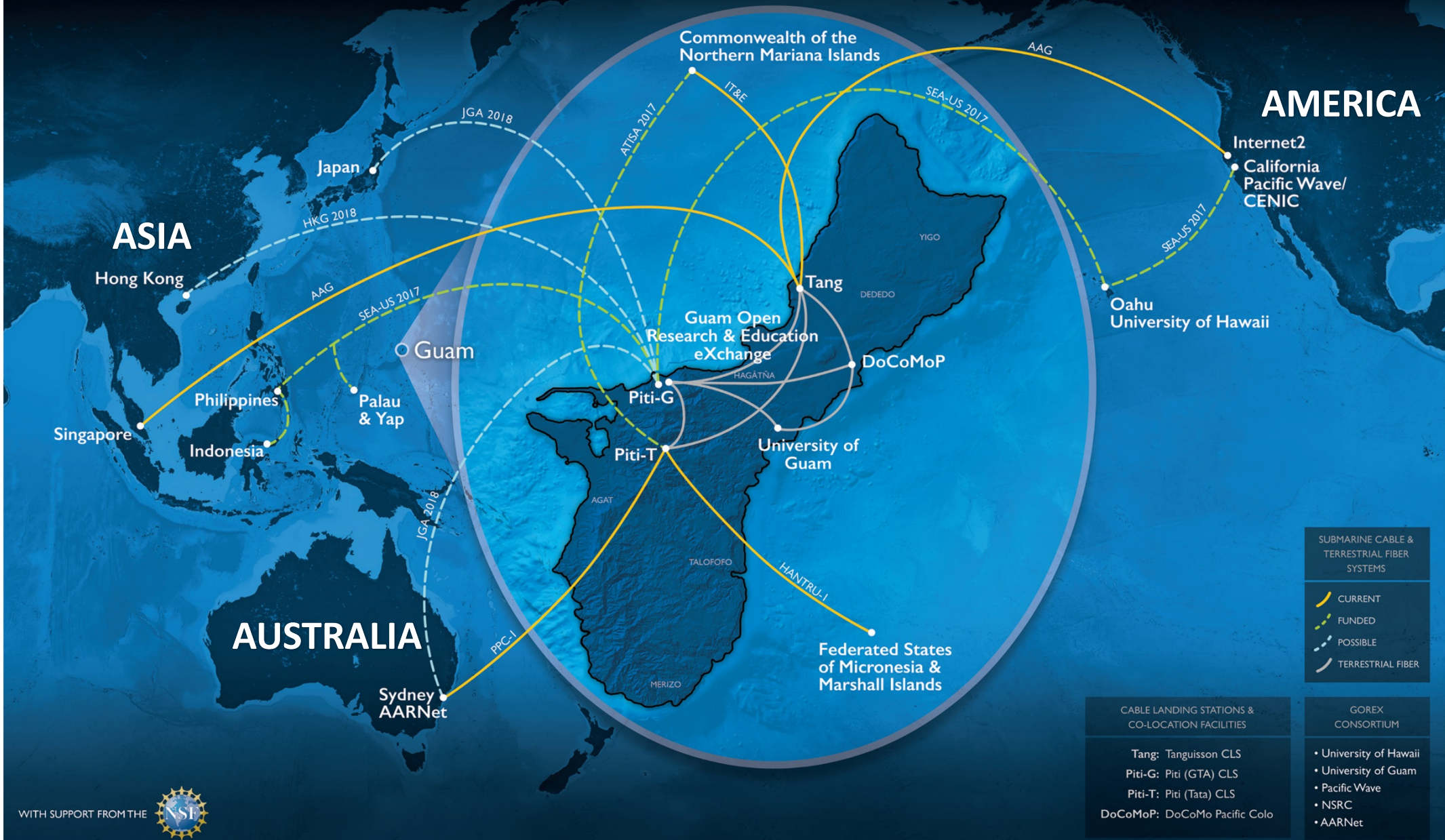
Univ. of Guam Cyber-Team Activities: 2017

- Jan. 2017 - PTC 2017 – Trans-Pacific REN & GOREX Discussions at University of Hawaii
- Feb. 2017 - APRICOT 2017 - Ho Chi Minh City
- Mar. 2017 - **PhNOG** and IN@IU PerfSONAR / Science DMZ Training at University of Philippines
- Mar. 2017 - CENIC 2017 Conference, San Diego, CA
 - **NSRC / CENIC Fellowship**
- Apr. 2017 - NSF EPSCoR (Guam Ecosystems Collaboratorium)
 - Reverse Site Visit, Washington, D.C. - GOREX Highlights
- Apr. 2017 - Internet2 Global Summit, Washington, D.C.
- May 2017 - NSRC Direct Engineering Assistance #2 w/CENIC
 - *CyberInfrastructure Improvements*
 - *Science DMZ and DTN test case setup (FIONette) w/John Hess from CENIC*
 - *CNMI - Northern Marianas College participated*

Univ. of Guam Cyber-Team Activities: 2017

- Jun 2017 - Received National Science Foundation CC* Award (OAC-1659182): \$250,000
 - ***CC* Network Design: Upgrading the University of Guam Network to Connect to Internet2 and Create a Science DMZ***
 - **CyberTeam, CyberConnectivity, CyberPlan – CI Best Practices**
 - **Leadership Institutes:** University of Hawaii, NSRC
- Sep. 2017 - GLIF 2017, Sydney, Australia
- Oct. 2017 - NSF CC* PI Workshop, Albuquerque, New Mexico (*Planned*)
- Oct. 2017 - Internet2 Technology Exchange, San Francisco, CA (*Planned*)
- **Nov. 2017 - Installation of GOREX Juniper MX-480 with University of Hawaii (*Planned*)**
- Nov. 2017 - Supercomputing 2017, Denver, CO (*Planned*)

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QUESTIONS ?

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