



IN@IU

Supporting Global Research

Brenna Meade

Senior Network Architect



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**International
Networks**

at Indiana University

International Networks @ Indiana University (IN@IU)

- 25 year history of operating international networks and building partnerships
- Currently support 4 100G links with 2 US NSF awards (TransPAC and NEA3R)
- Coordinate globally to ensure US researchers have worldwide access to networking services
- Work with research groups to improve international data flows via engagement and training
- Projects carry traffic data from researchers in 84% of the world



Connections

TransPAC5

A 100G TransPAC + Pacific Wave

B 100G Guam Singapore Circuit Consortium

NEA3R

C 100G NEA3R

D 100G NEA3R

Network Reach

NEA3R

TransPAC5

TransPAC5 & NEA3R

None



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NEA3R NY <> Amsterdam 400G Upgrade

Existing 100G circuit from NY<>Amsterdam will be upgraded to 400G Oct 2024

- Connecting directly to MANLAN, improving the AS-PATH
- Increased collaboration with Internet2 in the Atlantic
- Support for SC demos at 400G

Existing 100G circuit from NY <> London will remain

- Additional support for experimental traffic



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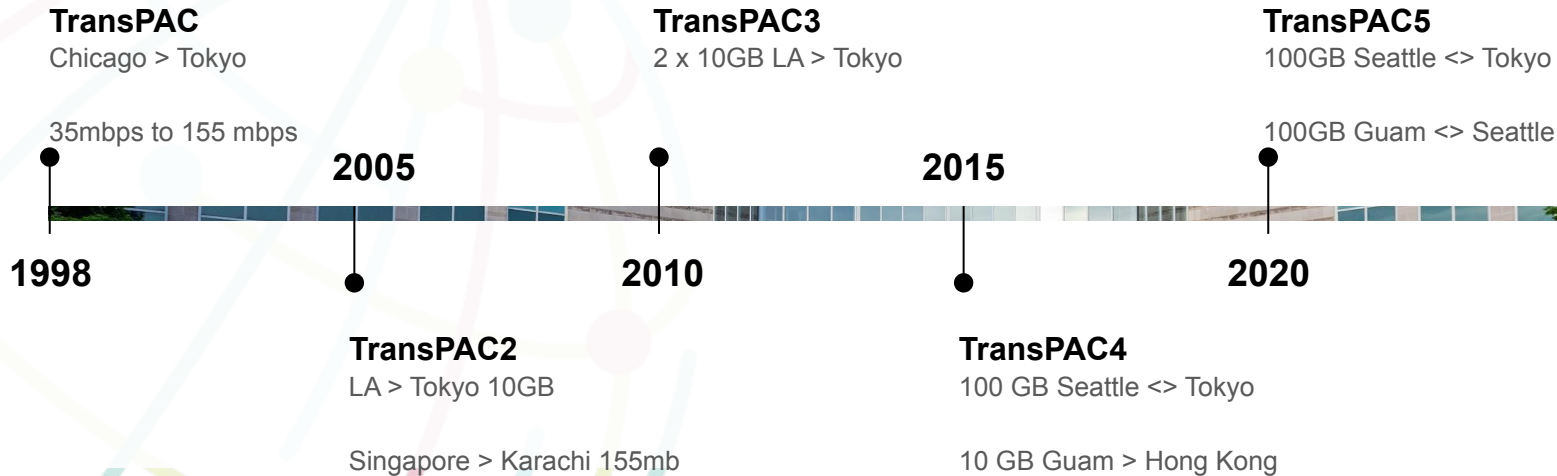


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TransPAC History





TransPAC5



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Services

- NetSage Measurement and Monitoring Framework
- TestBed support (FABRIC, SC, DMC)
- Experiment support
- LHCONe Network Service Provider
- End user science support

Circuits

- TransPAC-Pacific Wave 100G between Seattle and Tokyo.
- Guam-Singapore Connectivity Consortium (GSCC) 100G between GOREX and SingAREN
- Part of APOnet Consortium

2024 and Beyond



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- Removal of TransPAC router in Seattle for direct connectivity to PacWAVE
 - Planned support for AutoGOLE / Sense
 - More efficient AS-PATH
- Support for 100 Gbps services via existing links
- Analysis of opportunities for additional investment within APOnet
- Traffic study to align capacity with science needs
- Engineering system coordination via APOnet
- Measurement and monitoring dashboards
 - Public dashboard for NA-REX

aponet ASIA PACIFIC OCEANIA NETWORK (APOnet)



IN@IU Research Areas



International
Networks
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- Engineering and Architecting Global Collaborative Systems
- Measurement and Monitoring tools for R& E
- Infrastructure Investments Aligned with Science and Engineering Needs
- Advanced Network Research and Support for Experimentation
- End-to-End Performance Improvement
- Leading Community Diversity Initiatives



How can we improve research support?

- Improved collaboration with international partners and international collaborations
- Understanding who's using our network
- Working together to identify and improve slow rates of transfer
- Looking at data transfer patterns to understand use cases

Support the GRP

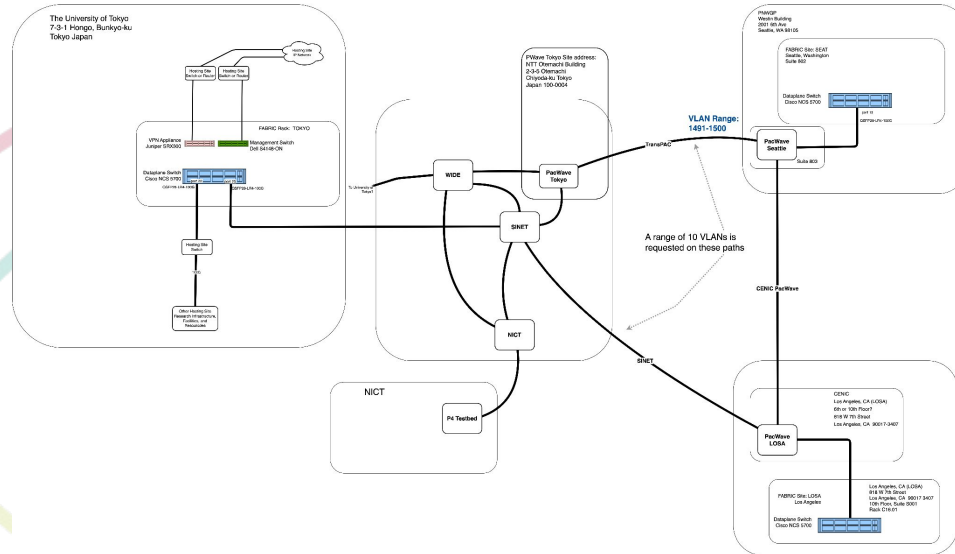


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- FAB / FABRIC
- Data mover challenge
- Routing working group
- SC24

FAB Tokyo - 2024

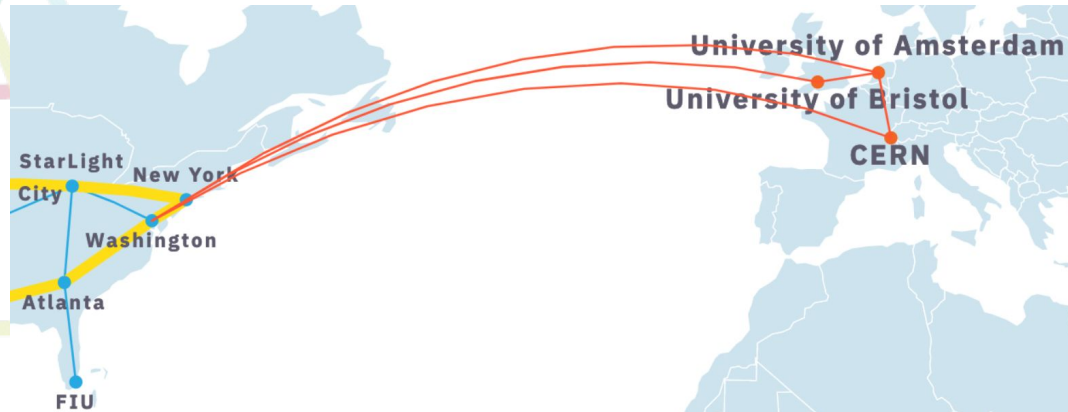


TransPAC provides connectivity between Seattle and Tokyo for FABRIC nodes at University of Tokyo



FAB - EU

- Provide international connectivity for FAB in the EU
- Supporting nodes at University of Amsterdam, University of Bristol and CERN



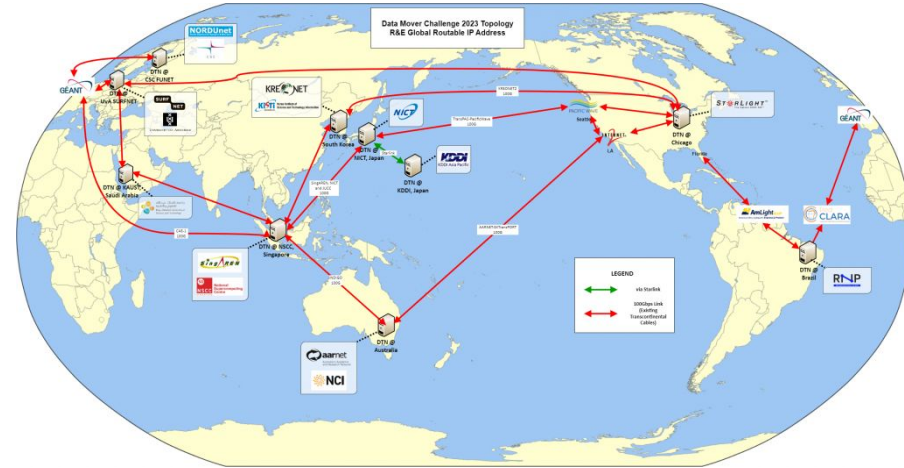


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Data Mover Challenge 23

The international Data Mover Challenge (DMC) is a competition that is run once every 2 years

Bring together experts from industry and academia globally to test their software and solutions for transferring huge amounts of research data across various 100Gbps national research and education networks (NREN).



August 1 - Oct 31, 2023

<https://www.redclara.net/en/events/listado-de-eventos/2464-august-1-to-october-31-data-move-r-challenge-2023>

Routing Working Group

Goals:

- Work on international routing issues TOGETHER to improve performance.
- Engage network owners and NRENs to address ineffective routes
- Proactively identify issues and create best practices

170 members on the email list from over 25 different countries

Active Slack channel - APAN #Routing

(https://join.slack.com/t/apan-network/shared_invite/zt-2gdzd58zp-r8Vzry_SAVplwIXFJJyDgg)



SCinet

Dual ASN architecture

- Conference
 - Provide seamless internet experience for conference attendees
- Research
 - Emphasizes the Science DMZ
 - Allow for more innovation

Supporting 34 NREs (possibly 36 by SC24)

OnSite FABRIC node provided by Ciena

IPv6 only - continuing efforts from SC23

SCinet Cluster (CPU only)

- Pilot program this year
- Educate the next generation of HPC engineers
- Select NRE submissions will use cluster during SC24

SCinet



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NA-REX North America Research & Education Exchange Collaboration



TransPAC & NEA3R @ SCinet



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TransPAC

- Toward Terabit-Scale Anonymous Communication Leveraging Programmable Switches
- Global P4 Lab (GP4L)
- Floating-Cyber Physical System for Local Production and Consumption of Data

NEA3R

- FAB / FABRIC
- 400G connectivity to CERN via Amsterdam

International Support for SC24

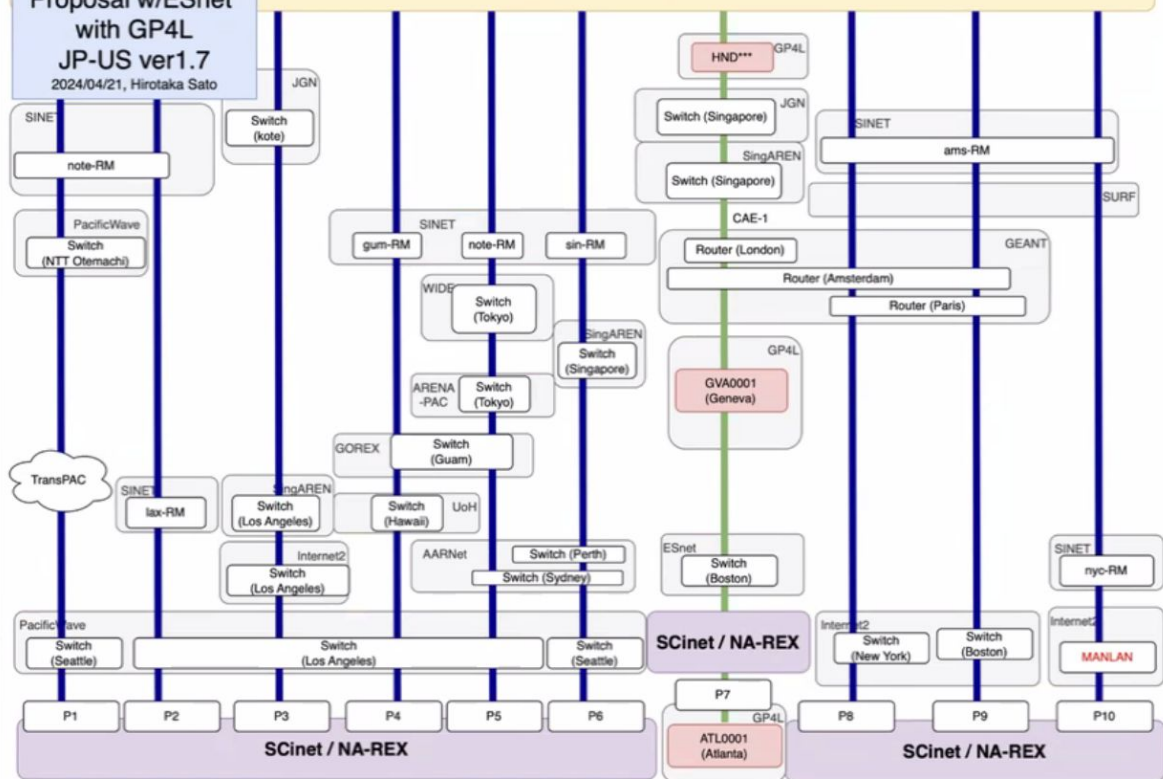


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VLAN Configuration
Proposal w/ESnet
with GP4L
JP-US ver1.7
2024/04/21, Hiroataka Sato

Japan (SINET, JGN)



Testing performance over
10 links @ 80Gbps

Services configured via
ANA, APOnet, AER and
NA-REX for experiments
using 10 R&E paths



THANK YOU!

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 - US NSF Award #2028501 TransPAC5
 - US NSF Award #2028495 NEA3R



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