TransPAC: More than Just a Network

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International Networking
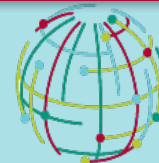
Indiana University

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Sep 28, 2016

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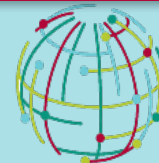At Indiana University

TransPAC History

- **TransPAC project was started in 1998 (we will have our own 20 year anniversary in just 2 years!)**

- **Cooperative partnership among Indiana University, APAN, TEIN*CC, JGN-x/NICT-Japan, NII-Japan, CERNET, and others**
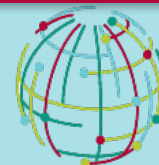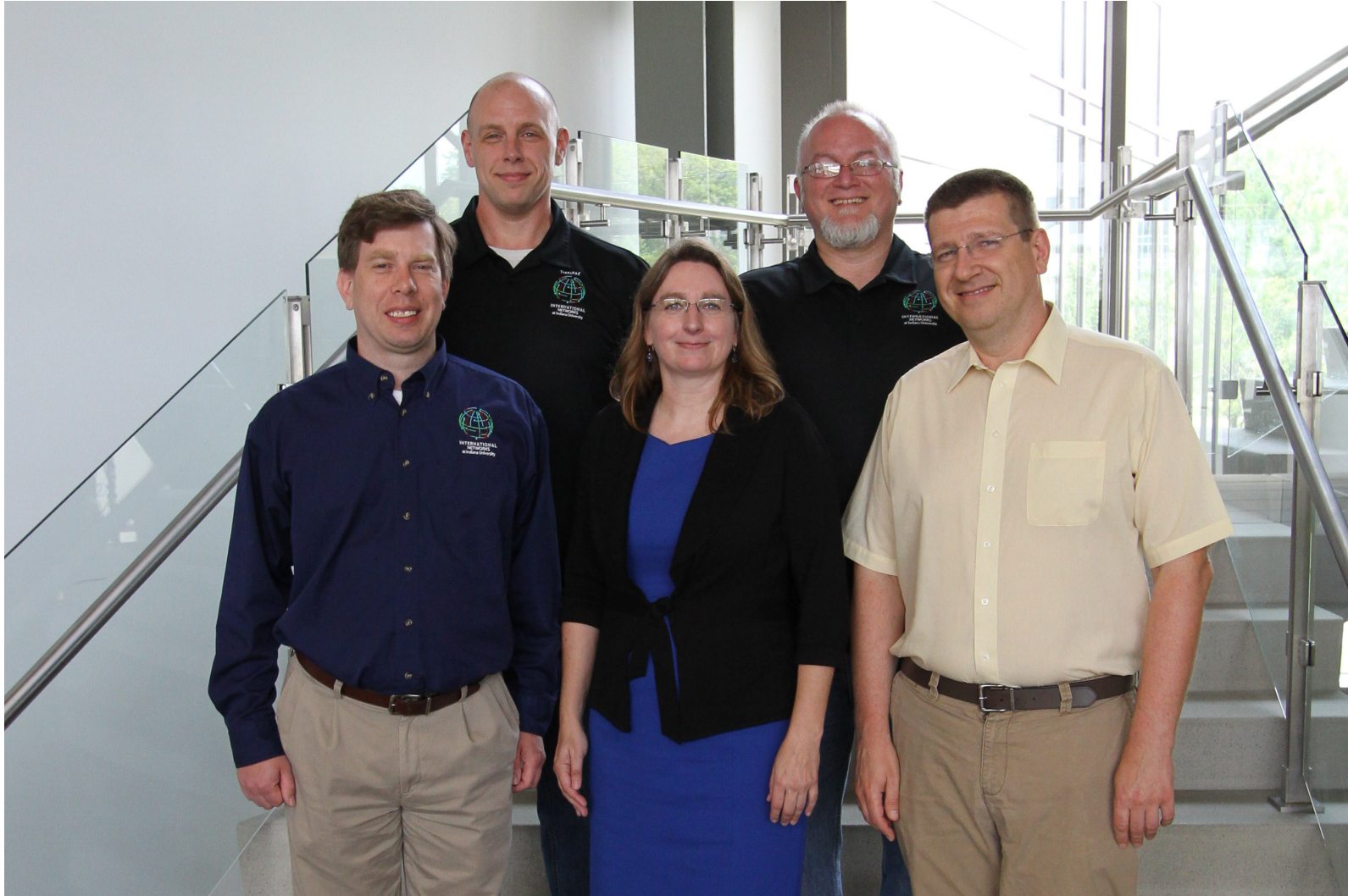
- **Historically, 10G links to Tokyo, Beijing**

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TransPAC4 continuation

- **TransPAC4: Pragmatic Application-Driven International Networking**

- **Runs through Feb 2020**

- **$4.8M over 5 years**

- **Includes funding for circuits, exchange points, application support, research**

- **Press Release: http://itnews.iu.edu/articles/2015/USE-iu-globalnoc-wins-4.8-million-asia-pacific-networking-grant.php**

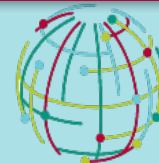INTERNATIONAL
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Current Team

End User Engagement

- **Directly engage with user communities**

- **Focusing on end-to-end performance**

- **Application Advocacy Specialists will work closely with end users with network needs**
  - **including US branch campuses in Asia**

- **Other training**

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TransPAC3

- **10G circuit funded by TransPAC3 from Los Angeles to Tokyo was decommissioned May 31, along with the equipment there**

- **NICT funded Los Angeles to Tokyo 10G is still in place**

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TransPAC-Pacific Wave 100G

- **Dedicated 100Gb/s wavelength between Pacific Wave in Seattle and Tokyo, Japan**

- **Network fabric provided by Pacific Northwest Gigapop**

- **Points of Presence in Seattle (PacWave) and in Tokyo (WIDE/T-REX and Tata)**

Transition

- **Traffic transitioned from one circuit to another without issue May 26, 2016 (morning Eastern time, evening Tokyo time)**

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Interfaces [Parameters]

Aggregate
Fri 20 May 2016 09:20:01 EDT to Fri 27 May 2016 09:20:01 EDT

Thu 26 May 2016 14:41:10 EDT

Inbound Bits per Second	Outbound Bits per Second
Crosshair: 107.9 M	Crosshair: 1.69 G
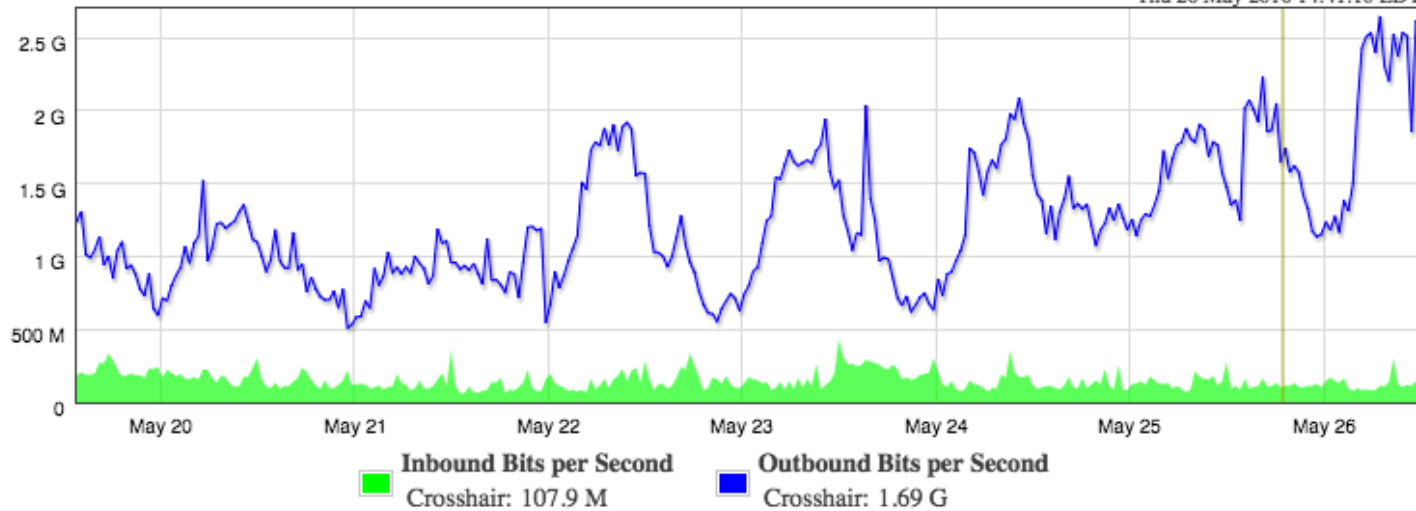
rtr.losa.transpac.org--xe-0/0/0
10GE to Tokyo XP
Fri 20 May 2016 09:20:01 EDT to Fri 27 May 2016 09:20:01 EDT

Inbound Bits per Second	Outbound Bits per Second
Crosshair: 187.69 M	Crosshair: 1.24 G
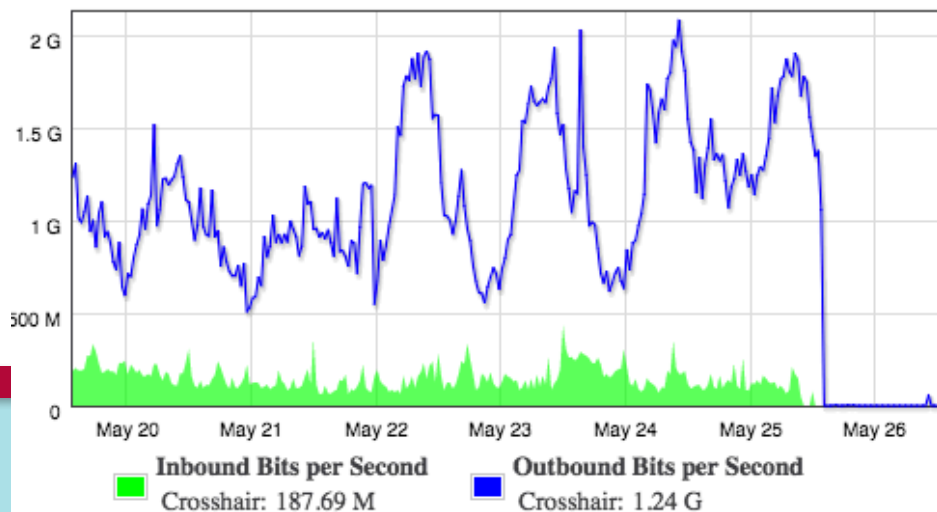
sttl-pacwave-switch--ethernet15/2
TransPAC - Pacific Wave 100G Circuit (provided by PNW Gigapop)
Fri 20 May 2016 09:20:01 EDT to Fri 27 May 2016 09:20:01 EDT

Inbound Bits per Second	Outbound Bits per Second
Crosshair: 252.88	Crosshair: 899.54
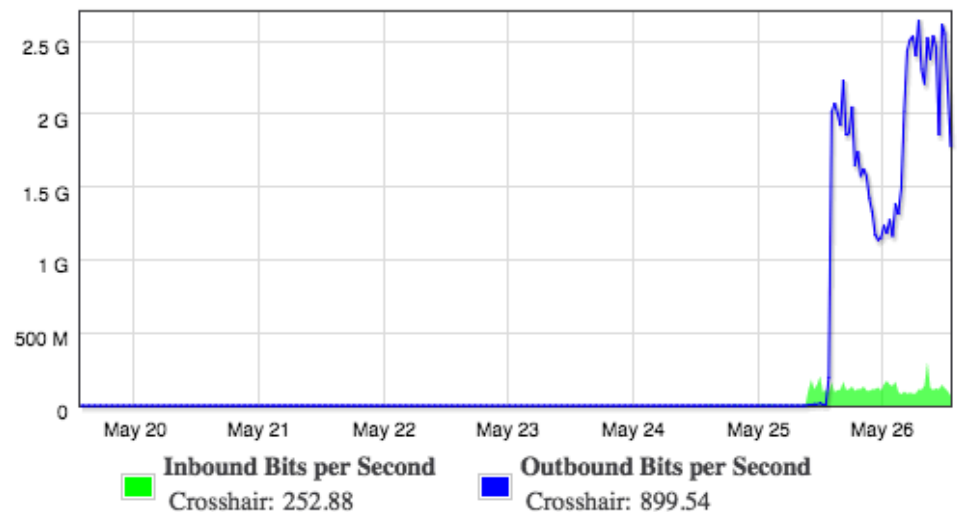
IRNC related Backbones and Exchange Points

ACE

TransPAC

Pacific Wave

Starlight

NOC   NetSage

AMPath

PIREN

SXTransport
(AARNet)

AmLight Exp
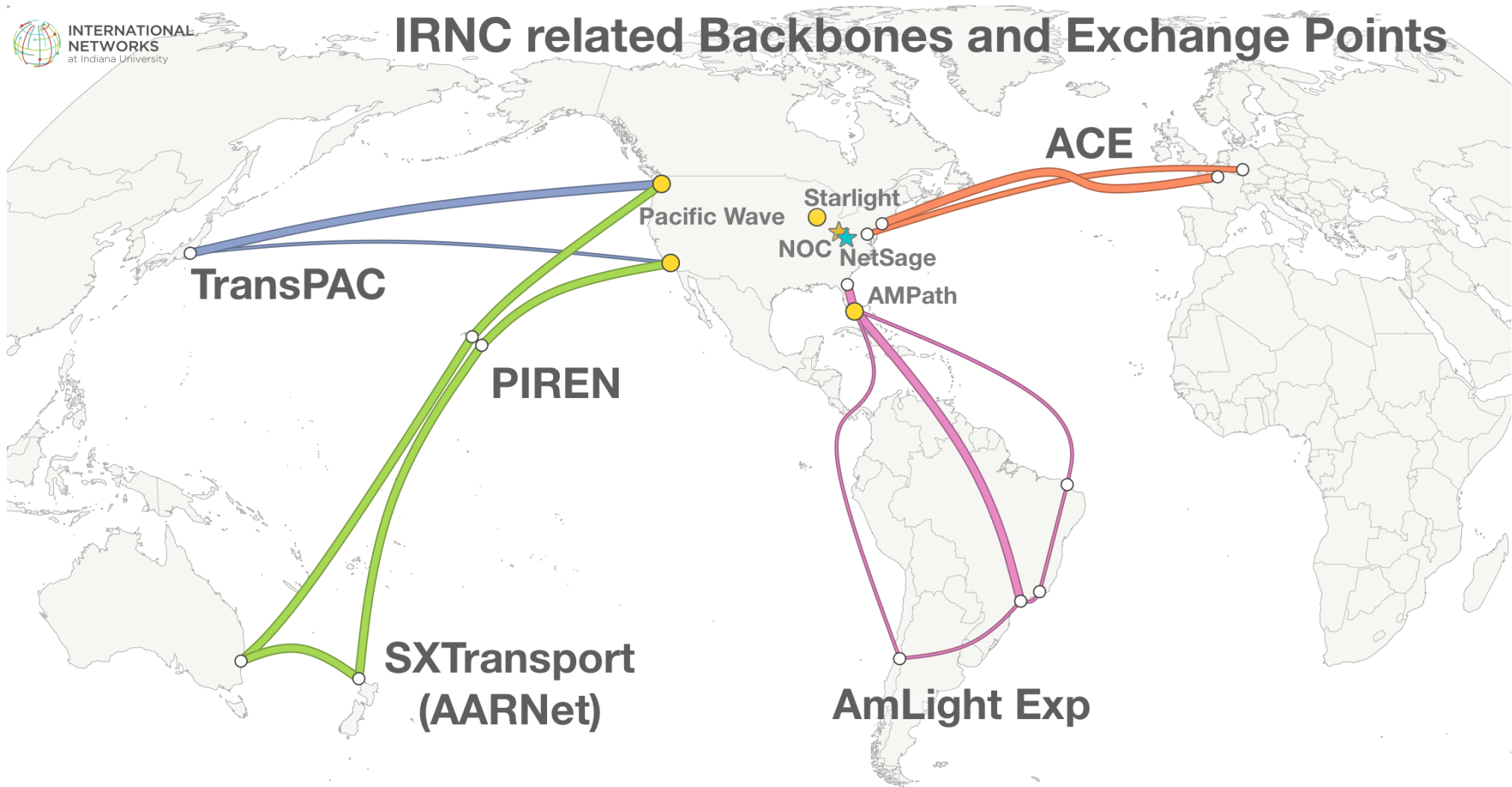
Who Uses TransPAC

- **De-identified flow data analysis**
- **Data covers February-June**

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TransPAC Top Ten Talkers by Source AS Outbound
February - June 2016

Legend:
- 7941 Internet Archive
- 1701 NASA
- 195 San Diego Supercomputer Center
- 70 National Library of Medicine
- 194 University Corporation for Atmospheric Research
- 6629 NOAA
- 25887 Washington University of St Louis (SLIAC)
- 31 California Institute of Technology
- 5663 US Geological Survey
- 2553 Florida State University
- - Non Top 10 Traffic

Pie chart values: 19%, 14%, 7%, 5%, 5%, 4%, 3%, 3%, 3%, 3%, 34%
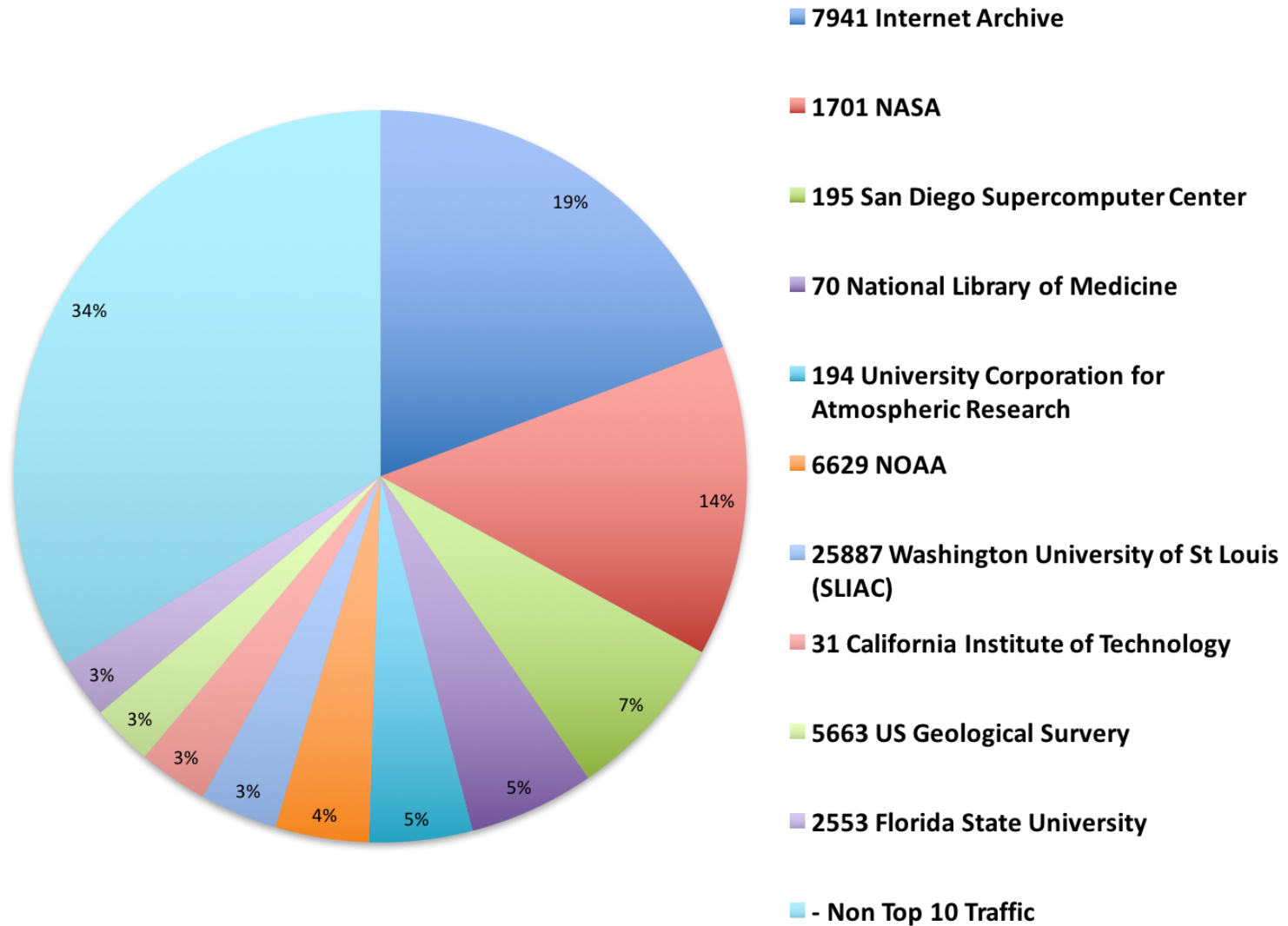
TransPAC Top Ten Talkers by Destination AS Outbound
February - June 2016

Legend:
- 55824 NKN Core Network (India)
- 18127 Tsukuba-WAN Network (Japan)
- 9264 Academic Sinica Network (Taiwan)
- 23456 4 byte place holder
- 9821 Department of Science and Technology (Philippines)
- 45773 PERN (Pakistan)
- 4665 Yonsei University (Korea)
- 3363 Hong Kong University of Science and Technology
- 7660 Asia Pacific Advanced Network - Japan
- 3661 The Chinese University of Hong Kong
- - Non Top 10 Traffic

Pie chart values: 21%, 10%, 9%, 6%, 5%, 5%, 4%, 3%, 3%, 3%, 31%

TransPAC Top Ten Talkers by Source AS Inbound
February - June 2016

Legend:
- **2501 University of Tokyo**
- **7660 Asia Pacific Advanced Network - Japan**
- **18127 Tsukuba-WAN Network (Japan)**
- **7497 Computer Network Information Center (China)**
- **9264 Academic Sinica Network (Taiwan)**
- **1659 Taiwan Academic Network (TANet) Information Center**
- **17716 National Taiwan University**
- **45773 PERN (Pakistan)**
- **3488 Japan Aerospace Exploration Agency**
- **3836 Thai Social/Scientific, Academic and Research Network**
- **- Non Top 10 Traffic**

Pie chart values: 18%, 15%, 7%, 6%, 6%, 4%, 3%, 3%, 3%, 3%, 32%

**TransPAC Top Ten Talkers by Destination AS Inbound
February - June 2016**

Legend:
- 22388 TransPAC
- 1749 NASA
- 70 National Library of Medicine
- 680 DFN (Germany)
- 786 JISC (United Kingdom)
- 292 ESnet
- 297 NASA
- 291 ESnet
- 5663 US Geological Survey
- 513 CERN
- Non Top 10 Traffic

Pie values: 8%, 6%, 5%, 4%, 4%, 4%, 3%, 3%, 3%, 2%, 58%
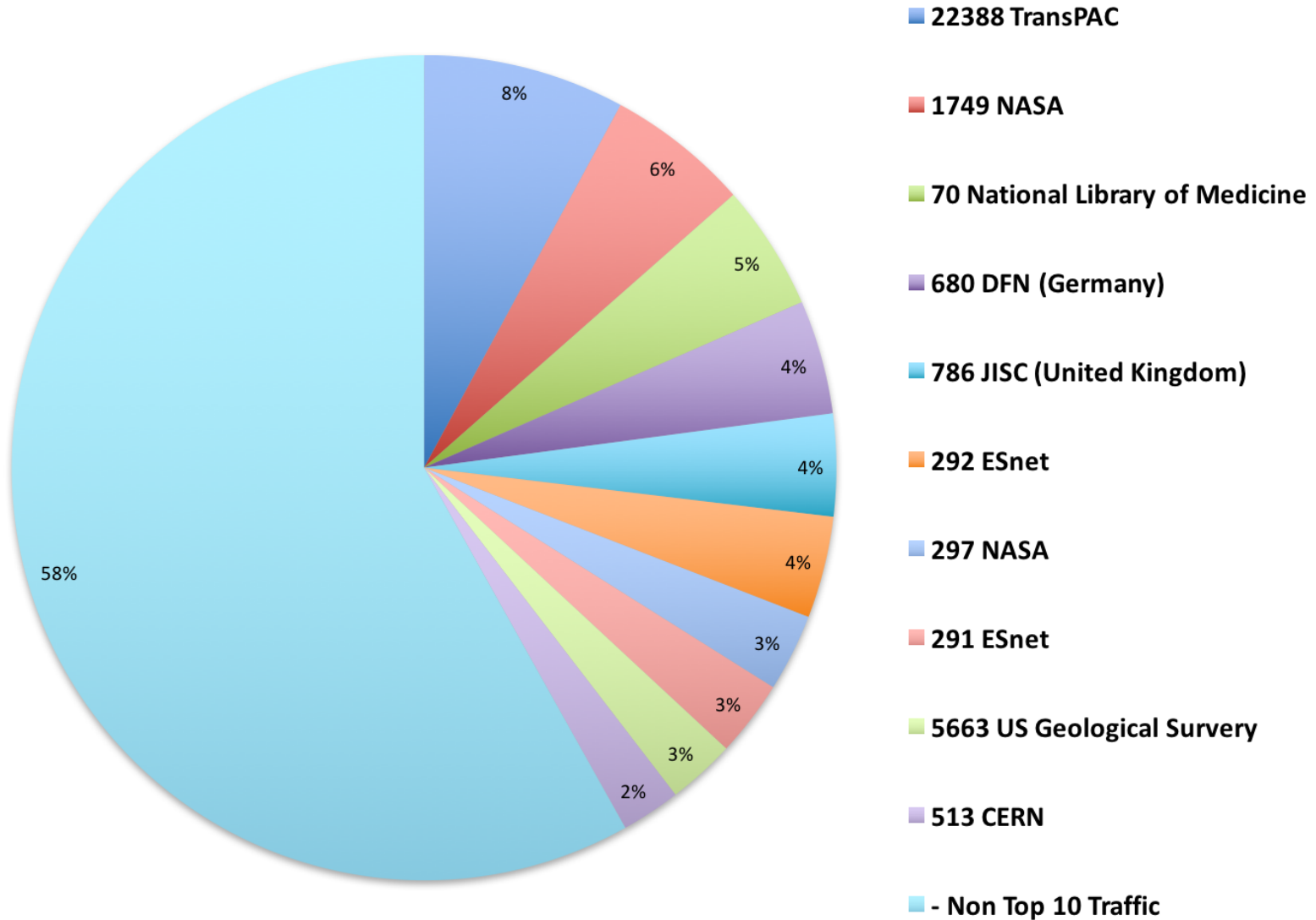
TransPAC - additional circuits

- **Exploring alternative options away from our traditional paths**
  - **Guam to ?**

Beijing
Seoul
Tokyo
Hong Kong
Taipei
Okinawa
Thailand
Manila
Vietnam
Kuala Lumpur
Indonesia
Singapore
Guam
Seattle
LA
Hawaii
Sydney
Auckland

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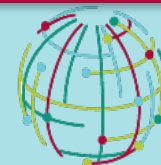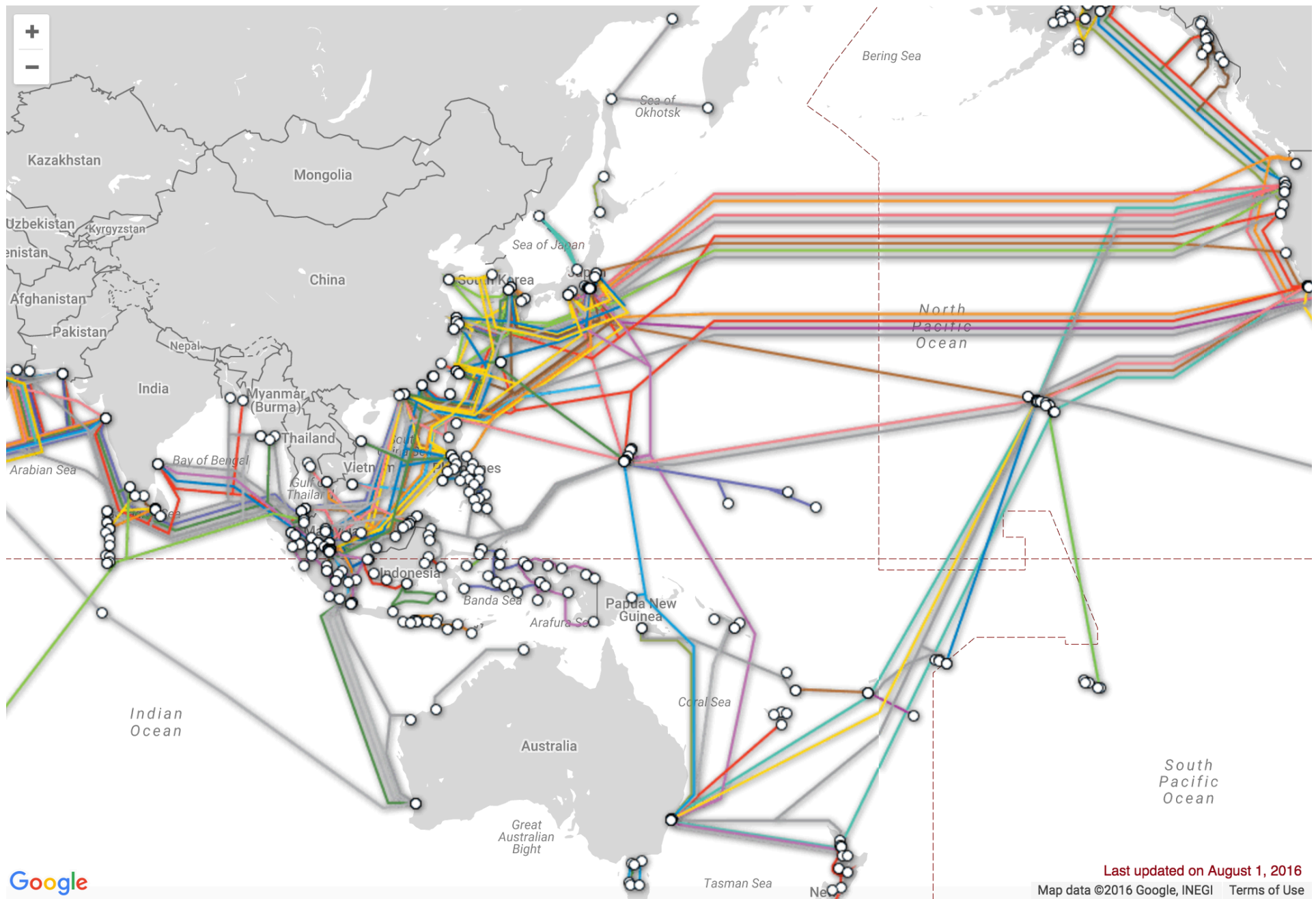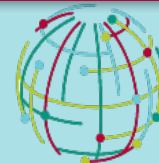
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Acknowledgements

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    - **US NSF award #0962968 for TransPAC3**
    - **US NSF award #1450904 for TransPAC4**
- **The TransPAC Pacific Wave 100gb/s network fabric is provided by Pacific Northwest GigaPop**
- **Pacific Wave is partially funded by a NSF IRNC award to CENIC & Pacific Northwest Gigapop**

Facebook!

- **Our group has dipped our toes into the pool of social media, please check out our page:**
https://www.facebook.com/InternationalNetworksatIU/

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That's it

- **Group Website:**

  http://in.iu.edu/

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