

# America Connects to Europe (ACE) and TransPAC3 (TP3)

Cooperative Partnerships to facilitate  
Global R/E Collaboration

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# Topics

The US National Science Foundation and the International Research Network Connections Program [NSF IRNC]

Indiana University, the GlobalNOC and International Networking at Indiana University [IN@IU]

ACE and TP3



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## The US National Science Foundation and the International Research Network Connections Program [NSF IRNC]

NSF – US government agency. Budget: \$8 billion focused on advancing “science” in the broadest sense. See: <http://www.nsf.gov/>

IRNC – Program within the NSF Office of Cyberinfrastructure (OCI). Budget: \$40 million over 5 years [2010-2015]; focus on providing production quality network infrastructure to increase/advance international science collaborations.

See: <http://irnclinks.net/>

Note: The NSF does NOT fund US domestic R/E infrastructure. That is funded by the universities (Internet2 or NLR networks) or US government labs (ESnet as an example).

OCI also funds a variety of high-performance computing activities, security research and a number of network research programs.

See: <http://www.nsf.gov/dir/index.jsp?org=OCI>

The ACE and TP3 awards are funded by the NSF through OCI and administered by Indiana University.



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## Indiana University, the GlobalNOC and International Networking

Indiana University: 8 campus state university system; core campuses in Bloomington and Indianapolis. See: <http://indiana.edu/> .

A strong research focus: <http://research.indiana.edu/>

GlobalNOC: The outward facing “networking” part of Indiana University. 80+ Staff; provides engineering and operations support to multiple networks including Internet2, NLR, NOAA-NWave, various US regional networks and ACE+TP3

International Networking [IN@IU]: International face of GlobalNOC; engineering and operational support for ACE and TP3; science and services outreach



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## ACE and TransPAC3

5 year [2010-2015] NSF IRNC funded projects; \$1M/year each; focus on production networking in support of R/E, but with support for network research also.

TransPAC3 (TP3): US-Asia connectivity (Tokyo-LA 10G); extended into South Asia and to Europe by TEIN3; partnering with APAN and JGN-X

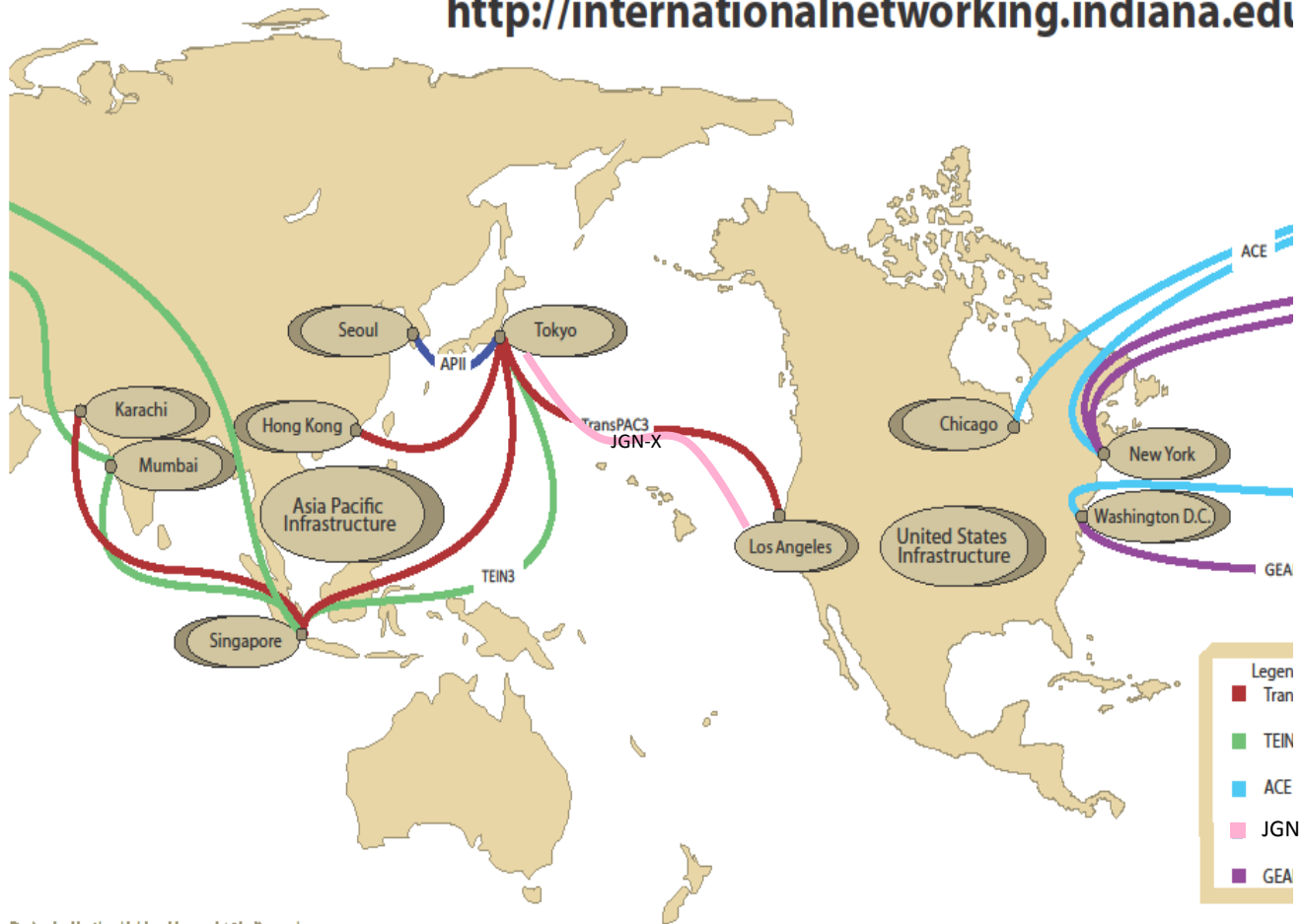
ACE: Multiple 10G connections US->EU; balanced by similar EU->US connections; cooperative engineering and operations; cooperative technical planning via DICE.

ACE+TP3 combined with GEANT, TEIN3, APAN and Internet2 create a globe-spanning network ring.

# Draft Topology

## ACE TP3 TEIN3 GEANT

<http://internationalnetworking.indiana.edu>



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## ACE and TransPAC3 Details

ACE will supply multiple 10G connections between the US-EU balanced by EU-US connections, increasing capacity as demand warrants. Step 1, in cooperation with GEANT, planned 2x10G aggregated links to NYC and DC, a link from NYC to London and a circuit based link to Chicago. We expect these connections be in place on/about 15-August-2011.

TransPAC3 will supply multiple 10G connections between the US and Asia. The initial connection is in place now. We are researching we a second connection might be located.

Not just infrastructure....services over infrastructure and science support. Security and measurement services are critical and, the reason for the IRNC program is to support science.

## Services over infrastructure

Measurement: development and dissemination of both capacity planning and end-user (end-to-end) tools. See: <http://www.perfsonar.net/> and <http://irnclinks.net/> particularly the IRIS and 6Watch activities

Dynamic circuit capability: ability of researchers to provision end-to-end bandwidth without engineering intervention <very difficult technically and politically>  
See: <https://intranet.geant.net/sites/Networking/NA4/T1/Pages/DICEDynamics.aspx/> and <http://irnclinks.net/> particularly the DyGIR activity

DYNES - A US project to provide extended dynamic circuit development combined with actual CI instrument creation. See: <http://www.internet2.edu/ion/dynes.html>

Security: the most difficult problem; Security Event Sharing (SES) proposed as a part of ACE+TP3. See: <http://www.ren-isac.net/ses/>

Network research: provide a platform for research without endangering production services; OpenFlow interest. See: <http://www.openflow.org/>



# Science Support

Primary focus of ACE+TP3 is supporting/increasing US international R/E collaborations

Workshops are a mechanism for increasing collaborations, particularly in “developing/emerging” regions.

Completed a workshop in India: See: <http://internationalnetworking.indiana.edu/us-india-workshop>

We are interested in Africa and Southeast Asia as possible locations for future workshops.

Some interesting US international science projects are located at: <http://www.nsf.gov/od/oise/pire-2010-list.jsp>



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# TransPAC3 supplements

- Partnership with Pakistan in support of PERN connection (via TEIN in Singapore) to APAN region.
  - Starting mid-2008
- Partnership with CERnet for 10GE connection to Los Angeles.
  - Starting late 2011

# TransPAC3 engineering & operations

- TransPAC3 is engineered and operated in close consultation with our partners in APAN-JP on behalf of the entire APAN community.
- All APAN members are encouraged to use the TP3 connection.
- Questions during the 5-year period of TP3:
  - as TransPAC3 expands, what should its topology be?
  - What new services should there be?
  - These are questions for input from the APAN community.

Thanks for your time....

Feel free to contact Jim Williams: [williams@indiana.edu](mailto:williams@indiana.edu)

Visit our web site: <http://internationalnetworking.indiana.edu/>



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**INDIANA UNIVERSITY**

## References and additional information

IN@IU: <http://internationalnetworking.indiana.edu/>

ACE: <http://internationalnetworking.indiana.edu/ACE>

TP3: <http://internationalnetworking.indiana.edu/TP3>

IRNC projects: <http://irnclinks.net/>

Internet2: <http://internet2.edu/>

DyGIR: <http://irnclinks.net/>

IRIS: <http://irnclinks.net/>

DYNES: <http://www.internet2.edu/ion/dynes.html>

DICE: <http://www.geant.net/Network/GlobalConnectivity/Pages/InternationalCollaboration.aspx>

ESnet: <http://www.es.net/>

ESnet: <http://fasterdata.es.net/>

ESnet: <http://www.internet2.edu/presentations/jt2011winter/20110201-dart-science-dmz.pdf>

PIRE: <http://www.nsf.gov/od/oise/pire-2010-list.jsp>