

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>

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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

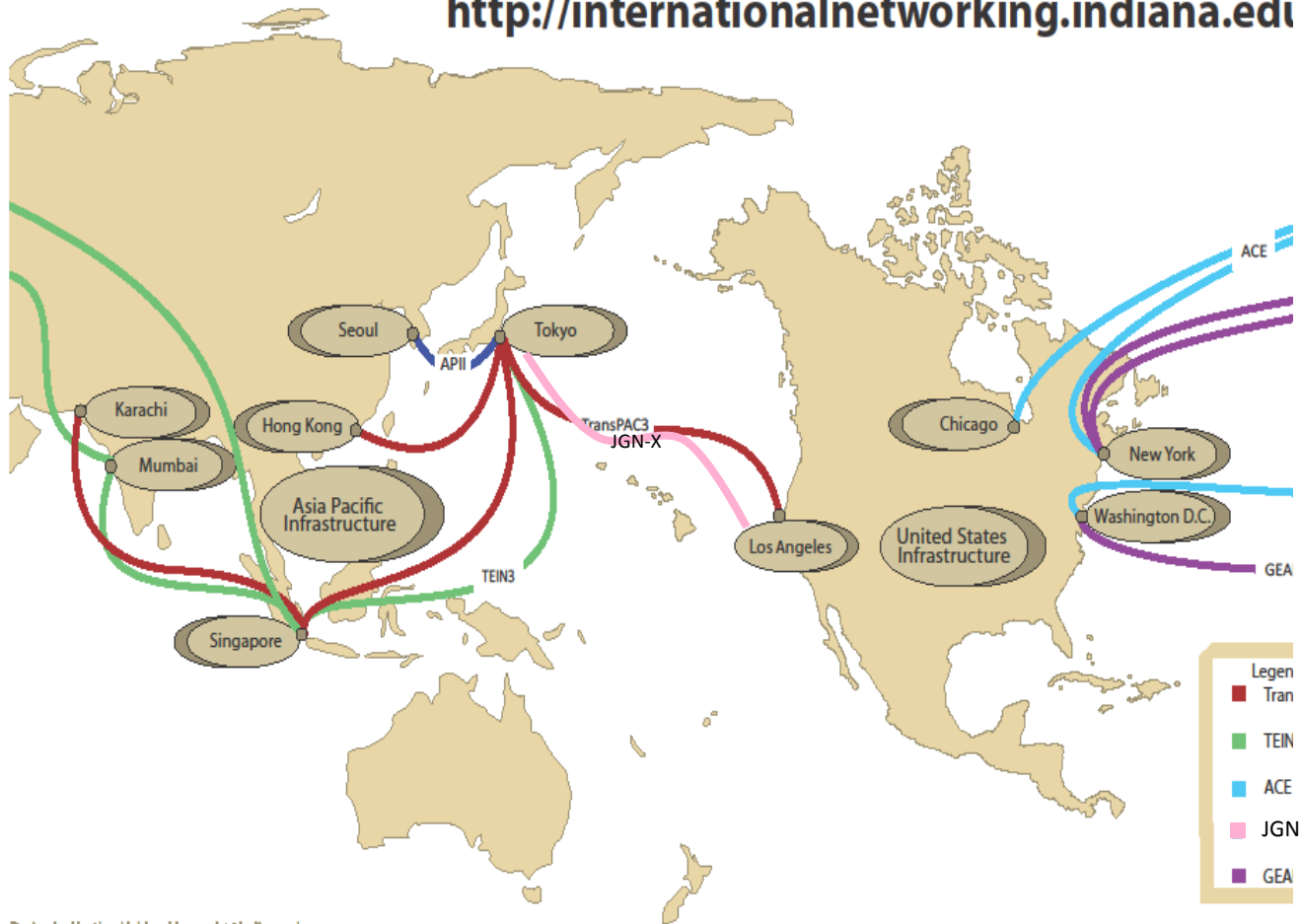
ACE: Multiple 10G connections US->EU; balanced by similar EU->US connections; cooperative engineering and operations; cooperative technical planning via DICE.

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

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



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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>