

The Role of Campus Infrastructure in International Science Projects

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INDIANA UNIVERSITY



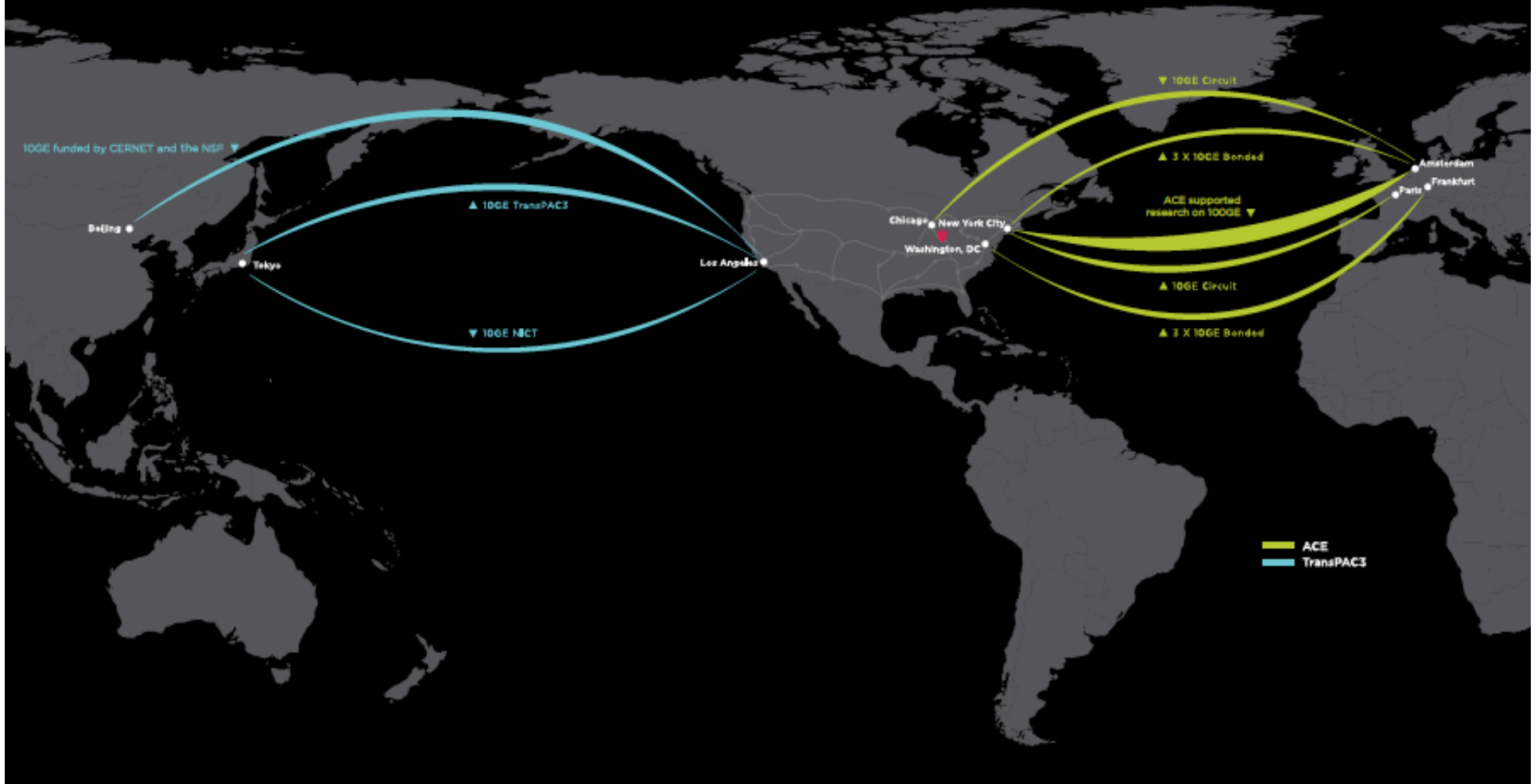
INTERNATIONAL
NETWORKING
at Indiana University

Why International?

- Scott Valcourt said – Talk to your users!
- Von Welch said – We're not doing infrastructure to just do infrastructure
- And I say (often) – We don't share data because we want to, we do this because we HAVE to in order to do our science
- And **every** campus has researchers working internationally



Supporting Global Research and Education Collaboration



America Connects to Europe (ACE)

- Funded by the NSF, EU/Dante
- Managed by Indiana GlobalNoC, GEANT
 - Current award expires May 2015
- 3x10GE Lag NYC (ManLAN) to Amsterdam
- 3x10GE Lag Wash. DC (WIX) to Frankfurt
- 10G ManLAN to Paris
- 10G StarLight (Chicago) to NetherLight (Amsterdam)
 - Designated for SDN experiments

TransPAC

- Funded by the NSF and managed by Indiana Univ
 - Current award expires May 2015
- Two 10G circuits between LA and Tokyo
 - One funded by US, primarily production
 - One funded by NICT, primarily experimental
- One 10G circuit to Beijing, joint with CERNET

Why should a campus care about International?

- Science is international
 - High Energy Physics
 - Genomics
 - Astronomy
 - Geosciences
- Campus researchers are working internationally, whether they know it or not



Schools are Building Branch Campuses

- There are more than 80 Branch Campuses of US universities across the world

<http://www.globalhighered.org/branchcampuses.php>

- eg. NYU
 - Main campus downtown Manhattan and Brooklyn
 - 2 degree-granting campuses
 - NYU Abu Dhabi and NYU Shanghai
 - 11 “international academic centers”
 - Africa, Asia, Europe, North America, and South America

Many Schools have “Global Gateway Offices”

- Locally staffed, function as hubs or home bases for university research and educational activities abroad
- eg. IU has 2, will be opening 5-7 more in the next 2 years

Most Likely Scenario is One-on-one Collaborations

- Data sharing on an international scale
 - All the “features” of domestic data sharing, with added administrative domains!
- And this gets worse as data sizes grow



Who can help you with international sharing?

NSF International Research Network Connections

- Central and South America: Julio Ibarra
- Australia, Hawaii, South Pacific: Dave Lassner
- Korea, Russia, Nordic countries: Greg Cole
- Europe or Japan/China/Asia: Jennifer Schopf

Additional Support for Use of Large Networks

- IU received a supplement from NSF
 - Direct support for users to try out 100G circuits
 - Funding to support extending monitoring tools
 - IXIA 100G Tester

Testbed Use

- We're primarily using the ANA-100-G circuit
 - We writeup a request for time, equipment, etc identifying our partners for the work
 - This is evaluated by the consortium owners
 - Their goal is to broadly support science – for more information here please contact
 - Erik-Jan Bos ejb@jibconsult.nl
- Could use other testbeds, such as ESNNet 100G domestic testbed

What are we doing differently?

- When we talk about use of 100G transAtlantic link we mean:
 - US university to EU university
 - Other groups may mean exchange point to exchange point

Biggest Problem we see with International Data Sharing

- NOT the backbone network (even at 100G)
 - It's the campus network
 - Or between regional network
 - Or the users machine
 - Or the users disk



Cross-domain Debugging is HARD

- First step should be local –
 - Local Support Person or Campus Network Guru
 - Local person should be able to point issue to a regional issue or farther up the stack
- Sometimes the end user needs to push on things to get issues resolved
- If you're transferring to EU or Asia you can contact noc@ace.iu.edu

Large flows are even harder

- The longer the distance the more likely there is to be a tiny bottleneck somewhere in the middle
 - Often a forgotten router or link from 10+ years ago
 - Often very hard to find

If you know of researchers with “large flows” to Europe

- Large flow == greater than 10G
- Please let us know!
- We have staff to support this, and to help you debug the issues that will (very likely) come up



Testing

International Science Projects

- Talk to your end users
- Network engineers need to interact with people who aren't network engineers
- Really, I mean it, talk to your end users



Focused Technical Workshop Improving Data Mobility & Management for International Climate Science

July 14-16, 2014

Goals:

- Bring together network, software and data management experts with climate scientists
- Initiate discussions between R&E engineering and climate science communities – goal for longer-term relationships
- Provide climate researchers with concrete, useful tools and resources to improve data transport and management
- Focus areas: Best practices, Science Drivers, Facility overviews

Hosted by the National Oceanic and Atmospheric Administration (NOAA), Boulder, CO

Partners: ESnet, Internet2, Indiana University, NCAR, NOAA, and the University of Virginia

Register via: <http://events.internet2.edu/2014/ftw-climate/register.cfm>

Additional Information

- Dr. Jennifer Schopf
 - Director, International Networks
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- Project Website
 - <http://internationalnetworking.indiana.edu/>
- We're Hiring
 - <http://globalnoc.iu.edu/careers.html>