INTERNATIONAL NETWORKS
at Indiana University

UbuntuNet CONNECT 2017

Developing Networking and Human Expertise in Support of International Science

Edward Moynihan, November 3, 2017

Indiana?

The NEAAR Collaboration

- Funding from US National Science Foundation
  - $3.25M over 4 years
- Partners:
  - Indiana University
  - GEANT
  - UbuntuNet Alliance
  - WACREN
  - ASREN
  - SANREN/TENET

NEAAR Funded Circuit

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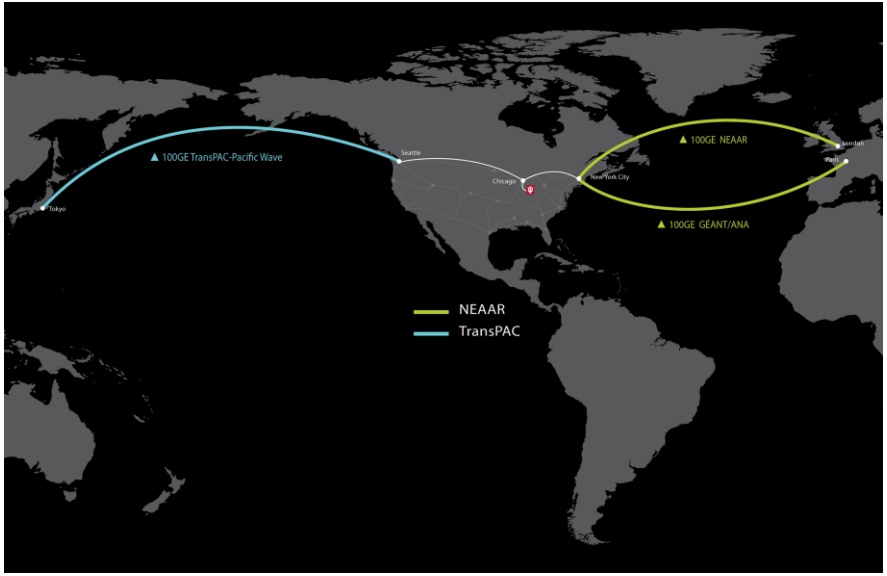
- 100G circuit US to Europe
  - New York > London
  - Aquacomm's AEConnect cable to Ireland
  - Extends across to England on the CeltixConnect cable
  - Part of ANA collaboration



More than just a Network

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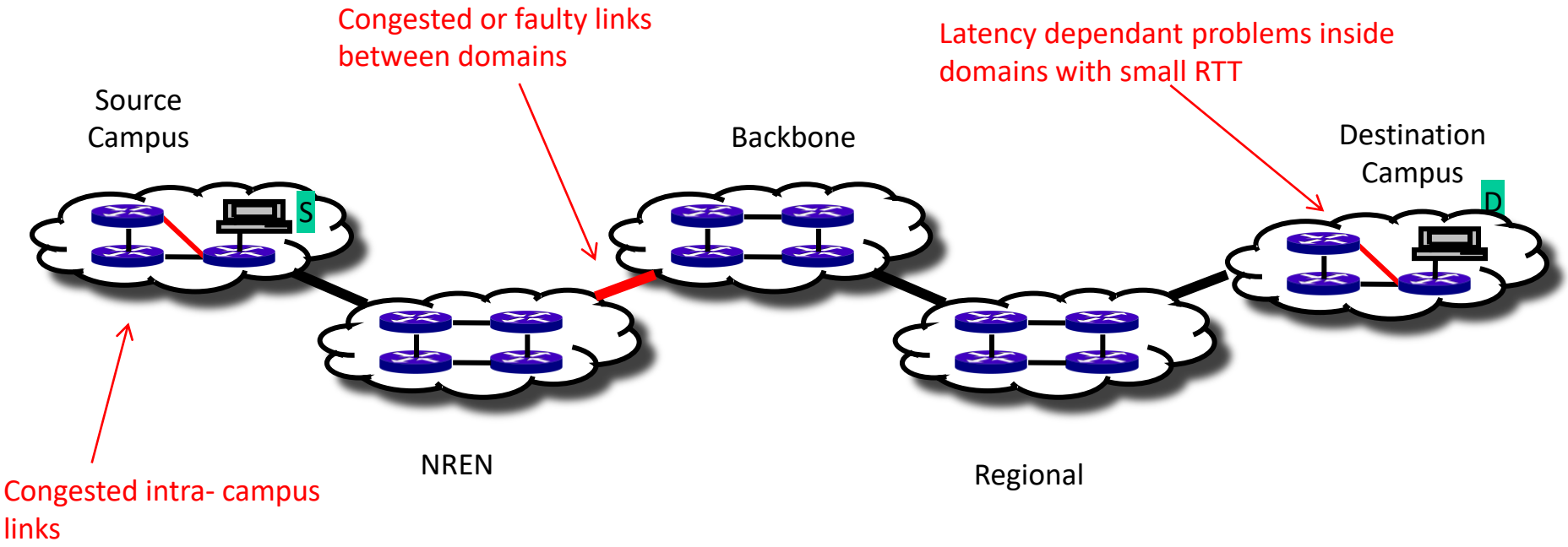
- Measurement and monitoring to better understand and improve performance
  - perfSONAR node deployments and training
- Enhancing and enabling science collaborations
  - Outreach to researchers and organizations working in Africa and Europe

perfSONAR

- Tool-kit designed to help network engineers keep networks operating at peak performance
- An open-source, community-developed software suite
  - Provides several active and passive tools to find network performance issues
  - Creates a standard way to visualize, publish, and archive network metrics and data for future analysis
  - Allows you to collect data for future network and investment planning
  - Improves responsiveness
  - inexpensive, easy, and low risk to deploy
  - Community developed and maintained

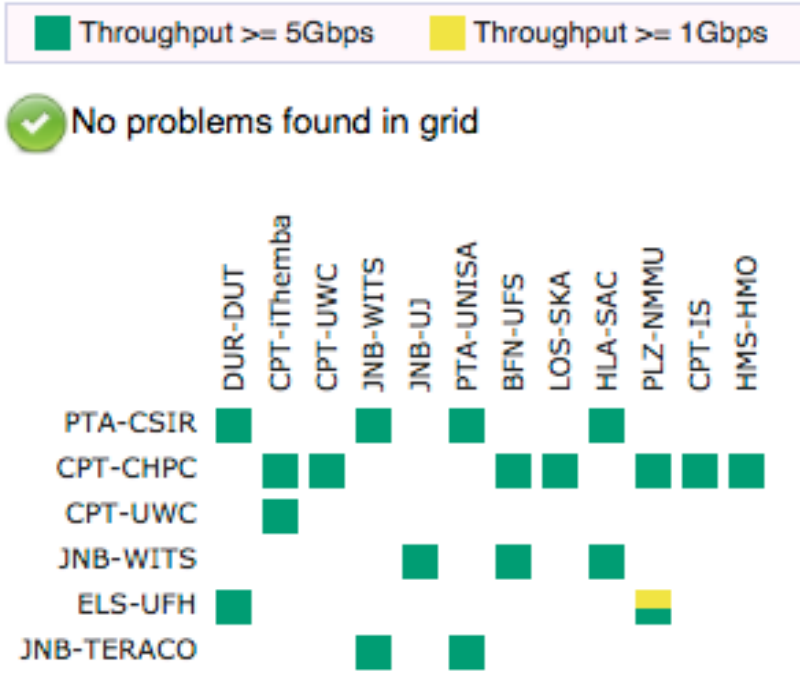
Where Are The Problems?



Raising Expectations and improving network visibility

Status at-a-glance
- Packet loss
- Throughput
- Correctness

Drill-down capabilities:
- Test history between hosts
- Ability to correlate with other events
- Very valuable for fault localization and isolation



Smaller, Less Expensive Nodes

- Rack-mounted hardware can be expensive
- Technology is getting smaller and less expensive
  - As this happens, small nodes are getting closer to specs of rack-mounted hardware with more attractive pricing.
  - Costs range from $200-350 currently for Celeron/i3 processors in a compact form.
- Easy to transport as a mobile tester
- Tests up to 1GE throughput

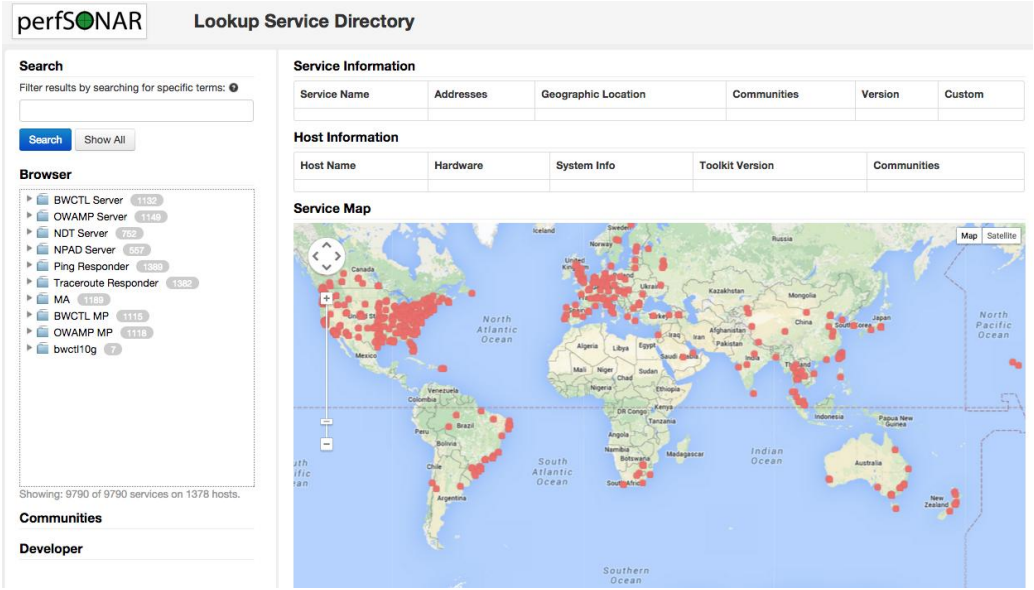
Active and Growing Community

- Active email lists and forums provide:
  - Instant access to advice and expertise from the community.
  - Ability to share metrics, experience and findings with others to help debug issues on a global scale.
- Joining the community automatically increases the reach and power of perfSONAR
  - The more endpoints means exponentially more ways to test and discover issues, compare metrics

ESnet ENERGY SCIENCES NETWORK GÉANT INDIANA UNIVERSITY INTERNET2 UNIVERSITY OF MICHIGAN

Who is running perfSONAR?

- More than 1500 deployments, world-wide



http://stats.es.net/ServicesDirectory/

IN@IU perfSONAR workshops

- Kenya - KENET
  - http://maddash-uon.kenet.or.ke/maddash-webui/
- South Africa - SANREN
  - http://psma.sanren.ac.za/maddash-webui/
  - Additional resources in support of perfSONAR: http://perfsonar.sanren.ac.za/
- West Africa Region – WACREN (Est. Oct. 2017)
  - http://central-lagos.ps.wacren.net/maddash-webui/
- **Regional workshops planned for 2018**

User Engagement

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- Who is using NEAAR resources?
- Who is having problems using the resources?
- Who is not using the resources but could benefit?
- Can we increase network adoption?

Why do we need science engagement?

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- Lack of communication and collaboration across domains
- Infrastructure is in place but low performance expectations persist
- Changing habits is hard
- Scientists do science - not IT support
- Builds relationships with local NRENs

Current Efforts

- Documenting Science Engagement best practices
- Documenting users and potential collaborators: including known users, active and relevant research and education projects, REN communities, administrative and governmental bodies, etc.
- Performance monitoring for known users
- Targeted outreach to users that are not using resources but have a large-data transfer needs
- Promoting REN adoption
- Advocating and developing new monitoring and measurement infrastructure
- Developing consistent performance and reporting measures for Science Engagement efforts

Resources

- perfSONAR website
  - http://www.perfsonar.net/
- perfSONAR Documentation
  - http://docs.perfsonar.net/
- perfSONAR mailing lists
  - http://www.perfsonar.net/about/getting-help/
- perfSONAR directory
  - http://stats.es.net/ServicesDirectory/
- perfSONAR YouTube Channel
  - https://www.youtube.com/channel/UCjK-P49pAKK9hUrrNbbe0Sg
- FasterData Knowledgebase
  - http://fasterdata.es.net/

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- edmoyn@iu.edu; www.in.iu.edu
- http://internationalnetworks.iu.edu/projects/perfSONAR
- perfSONAR is developed by a consortium of institutions including Indiana University, GEANT, ESNet, Internet2, and the University of Michigan
- The latest version of perfSONAR (4.0.1) is available at http://www.perfsonar.net