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

- 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

• 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

November 7, 2017

Where Are The Problems?

- Congested or faulty links between domains
- Latency dependant problems inside domains with small RTT
- Congested intra-campus links
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
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/

  • http://central-lagos.ps.wacren.net/maddash-webui/

• Regional workshops planned for 2018
User Engagement

• 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?

- 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/
Acknowledgements

• IN@IU is funded by
  • NSF awards #0962968, #0962973, #1450904, #1540933, #1638863

• 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