A Giant Leap Forward:
New Network Infrastructure

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- SoX network in 2010
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What is SoX

- GigaPOP in Southeast US that supports connectivity and services for Research and Educational networking

- Participants
  - GA: Georgia Tech, Georgia State, University of Georgia, Emory University, Morehouse School of Medicine, Georgia Board of Regents
  - TN: ORNL, Vanderbilt, University of Tennessee
What is SoX

- Participants
  - AL: University of Alabama, University of Alabama at Birmingham, University of Alabama in Huntsville, Alabama Supercomputer Authority, Auburn University
  - SC: South Carolina Light Rail
  - FL: Florida Lambda Rail
  - MS: Mississippi State
SoX Network in 2010

- Atlanta
  - Juniper M-320
  - Force10 E1200
  - Cisco Nexus 5020

- Chicago
  - Partner with Starlight
  - Ports on Starlight Force10
  - Circuit through ORNL network
SoX Network in 2010

- 802.3ad Link Aggregation
  - 3x 10GigE between Juniper and Force10
  - 2x 10GigE between Cisco and Force10
SoX Network in 2010

- Services
  - National R&E backbones: NLR Framenet, NLR Packetnet, Internet2 network, ESNet
  - Regional peering: MREN, LONI, FLR, MCNC, 3ROX, OARnet
  - Commodity peering: Google, Comcast, Telx Internet Exchange, Transitrail
  - Commodity services: Cogent, NTT, TeliaSonera, Qwest, Hurricane
  - Global peering: AtlanticWave, GLORIAD
Challenges

- Redundancy: Vanderbilt, Alabama Supercomputer Authority
- Performance: Eliminate etherchannel
  - 48x 10GigE ports
  - 64x GigE ports
  - Ports for Services, Participants, Test gear
- Telx won't provide additional power in Atlanta
Constraints

- Atlanta
  - 1x 70Amp DC A+B + 1x 80Amp DC A+B
  - ½ rack
  - Single chassis
  - Support direct WDM optics (XFP, XENPAK, X2)
- Redundancy
  - Connectivity to Nashville, Dallas, Jacksonville
  - Equipment and colocation in Nashville and Dallas
  - Redundant Internet2 and TR-CPS connections
Partners

- Connectivity
  - NLR Birthright Lambda = no additional recurring costs
  - Qwest = Colocation in Nashville, Local loop in Nashville, aggregation of commodity internet ports under Quilt contract
  - University of Alabama System = connectivity to Internet2 in Nashville, circuits to Chicago and Atlanta from Nashville
Partners

• Connectivity
  • LEARN = Local loop between POPs in Dallas, colocation in 2 Dallas POPs
  • Florida Lambda Rail = Ports on FLR switch in Jacksonville, crossconnects to NLR, Internet2

• Equipment
  • Juniper MX240 for Nashville and Dallas
  • Juniper MX960 for Atlanta
Partners

- Juniper
  - 16x 10GigE (SFP+) cards (12x 10GigE non-blocking) provide high density of 10Gig ports
  - 4 port 10GigE (XFP) card provides for WDM optics
  - Engineers prefer configuration syntax
  - Excellent performance, expect 100G offering
  - Power issues = 4x dual feed power supplies requires 4x 80Amp DC A+B feeds
Partners

- Internet2
  - 3x 10GigE, 2x ATLA/JACK and 1x CHIC/NASH
  - Internet2 network and TR-CPS redundancy