GLIF Americas

AMLIGHT EXP IRNC
Florida International University
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Outline

- Backbone: AmLight Express and Protect (ExP)
- RXP: AtlanticWave-SDX

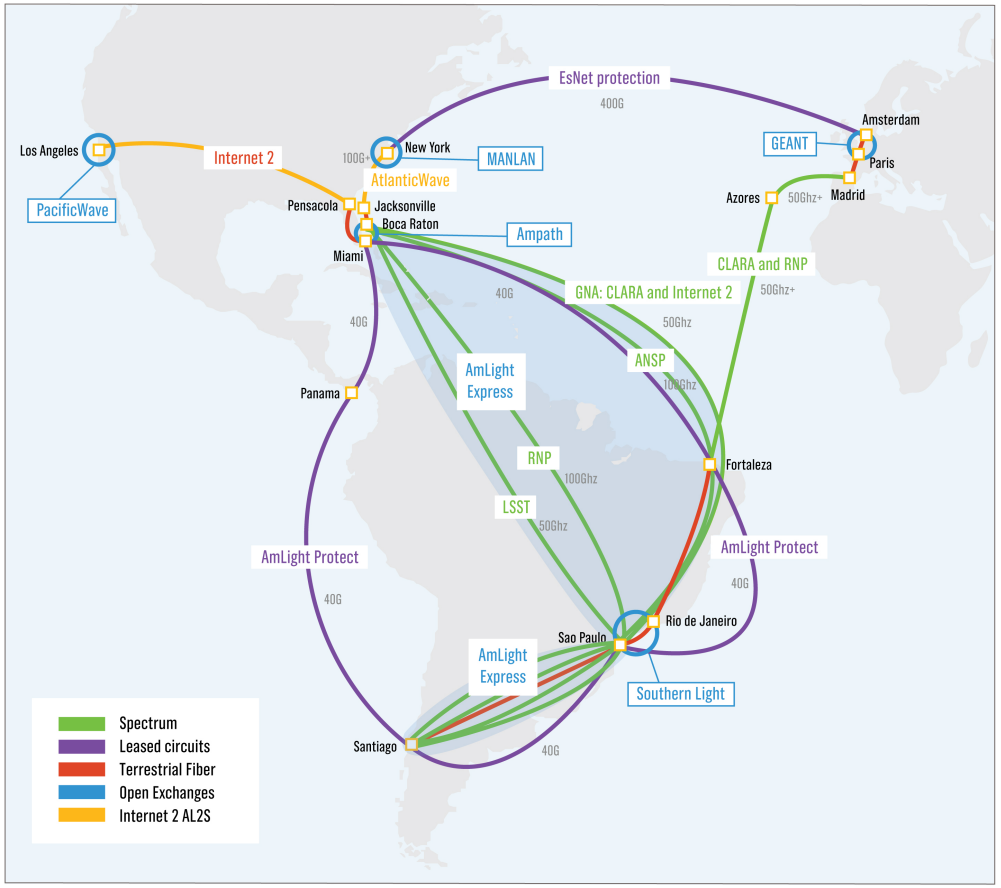
AmLight Today

- 4 x 10G links (6x10 soon)
  - Two topologies and
  - Two submarine cable systems to increase resilience and support for experimentation
- SDN Ring: Miami-São Paulo, São Paulo-Santiago, Santiago-Miami
  - 20G total capacity
  - Full Openflow 1.0 and network virtualization support
  - Uses Brocade devices
- MPLS Ring: Miami-Fortaleza, Fortaleza-Rio, Rio-São Paulo, São Paulo-Miami
  - 20G total capacity
  - Layer2 support via L2VPN
  - Uses Juniper devices
- Mutual redundancy between SDN and MPLS rings

AmLight Express and Protect (ExP) 2016-2031

- AmLight Express:
  - 300GHz of spectrum: Santiago-São Paulo, and São Paulo-Miami
  - Spectrum to be configurable by RENs to meet user/application requirements
- AmLight Protect:
  - 40G leased capacity ring
  - Miami, São Paulo, Santiago, Panama City, Miami
  - AMPATH, Southern Light, REUNA, and RedCLARA operated
- Potential for unprecedented regional resilience for U.S.-Latin America, and U.S.-Europe connectivity, supporting global science research

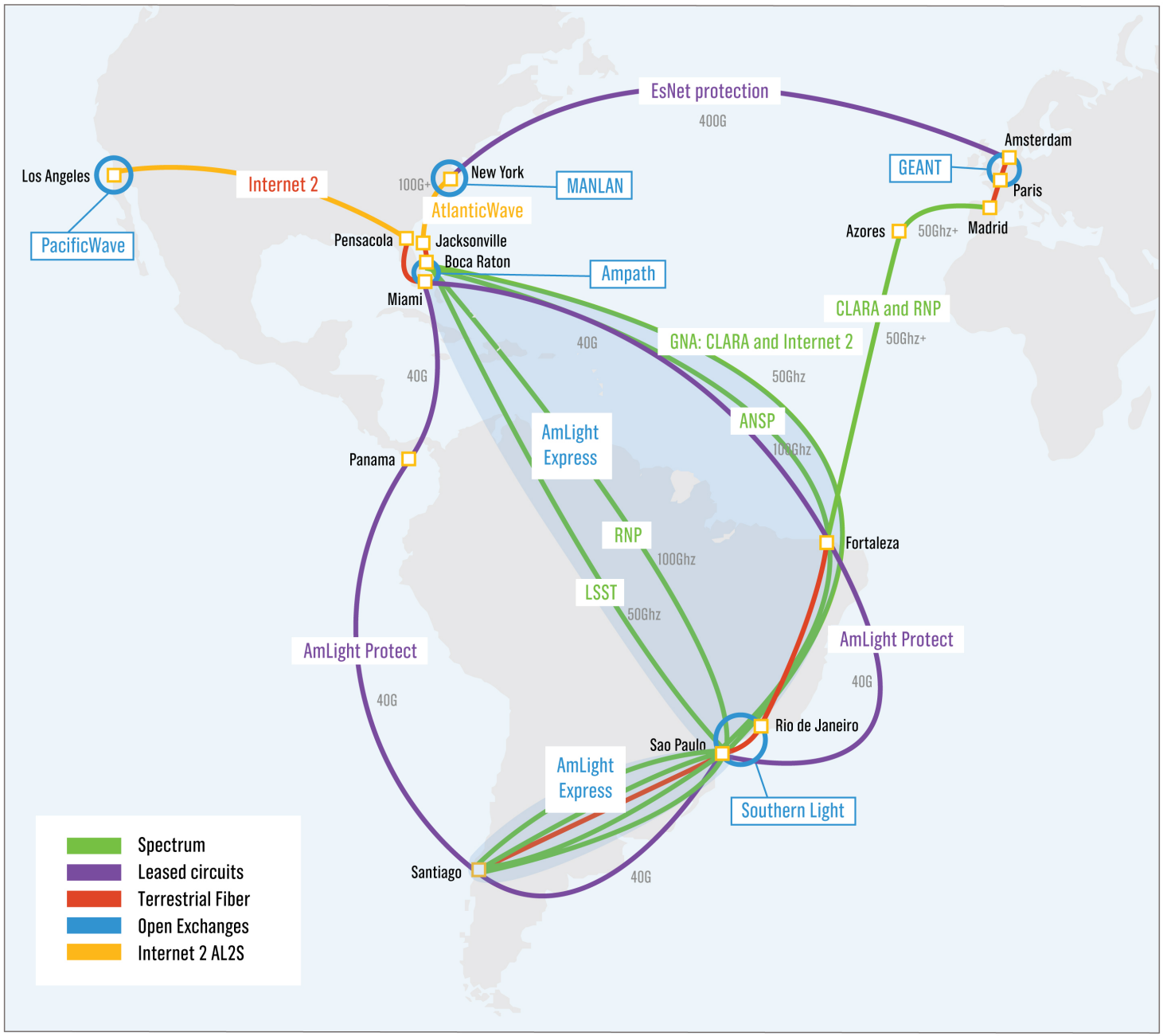
680G+



2018-2031

AmLight ExP Challenges

- Bandwidth capacity into the U.S. on I2, ESnet and regionals
  - 680G+ capacity into the U.S.
- How to make the best use of spectrum to meet the network services requirements of LSST and other science drivers
  - Guidance and lessons learned form OpenWave
- Quality of Service
  - Bandwidth Guarantee in an OpenFlow/SDN network
  - Dynamic application load-balancing
- Security
  - Secure access with network virtualization
  - Isolation between applications
- Networking
  - Multipath TCP
  - Scalability
  - IP/IPv6/Multicast Routinng
  - Inter-SDN domain forwarding (SDX)


EsNet protection
400G
Amsterdam
GEANT
Paris
Madrid
Azores
50Ghz+
Los Angeles
Internet 2
100G+
New York
MANLAN
AtlanticWave
PacificWave
Pensacola
Jacksonville
Boca Raton
Ampath
Miami
CLARA and RNP
50Ghz+
GNA: CLARA and Internet 2
40G
50Ghz
40G
ANSP
100Ghz
AmLight
Express
Panama
RNP
100Ghz
Fortaleza
LSST
50Ghz
AmLight Protect
AmLight Protect
40G
40G
Rio de Janeiro
Sao Paulo
AmLight
Express
Southern Light
Santiago
40G
Spectrum
Leased circuits
Terrestrial Fiber
Open Exchanges
Internet 2 AL2S