AmLight ExP
Americas Lightpaths Express & Protect

AmLight Express and Protect (AmLight-ExP)
NSF #OAC-2029283

Americas Research Platform (AmRP)
*Working Group Meeting*
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Goals for the AmLight Express and Protect (AmLight-ExP)

- <u>Major Goal</u>: Improving Resiliency and Increasing Self-Management

- Improving the AmLight-ExP physical network by
  - *Increasing capacity and adding network paths to increase resiliency*
  - *Replacing and refreshing legacy network devices*

- Improving the performance measurement environment by
  - *Adding 10G perfSonar nodes across the AmLight topology*
  - *Adding In-band Network Telemetry for fine-grained real-time network monitoring*

- Increasing self-management of the AmLight-ExP network by
  - *Improving the Software Defined Networking (SDN) infrastructure*
  - *Adding Autonomic Network capabilities at Open Exchange Points (OXP)*

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AmLight-ExP 2021 Network Topology

- **AmLight Express network (green), 600Gbps in service:**
  - 200G Boca Raton to Sao Paulo
  - 200G Boca Raton to Fortaleza
  - 200G Sao Paulo to Fortaleza
  - 100G Boca Raton to Fortaleza to Cape Town
  - 100G Santiago to Porto Alegre (coming soon)

- **100G AmLight Protect ring (solid red): Miami-Fortaleza, Fortaleza-Sao Paulo, Sao Paulo-Santiago, Santiago-Panama, Panama-San Juan, and San Juan-Miami**

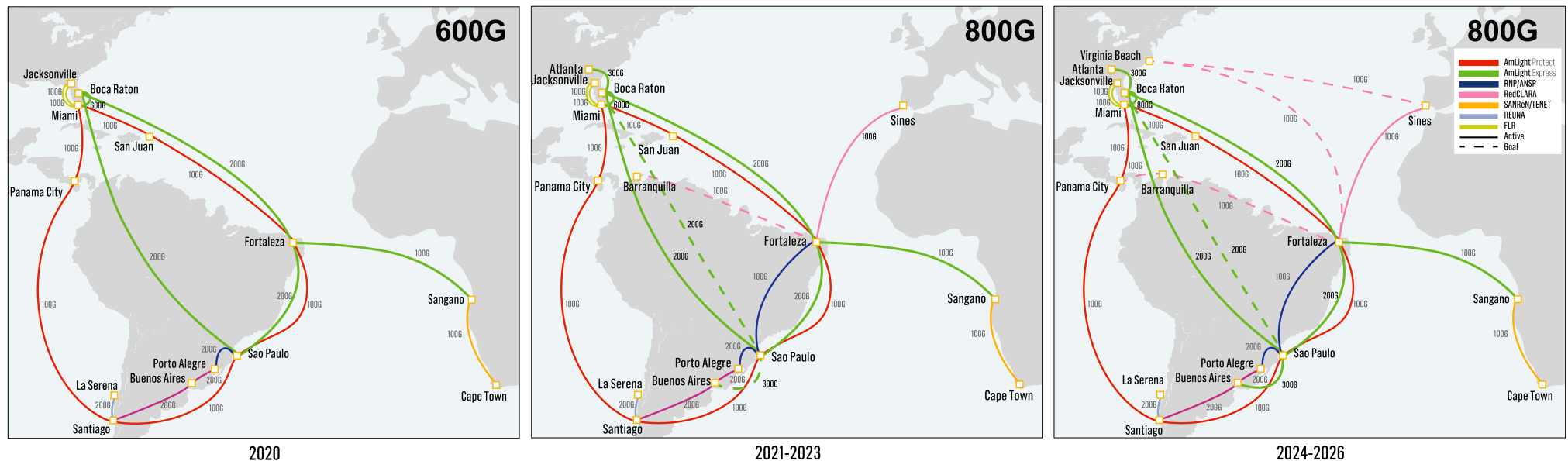- **Open Exchange Points: Miami, Fortaleza, Sao Paulo, Santiago, Cape Town**

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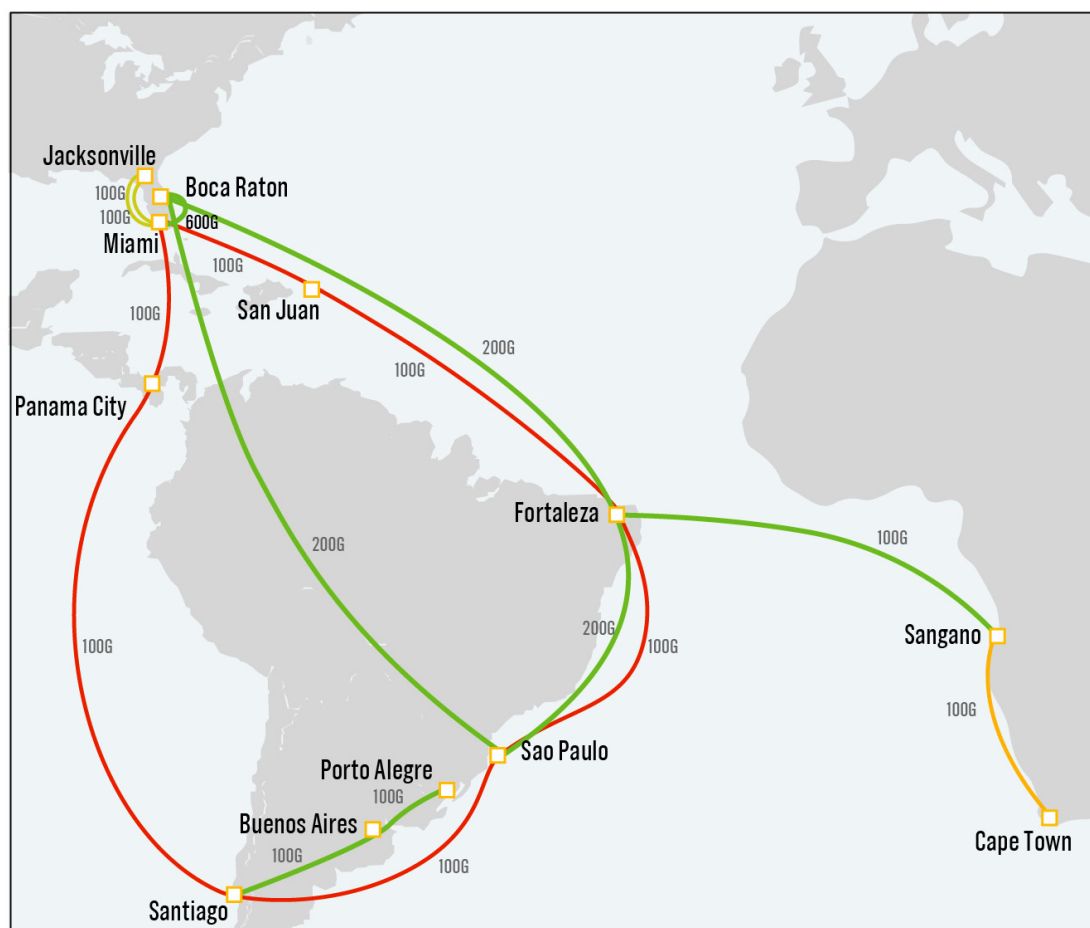
Americas-Africa Lightpaths Express and Protect (AmLight-ExP)

Increasing capacity and adding network paths to increase resiliency

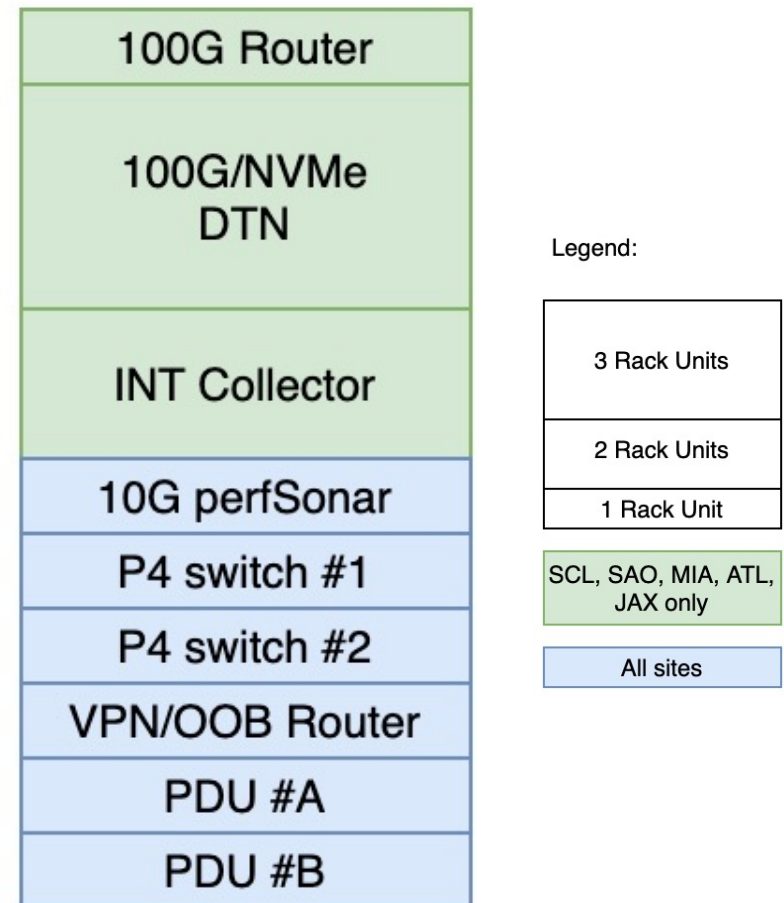# Upgrading the physical infrastructure

- Deploying P4 switches to connect AmLight links and sites
  - Santiago, San Juan, Panama, Boca Raton
  - Sao Paulo (Rednesp), Fortaleza (RNP)
- Juniper routers with 100G ports
- 100G processing and storage nodes for
  - processing and hosting telemetry data
  - DTN
- VPN/OOB routers with 1G interfaces
- 10G perfSonar nodes
- Power Distribution Units

100G Router
100G/NVMe DTN
INT Collector
10G perfSonar
P4 switch #1
P4 switch #2
VPN/OOB Router
PDU #A
PDU #B

Legend:

3 Rack Units
2 Rack Units
1 Rack Unit

SCL, SAO, MIA, ATL, JAX only

All sites

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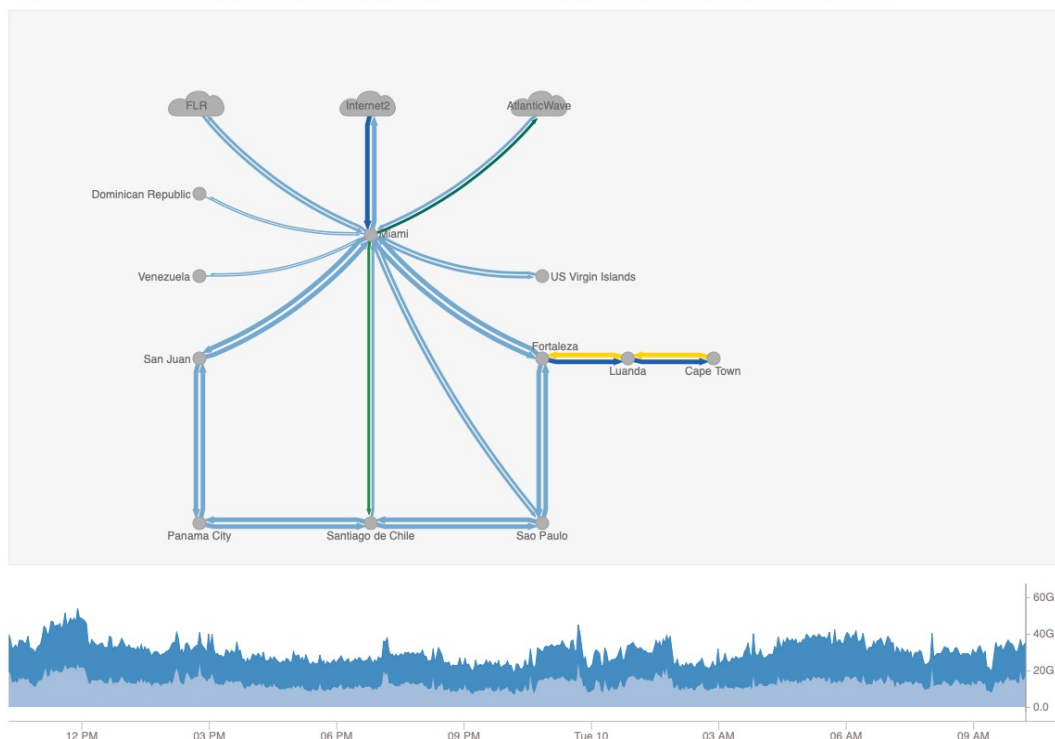
AmLight Weather Map

https://my.amlight.net/

AmLight Locations Map

Network Overview

This map highlights the locations AmLight serves, the network topology, and the per link traffic utilization. Clicking on a link will show its utilization details.
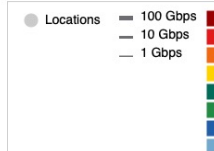
Total

Begin: Nov 09 2020 10:16:58
End: Nov 10 2020 10:14:28

	Avg	Max
in	13.24 Gb/s	24.9 Gb/s
out	17.37 Gb/s	30.37 Gb/s

Nov 10 2020 10:14:28
in: 18.09 Gb/s
out: 17.24 Gb/s

Map is available to the community to highlight the locations AmLight serves, the network topology, and the per link traffic utilization

This portal has been designed and implemented in collaboration with ESnet Software Developer Team.

Its core has been built using several of the packages used in the [MyESnet Portal].

6

Planned Activities (2021 - 2022)

- Migrating the SDN orchestration to Kytos SDN platform

- Deploying P4 switches at all facilities

- Deploying the New Out-of-Band Management solution

- Installing DTNs in Jacksonville and Atlanta (soon)

- Making SAX programmable:
  - SAX has two CLI-based Juniper MX routers
  - The goal is to enable telemetry via JTI and support dynamic provisioning
  - Joint effort with RNP

- Evaluating Ciena's telemetry solution for the Waveserver Ai solution

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