GNA-G Community VC
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Advancing network infrastructure between Africa, Latin America, and the U.S.

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The SA NREN = TENET & SANReN

TENET

- Created in 2000 as a non-profit company. Membership is primarily universities (all 26) and research institutions, but serves a much wider constituency (TVET Colleges and School Networks)

- Funded through cost recovery from beneficiary Institutions.

- Operates the network deployed by SANReN, but also deploys some network functions and components

- Delivers services

SANReN

- Created in 2006 as a business unit in the Council for Scientific and Industrial Research

- Funded through a State grant (Department of Science and Technology)

- Designs, acquires and implements networks and network components, from metro to international level

- Develops and incubates services
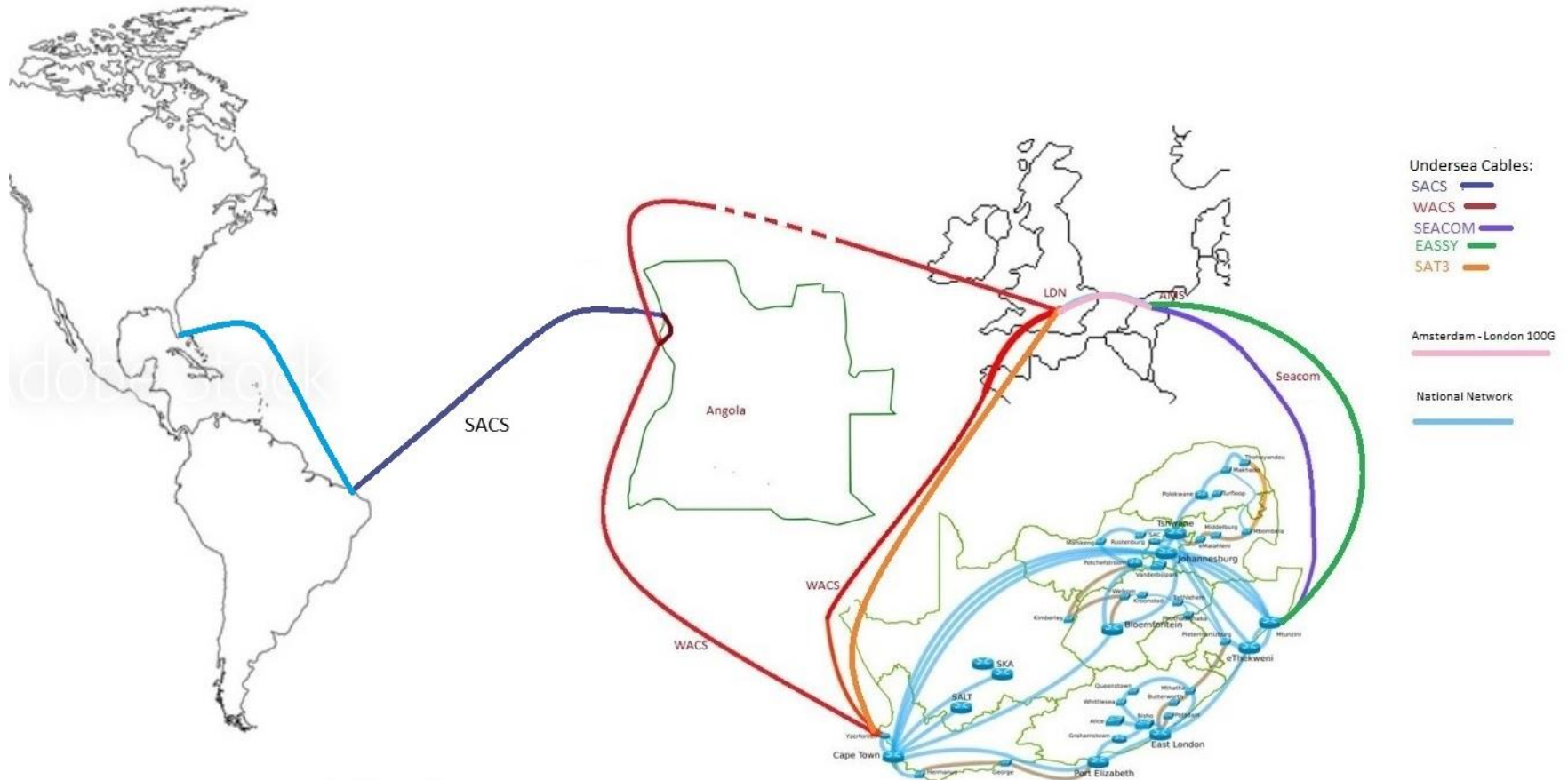
UbuntuNet peering at the Exchange Point in Cape Town

- SA NREN (TENET and SANReN) operates an exchange point in Cape Town – ZAOXI.

- AmLight has a collaborative partnership with SA NREN.

- UbuntuNet is now connected to ZAOXI. SA NREN carries UbuntuNet Member traffic from their South African POPs to the Exchange Point and thereby opens the path to Fortaleza and Miami.

- Collaborative partners can utilize capacity as needed on the SACS cable, WACS cable, to connect to AmLight in Fortaleza, ZAOXI in Cape Town or any other connected Exchange point.

# SA NREN International Connectivity

- SA NREN has capacity between Europe and South Africa on 4 undersea cables.

- SA NREN has ownership of 7.4% of the WACS cable allowing it to light capacity between any landing stations on the route from Cape Town to London.

- The SA NREN's WACS connectivity may be extended to reach other landing stations to add new collaborative partners to the project.
  - This opportunity is being discussed among interested parties and Angola to Lagos and on to London could be a possible starting point. Landing costs are needed.

SA NREN Future plans

- Will be implementing 100G capable DTN nodes strategically in SA, to cater for future large Data Intensive Science Flows (Mid 2021)

- Will deploy various 100G capable Perfsonar boxes in 2021 to test various local and international links (Mid 2021)

- Will light two 100Gbps circuits from South Africa to Europe on the East and West Coast of Africa (Early 2021)

- May obtain capacity/spectrum on 5th Cable between Europe and South Africa (Mid to Late 2021)

Americas-Africa Lightpaths Express and Protect (AmLight-ExP): Increasing Resiliency and Programmability

Backbone: Americas Lightpaths Express and Protect (AmLight-ExP)
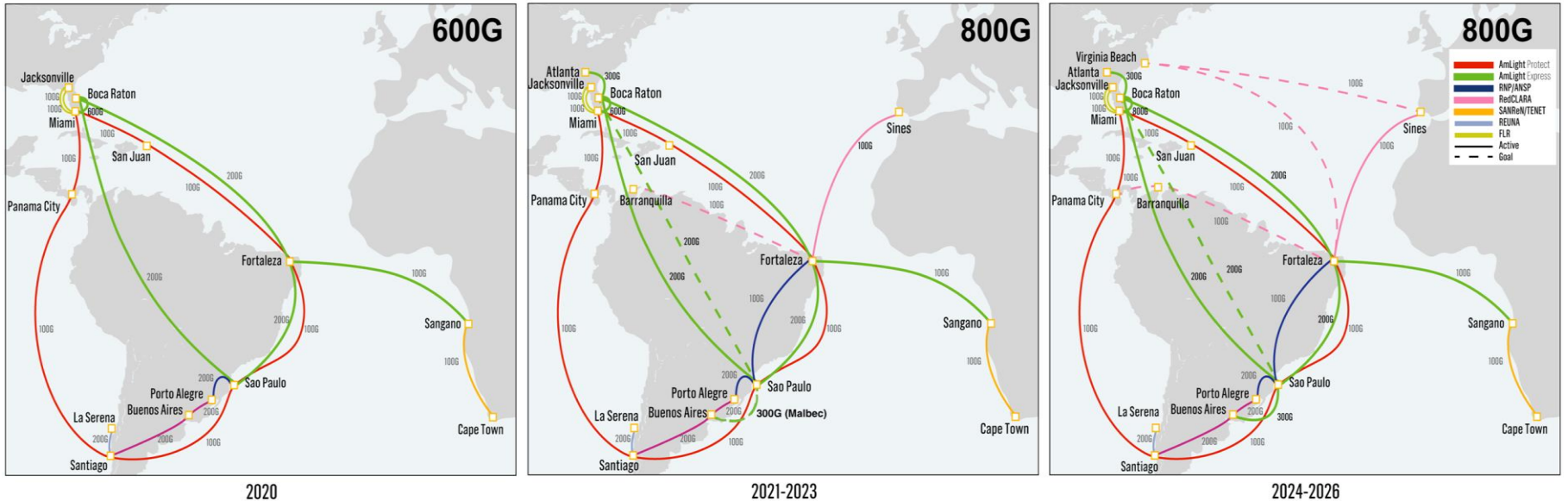
(NSF Award # ACI-1451018 & Award # ACI-2029283)
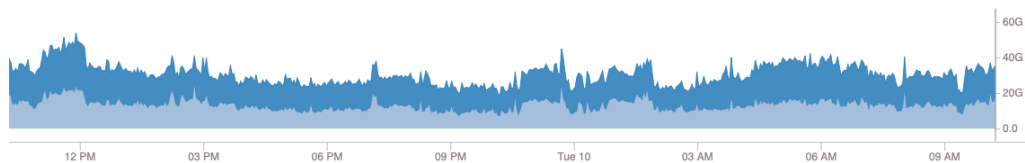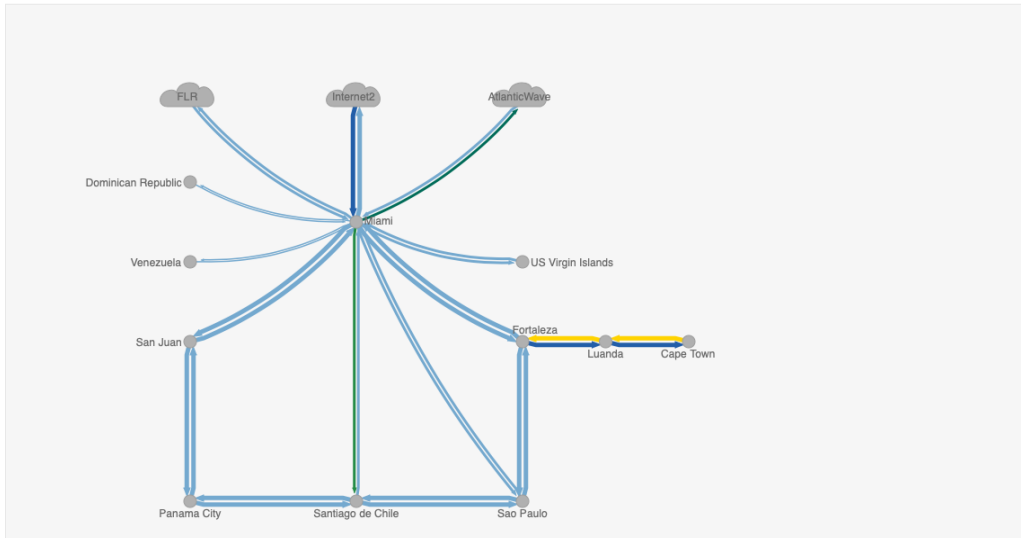
AmLight Network Traffic Map

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

AtlanticWave-SDX

A Distributed Production SDX Supporting Research, Enhancing Operations, and Interoperability Testing at National and International Scales

GOALS:

- Improve AW-SDX between the U.S., South America and Africa by
  - Leveraging the SDN cyberinfrastructure of OXPs on the AmLight-ExP network

- Evolve the development and integration of the AW-SDX
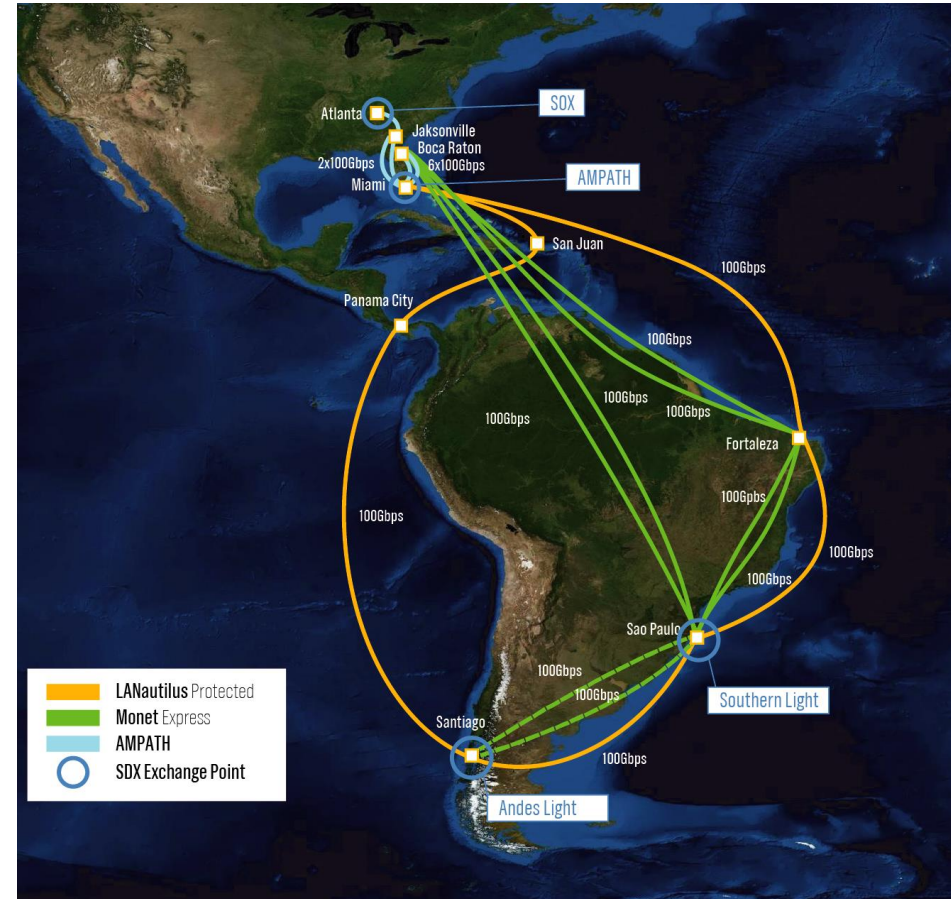 - To include fault tolerance and operations functions for production use

- Increase adoption of the AtlanticWave-SDX by
  - OXP operators and domain science communities, such as the OSG
  - Coordinating with related projects: SENSE, AutoGOLE, FABRIC

(NSF Award #1451024 & Award #2029278)

AtlanticWave-SDX Architecture

- Closed-Loop Orchestration
- Dynamic provisioning of Layer3 services
- Integration with SENSE, AutoGOLE and FABRIC orchestrators
- Compute and Storage integration
- Integration with science applications by
  - Exporting topology information
- Network Management tools
  - Inventory, Monitoring, Debugging, SDX configuration, Telemetry
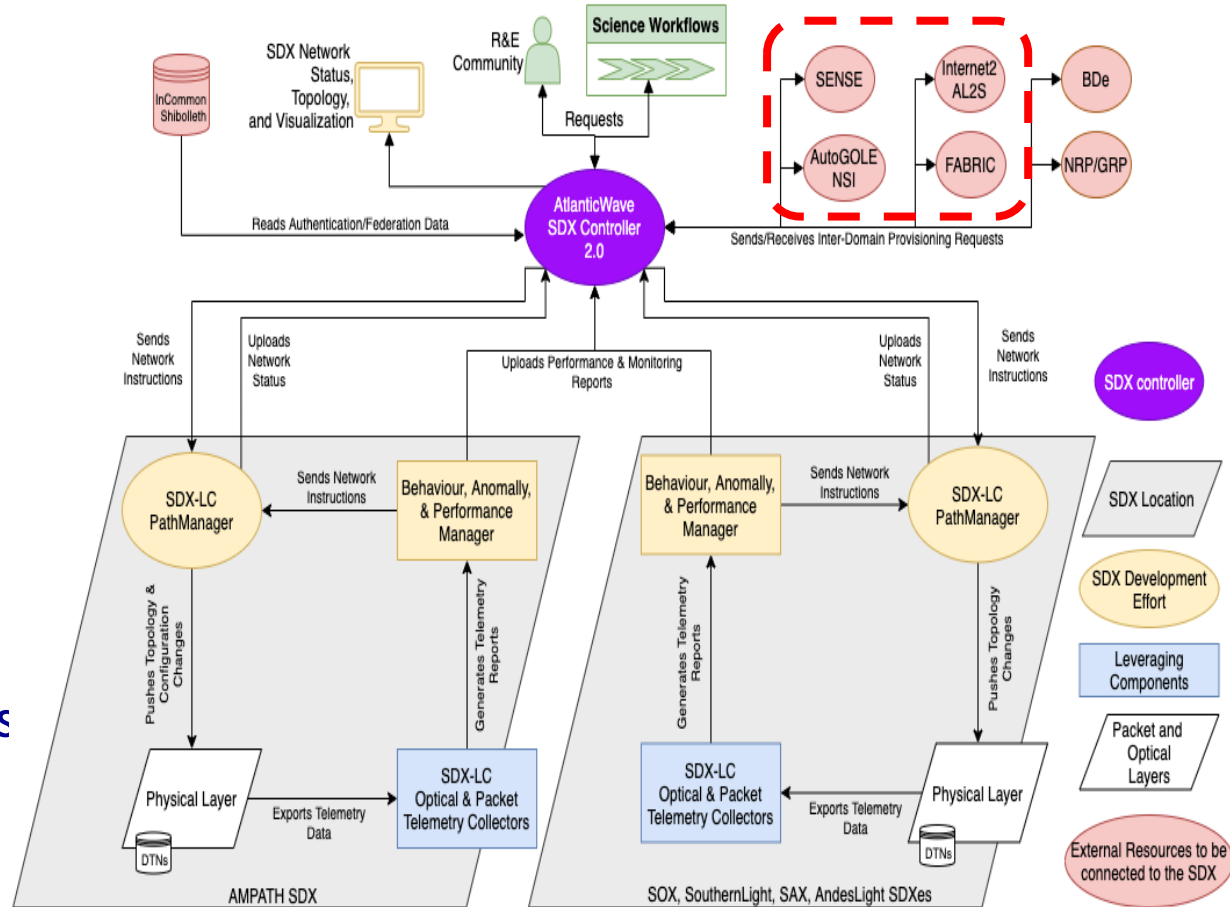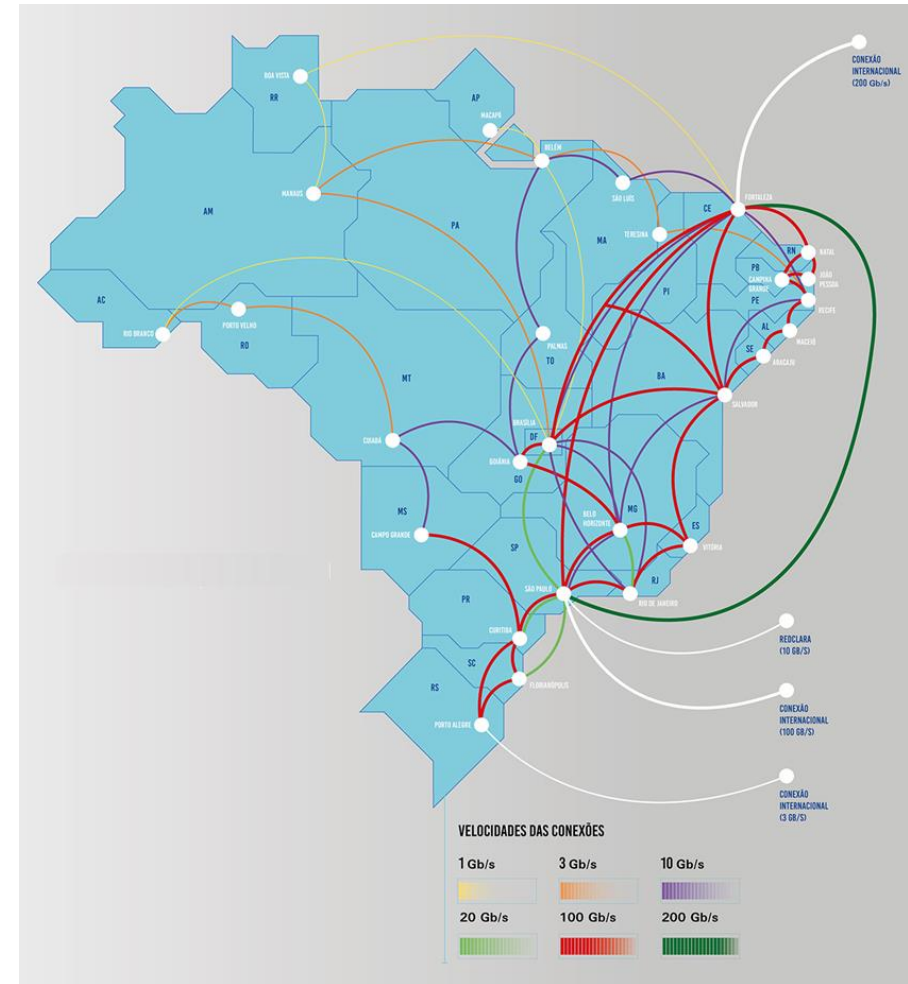
RNP backbone network and connections in 2021
(https://www.rnp.br/en)

- Brazil is the World's 5th largest country, and 6th most populous at 209M in 2018. The capital is Brasília and the official language is Portuguese.

- RNP, the Brazilian NREN, has operated an R&E backbone network with government support since 1992.

- Each state and the national capital has a point of presence (PoP) on the backbone network, known as the Ipê network (Rede Ipê), which is currently being upgraded to N x 100G by 2022. More than 1500 sites are connected, and, in more than 40 cities, by means of RNP's own metro networks.

- International connections via RedClara and Amlight.

Current configuration:

- 200G Monet + 100G SACS - Angonap Datacenter
  - Juniper MX10003 router
- 100G SAC/LAN - CLS TiSparkle
  - Brocade MLXe8 switch
- These sites are not interconnected

Working on:

- Replacing the Brocade MLXe8 by a Juniper MX204 in TiSparkle site
- Interconnection of the Amlight-Exp (200G Monet) and Amlight-Protect (100G SAC/LAN) with the establishment of a 100G ring between the sites.
- perfSONAR node with 100G capability
- Reconfiguration of the nodes into a single domain, and adoption of EVPN (VPWS) in order to simplify the setup of virtual circuits – by Jan/21

SAX (South America eXchange) – Fortaleza – 2021+

2021

- A topology optimized dark fiber ring connecting the main sites in Praia do Futuro – Fortaleza (Angonap, CLS TiSparkle, CLS Telxius and Globenet)
- Delivery and publicy the Service and Policy descriptions of SAX
- Split the current full redundant router in 2 with only one 1.2 Tb/s linecard
- Design automation workflow

2022+ (in discussion – not commited)

- A new ethernet equipment in Telxius CLS
- Virtual router as a service (eg: Junos Logical Systems) to facilitate peerings for remote connectors
- Adopt equipment uniformity throughout Amlight
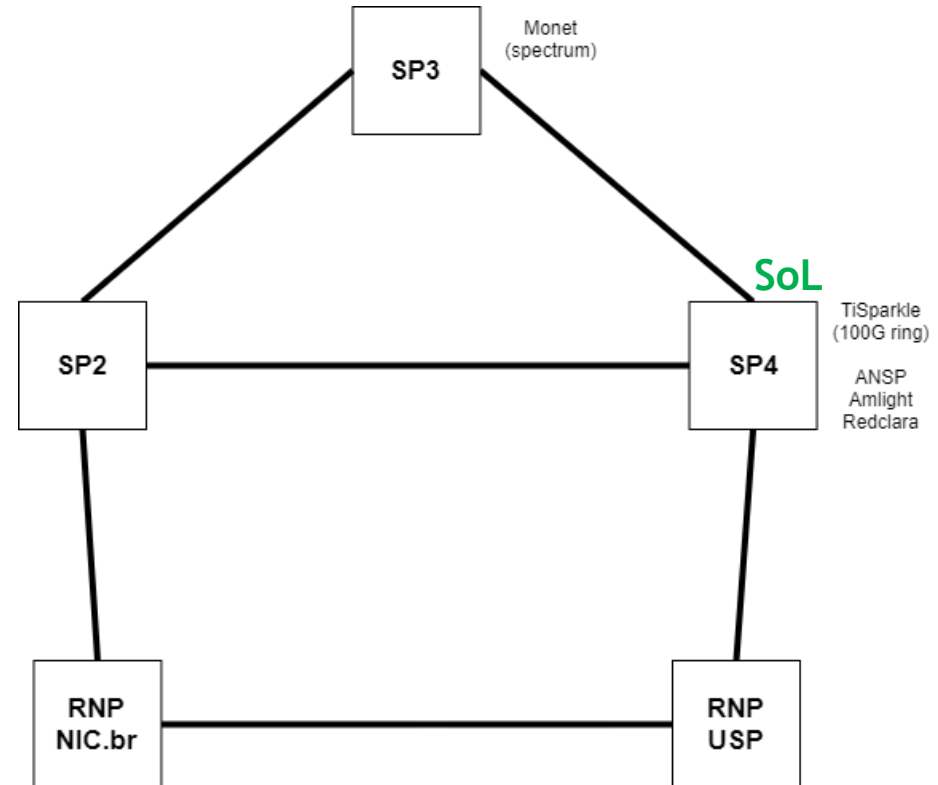

RNP's SAX router in Angonap

AmLight ExP
Americas Lightpaths **Express & Protect**

SoL (SouthernLight) – São Paulo – jointly with ANSP – 2020~2021

2020

- Integration of the Juniper node with the Fortaleza equipment to create a single MPLS domain
- Acquisition of the new generation of Amlight SDN switch to manage part of the international connections – in progress
- Negotiating a new fiber ring connecting Equinix SP2, SP3, SP4 and RNP PoPs in USP and NIC.br

2021

- Installation of the new Amlight switch in Equinix SP4
- RFI/RFP – DWDM line system for service protection considering the new topology

SP3 — Monet (spectrum)

SoL

SP4 — TiSparkle (100G ring)
ANSP Amlight Redclara

SP2

RNP NIC.br

RNP USP

FIU FLORIDA INTERNATIONAL UNIVERSITY · RNP REDE NACIONAL DE ENSINO E PESQUISA · SANReN South African National Research Network · TENET Tertiary Education and Research Network of South Africa · USC University of Southern California · UbuntuNet Alliance · WACREN

AmLight ExP
Americas Lightpaths Express & Protect

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