

## **RNP Update**

### **SAACC Meeting April 13-14, 2021**

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## **Agenda**

- **Objective**
- **RNP activities**
- **RNP Backbone 100G 2021**
- **International R&E links by 2021**
- **GXPs – SAX & SoL**
- **Routes in progress**
- **Conclusion**

## Objective

### **AMLIGHT SAACC Virtual Meeting Invitation of March 25, 2021**

***....provide an Update on RNP activities in support of data movement between the observatories in Chile and the R&E communities in South America, Africa, the U.S., Europe and other destinations of interest.***

## RNP activities in support of AmLight-ExP Network Infrastructure today

### Express Ring: Boca Raton – Fortaleza - São Paulo (green lines)

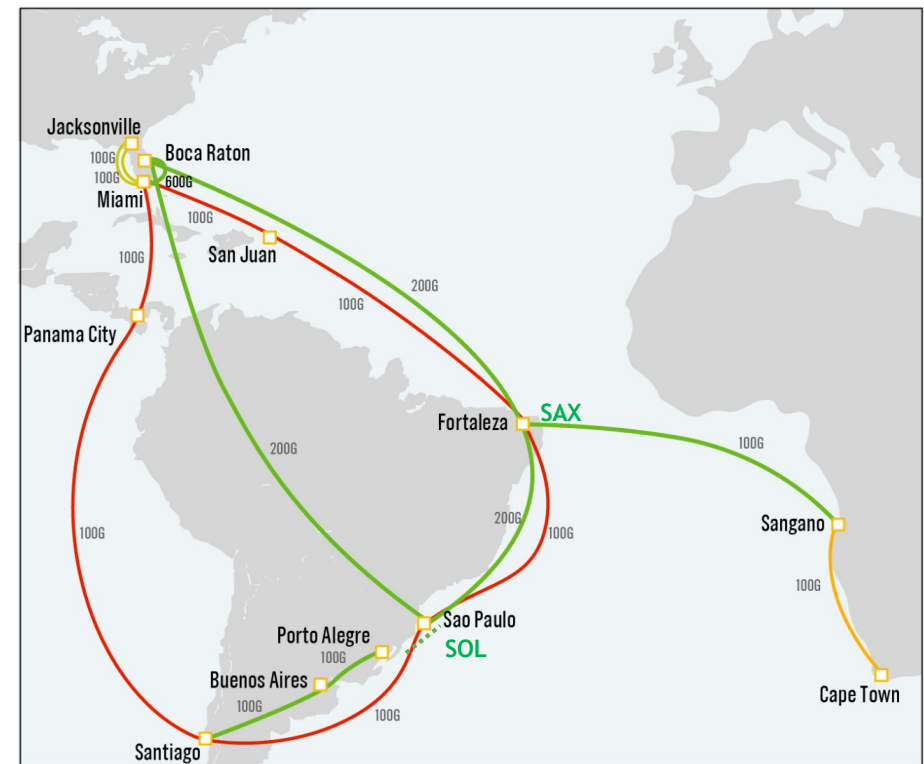
- Joint Engineering Team FIU - RNP
- 6 x 100G links: 4 managed by RNP, supported by FIU & ANSP

### 100G Protect Ring: Miami-Fortaleza, Fortaleza-Sao Paulo, Sao Paulo-Santiago, Santiago-Panama, and Panama-Miami (red lines)

- Joint Engineering Team FIU-RNP-RedCLARA
- 5 x 100G links: managed by FIU, support by RNP, ANSP & RedCLARA

### Operation of 2 Global Exchange Points (GXP) in Brazil:

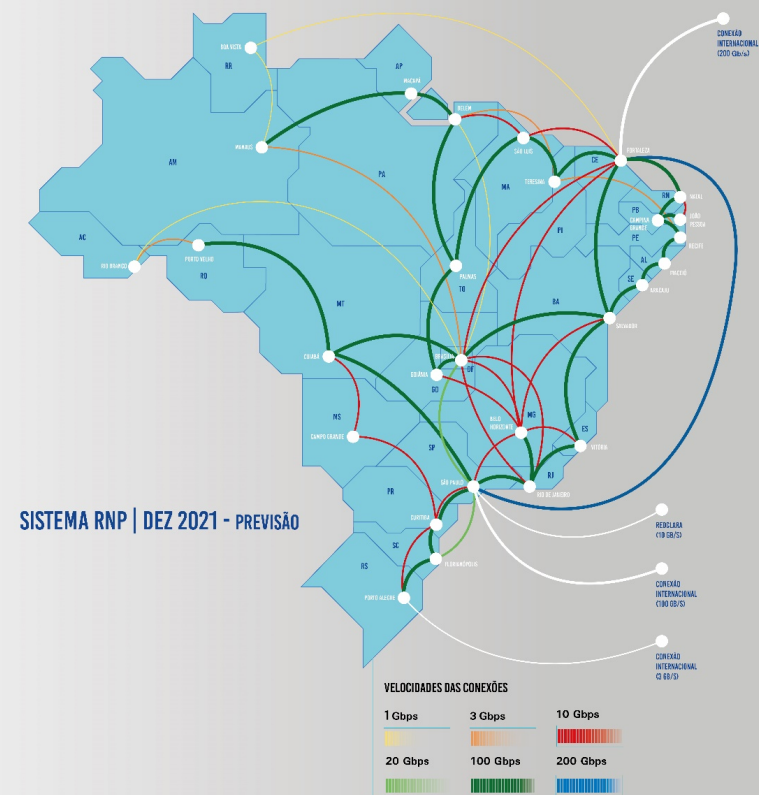
- SAX, Fortaleza and
- SOL\*, São Paulo.



\* Jointly with ANSP.

## RNP backbone network and connections in 2021 (<https://www.rnp.br/en>)

- R&E backbone network with government support since 1992.
- Point of presence (PoP) in each state
  - More than 1500 sites are connected, and, in more than 40 cities, by means of RNP's own metro networks.
- Currently being upgraded to N x 100G by 2022.
- International connections via RedClara & Amlight
- In July - 2021, an new international connection to Europe should be activated through the BELLA (Building Europe Link Latin America) Project
  - Use of the Ellalink Cable



## International R&E links by 2021 & GXPs

Brazil already operates the SouthernLight (SoL) GXP in São Paulo,

- Interconnect the N-S cables from the US used by R&E networks (Monet, SAC/LAN), the Brazilian R&E networks (ANSP, RNP) and RedClara

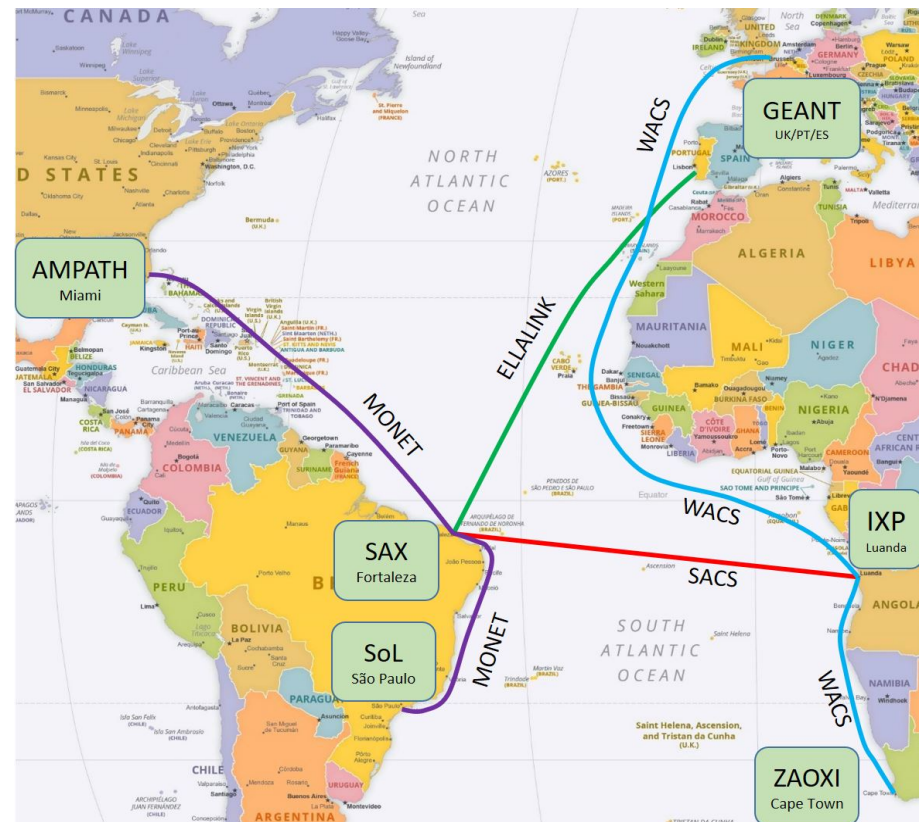
To cater for this new international connectivity, RNP has provided the new GXP in Fortaleza, called SAX - South America eXchange,

- interconnecting the Monet, SACS and SAC/LAN cables

In December 2019, using SACS and WACS cables, connectivity was extended from SAX to the South African NREN (TENET/SANREN).

- This is the first trans South Atlantic link for R&E networks, substantially shortening distances, and thus latency, between Africa and the Americas, especially South America.
- One benefit: Increased redundancy with new South Atlantic routes (see recent WACS cable outage, backed up by SACS+Monet)

In July, 2021, SAX will also host BELLA Project's Channels, from Ellalink, to link South America and Europe



## SAX (South America eXchange) – Fortaleza

### Current configuration:

- **200G Monet + 100G SACS - Angonap Datacenter**
  - Juniper MX10003 router
- **100G SAC/LAN - CLS TiSparkle**
  - Juniper MX204 router
- **These sites are interconnected since Dec 2020**

### Updates:

- Brocade MLXe8 replaced by a Juniper MX204 in TiSparkle site – Dec 2020
- Amlight-Exp (200G Monet) and Amlight-Protect (100G SAC/LAN) are interconnected using an 100G ring between the sites – Dec 2020
- PerfSONAR node installed with 100G capability – 4Q2020





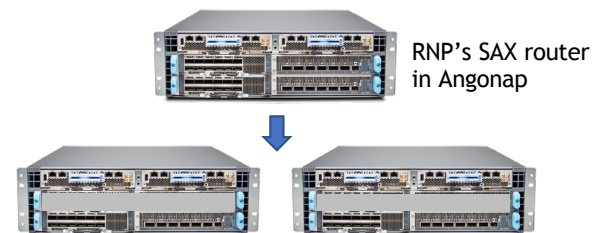
## SAX (South America eXchange) – Fortaleza – 2021+

### 2021

- A topology optimized underground dark fiber ring connecting the main sites in Praia do Futuro, Fortaleza (Angonap, CLS TiSparkle, CLS Telxius and CLS Globenet)
- Delivery and publicity the Service and Policy descriptions of SAX
- Split the current full redundant router in 2 routers with only one 1.2 Tb/s linecard to enhance the redundancy
- Design automation workflow
- Planning the reconfiguration of the nodes into a single domain, and adoption of EVPN (VPWS) in order to simplify the setup of virtual circuits.

### 2022+ (in discussion – not committed)

- New routers in CLS Telxius and TiSparkle
- Virtual router as a service (eg: Junos Logical Systems) to facilitate peering's for remote connectors





## SOL (SouthernLight) – São Paulo – 2021~2022

### 2021

- Acquisition of a Noviflow switch with 32x100G ports (Amlight's new generation SDN equipment). Arrived in Brazil, in process of customs clearance.
- A new dark fiber in São Paulo connecting the main sites of interest: RNP PoPs (USP and NIC-JD), Equinix SP2, SP3 and SP4.
- RFI/RFP – DWDM line system for service protection considering the new topology



### 2022 (in discussion – not committed)

- Acquisition of a second Noviflow switch to replace the current Juniper MX10003 router



## Routes in Southeast & South - OPGW optical fiber

RNP Right of Use of optical fiber, for 20 years

### Southeast:

- Rio de Janeiro – São Paulo (green): 4Q2021

### Southeast – South:

- São Paulo/SP – Curitiba/PR (green): 2Q2021
  - The 1<sup>st</sup> 100G to be a shared link between RNP, Vera Rubin\* and Bella.

### South:

- Curitiba/PR – Florianópolis/SC – Porto Alegre/RS (red): **activated**



## Routes in Northeast & Southeast - OPGW optical fiber

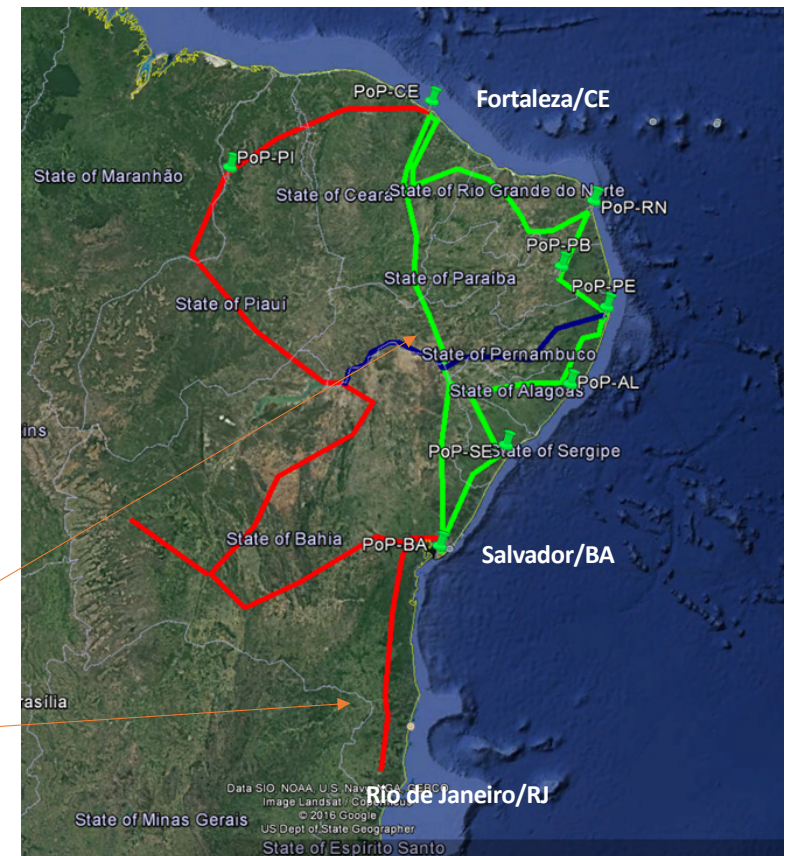
RNP Right of Use of optical fiber, for 20 years

Northeast:

- Fortaleza/CE – Salvador/BA: (green): **activated**

Northeast - Southeast:

- Salvador/BA – Rio de Janeiro/RJ – (red): 4Q 2021







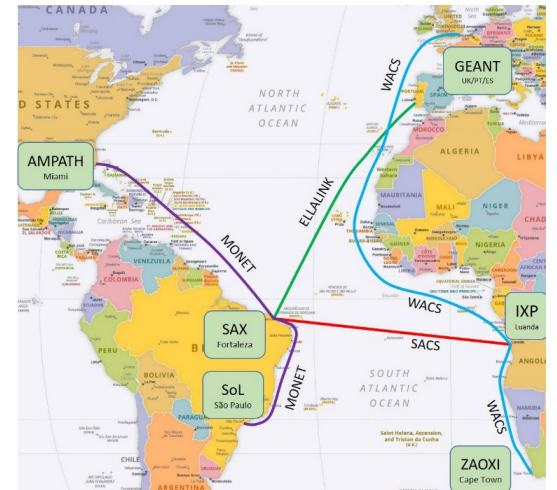
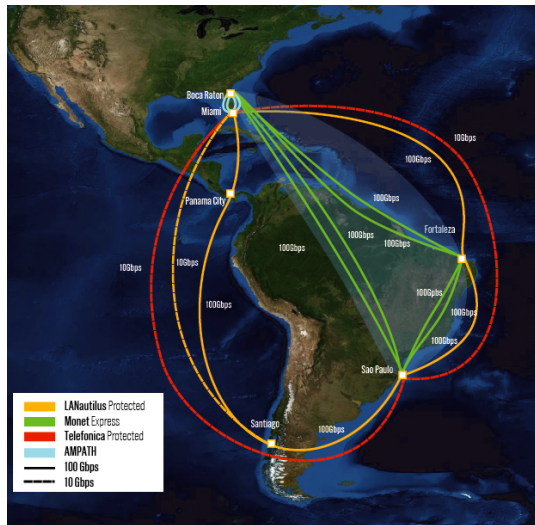
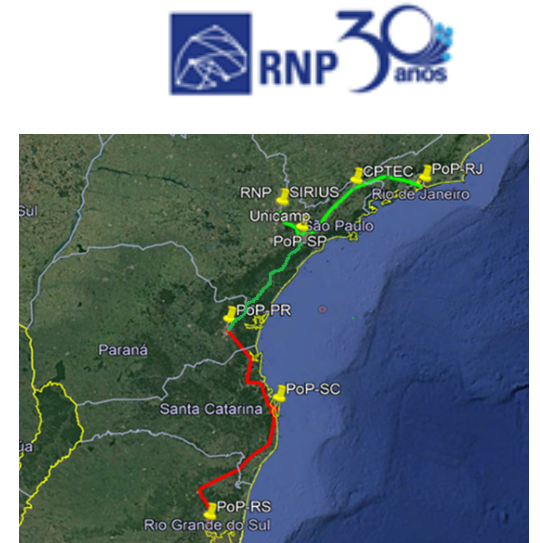
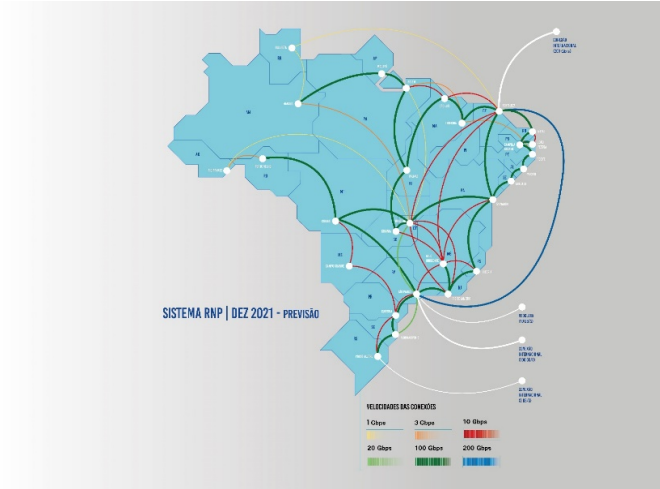
## Conclusions

## RNP 100G Backbone 2021 “is on its way”

- **Still need to complete São Paulo – Porto Alegre route & Salvador – Rio de Janeiro**

**Partnership w/ FIU/AmLight networks & SAACC has been fundamental**

## SAX & important new international routes within South America, Africa and Europe



**Thank you!**

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