RNP Update

18th Annual Global LambdaGrid Workshop

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GLIF Workshop, Helsingør, Denmark

September 2018

10 years on!

RNP
REDE NACIONAL DE ENSINO E PESQUISA

RNP

SouthernLight: New GOLE for Latin America

8th Annual Global LambdaGrid Workshop
Seattle, October 2008

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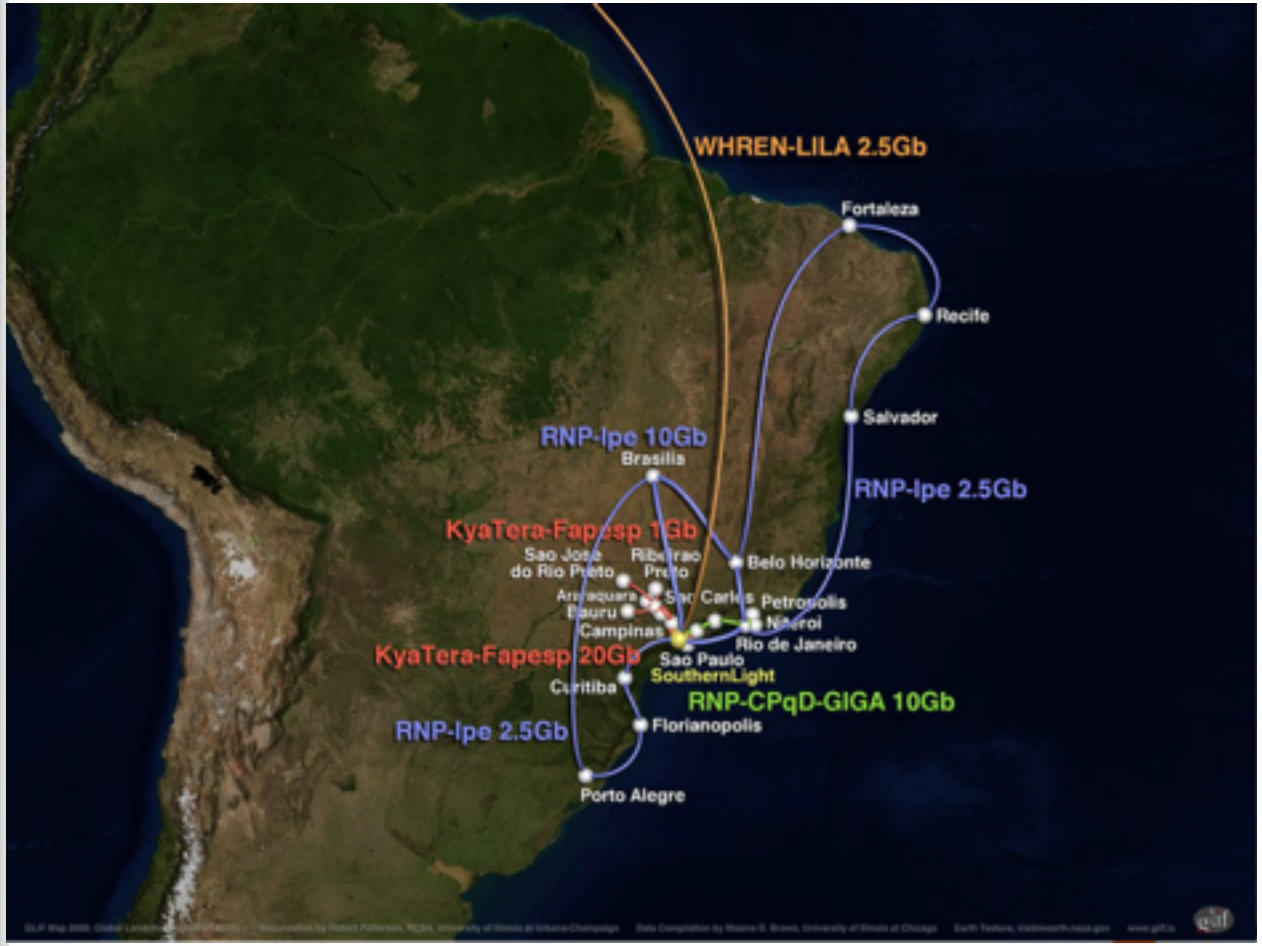
Programa Interministerial MEC/MCT



1. Amlight ExP Collaboration (IRNC 2015-2020)
   Connections from US to South America
2. LSST support until 2032
3. AARClight Collaboration
   Connection Brazil – Angola
4. BELLA project
5. New GOLE/GXP in Fortaleza: South Atlantic Crossroads (SAX)
6. Meican update

Current AmLight Network Infrastructure (uses ”old” cables)

- 100G ring Miami-Fortaleza-São Paulo- Santiago-Miami (SAC cable - solid yellow)
- 10G ring from Miami-Sao Paulo-Miami for protection (Sam-1 cable - dashed red)
- 10G Miami-Santiago for protection (SAC cable - dashed yellow)
- 100G and 10G rings are diverse, operating on multiple submarine cables
- Total upstream capacity presently at 230Gbps
- Collaborative partnerships: FIU, ANSP, RNP, CLARA, REUNA, AURA, FLR, and Internet2

New 100G long distance submarine cables to Brazil 2016-2020

- USA (3)
  - BRUSA (Telxius)
  - **Monet** (Google, Algar (BR), Angola Cables (AO), Antel (UY))
  - Seabras-1 (Seaborn (US))
- Europe (1)
  - **EllaLink** (ES, FR) **2020**
- Africa (3)
  - SAIL (Camtel, China Unicam)
  - **SACS** (Angola Cables)
  - SABR (Seaborn) **2020**
- S. America (3)
  - Tannat (Google, Antel)
  - Malbec (FB, GlobeNet(BR)) **2020**
  - ARBR (Seaborn, Wertein) **2019**

Expected R&E use of new cables

- Monet (6 channels) Interconnects GOLES/GXP: Ampath, **SAX (new)**, SOL
- EllaLink (45 channels) will interconnect SAX to Portugal (2020)
- SACS (1 channel) interconnects SAX to Angola, with possible extension to South Africa (SANREN)

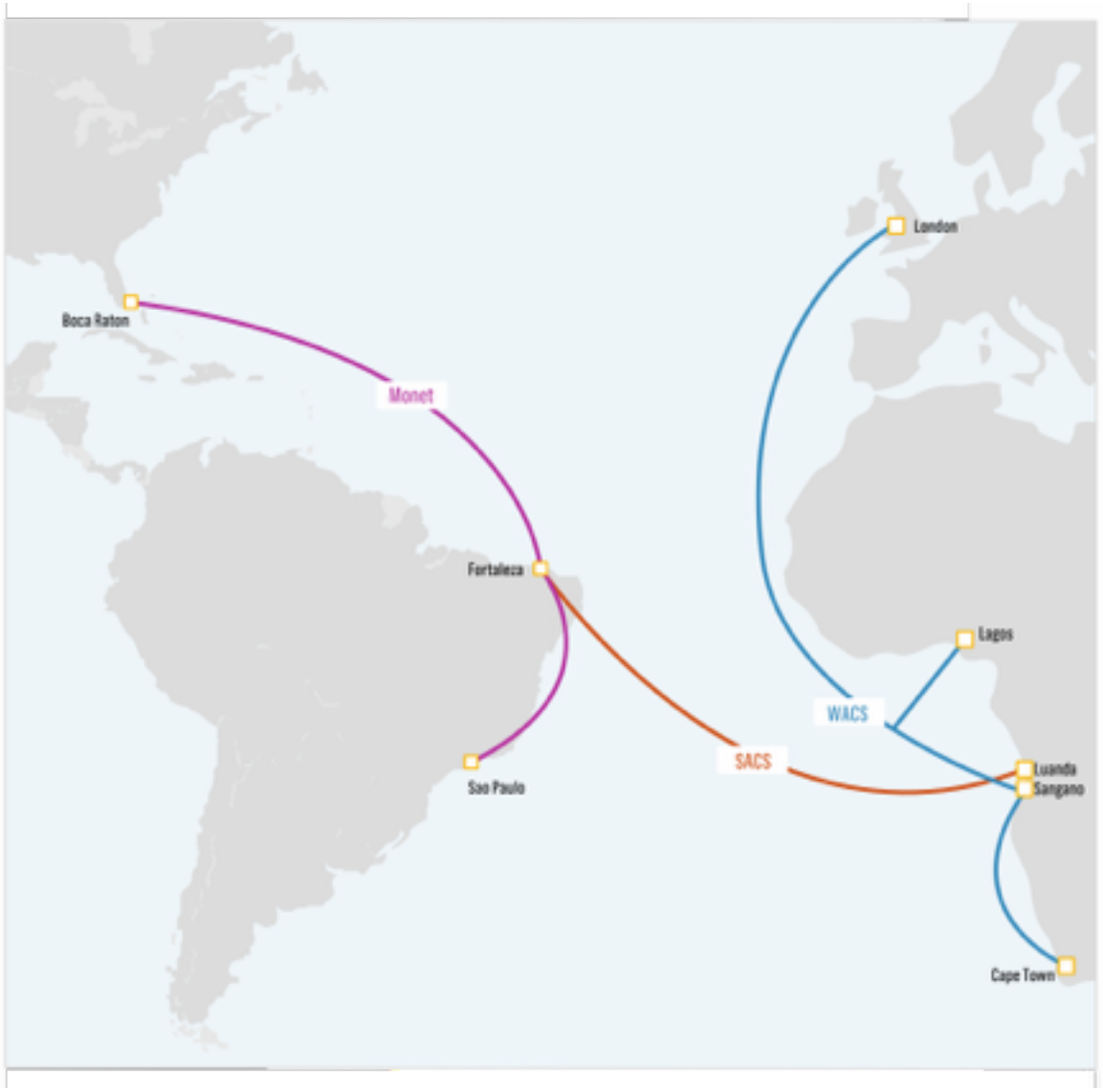
2018: Amlight upgrades – use of Monet cable

- Activate spectrum (Monet - green):
  - Two 100G channels Miami – Fortaleza – São Paulo
  - One direct 100G channel from Miami to Sao Paulo (Q4 2018)
  - Enhance resilience to the AmLight-ExP backbone, using 2nd Atlantic cable
- Also: add Panama to the 100G Protect ring (SAC cable - yellow)
  - Miami, Fortaleza, Sao Paulo, Santiago, Panama, Miami

AARCLight: potential collaboration US – Brazil – Africa

(Julio Ibarra, TNC18, June 2018)

- 225GHz linear spectrum of Monet committed in AmLight-ExP project
- 40GHz of spectrum on SACS is available to the R&E community
- TENET operates 220G of capacity on WACS
- South Atlantic eXchange point (SAX) is under development in Fortaleza, led by RNP
- R&E exchange point in Cape Town operated by SANREN and TENET
- R&E exchange point in Lagos, operated by WACREN



BELLA – Building Europe Link to Latin America

BELLA originated in a question posed in 2009: what prevents the laying of a direct submarine cable between Brazil and Europe. Advances since then:

- in 2010, the European Commission (EC) financed a study which demonstrated the economic feasibility of a direct cable
- in 2014, following the Snowden ”affair”, the EC and the Brazilian government decided to support a direct cable
- in 2016, the EC decided to invest 25 M € in the the co-financing of BELLA, in collaboration with South American countries

BELLA = BELLA-S (submarine cable) + BELLA-T (terrestrial cable)

BELLA-S: **acquisition of 45 channels of spectrum** on a new submarine cable, **for the effective lifetime of the cable** (estimated in 25 years) in exchange for upfront payment**: contracted in August 2018**.

- The EllaLink company was established to build and operate the Ellalink cable between Portugal e Brasil. Currently, EllaLink is signing up other customers to start building the cable (2 years).

BELLA-T: **long-term** (10 a 15 anos) **acquisition of terrestrial spectrum** in cables **interconnecting the major interested countries**. Tenders in course.

- spectrum to be shared by RedClara and participating NRENs

The South Atlantic Crossroads (SAX)

RNP's Global Exchange Point to be deployed in Fortaleza, CE, Northeast Brazil as a hub for multiple international connections in the region.

It is been designed to be compliant with both GNA and GLIF initiatives

International partners, such as RedClara, Ampath and GEANT, are crucial to providing the new circuits reaching SAX.

Connections planned to SAX (spectrum)

2018:

Monet (to US)

2019:

SACS (to Angola)

+ Replacement of leased line

2020:

Ellalink (to EU)

RedClara (to LA)

Open to discuss future connections with other partners

Collocation site

Agreement established with Angola Cables in order for collocation and related activities in its new DC in Fortaleza.

Collocation point chosen for strategic reasons.

- < 400 meters from of the Monet CLS (US – BR)
  - Spectrum will be delivery directly in the DC
- CLS of SACS (to Luanda, Angola)
- 1-2 Km away from other CLS (SAC/LAN, Globenet and maybe Telxius)

A second site could be added if needed.

The agreement provides for the following services:

- Racks and energy
- Cross-connects
- External fiber connections
- Remote-hands
- Low speed internet access for OoB management

Equipments for initial installation

Router/switch with deep buffer 100G ports

- High performance and highly programmable using open/commercial tools
- P4 supported - for future use
- Purchase order should be placed by the end of September, 2018
    - But still open to the possibility to add MAC-SEC support

Server with 100G NIC - Monitoring (including perfSonar)

Planning to support all or most services described in GNA doc references

- Starting with what are the most common use in Open/Academic Exchange Points

We will start write the draft of documents in 4Q2018 and expect to have the final version by 1Q2019 published on the RNP site.

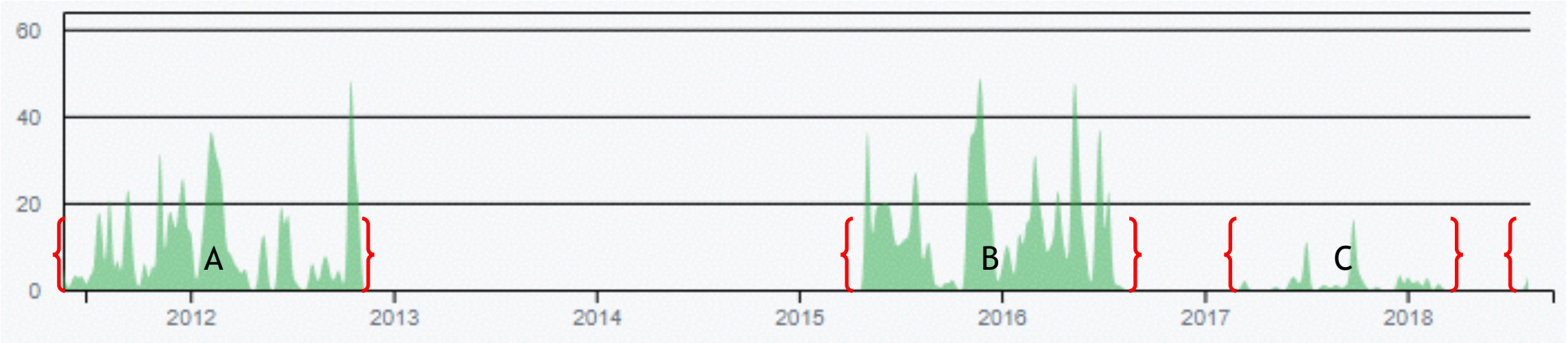
GLIF services (AutoGOLE/NSI) will be full supported as well

Supported connectivity: 100G, 40G or 10G.

- 1G connections are not planned.

MEICAN update: History

A. First R&D cycle 2011-2012: MEICAN 1.0 OSCARS-IDP GUI
B. Second R&D cycle 2015-2016: MEICAN 2.0/3.0 NSI GUI
C. Support cycle 2017-2018: AutoGOLE Pilot
D. Third R&D cycle 2018.9 - 2019: MEICAN Extension



https://github.com/ufrgs-hyman/meican/graphs/contributors

MEICAN: Current Status

Next Release 3.1.0 (October)

- Support for NSI Authentication and Authorization
- Per domain configuration and user management
- STP representation overhaul (OSCARS -> NSI)
- Support for extracting geographic and bandwidth information from NML

Expectations

- [RNP] Per circuit monitoring visualization
- [RNP] MEICAN extension (integration of new resource types/ automations)
- [AutoGOLE] Automated circuit testing (control/data plane)

Thank you!
Questions?

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