

LSST access: RNP update

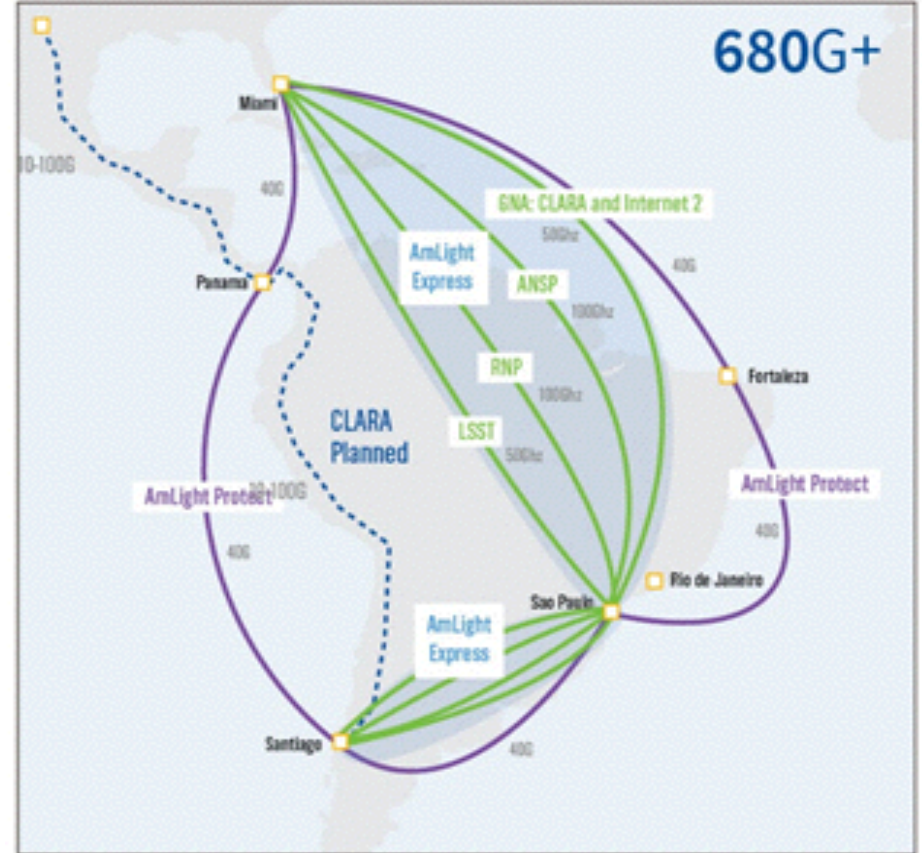
LSST Engineering meeting
REUNA, Santiago, Chile
October 19th, 2017

Eduardo Grizendi, Engineering &
Operations

Michael Stanton, Research &
Development

Brazil - EUA (2017) - LSST Project

- Project AmLight Exp (Express and Protect)
- Use of Monet Cable
 - MoA signed in 2015
 - Partners: Brazilian astronomy community, LSST, ANSP, RNP & FIU
 - Use of optical spectrum (GHz)
- 680G+ includes LSST, GNA, ANSP, RNP



LSST Project - RNP's viewpoint

- MoA signed in July - September 2015
- RNP is committed to provide connectivity between São Paulo and Santiago 2 x 100 G
 - 100 G starting September 30, 2019
 - Additional 100 G of burst traffic
 - Agreement lasts until September 2032.
- In exchange, RNP will be granted access to 100 GHz spectrum on the Monet cable, between Florida and São Paulo.
 - 100 GHz: 2 channels with current 100 G technology
 - Santos, SP, to Boca Raton, FL.
 - Available when the cable becomes operational
 - The 100 GHz operation will be the subject of a separate MoA
 - The Brazilian astronomy community will also gain right to participate actively in the LSST project

BELLA project (Building Europe Link to Latin America), with subprojects BELLA-S & BELLA-T

BELLA-S: project to acquire spectrum (45 slots) on a new 100G subsea cable between Portugal and Brazil for R&E network use during the cable lifetime (25 years)

EC and S. American governments to support this acquisition by GEANT and RedCLARA

1 slot for use by Copernicus.



BELLA project (Building Europe Link to Latin America), with subprojects BELLA-S & BELLA-T

BELLA-T: project to build a scalable terrestrial DWDM capacity to provide access to:

- backhaul to the BELLA-S cable from NRENs in S. America
- Internal use for the NREN in each participating country
- Funding by EC and LA NRENS

Each NREN will need to build out its national portion of this network



Final thoughts on BELLA

BELLA-S (submarine cable)

- It is expected that the decision to build the Ellalink cable will be taken in 2017, and that it will become available for use 2 years later.
- This cable will make an important alteration in global connectivity, enabling alternative routes between Europe and S. America.

BELLA-T (terrestrial network)

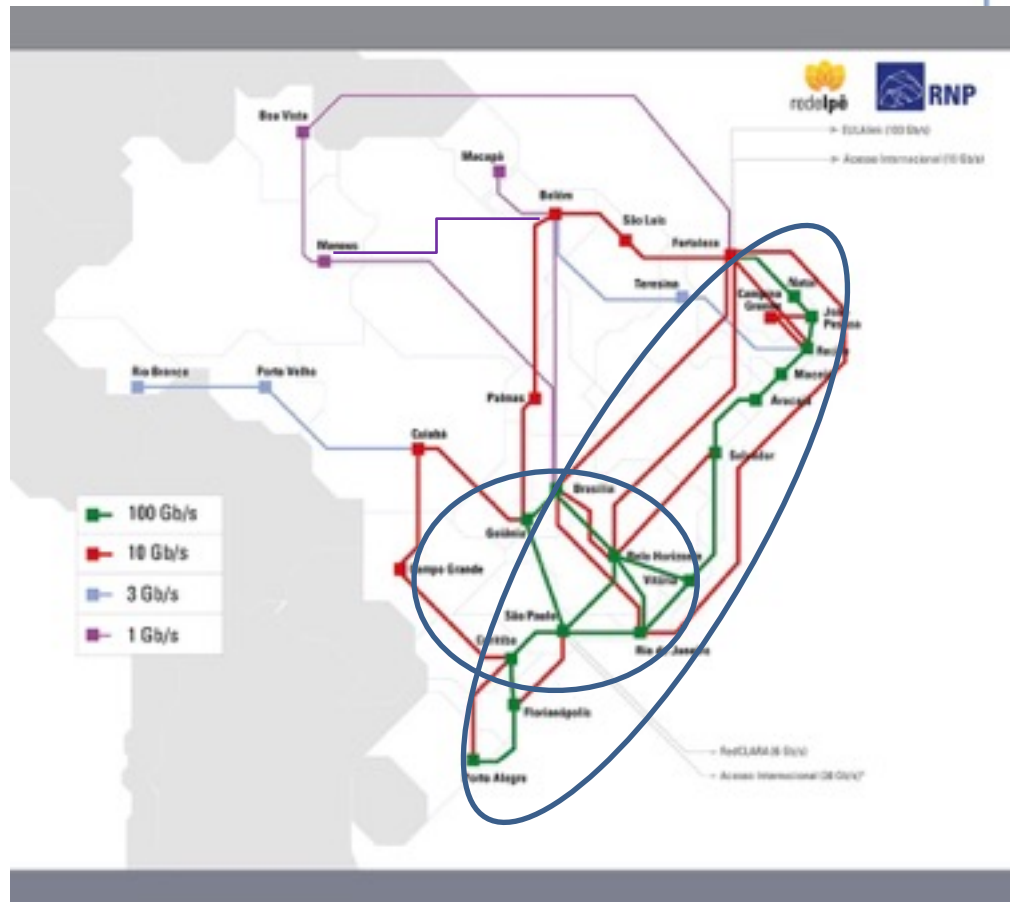
- Currently tenders are in course for completing the new DWDM 100G network linking South American NRENs by 2020
- This network will be of great importance for providing access to the great observatories of Chile, and of transporting its data to the Northern Hemisphere.

Building Phase 7 of the RNP backbone

- RNP needs to build a scalable network infrastructure to meet the following needs:
 - Expand the capacity of its network whilst reducing running costs
 - Provide network infrastructure required by the BELLA-T project
- Partners with long-distance fibre assets have been sought: the candidates include smaller telco providers, and big energy utility companies.
- First positive results with a state-controlled electrical company in NE Brazil, called CHESF

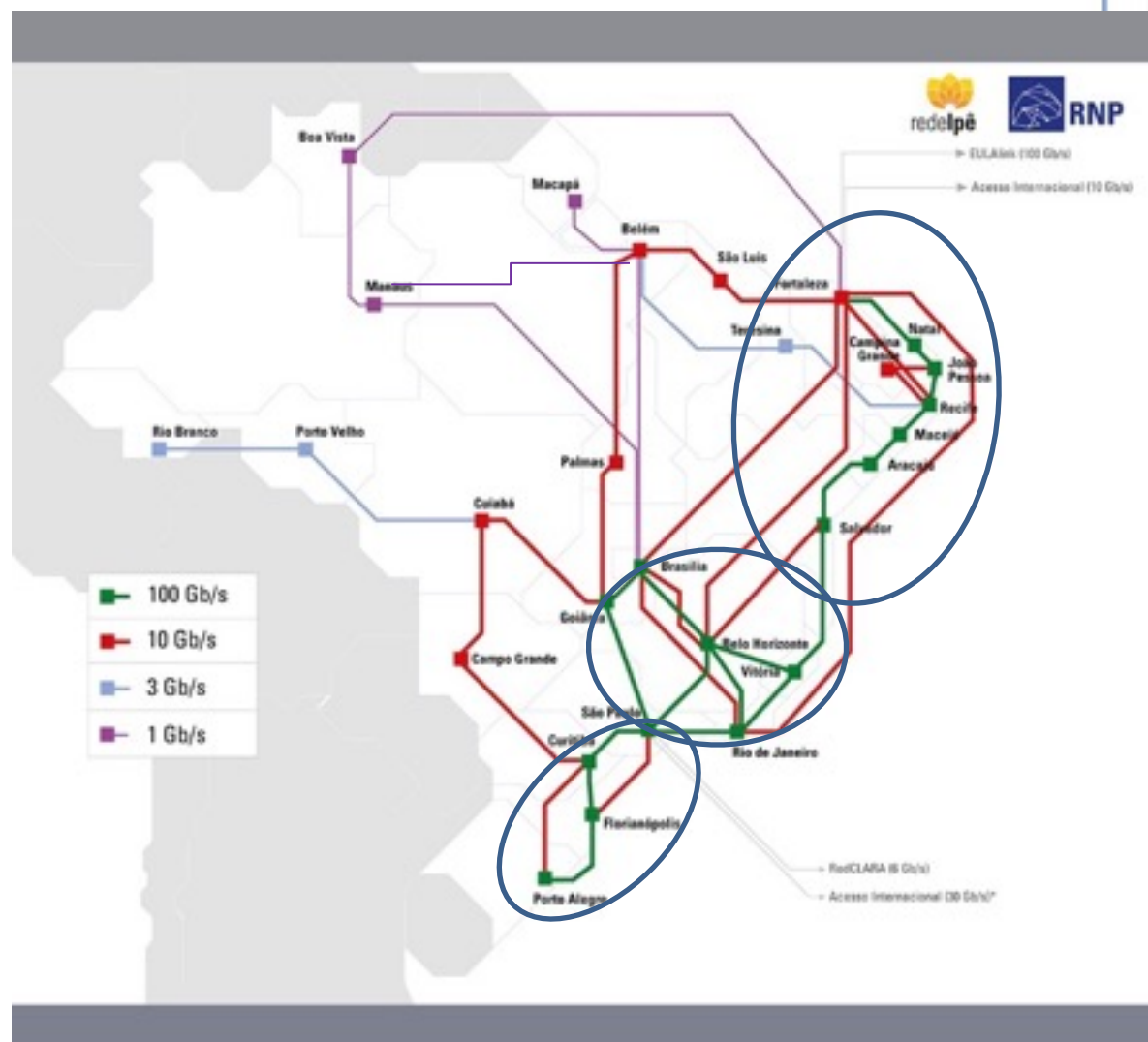
RNP National Backbone 2018

- Fortaleza - Porto Alegre Route
- 100 G Southeast Ring



RNP National Backbone 2018

- **3 phases:**
 - Northeast region (NE)
 - Southeast region (SE)
 - Southern region (S)



First step: Northeast - Alliance with CHESF

- CHESF - Companhia Hidro Elétrica do São Francisco
- Right of Use of ½ the optical spectrum
- Initially using 3 × 100G waves
- Part of the Fortaleza - Porto Alegre route
 - Fortaleza - Recife - Salvador - South of Bahia
- Agreement signed on Sept 19, 2016, to last 20 years.
- DWDM equipment (Huawei) recently imported to light up the fibre between Fortaleza and Salvador by the end of 2017



The nx100G network to be built with CHESF

6000 km of **OPGW cables**

- 8 states and their capitals
- 10 backbone links

- **CHESF:**

- Maintenance of optical fibre
- Maintenance of SDH equipment
- Network operation
- **Garantee of 99.98% SLA per PoP, and 99% per route**

- **RNP:**

- Initial Investment
- Repair of modules and other accessories of DWDM system
- Maintenance of last mile of RNP nodes



Use of Monet cable in LSST

Monet cable
extends from
Florida to São
Paulo via
Fortaleza

Backhaul São Paulo
- Santiago to be
provided by RNP

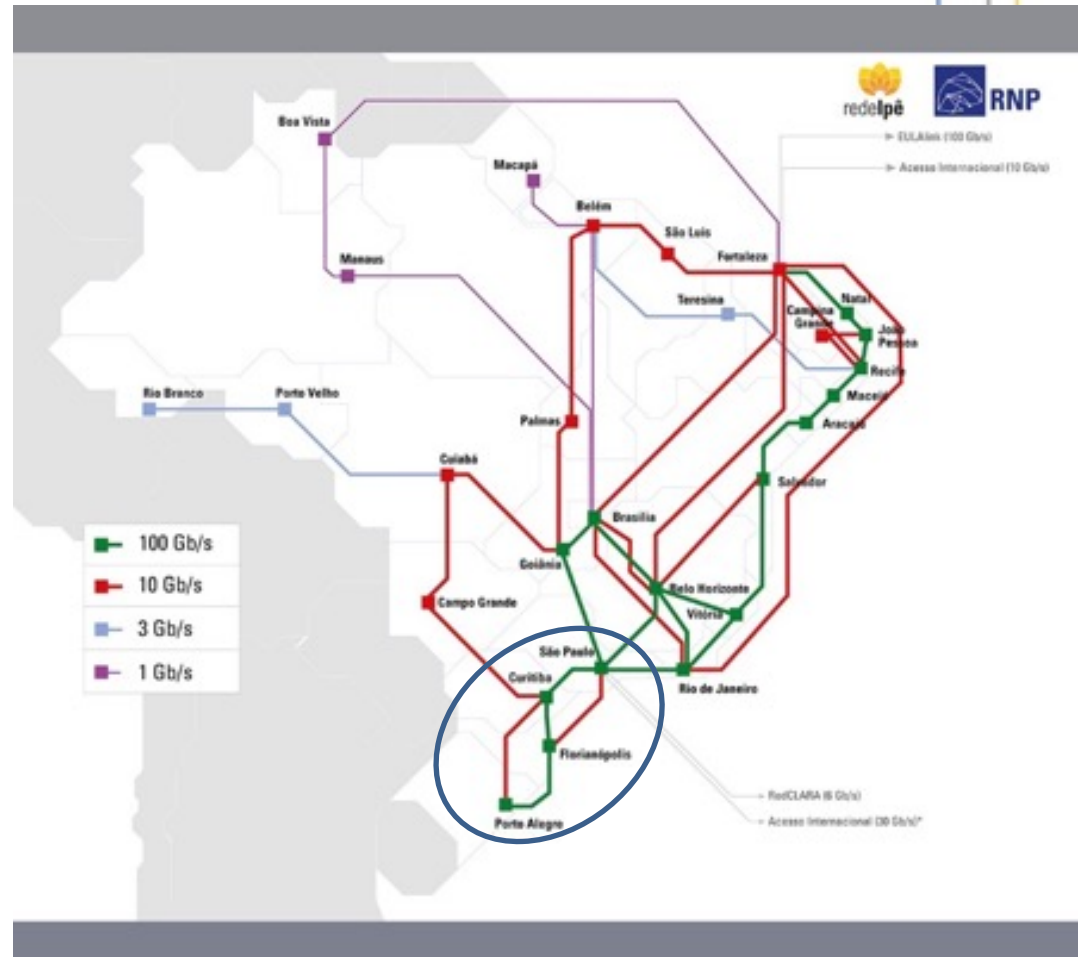
3 sections

- A. S. Paulo - P. Alegre
- B. P. Alegre - B. Aires
- C. B. Aires - Santiago

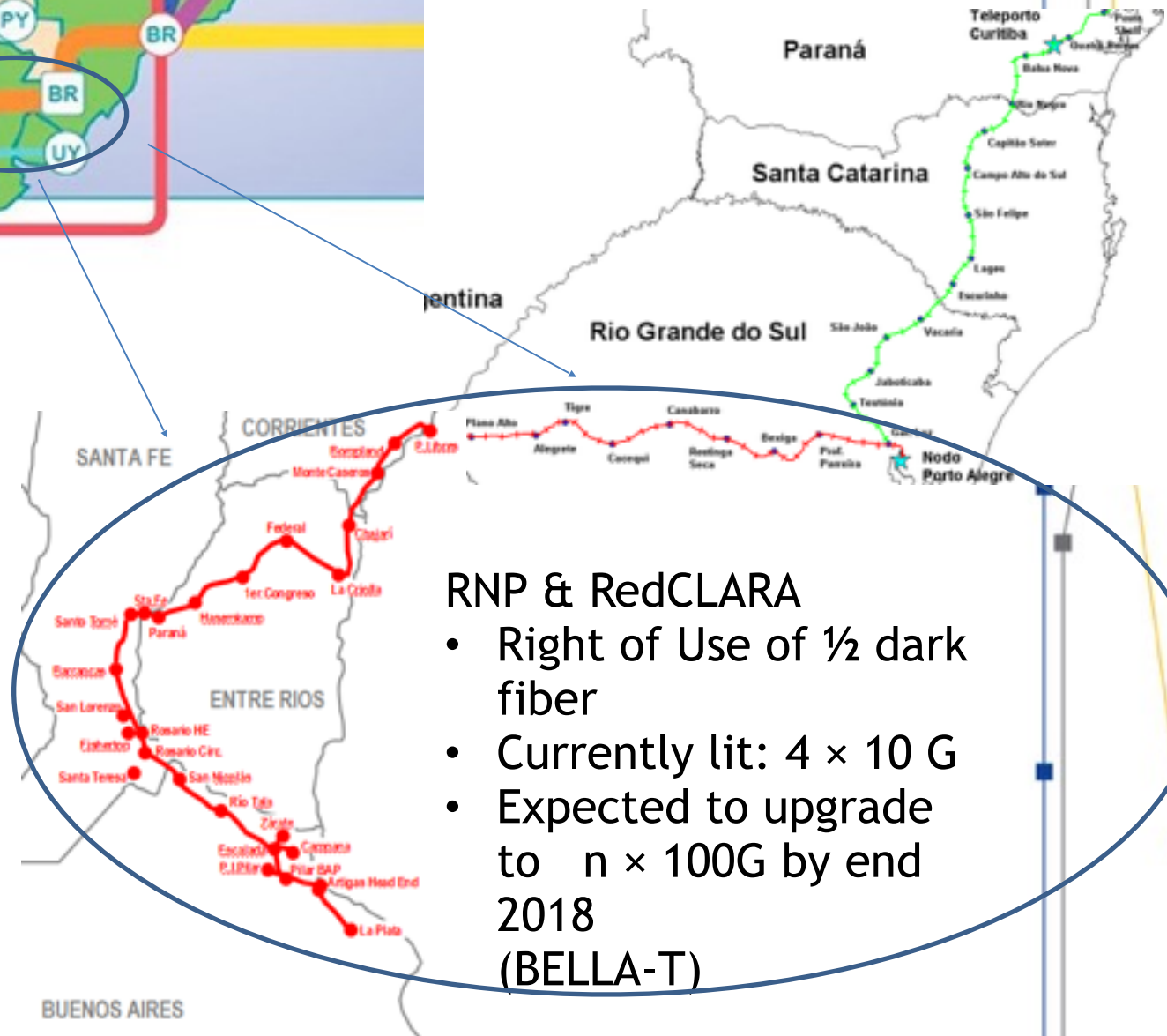


A: São Paulo - Porto Alegre

- Upgrade to scalable, shared infra RNP + Bella-T by 2018
- $n \times 100G$
- Potential partners:
 - Furnas
 - Eletrosul
 - BRFibra
 - ...

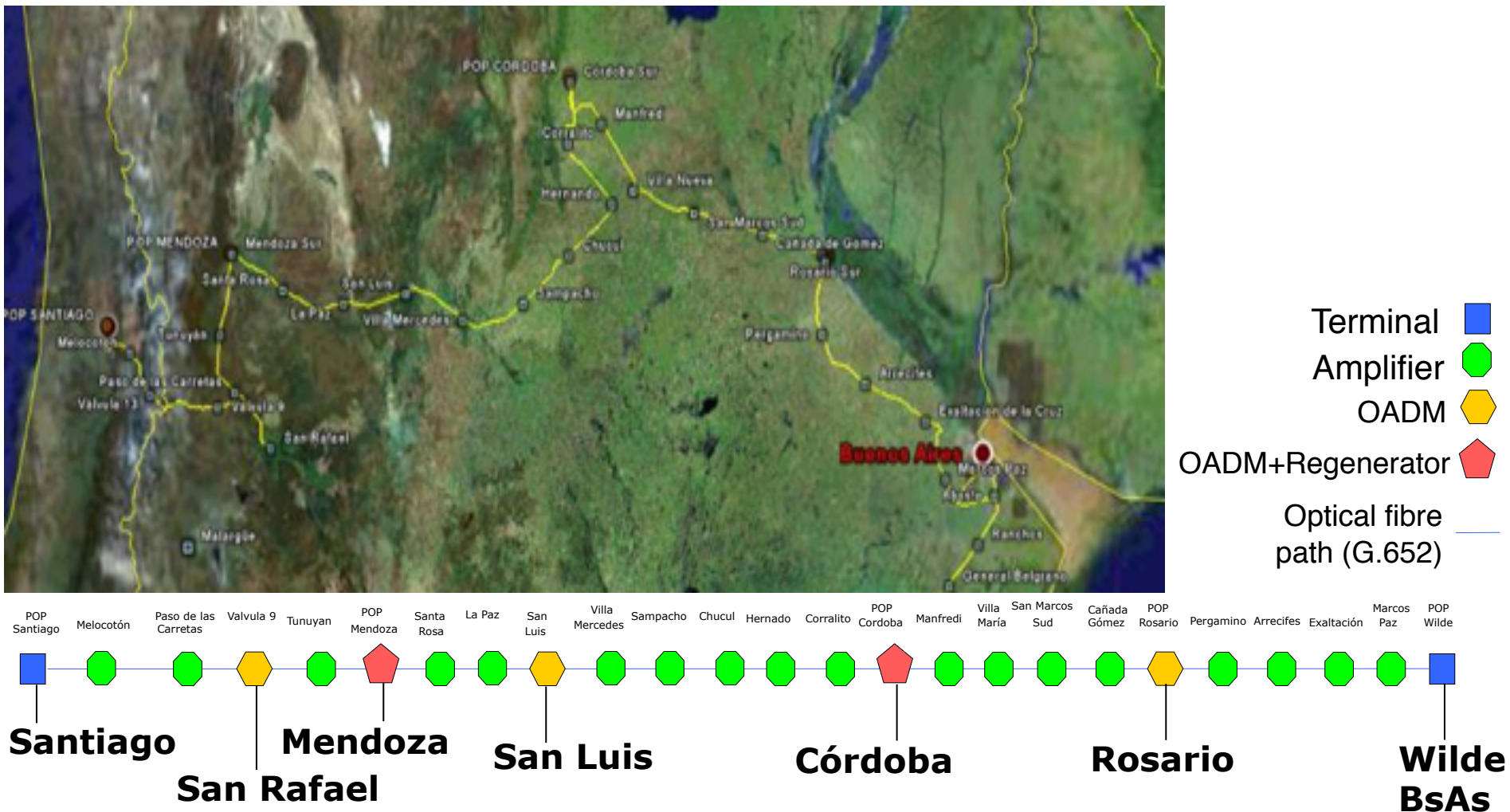


B: Porto Alegre - Buenos Aires



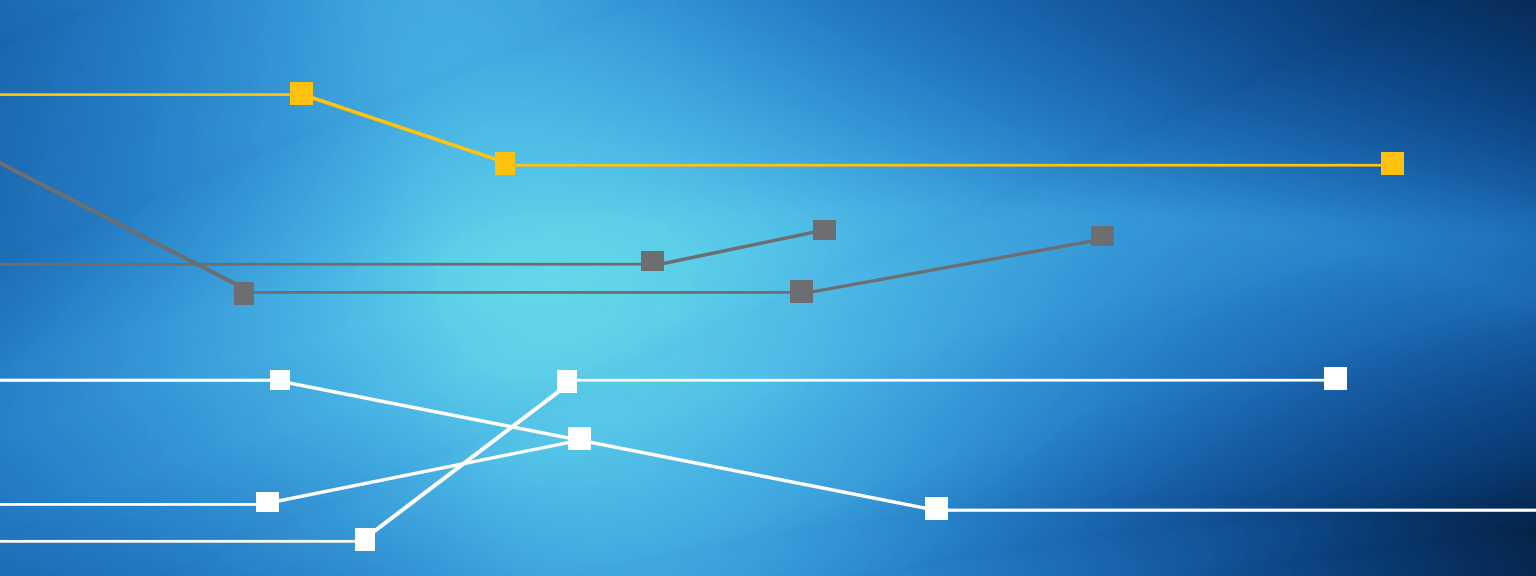
C: Buenos Aires - Santiago(with RedClara/Innovared)

Currently, up to 16x 10G channel DWDM between Buenos Aires and Santiago, Chile, with a total length of more than 2,200 km.
Should be upgraded to 100G as part of BELLA-T by end 2018



In conclusion

- RNP expects to fulfill obligations assumed under the 2015 MOA, to provide backhaul between São Paulo and Santiago, starting in 2019, using a combination of her own infrastructure between São Paulo and Buenos Aires, and third party (RedClara) infrastructure between Buenos Aires and Santiago.



Thank you!
Questions? Comments?

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