# RNP's strategy for deploying optical infrastructures in partnership with electrical companies and ISPs

## Ubuntunet Connect 2019

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**Antananarivo, Madagascar**

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# Agenda

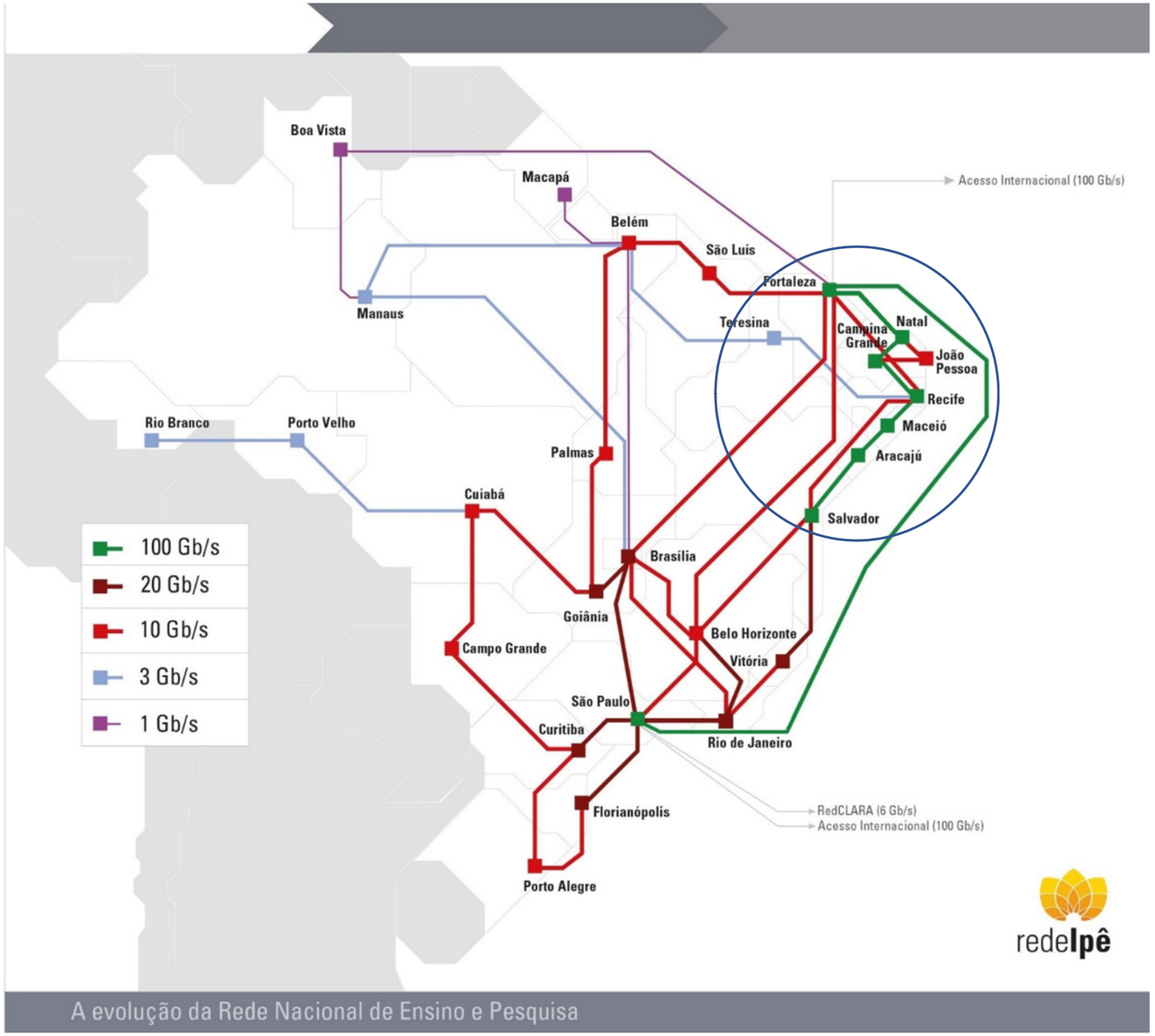
- RNP’s infrastructure – backbone & metro networks
- Current partnerships for the backbone: Power Companies & ISPs
- Metro networks, State Info Highways & ISPs
- Valuation of counterparts in dealing w/ ISPs
- Examples of deals w/ ISPs
- Conclusions

# RNP

- **Brazilian Academic Network (Brazilian NREN)**
- **Nonprofit Civil Association**
- **Social Organization (OS) linked to MCTIC (Ministry of Sc&T + Innovations + Comms)**
- **≅ 300 employees**
- **3 offices (Campinas, Brasilia and Rio de Janeiro)**
- **≅  1.500 connected campuses of universities and research institutions**
- **National Multgigabit Backbone**
  - Presence in all states
- **Own metro networks**
  - In capitals and some interior cities

# Current backbone 2019

- **Multgigabit**
- **100% optical fiber**
- **A Point of Presence (PoP) in each capital (26 states and federal capital)**
- **First 100G circuits, own optical infrastructure, in 2018**
  - Recife – Campina Grande
  - Campina Grande – Natal
- **Route Fortaleza – Salvador @ 100G, own optical infrastructure, in Northeast (July, 2019)**



# Backbone 100G 2022 - Partners

**Northeast:**
CHESF (agreed in 09/2016)

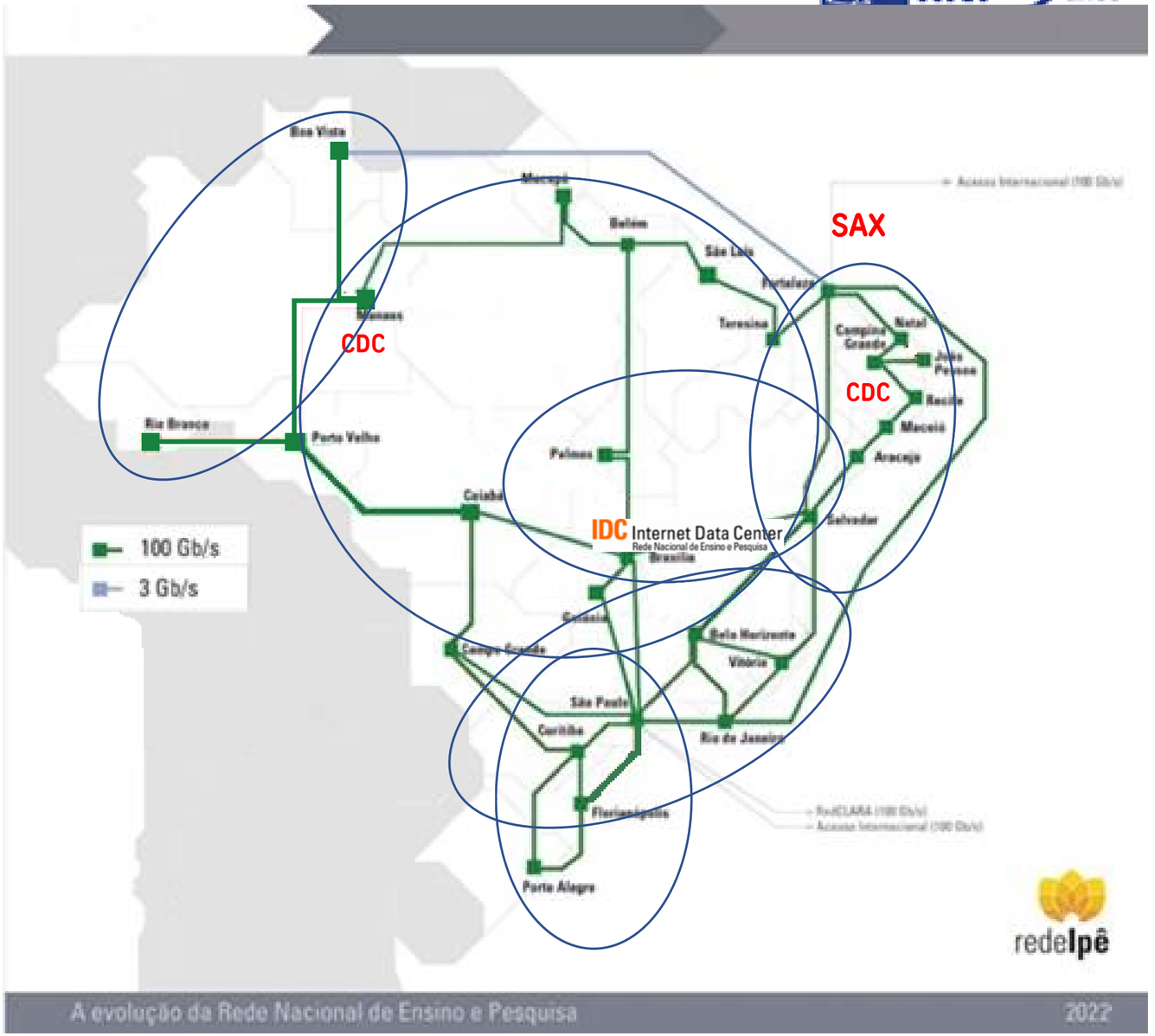
**Southeast & Midwest:**
Furnas (agreed in 11/2017)

**South & Midwest :**
Furnas
Eletrosul (agreed in 01/2018)
Regional ISPs (swap)

**North & Midwest**
Taesa (agreed in 05/2019)
Telebras (agreed in 02/2019)
Regional ISPs (swap)

**SAX - Global Exchange Point in Fortaleza**
Angola Cables DC (agreed 08/2018)

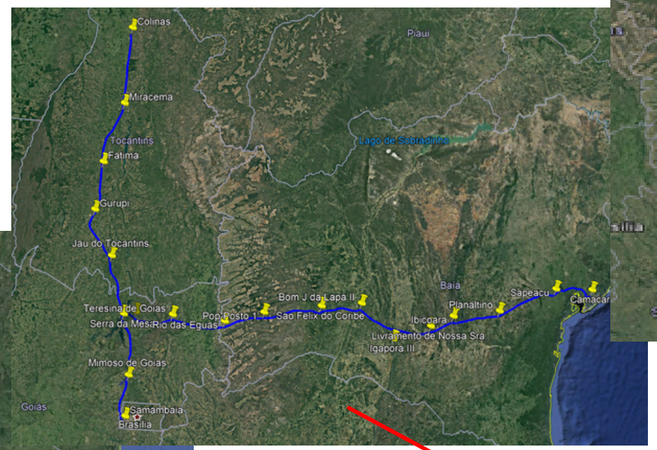
Power Companies ("Electrics")



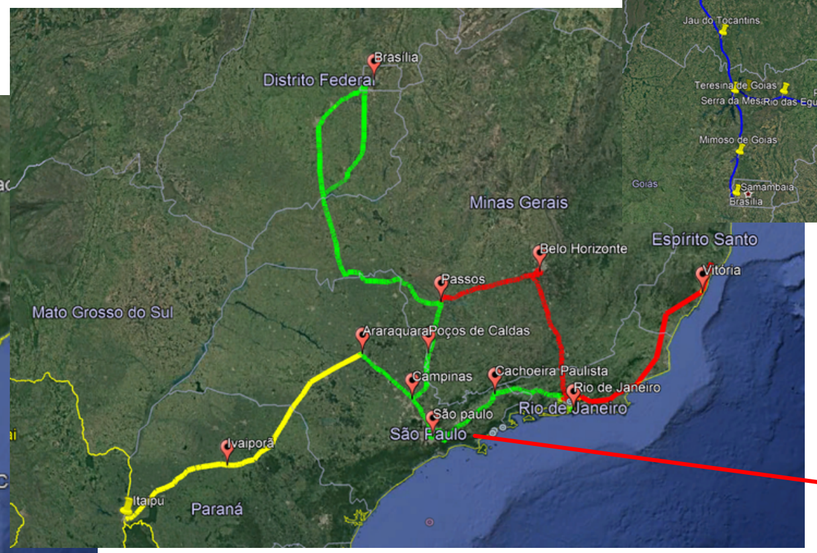
# Agreements w/ Power Companies (Electrics) - Chesf, Furnas, Taesa & Eletrosul (OPGW holders)

- Agreement for 20 years, RoU of 1 dark fiber pair
- No IRU direct payment
- Counterpart: RNP lit up w/ 40 optical channels, 20/20 RNP/Power Company
- Initially 2 X 100G, 1 X 100G each one
- All routes of the Power Company, except Taesa

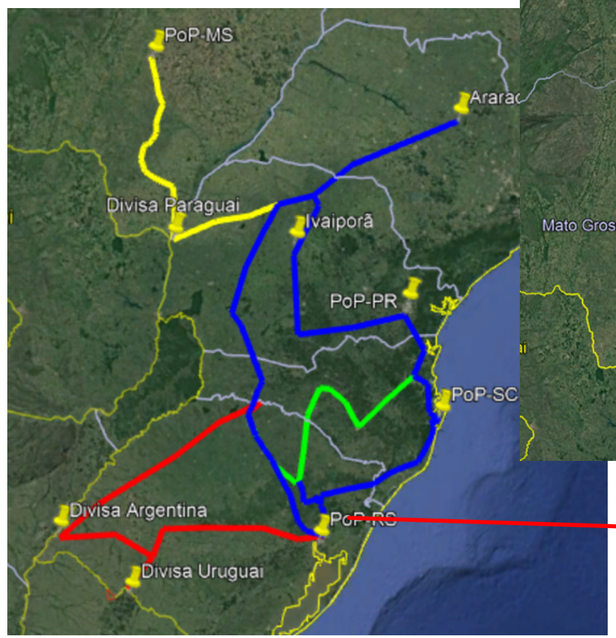

Chesf




Taesa




Furnas




Eletrosul

# Routes on Chesf infrastructure

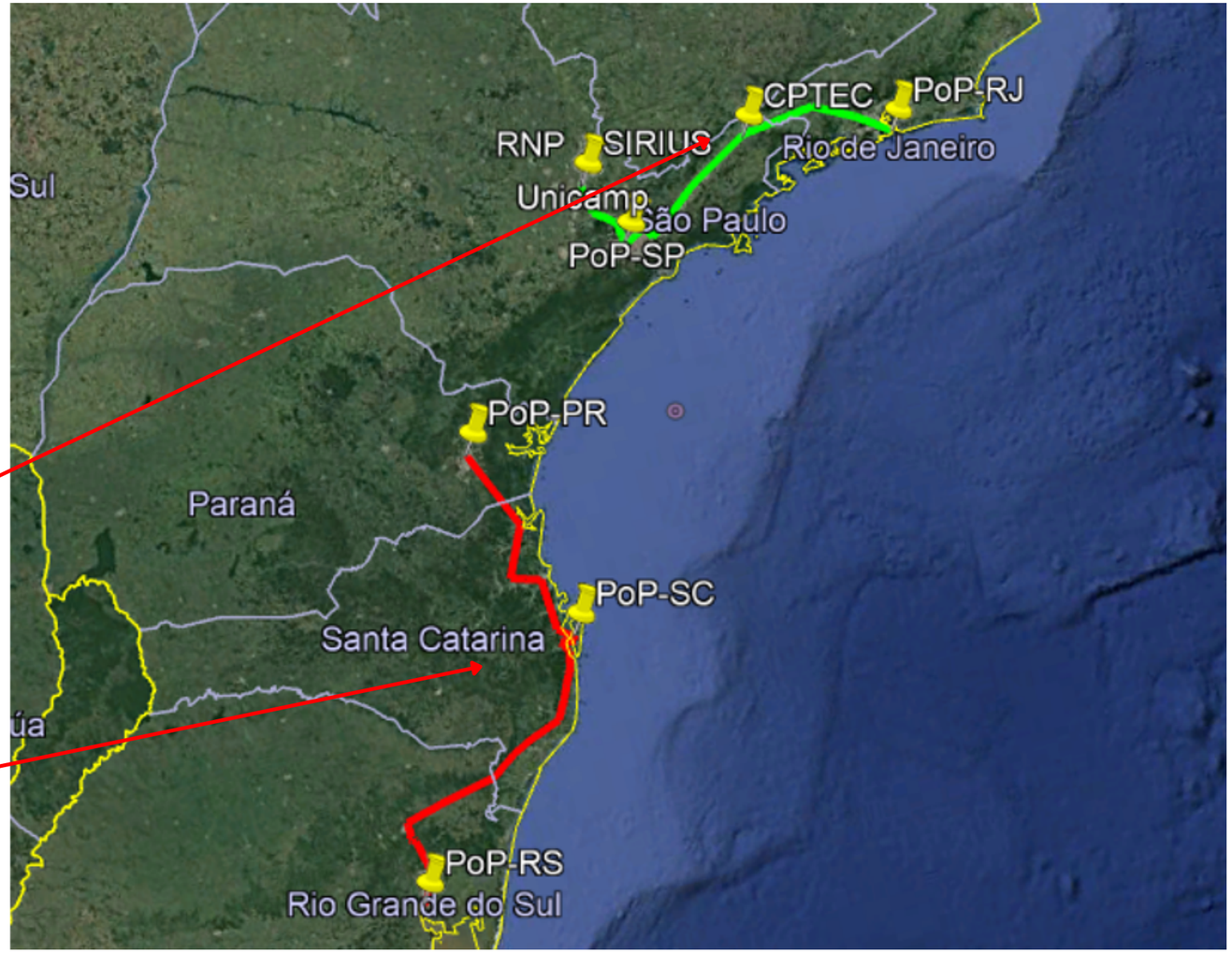
- **Phase I : green**
  - Ready, in 07/2019


Chesf

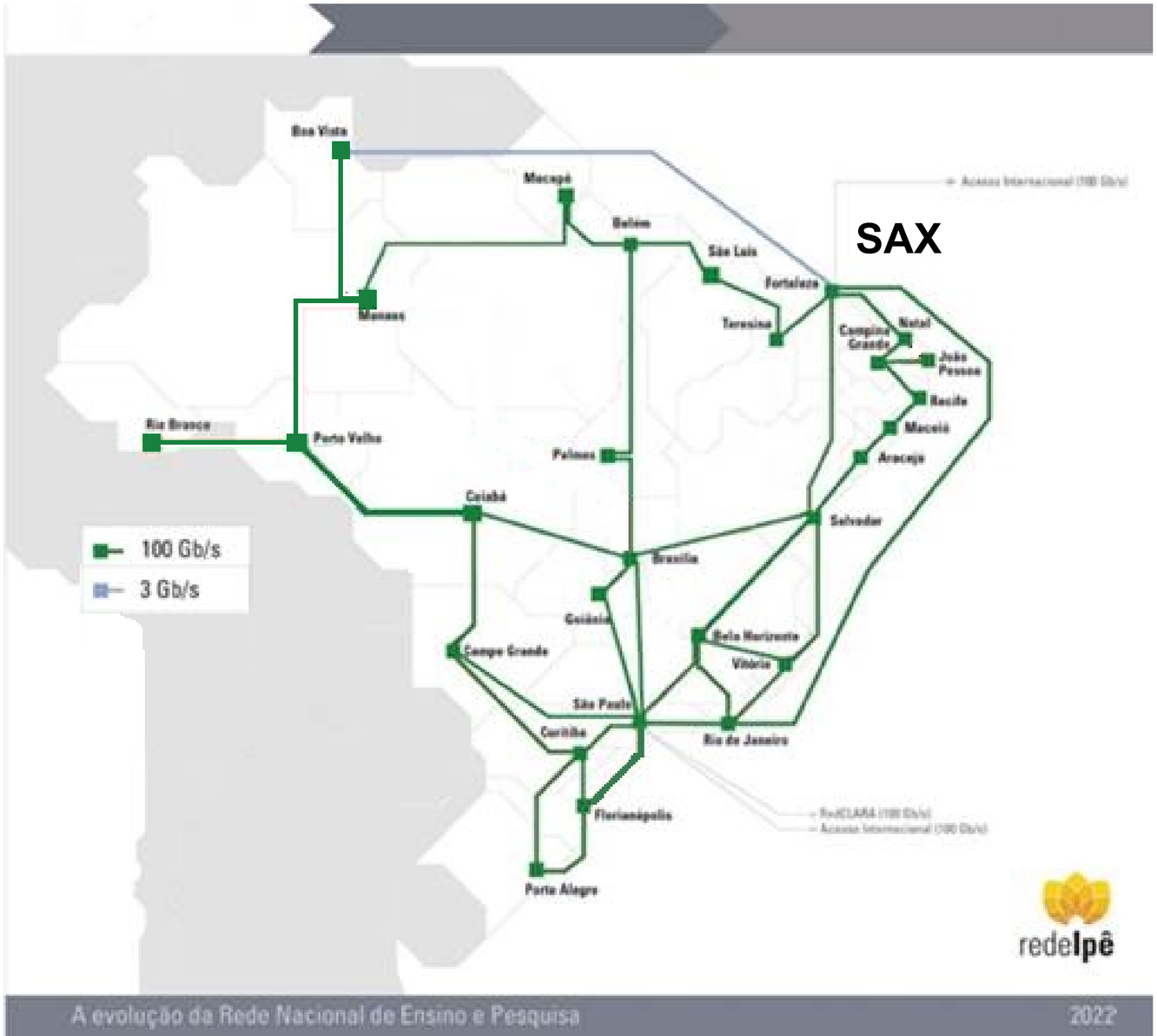
# Routes being installed on Furnas & Eletrosul infrastructure

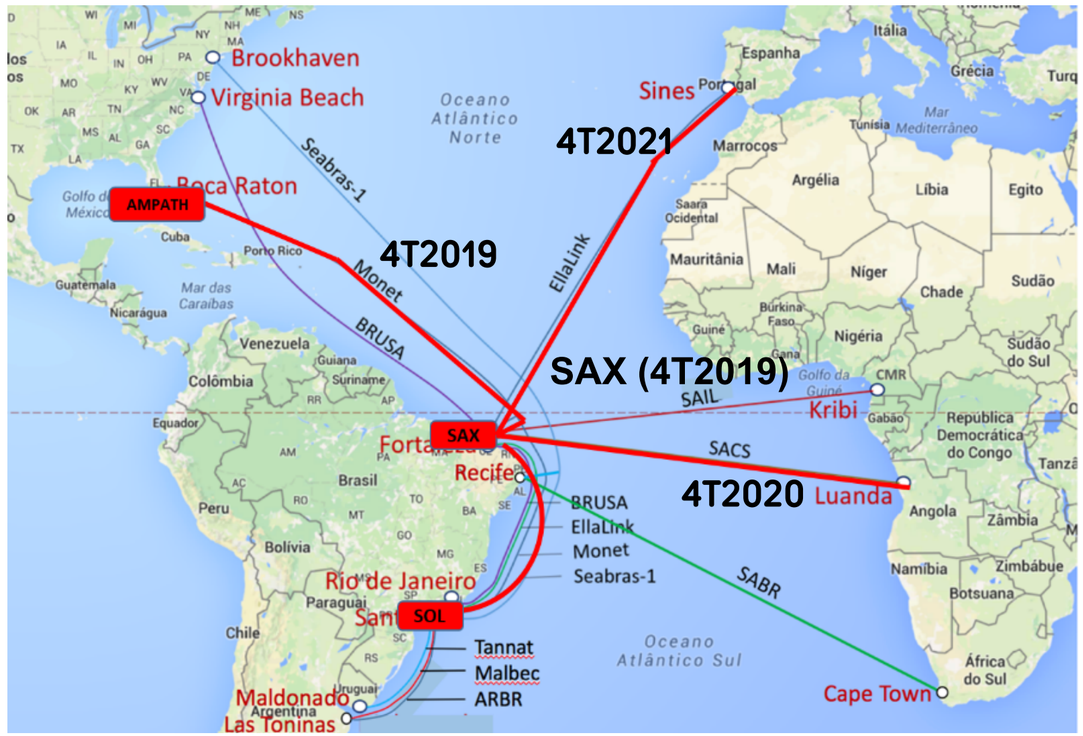
- **Phase I - Furnas (Southeast)**
  - Rio – S Paulo – Campinas (green)
- **Phase I - Eletrosul (South)**
  - Curitiba – Florianópolis – Porto Alegre (red)
- **Expected for end of 2019**

Furnas & Eletrosul



# Backbone in 2022 & international links




**International Exchange Points (GXP):**

AMPATH: Miami, FL, USA

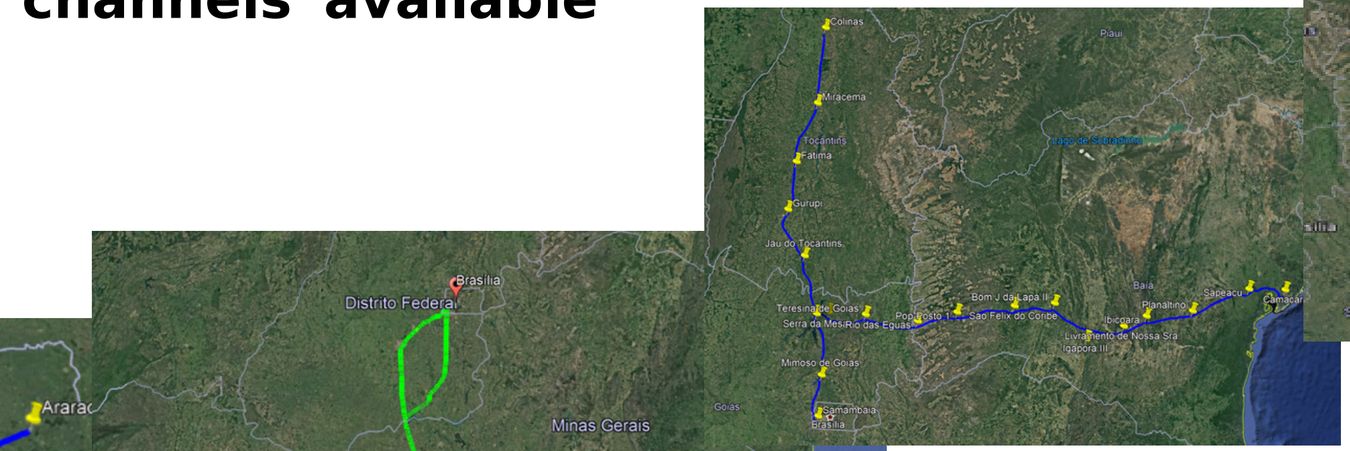
SAX: Fortaleza, CE, Brazil

SOL: São Paulo, SP, Brazil

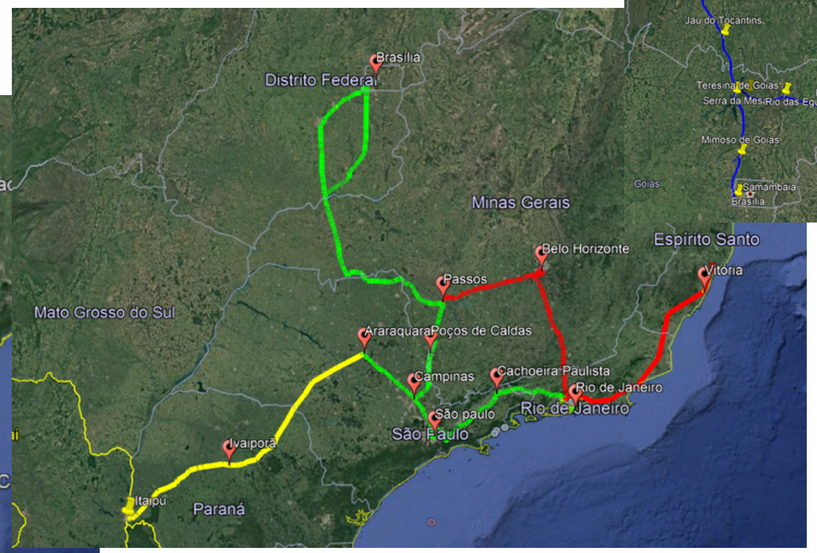
# Sharing the backbone built w/ Power Companies (Chesf, Furnas, Taesa & Eletrosul)

- **With regional ISPs and States Information Highways (“Infovias”)**
  - States of Northeast, Southeast & South
- **Multiple optical channels available along all routes**

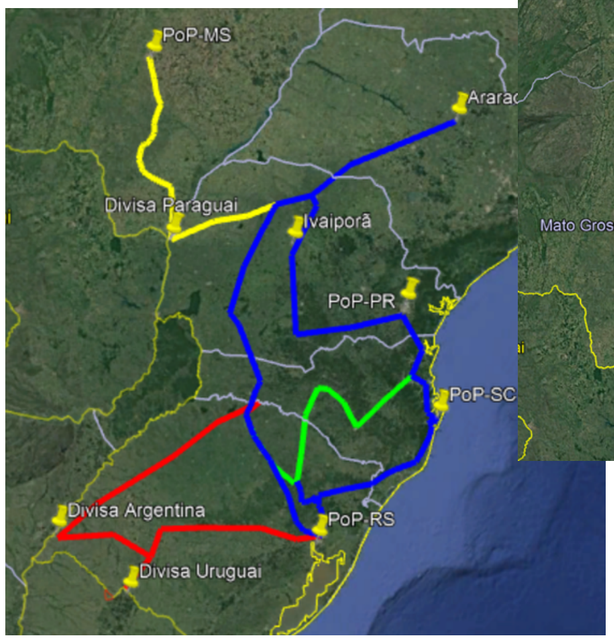

Chesf




Taesa




Furnas




Eletrosul

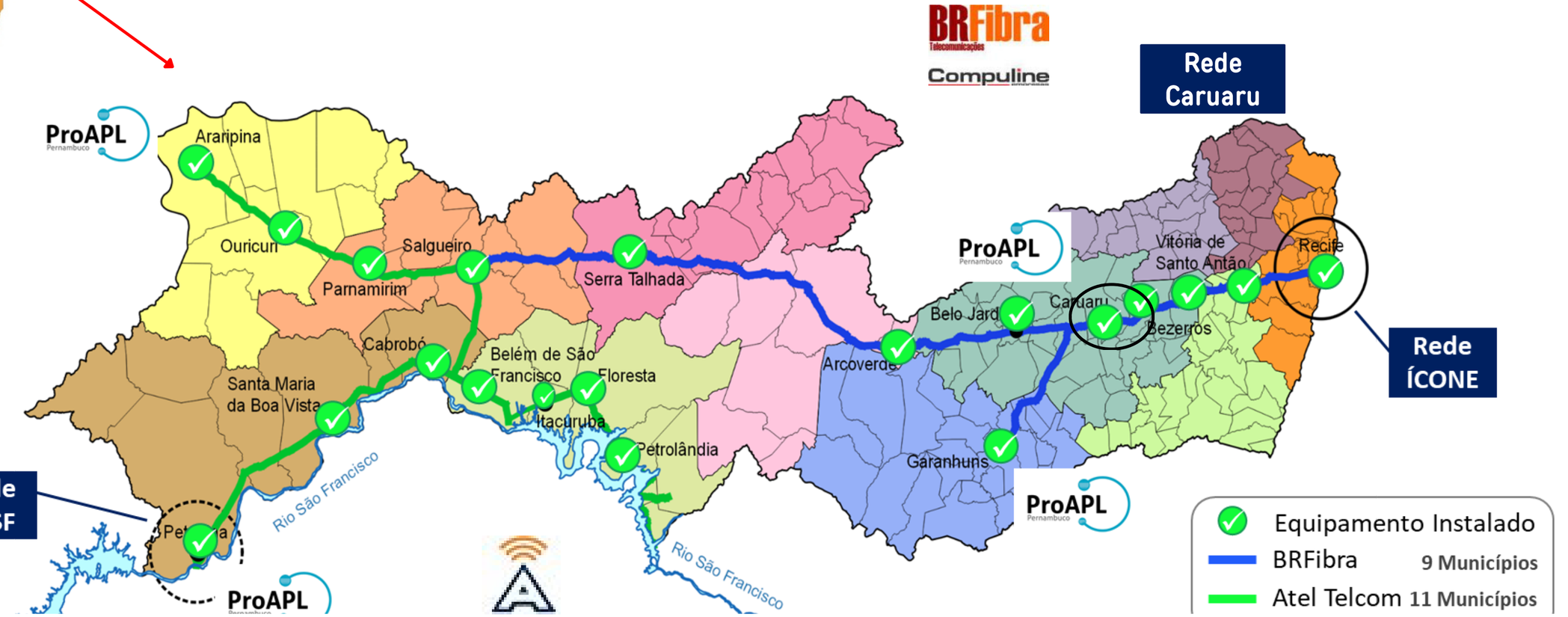
# Metro networks (“Redecomep”)

- **Community Education and Research Network ( “Redecomep”**
- **Own metro networks in 36 cities**
  - 24 capitals
  - 12 non-capitals
- **Metro networks under construction**
  - 27 non-capitals
- **Metro networks under project**
  - 5 non-capitals


# Sharing, swap and joint construction w/ ISP (Internet Service Provider) in metro networks

- **Joint construction**
  - Together with providers chosen through a public tender process
  - RNP: acquires optical cables; ISP: installs the cables (aerial)
  - Several cities just deployed or “in progress”
- **Swap of fiber pairs vs. maintenance in the same location**
  - RNP: cedes 1 (one) fiber pair, ISP: undertakes to provide maintenance under SLA
  - Examples: Manaus, Rio de Janeiro, Porto Alegre, …
- **Swap of fiber pairs in same/different location(s) or long-distance fiber**
  - Fiber x fiber (km-pair)  in the same (1:1) or different location (1:n)
  - Fiber x fiber (km-pair) of metro network for long-distance fiber (1:n)

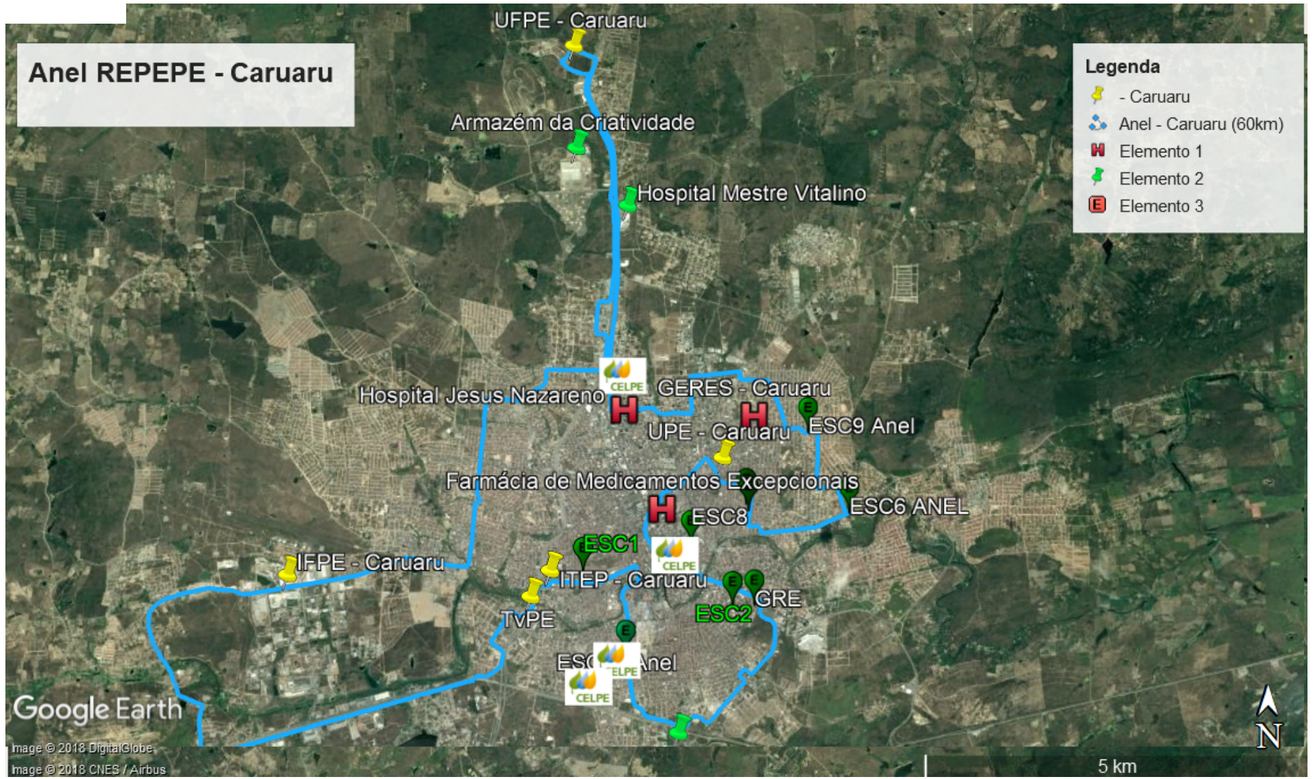
# Backhaul construction and metro networks
# Partnership w/ state government & ISP
# Pernambuco State Infovia – RePEPE




Atel Telecom

# Example of joint construction w/ ISP
# Metro network – Caruaru (Northeast)

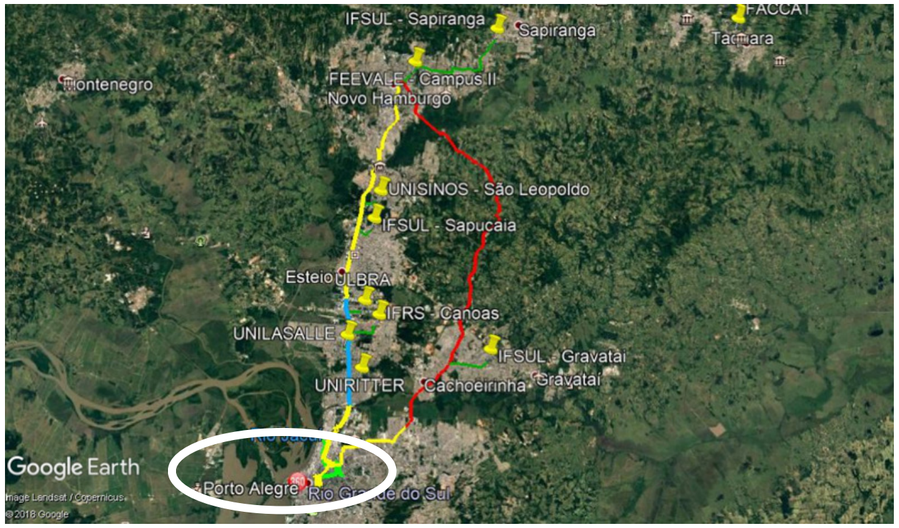
- **City in Northeast region**
- **Caruaru metro**
  - Size of ring ~60 km
  - 10 clients attended.
- **ISP Partner**



# Example of swap w/ ISP
# Metro network - Porto Alegre city

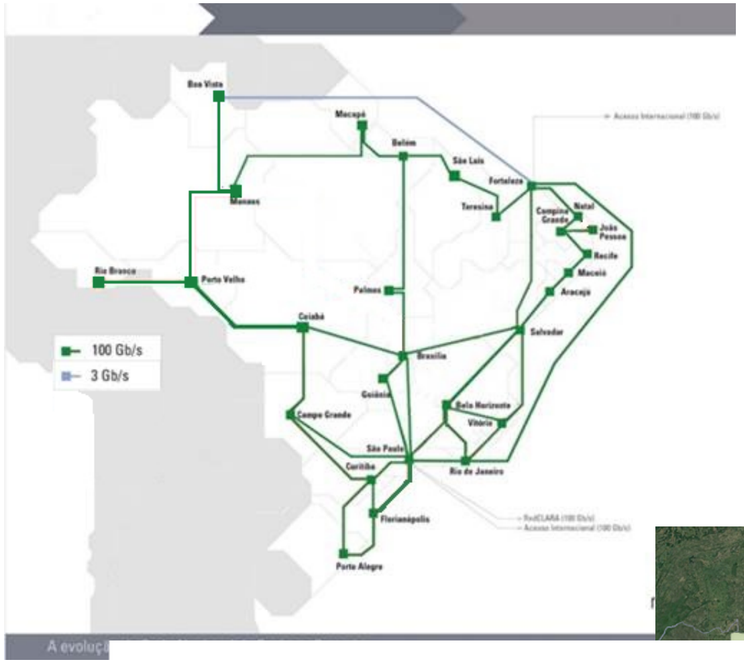
- **Porto Alegre City**
  - State of the southern region, border with Uruguay and Argentina
- **Swap**
  - RNP ceded ~90 km
  - ISP ceded ~50 km w/ redundancy
  - Km-pair X km-pair
- **Metro extended**
  - + ~100 km
  - + 8 clients, attended
- **ISP Partner**


X



# Conclusions

- **100G Backbone “is on its way”**
- **Opportunities for joint construction & swap w/ ISPs**
  - Backbone & Backhauls
  - Metro networks
- **Opportunity to build statewide data highway**
  - Making good use of optical infrastructure of RNPs partnership with the major power companies
  - Building of backhaul & new metro networks









**Thank you!**

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# Support slides


# Valuation of counterparts in dealing w/ ISP


- **Joint construction**
  - Optical cable acquisition / km ≅ aerial cable-laying service / km
  - 50% deployment cost reduction
- **Fiber swap X maintenance in the same locality**
  - Rental of 1 (one) fiber pair / km ≅ Maintenance cost / km
  - Save EU 1.500 – 2.000 per km/year
- **Fiber swap in the same or different localities**
  - km-pair x km-pair in same/different locality(ies)
  - Different localities can have different valuations
- **Long-distance fiber swap**
  - km-pair x km-pair
  - Difficulty for valuation

# Information highways & Metro networks
# Important points

- **Segregation between Academic Network & Backhaul x ISP Network x State Backbone**
  - Links between localities
  - Metro networks
- **Complementary ir electrical infrastr government use**
  - (Transponders + Ma
- **PoP/NOC/Service Infovia/metro net**
  - O&M/remote hands i state government
- **Service to our clientes is the main objective**
- **Attention to payback, CAPEX/OPEX, TCO, $$$, etc.**


Infrastructure is like a child:
if you bring it into the world,
you have to take care of it!