



rednesp

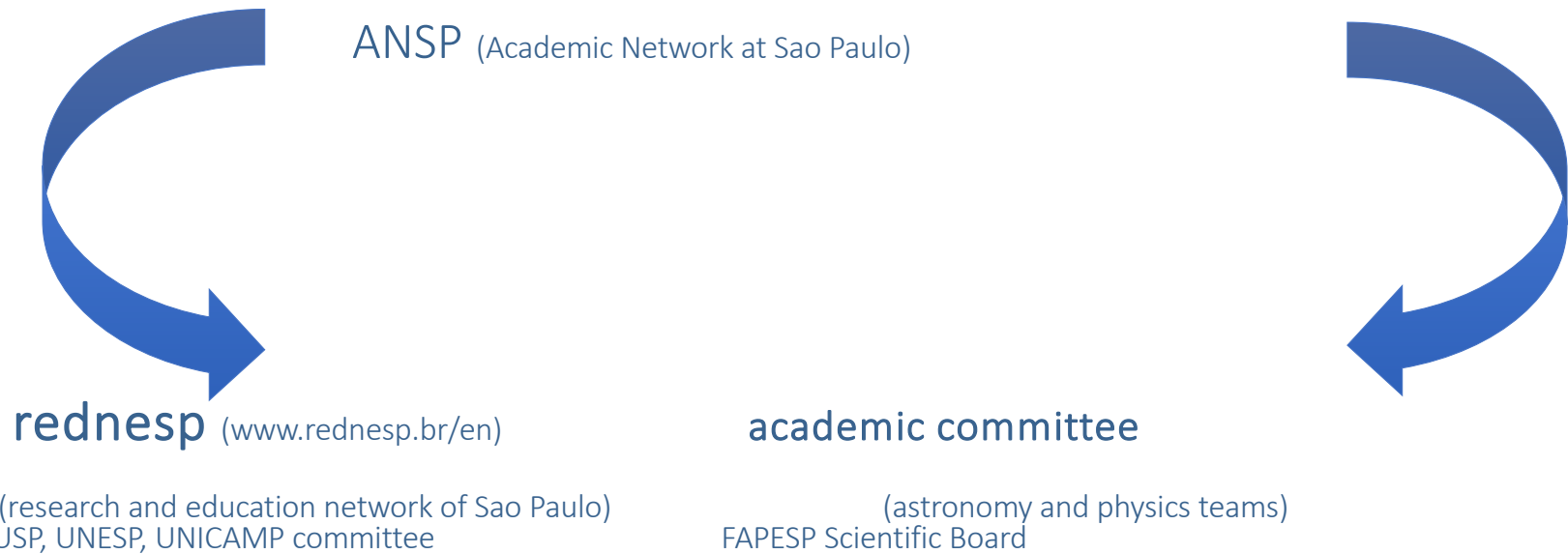
Research and Education Network of São Paulo

SA3CC Meeting
May 05-05, 2025

Agenda: current rednesp efforts

Prof. Dr. Ney Lemke
(São Paulo State University - UNESP)
ney.lemke@unesp.br

from ANSP to rednesp



USP (University of Sao Paulo)
UNESP (São Paulo State University)
UNICAMP (State University of Campinas)

Financial Investment

- USD 5 M by year in last 16 years
for providing Atlantic and Pacific links (orange lines)
in the AmLight cooperation and rednesp
connections.
- **Funded by FAPESP**
(The Sao Paulo Research Foundation)
<http://fapesp.br/en>



management of international connections



Resilient Links (2 x 100 Gbps)

Funded by FAPESP-rednesp and provided by Lauren

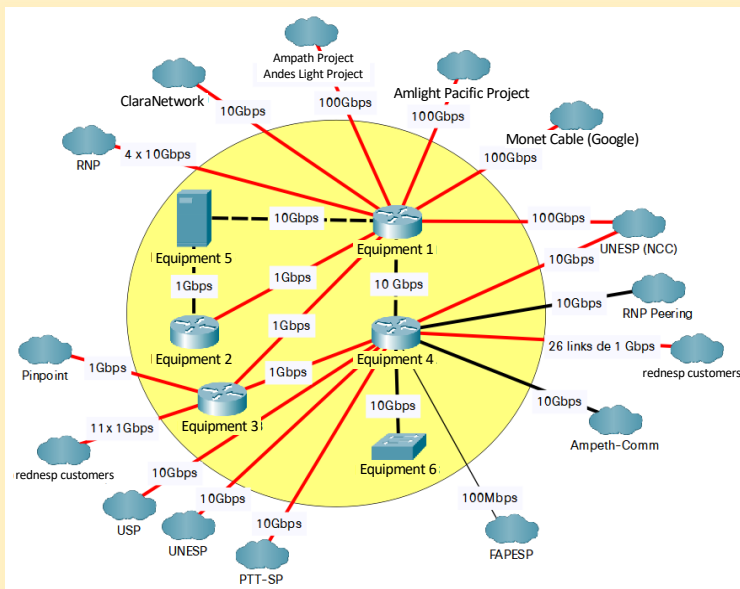
Monet Link (2x 100 Gbps)

Provided by AmLight cooperation

Ella link (Bella Programme)

Provided by European effort and RNP management in Brazil

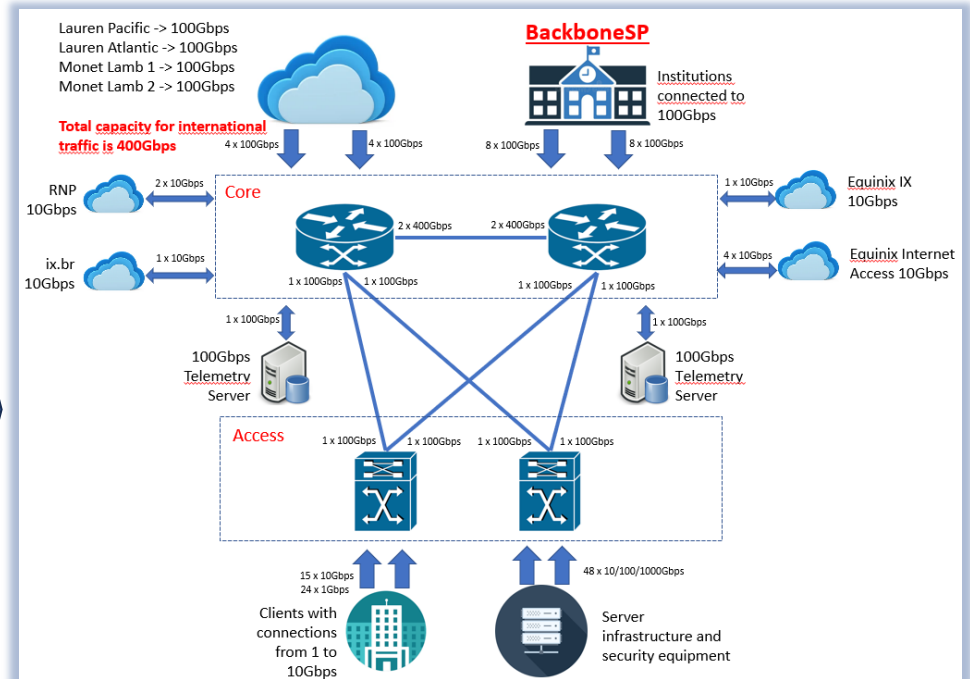
Old infrastructure –100Gbps



Obsolete and discontinued equipment

- limited capacity
- no possibility of upgrade
- no possibility of growth

New infrastructure - 400Gbps



State-of-the-art Juniper equipment

- capacity of up to 14.4Tbps per slot
- PTX10004 has 4 slots totaling 57.6Tbps

Investment of USD 500 thousand

Infrastructure evolution

New cage - Equinix

front view



background view





Integrating 8 academic institutions at 100Gbps in the State of Sao Paulo

✓ 2 new academic institutions integrated in 2025

Integrating academic institutions by Backbone-SP



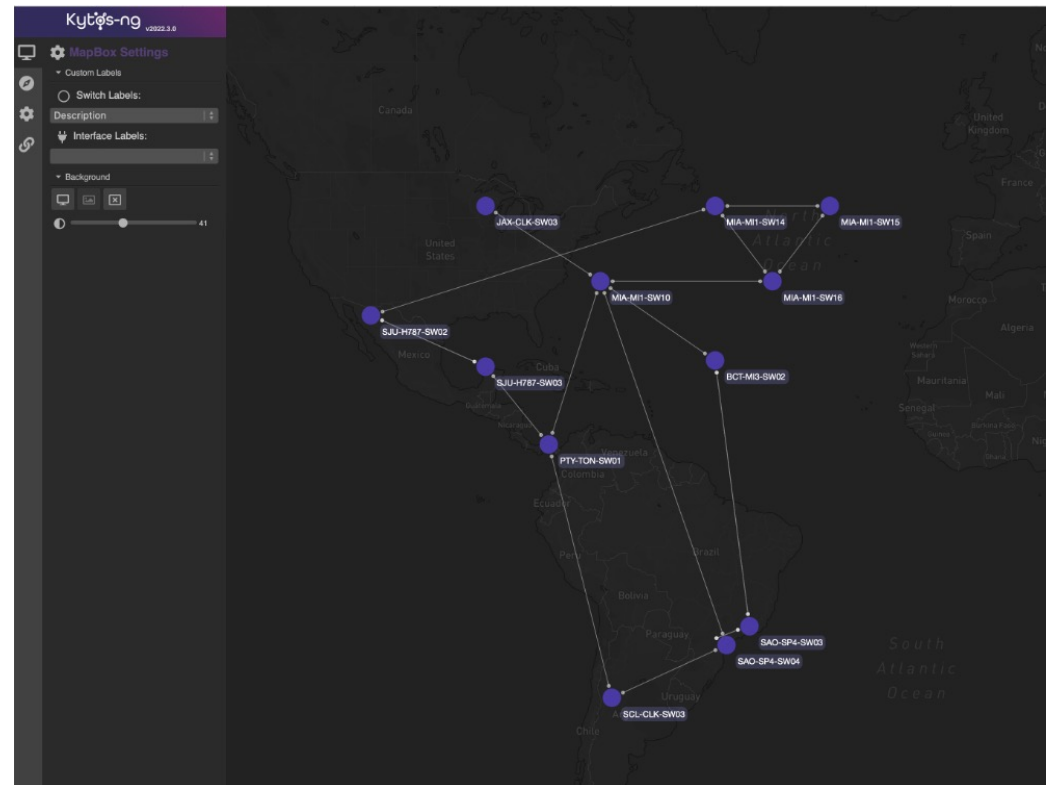
- High availability connectivity infrastructure using 100Gbps for supporting teaching and research in the State of São Paulo
- Backbone for state and international connection using high speed
- Protocol-transparent point-to-point links
- Alternative for interconnection of research centers in the State of São Paulo
- Backbone for integration of HPC servers
- 2 New institutions in 2025

Kytos-ng

- SDN platform
 - SDN Controller
 - orchestration of SDN switches of the Pacific/Atlantic ring connecting São Paulo/BR to Florida/US
 - Multi-component architecture
 - Framework to develop Network Applications (NApps)
 - E-Line (Point-to-Point Ethernet virtual circuits)
 - LLDP network topology discovery
 - Pathfinder for computing constrained best paths
 - Bidirectional Forwarding Detection (BFD)
 - INT In-band network telemetry
 - Controlled by REST APIs or Web UI
- Open source code available at Github repository
 - [<https://kytos-ng.github.io/releases/2025.1/2025.1.html>]
 - Source-code and release notes are publicly available

Kytos-ng next steps

- rednesp contribution for Kytos-ng 2025.1
 - Upgrade and review core UI and NApps UI to Vue.js 3
 - Review of UI unit tests core infrastructure





SC 2024 experiment



Supercomputing 2024 (SC 2024) <https://sc24.supercomputing.org>

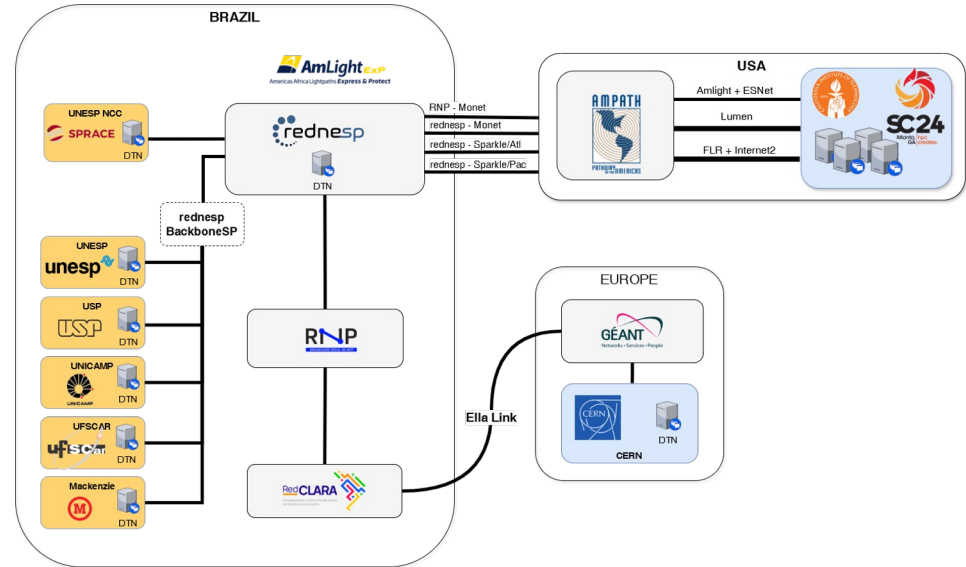
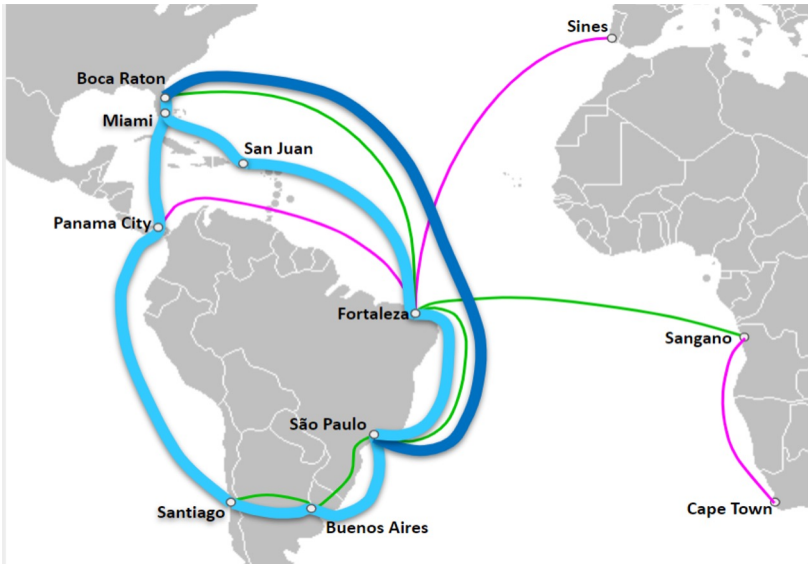
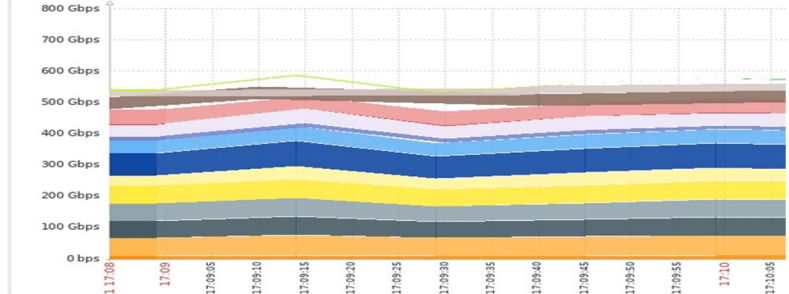


Grafico SC24 DTNs



Adding projects

- **Observatory - Cherenkov Telescope Array (CTA)** <https://www.cta-observatory.org/>

Prof. Luiz Vitor de Souza Filho – PI FAPESP in the CTA cooperation grant

the main goal: linking the observatory from Chile to Europe for study the extreme environments of the universe through detection of the **highest known energy radiation** such as the explanation of dark matter, the possibility of breaking of Lorentz invariance and understanding how supermassive black holes operate.

- **Integrating High Performance Computing Centers in Sao Paulo**

the main goal: provide the Scientific and Technological Cooperation Agreement between FAPESP, MCTI and MCom (fapesp.br/8388) - USD 20 M.

rednesp-FAPESP teams and Partners

FAPESP

Prof. Dr. Marco Antonio Zago - President

Administrative-Technical Board (ATB)

- Prof. Carlos Américo Pacheco – Director of ATB
- Prof. Márcio de Castro Silva Filho – Scientific Director
- Prof. Fernando Menezes de Almeida – Administrative Director

rednesp university committee:

- Prof. João Paulo Gois / UFABC
- Prof. Calebe de Paula Bianchini / Mackenzie
- Prof. Paulo Bandiera Paiva / UNIFESP
- Prof. Hermes Senger / UFSCar
- Profa. Cecilia de Azevedo Castro Cesar/ITA
- Prof. Daniel Batista Macedo/USP
- Prof. Ney Lemke / UNESP
- Prof. Ricardo Dahab / UNICAMP

rednesp executive committee

- Prof. Ney Lemke (UNESP) – Coordenador
- Prof. Daniel Batista Macedo (USP)
- Prof. Ricardo Dahab (UNICAMP)

rednesp technical team

- Prof. Carlos Antônio Ruggiero
- Bruno Ferreira Baldim
- Paulo Sérgio Simionato
- Rogério Motitsuki
- Geraldo Teodoro da Silva
- Ana Maria Dias Cerqueira

USP collaborators

- Jorge Marcos de Almeida

Partners - Backbone SP



Partners





rednesp

Research and Education Network of São Paulo

SA3CC Meeting
May 05-05, 2025

Thanks!

Prof. Dr. Ney Lemke
(São Paulo State University - UNESP)
ney.lemke@unesp.br