SC26 Network Research Exhibition:

High Performance Networking with the São Paulo Backbone SP Linking 10 Academic Institutions

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Abstract

The research and education network at Sao Paulo (rednesp), formerly ANSP (Academic Network at Sao Paulo), connects dozens of research and education institutions in the State of Sao Paulo, Brazil also providing international connections to the USA and to Europe. After designing it in 2022, rednesp started deploying a new backbone, known as "Backbone SP" connecting major research and education institutions with 100 Gbps links: University of Sao Paulo (USP), University of Sao Paulo State (UNESP), University of Campinas (UNICAMP), Aeronautics Institute of Technology (ITA), Federal University of São Carlos (UFSCAR), Mackenzie University, Federal University of ABC (UFABC), Federal University at São Paulo (UNIFESP), National Institute for Space Research (INPE) and Data Processing Company of the State of São Paulo (PRODESP). All links are now fully operational including a 100 Gbps link to UNICAMP from the Brazilian Synchrotron Light Laboratory (LNLS) which is part of the Brazilian Center for Research in Energy and Materials (CNPEM), in Campinas (SP). Backbone SP (figure 2) is connected to the USA through two 100 Gbps and one 800 Gbps links (all shared with Amlight and RNP), recently uodated from 2x200gbps, and to Europe through a 100 Gbps link using the Ellalink cable (figure 1). The total bandwith from Brazil to the US has risen to 1.2 Tbps in the beginning of 2026. There is also a connection to Chile (to the Vera Rubin Large Synoptic Survey Telescope (LSST)), and a connection to Buenos Aires in Argentina (RNP).

This year, the rednesp team will try to improve high-speed transmission efficiency. Last year, we achieved 81% efficiency on a 1.3 Tbps intercontinental link connecting São Paulo, Brazil, with the United States. While the available bandwidth will be lower this year, transmission efficiency is expected to improve by optimizing the transmission method and the number of streams, aiming for better utilization of the communication channel, which has high latency due to the great distances involved in intercontinental transmissions.



Figure 1 Intercontinental connections - rednesp



Figure 2 Backbone SP - State of Sao Paulo, Br

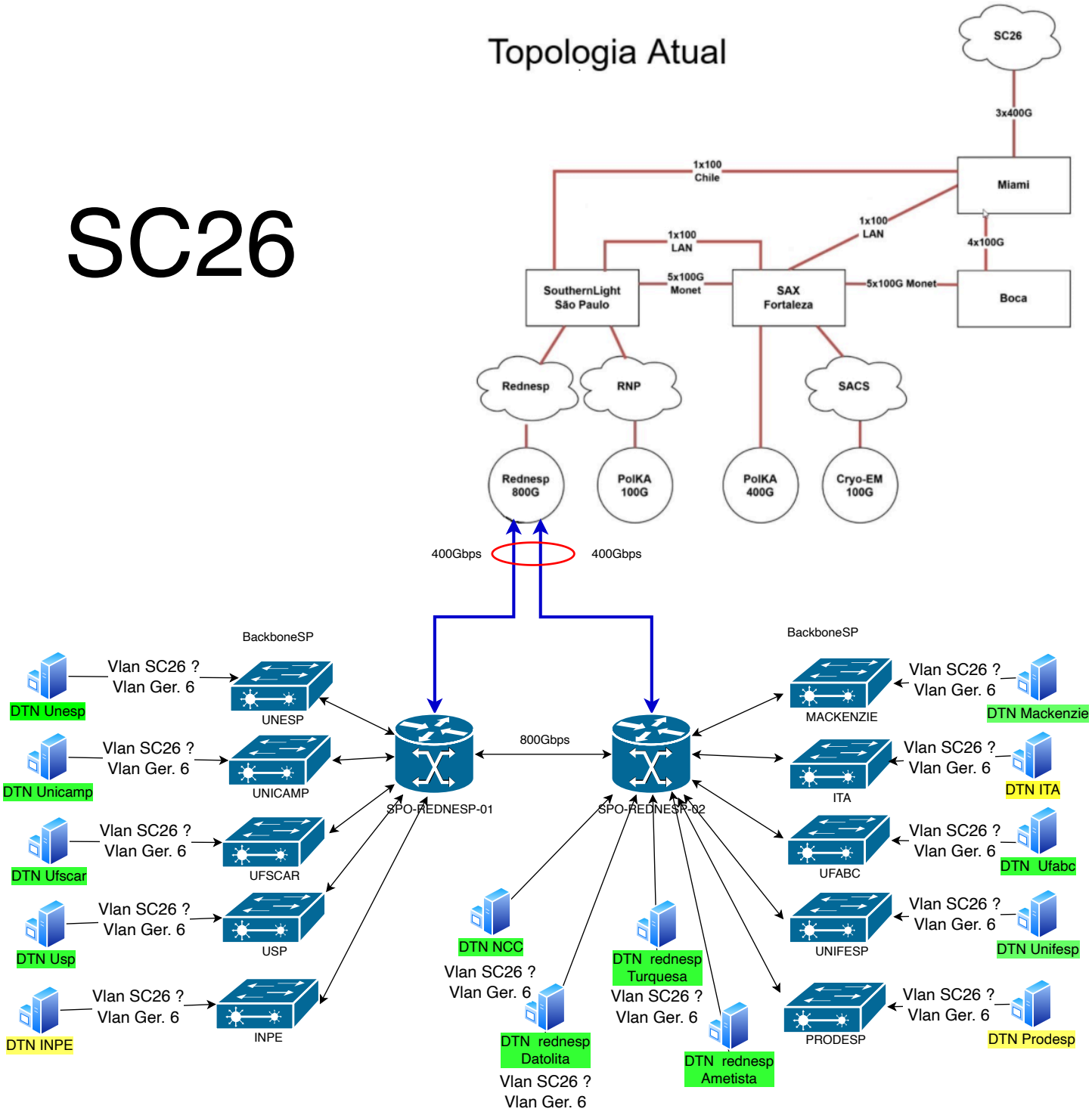
Goal

Achieving an academic record for efficiency on a high-speed intercontinental circuit (North and South America) by improving upon last year's 81% efficiency between the São Paulo rednesp backbone and the SC26 Caltech booth in Chicago, USA.

Resources

- AmLight 400 Gbps connection between the state of Sao Paulo, in Brazil and Florida in the US using the Monet cable.
- Three 400 Gbps SCinet connections linking Miami to , SC26, in Chicago, USA.
- The rednesp BackboneSP 100Gbps nodes, to aggregate traffic from major research institutions.
- Caltech DTN server with two 400 Gbps interfaces located at the SC26 Caltech booth.

The setup that will be used for the SC26 demonstration is shown in the figure below.



Involved Parties

- **Rednesp**: The rednesp team.
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