



núcleo de aplicações em redes avançadas



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Brasil



The State Of São Paulo

1. The State of São Paulo:

- Produces ~ 30% of Brazilian GDP
- Produces ~ 40% of Brazilian Science & Technology
- Has a Science Foundation (FAPESP) similar to NSF, supported by 1% of the State Government budget
 - FAPESP supports research in:
 - Universities
 - Research Centers
 - Small businesses

2. ANSP (the Network)

- First application approved by FAPESP on February, 1989, as a project connected to Fermilab (then, the name *an Academic Network at São Paulo* – in English!).
- Initially meant to link the Physics community in São Paulo (USP, Unicamp, Unesp, IPT) to the Fermilab.
- Later, until 1994, the only access from Brasil to Internet, both for research & education and comercial purposes.
- Currently links 56 institutions from the State of São Paulo to virtually all networks over the world.

- **ANSP** peers directly to
 - **RNP** (Rede Nacional de Ensino e Pesquisa);
 - **RedCLARA** (Cooperación Latino Americana de Redes Avanzadas);
 - **Ampath**;
 - **AtlanticWave**;
 - **Cenic** (Corporation for Education Network Initiatives in California);
 - **Internet2**;

And through them, to the rest of the NRENs in the world.

- ANSP is also a funding member of the **GLIF** (Global Lambda Integrated Facility).



3. ANSP (the Program)

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Research Infrastructure Programs

- ANSP Network
- Scientific Electronic Library Online (SciELO)
- Technical Training Program
- Support of Research Infrastructure

Refine results

- Field of knowledge
- Research Grants
- Research Infrastructure Programs
- Institution

ANSP Network

FAPESP **ANSP Network** is an important support for the operation of the Internet in Brazil. It is also used as infrastructure for research projects approved in the program Information Technology and the Development of Advanced Internet (TIDIA). The projects are carried out under the responsibility of a Principal Investigator, associated with higher education or research institutions in the State of São Paulo. The selection is through a peer-reviewing system.

FAPESP support in numbers (Total / Available in English)

- 25 / 23 Ongoing research grants
- 88 / 23 Completed research grants
- 4 / 0 Completed scholarship in Brazil
- 117 / 46 All Research Grants

*Updated in January 03, 2015

Ongoing research grants (most recent)

- Annual Application Plan for the USP technical provision related to the projects "Conectividade da USPnet com a ANSP: Resiliência da USPnet" e "Hospedagem da InterNuvem", AP.RT.ANSP
- Development of FapUNIFESP connectivity - ANSP network, AP.RT.ANSP
- Connectivity to the ANSP network from the research center from a.c. Camargo Cancer Center, AP.RT.ANSP

See more Ongoing research grants (Only some records are available in English at this moment)

Completed research grants (most recent)

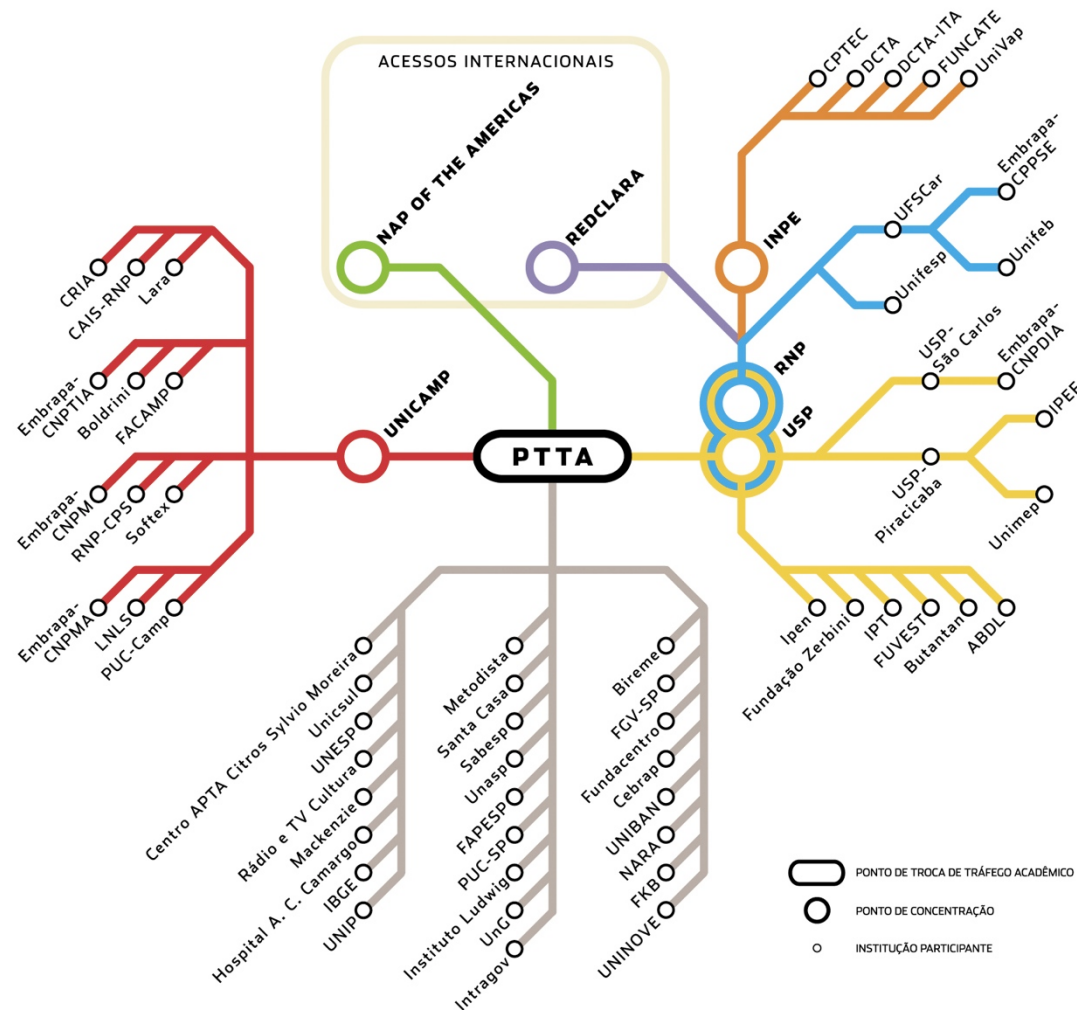
- High speed network extension to the development of clinical research, AP.RT.ANSP
- Reserva técnica institucional Conectividade ANSP, AP.RT.ANSP
- Reserve technical institutional connectivity for ANSP, AP.RT.ANSP

See more Completed research grants (Only some records are available in English at this moment)

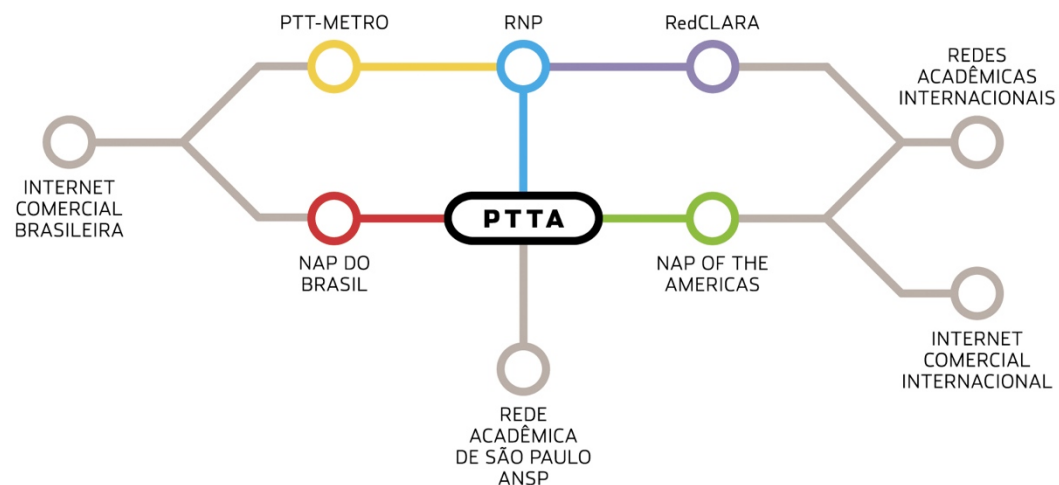
Map of FAPESP Support in the State of São Paulo

ANSP Network

Map Satellite



ANSP has
the topology
of a distributed
peering point



ANSP is
connected to
all the NRENs
and the
commercial
Internet

- ANSP runs only (SDN)BGP so that it is completely transparent for its users, who may have whichever peering/transit policies they want.
- As a member of GLIF, ANSP, together RNP operates a GOLE (SouthernLight)
- Currently, ANSP connects to Brazilian commercial networks and to the Brazilian NREN (RNP – Rede Nacional de Educação e Pesquisa) with a total capacity of 40 Gbps (USP and Unesp connect also directly through two additional 10 Gbps links).
- Internationally, ANSP works with FIU's Ampath and with RNP, providing four 10 Gbps links between São Paulo and Miami, which connect to the rest of the world through Atlantic Wave and Internet2 (OpenWave - 100 G in 2015).



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Microsoft Word interface showing a document titled "Benefits brought by the use of OpenFlow/SDN in the AmLight intercontinental research and education network". The document is displayed in Print Layout View, showing the title, authors, and abstract.

Benefits brought by the use of OpenFlow/SDN in the AmLight intercontinental research and education network

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Abstract—Operating unprotected network links for international collaboration between research and education communities, subject to a high-availability production service requirement, is challenging. Provisioning circuits, maintaining a loop-free network topology, and configuring multi-path redundancy to provide high availability are complex processes, which involve extensive coordination between, and manual configuration operations carried out by, multiple network operators, resulting in high operations costs. Moreover,

America. The AmLight links are shared and operated collaboratively by Florida International University (FIU) [3], the Academic Network of São Paulo (ANSP) [4], and Rede Nacional de Ensino e Pesquisa (RNP) [5]. The AmLight network uses a double ring topology formed by four spatially-diverse unprotected (a.k.a. "linear") 10Gbps connections, providing redundancy in case of a fiber cut on one of the network links, by moving data in both clockwise and counterclockwise directions around both rings. From São

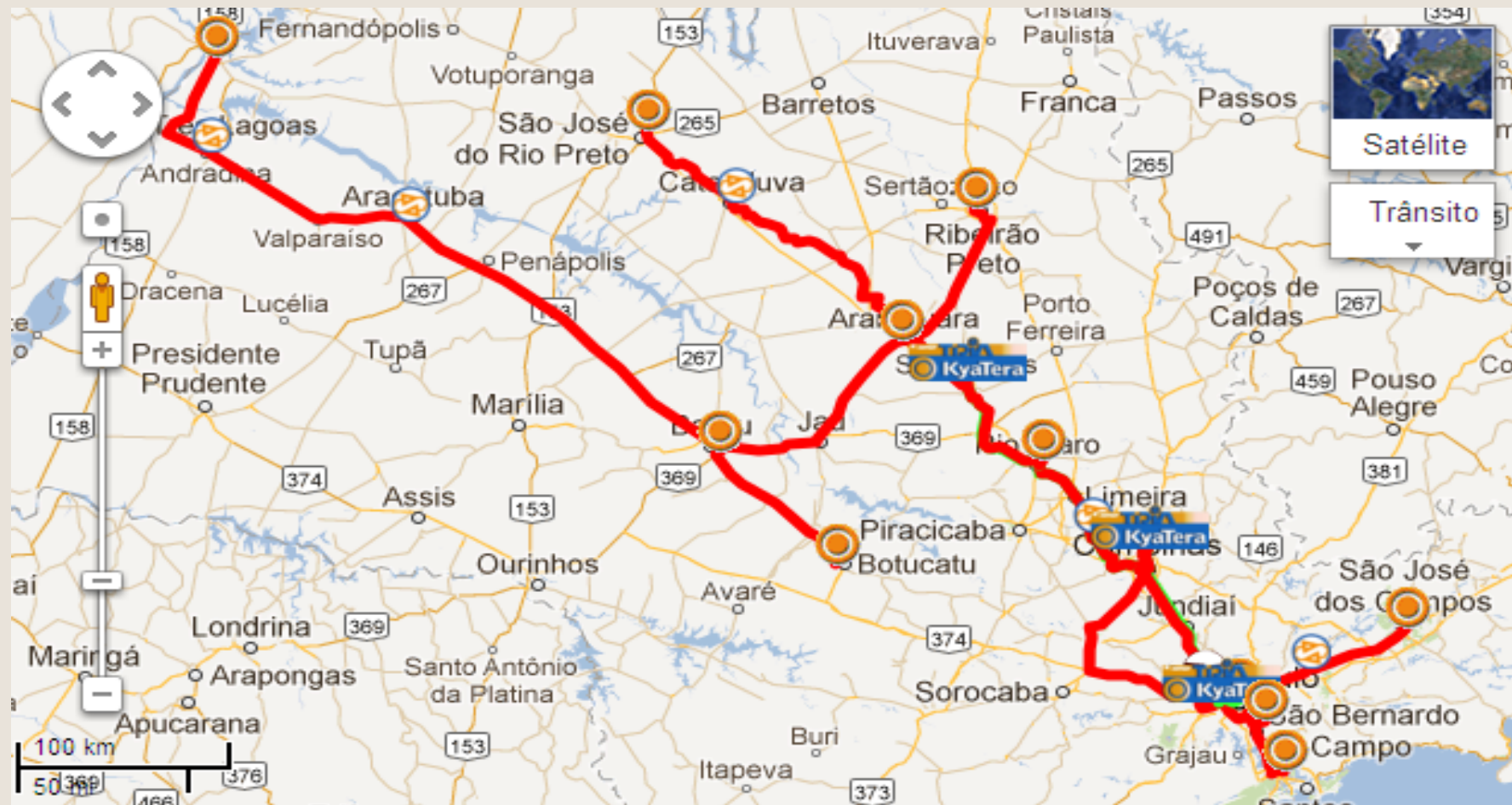
Print Layout View Sec 1 Pages: 1 of 6 Words: 0 of 4174 188%

ANSP (www.ansp.br) offers to its members:

- Internet access
- R&E networks access;
- Network connectivity (both physical and logic);
- High end data center (currently 1,000 sq ft) and
- Network project and operation consulting.

- **4. KYATERA (the Testbed)**

- First application approved by FAPESP in 2005;
- Initially meant to be a test bed for photonic research (Optical networks equipment is an important sector of the industry in the State of São Paulo);
- Currently works synergically with ANSP, providing to the R&E community also a experimental test bed of general use.
- The new test bed is planned and maintained by ANSP and Telefonica (now VIVO). Currently offers 10 Gbps lambdas and 100 Gbps lambdas are planned for 2015, depending on the demand (projects from Astronomy, Oil&Gas Research and Future Internet are expected).





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THANK YOU!