



Luis Fernandez Lopez

Center for Advanced Network Applications – University of São Paulo

Center for Internet Augmented Research and Assessment – Florida International University

Internet2 Technology Exchange

Miami, 28 September 2016



# Brasil



# The State Of São Paulo

## 1. The State of São Paulo

- 7 major research universities (all public).
- 200.000 students (half at USP) –  $\frac{1}{4}$  grad students.
- 40+ private universities and research centers (most public).
- 1 Science Foundation, pretty similar to NSF way of work – current budget ~ \$ 350 M.

## 2. ANSP (the Network)

- Project run by the Center for Advanced Network Applications of the Medical School of the University of São Paulo – I use to say ANSP is RNP in São Paulo.
- First links operational during the first half of 1988. First international link operational at the end of 1988.
- Officially inaugurated by FAPESP on February, 1989, as a project connected to Fermilab (then, the name *an Academic Network at São Paulo* – in English!).
- One of the first REN in the world to use TCP/IP (in production on february/1991)

## 2. ANSP (the Network)

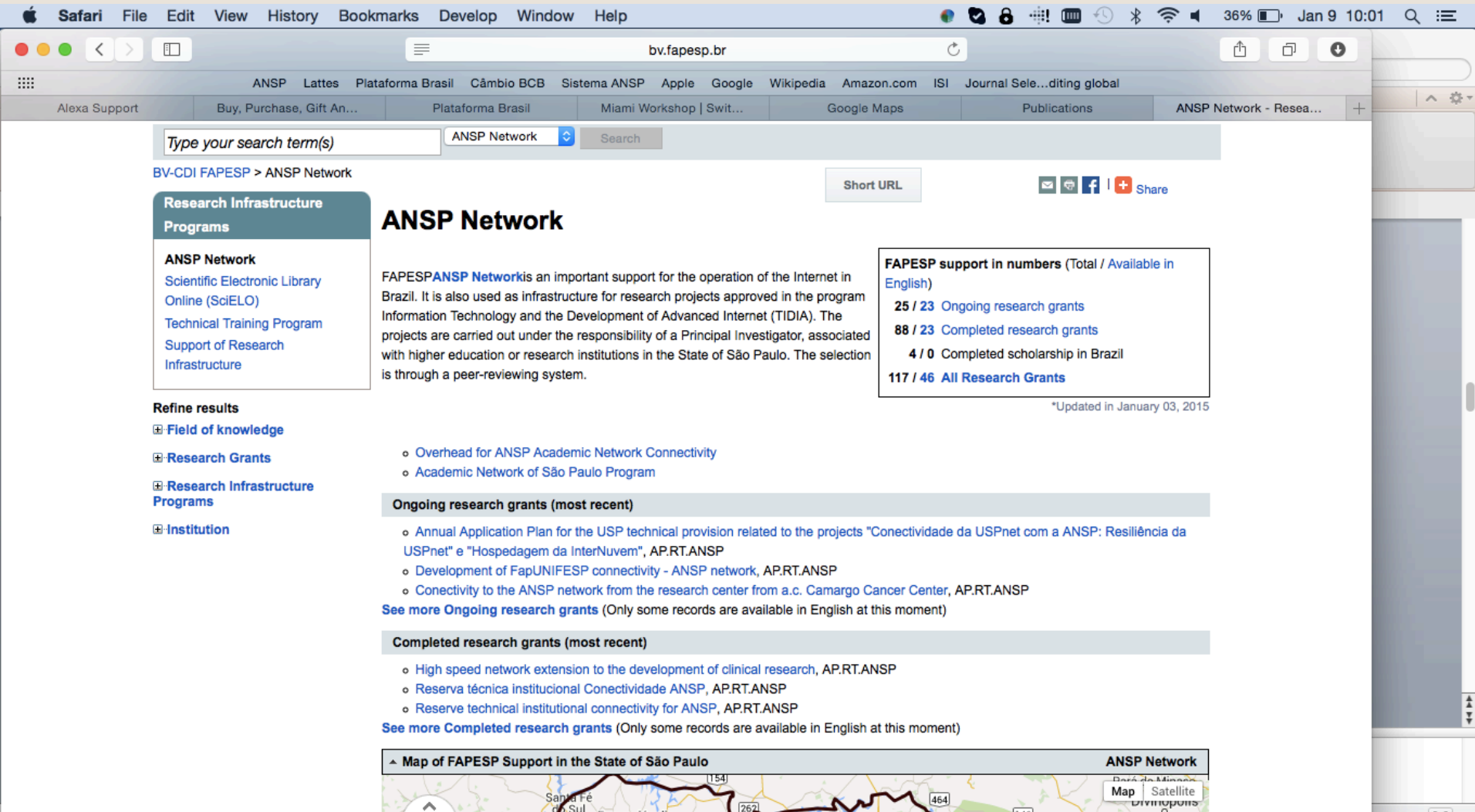
- Initially meant to link the Physics community in São Paulo (USP, Unicamp, Unesp, IPT) to their peers in US.
- Later, until 1994, the only access from Brazil to Internet, both for research & education and commercial purposes.
- Currently links 50 institutions from the State of São Paulo with bandwidths varying from 10 Mb/s to 100 Gb/s.
- In 2004 decided it should work with some institution in US in order to have a permanent reliable connectivity with the world research and education networks. FIU-CIARA was chosen.

### 3. ANSP (the Network – cont.)

- From 2004 to 2008 funded 80% of the links between Brazil and US (20% funded by the FIU project WHREN).
- Since 2009 funds 40% of the links connecting Brazil and Chile to US (other 40% funded by RNP and 20% funded by FIU projects Amlight and Amlight Express).
- ANSP is also a funding member of the **GLIF** (Global Lambda Integrated Facility) and operates the GLIF GOLE SouthernLight.
- ANSP hosts the PoP of red CLARA in São Paulo (the main red CLARA PoP).

# 3. ANSP (the Program)

núcleo de aplicações em redes avançadas



The screenshot shows the website [bv.fapesp.br](http://bv.fapesp.br) in a Safari browser. The page title is "ANSP Network". The main content area includes a search bar, a "Short URL" button, and social media sharing options. The main heading is "ANSP Network". Below this, there is a paragraph describing the network's purpose and a box containing statistics on FAPESP support in numbers. The statistics are as follows:

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

Below the statistics, there are sections for "Ongoing research grants (most recent)" and "Completed research grants (most recent)", each with a list of projects and a link to see more grants. At the bottom, there is a "Map of FAPESP Support in the State of São Paulo" showing the network's coverage area.



### 3. ANSP (the Program – cont.)

- ANSP's 2016 budget: ~ \$ 10M (1/3 transferred to the users for connectivity expenses)
- ANSP support its users financially to connect to the NAP but does not interfere in their technology or political choices. This is made in annual based calls.
- ANSP polices are defined by research needs, without interference of university's administration.

## 4. ANSP (some technical aspects)

núcleo de aplicações em redes avançadas

- Since 2004 ANSP runs only BGP(SDN) so that it is completely transparent to its users, who may have whichever peering/transit policies they want.
- 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 (most of our users connect also directly to RNP and Brazilian commercial internet).
- Internationally, ANSP works with FIU's Ampath and with RNP, providing four 240 Gbps of connectividade between São Paulo and Miami, with a stop in Santiago (Chile) which connect to the rest of the world through Atlantic Wave and Internet2 (AmLight Express).
- ANSP transports half of the research traffic of Brazil.

## Ongoing work:

- Amlight Express
- SDX
- State of São Paulo Academic Cybersecurity Center



---

núcleo de aplicações em redes avançadas

THANK YOU!