

IPv6.br

The Brazilian experience in IPv6 dissemination

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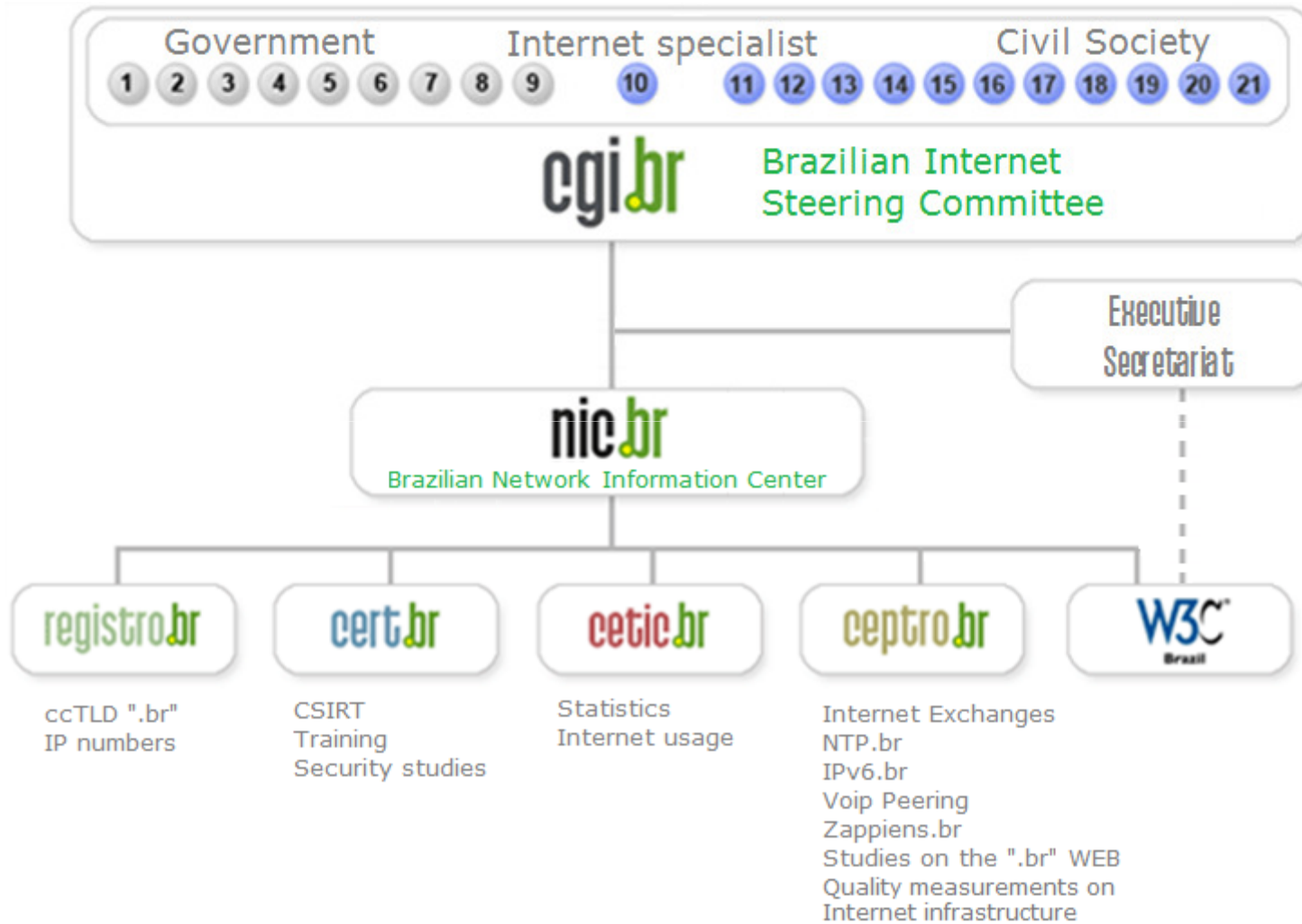
APRICOT 2010

03 March 2010 – Kuala Lumpur - Malaysia

CGI.br and NIC.br

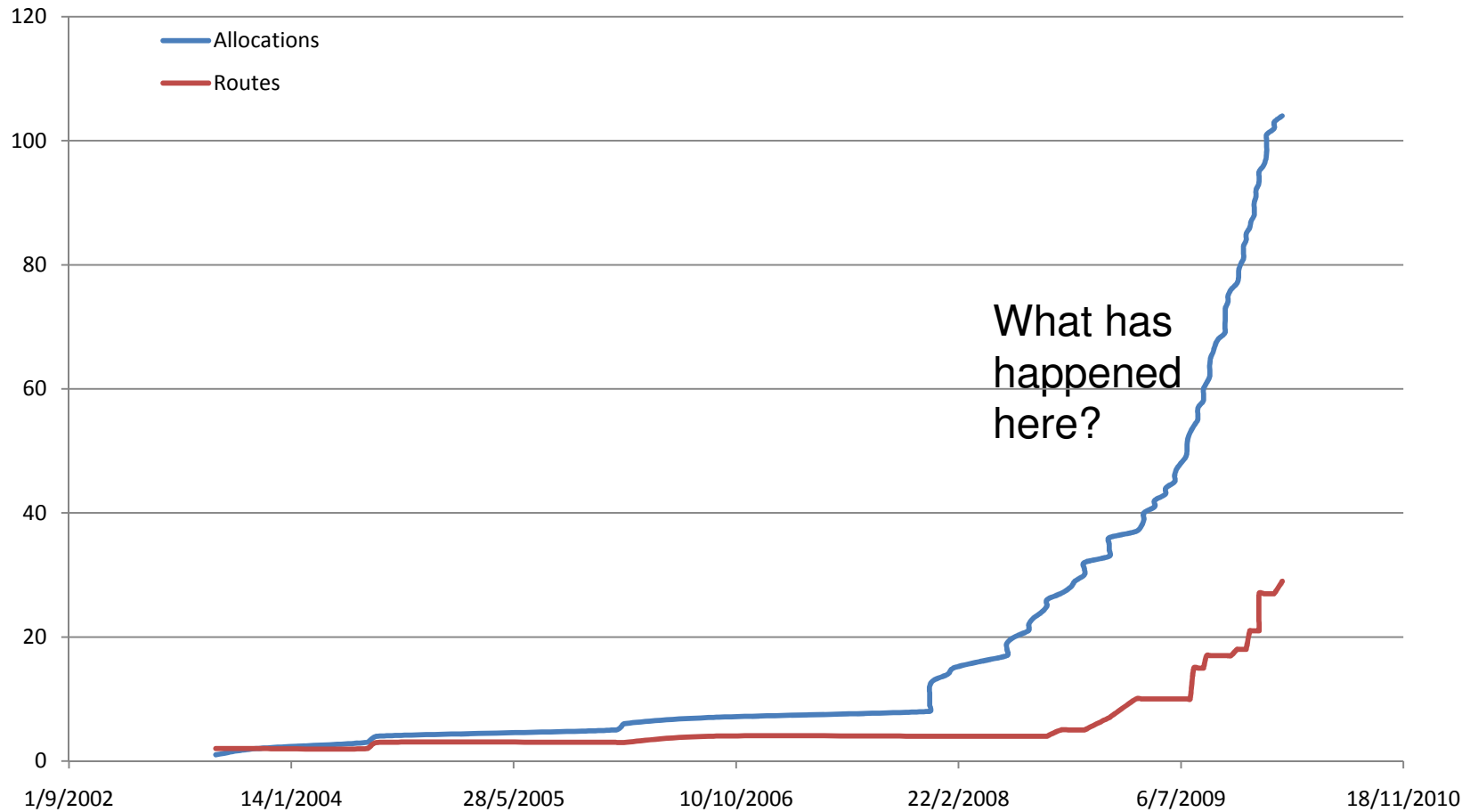
- The Brazilian Internet Steering Committee
 - Main Internet Governance organization in Brazil
 - Multistakeholder
 - Space of debate and coordination for the Internet initiatives
- Brazilian Network Information Center
 - Non-profit organization
 - Executive arm of the Internet Steering Committee
 - Manages “.br” ccTLD ← ~US\$ 17,00/domain/year
 - Functions as a National Internet Registry
 - Projects and services to improve Internet in Brazil

CGI.br and NIC.br



some results (ipv6 allocations)

(ftp://ftp.registro.br/pub/stats/delegated-ipv6-nicbr-latest)



some results (ISPs / government)



- ISPs started to create IPv6 test websites, or enable IPv6 in their websites:

www6.terra.com.br
www.acesa.com.br
www.onda.net.br
www.nipcable.com.br
www.abasetelecom.com.br
www.tecla.com.br (hosting 20.000+ IPv6 domains)
(...)

- Governments start to ask for IPv6 as customers...



(e-ping is a document with interoperability standards for the Brazilian Federal government, and it recommends IPv6)

(<http://www.governoeletronico.gov.br/anexos/e-ping-versao-4-0-in-english>)



intraGov is a network to be used by São Paulo (state) government, and it will have IPv6 and IPv6 access to the Internet.

(<http://www.prodesp.sp.gov.br/NOTICIAS/noticia-45.htm>)

easier access to the addresses (0)

- Until 2007, LACNIC was responsible for IPv6 allocations
 - This means a challenge for Brazilian Providers:
 - A legal contract, in spanish, with a foreing organization.
 - December 2007: Registro.br starts to register IPv6 address and AS numbers, what had been already happing with v4.
 - Policy: if you have already an IPv4 allocation, than you certainly justify at least a /32 IPv6.
 - Easier process led to a increase in registration.

awareness raising (1)

- It has started at beginning of 2008
 - Awareness raising
 - Speeches at 28 events
 - Universities
 - IT meetings / events
 - (...)



FISL 9
17, 18 e 19 de Abril de 2008
Porto Alegre



website (2)

- Awareness raising
- Information
- Started as a simple repository of pre-existent information (in Portuguese language)
- We noticed the need to write some articles / information → fill the gaps...
- Colaborative
- Creative Commons 2.5

website (2)

http://ipv6.br




e-learning package (3)

- We were pleased about 6diss (EU project) e-learning package
 - It was in English, but it has already Portuguese subtitles...
 - The language was a problem even with subtitles...
- We have tried to get permission to translate it... But it was not possible...
- We have decided to start our own project...
 - About six months later, we have done it (may/2009)
 - Professional look
 - Well written content
 - It has become very popular in Brazil

e-learning package (3)


http://ipv6.br/curso



A Nova Geração do
Protocolo Internet

- Introdução
- O Protocolo IP
- Implantação do IPv6
- Cabeçalho IPv6
- Endereçamento do IPv6
- Serviços Básicos do IPv6
- Segurança
- Roteamento e Gerenciamento
- Coexistência e Transição
- Mais Informações

Uma iniciativa



Curso de Introdução ao IPv6
☰ ? 6 / 14

Cabeçalho IPv6

Versão (Version)		Classe de Tráfego (Traffic Class)	Identificador de Fluxo (Flow Label)	
	Tamanho dos Dados (Payload Length)	Próximo Cabeçalho (Next Header)	Limite de Encaminhamento (Hop Limit)	

Endereço de Origem(Source Address)

Endereço de Destino(Destination Address)

O campo Identificador de Fluxo foi acrescentado, adicionando um mecanismo extra de suporte a QoS ao IP. ➔

anterior
próximo

capacity building (4)

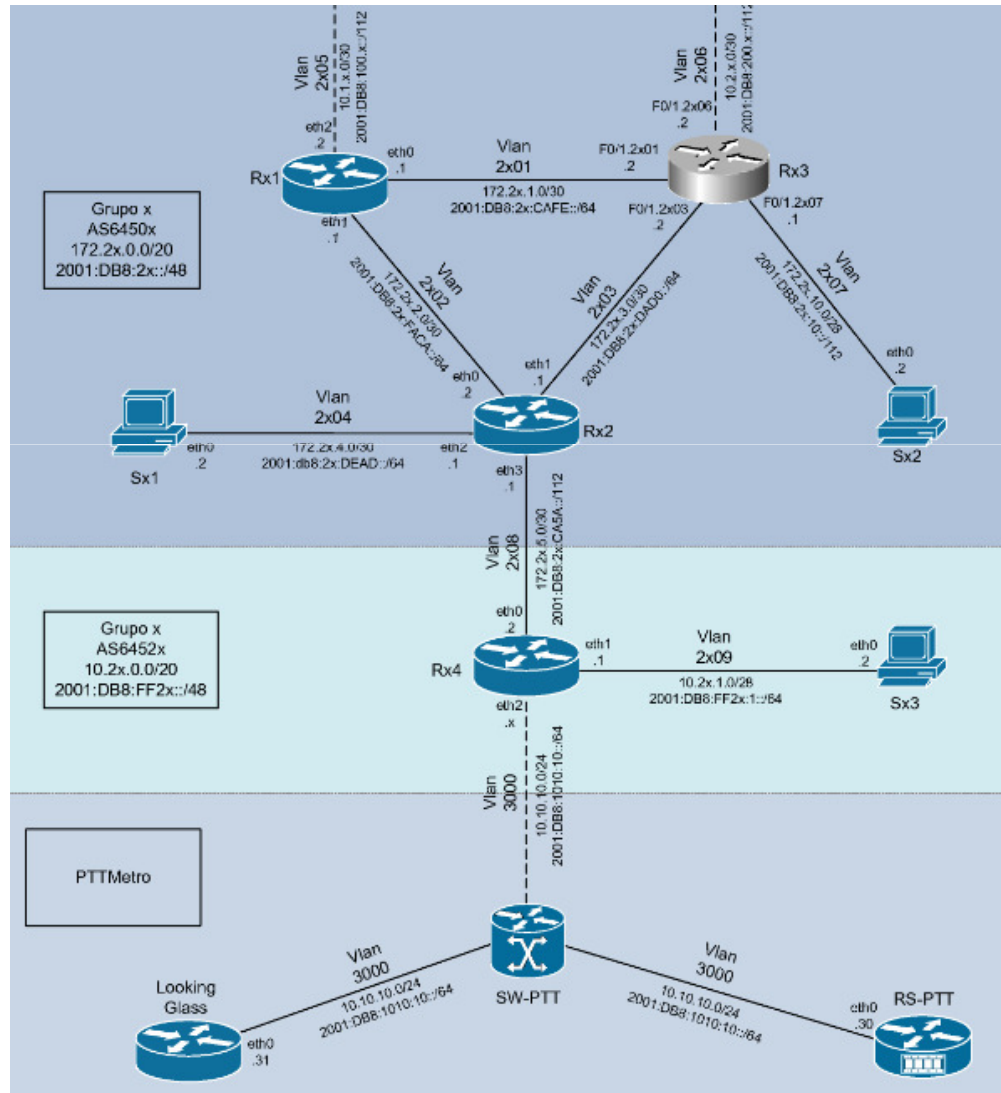
- How do we reach the Brazilian ISPs?
 - We have had the feeling that capacity building was an important need.
 - High costs...
 - We have prepared our own brochures inspired on 6diss/6deploy material, but completely rewritten
 - Creative Commons! Comercial use, derivative works, copy, distribution, all uses are allowed...
 - Laboratory: 6 CISCO + a lot of virtual machines with linux and quagga
 - Evolved to 8 Cisco + 8 Juniper routers, plus ~ 50 virtual machines, to teach 8 groups of 4 people each.

capacity building (4)

- 10 courses already
 - More than 250 people, from ~150 organizations (mainly ISPs or other Autonomous Systems) trained.
- Intensive / hands on / 5 days = 36h (theory + labs)
 - It has become very common, in the next few weeks :
 - ...the ISPs ask for an IPv6 allocation
 - ...to ask for IPv6 peering in our IXPs
 - ...sometimes, to put a test IPv6 website to work



capacity building (4)



Theory

- introduction
- basic functionality
- routing
- management
- security
- planning

Labs

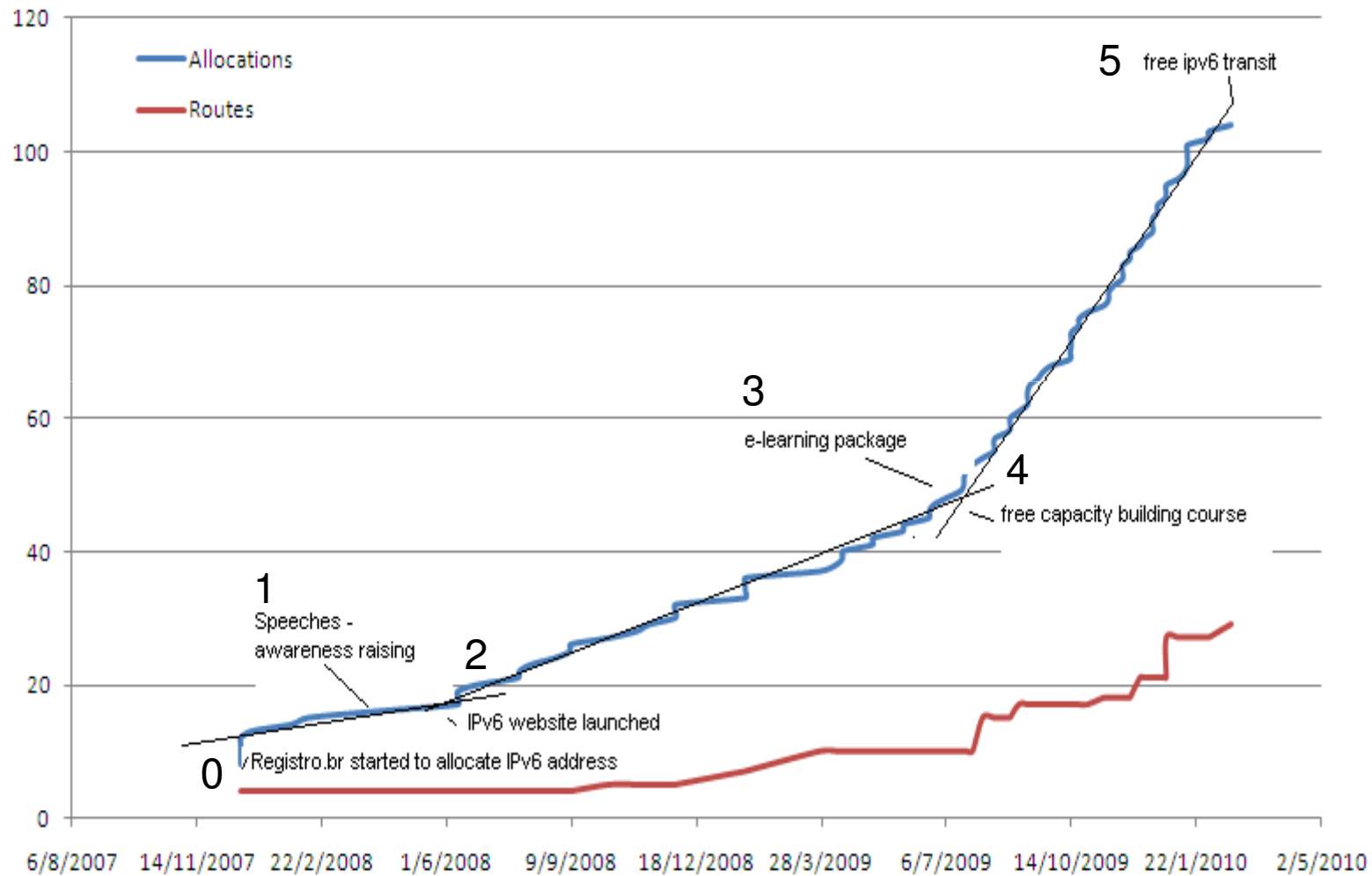
- basic
- tunneling
- firewall
- routing (ospf, bgp)
- dns

<http://ipv6.br/presencial>

IPv6 transit free of charge (5)

- Participants of Internet Exchange PTTMetro São Paulo.
- Experimental
- Time limited (end of 2010)
- Limited and shared bandwidth

back to the graph...



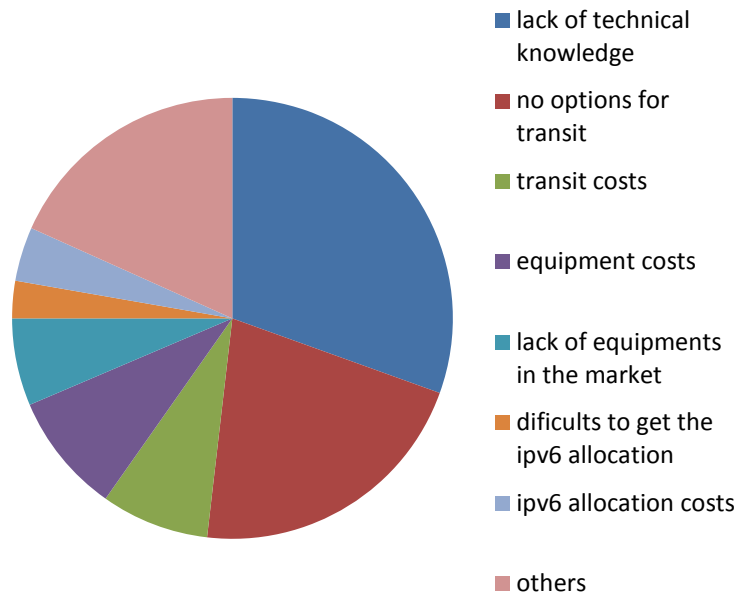
budget

- 1 engineer / 1 system analyst – full time
 - + coordination
 - + some help from IX PTT Metro team
- + ~ us\$ 100k / 2009 (labs, courses, e-learning)
- + ~ us\$ 100k / 2010

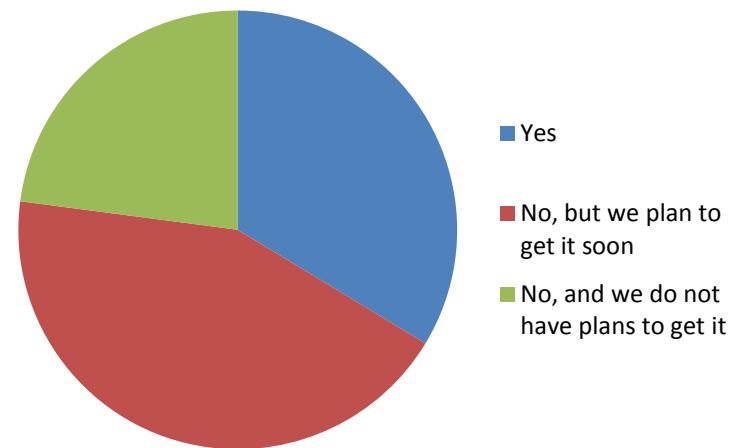
2010 survey (preliminary results)

- 205 responses of a total 654 Autonomous Systems

main difficulties



ipv6 allocation



lessons learned

- Capacity building is really a need for our ISPs, we shall continue to work on it.
- Licensing under Creative Commons is a very good idea, preferably allowing all kinds of use of the material. It enables the dissemination of knowledge, more than the material itself.
- We have started targeting small and medium ISPs... Some of the big ones have followed asking for training... Some governments and universities are doing the same now...
- IPv6 has to be demystified, more than taught, at least in a first moment... Hands on labs are also needed.
- Virtualization is your friend... Don't have a lot of money? Try OpenVZ, Imunes, Netkit, etc.

problems not solved / next steps

- Some ISPs are asking for IPs first, and then planning... In some cases probably the default /32 will not suffice...
- The announcements in the global IPv6 table are not growing so fast as the allocations...
 - Sometimes it is a problem with lack of IPv6 enabled upstream providers...
 - We expect that the free IPv6 transit for PTT Metro São Paulo participants (our biggest IXP) will help to solve this...
- We need to train more trainers.
- We need to cover some IPv6 aspects in more details (other specialized, capacity building courses?)
- The equipment in the network core isn't a problem... But where is the IPv6 equipment for the edges??? ADSL and cable modems? CPEs? VoIP phones? Etc?

THANK YOU

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<http://ipv6.br>

<http://ceptro.br/english>

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