

ITU Workshop on “Apportionment of Revenues and International Internet Connectivity”

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International Internet Connectivity – Brazilian Experience

**Salermé Oliveira,
Operational Manager, Anatel –
salermé@anatel.gov.br**

Introduction

- Brazilian Administration defined Internet as a key issue to the development of the country
 - ➔ In 05/12/2010 was published the Broadband Internet National Plan – PNBIL
- Cepal studies points 3 main questions to developing countries improve IIC
 - Improve national and regional infrastructure
 - Increase the number of IXPs
 - Development of national content

Introduction

- Quality of the connection in terms of transmission capacity, is a main factor that increases the cost of Internet traffic
- In countries where there is gap of Internet networks many ISP, in order to reduce their costs, host their websites in countries where the networks have greater capacity, further increasing the cost of Internet access for local providers , which will have to pay costs of international connections to access local content

Introduction

- The operators to be competitive, have to make big investment in high capacity networks
- Since there is no sufficient investment, networks become obsolete, which increases the costs for the provision of services, leading providers to host their sites in other countries

Introduction

- Costs of the links between different countries can also vary according to the period of employment and amount of capacity required. Greater capacity and longer-term contract reduces the monthly cost of each Mb
- Traffic in Latin America is more intense for the United States. This is due in large part to the fact that many Latin American websites host their websites in Miami, which is the busy traffic in Latin America.

Introduction

- IXPs reduce the amount of traffic that an ISP should be delivered through the amount of transit providers, reducing the average cost of delivery for some of its services. Moreover, the increase in the number of paths through the IXP improves efficiency and reduces the routing failures

Introduction

- The main objective of the IXP is to allow networks to interconnect two specific providers directly, through exchange, and not through one or more third party networks
- The advantages of direct interconnection are numerous, but the main reasons are cost, latency and bandwidth. The traffic passing through an exchange is usually not charged by either party, whereas traffic to an ISP is great

Introduction

- The direct interconnection, often located in the same city on both networks, avoids the need for data to travel to other cities (potentially overseas) to get from one network to another, thereby reducing the latency.
- Speed is most noticeable in areas that have poorly developed the long-distance calls a connection to a local IXP may allow the transfer of data without limit and without cost, greatly improving the bandwidth between customers of two adjacent ISP

Brazilian Experience – Actions to Improve National and Regional Infrastructure

■ PNBL

- Objective: massification of Broadband Internet
- Tactics : Telebras was restructured to operate the backbone of public national network
- Target: connect 40 million homes with broadband internet

Brazilian Experience – Actions to Improve National and Regional Infrastructure

- Anatel's action – obligations to operators to attend with 3G Internet small locations when operators acquire 3G frequency
- The operators must provide 3G service as shown bellow

Brazilian Experience – Actions to Improve National and Regional Infrastructure

- 100% of cities with more than 200.000 people until april 2012;
- 100% of cities with more than 100.000 people until april 2013;
- 50% of cities with more than 30.000 and less than 100.000 people until april 2013;
- 60% of cities with less than 30.000 people until april 2016.

Brazilian Experience – Actions to Improve National and Regional Infrastructure

- Anatel's actions – obligations to pass on economies of scale in network improves when operators makes corporate transactions
- Act 7.828, of 12/19/2008, obligated Telemar to connect with fiber (apart from Universalization Targets):
 - Until December of 2010 – 100 new cities
 - Until December of 2015 – 200 new cities
 - Until December of 2009 – Connect the city of Boa Vista
 - Until December of 2010 – Connect the city of Manaus

Brazilian Experience – Actions to Improve National and Regional Infrastructure

- Act 1.970, of 04/01/2011, obligated Telefónica to:
 - Expand the FTTH network to more than 70.000 homes until december of 2012;
 - Cover 100 more cities with 3G network until december of 2012;
 - Available 3G access to 100 schools in rural areas.

Brazilian Experience: the IXPs Case

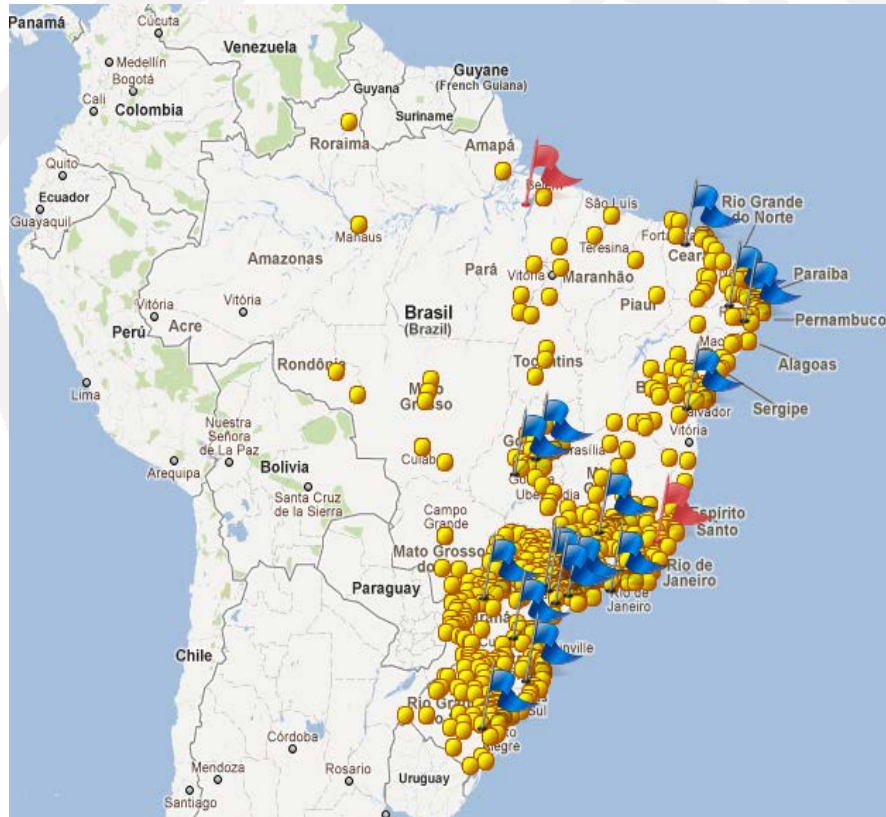
- According to OECD, in the report “Internet Traffic Exchange: Market Developments And Policy Challenges”:
 - ➔ *The growth of the Internet market in Latin America in the past five years has been dramatic, led by the success of a long-term program of new exchange point development by “Comitê Gestor da Internet no Brasil” (CGI), the Brazilian Internet Steering Committee, a public-private partnership funded in large measure by revenue from domain name registrations within the .BR country-code top-level domain.*

Brazilian Experience: the IXPs Case

- *Brazil's success has been a product of several factors coinciding: the CGI takes the long view, with a consistent program of economic development, rather than short-term one-off projects. Their IXPs are among only a handful in the world that are the product of a considered and intentional economic model. Before beginning, they made a careful investigation of CityLink, the New Zealand IXP system, and of the SeattleIX, including site visits, observation of the annual governance meeting, and interviews with the founders, board of directors, and Internet exchange participants. This feedback loop has continued to the present day, with CGI management staff and board members actively investigating the successes and failure of other IXPs and participating in the international IXP operations community.*

Brazilian Experience: the IXPs Case

IXPs in Brazil – Current localizations



1. **Americana**
2. **Belém**
3. **Belo Horizonte**
4. **Brasília**
5. **Campina Grande**
6. **Campinas**
7. **Caxias do Sul ***
8. **Curitiba**
9. **Florianópolis**
10. **Fortaleza**
11. **Goiânia**
12. **Londrina**
13. **Natal ***
14. **Porto Alegre**
15. **Recife**
16. **Rio de Janeiro**
17. **Salvador**
18. **São José dos Campos**
19. **São Paulo**
20. **Vitória**

● AS



PTT.br IXP

Brazilian Experience: the IXPs Case

■ IXPs – Current Members Situation

Locality	Current Members	Growth (2010-2011)
Americana	11	-
Belem	4	-
Belo Horizonte	17	240%
Brasília	13	30%
Campina Grande	10	200%
Campinas	19	6%
Caxias do Sul	4	-
Curitiba	24	40%
Florianópolis	10	11%
Fortaleza	11	35%

Brazilian Experience: the IXPs Case

Locality	Current Members	Growth (2010-2011)
Goiânia	12	300%
Londrina	16	45%
Natal	3	-
Porto Alegre	34	25%
Recife	5	0%
Rio de Janeiro	19	6%
Salvador	22	175%
São Jose dos Campos	8	-
São Paulo	242	72%
Vitoria	4	-

Brazilian Experience: the IXPs Case

■ IXPs – Current Traffic Situation

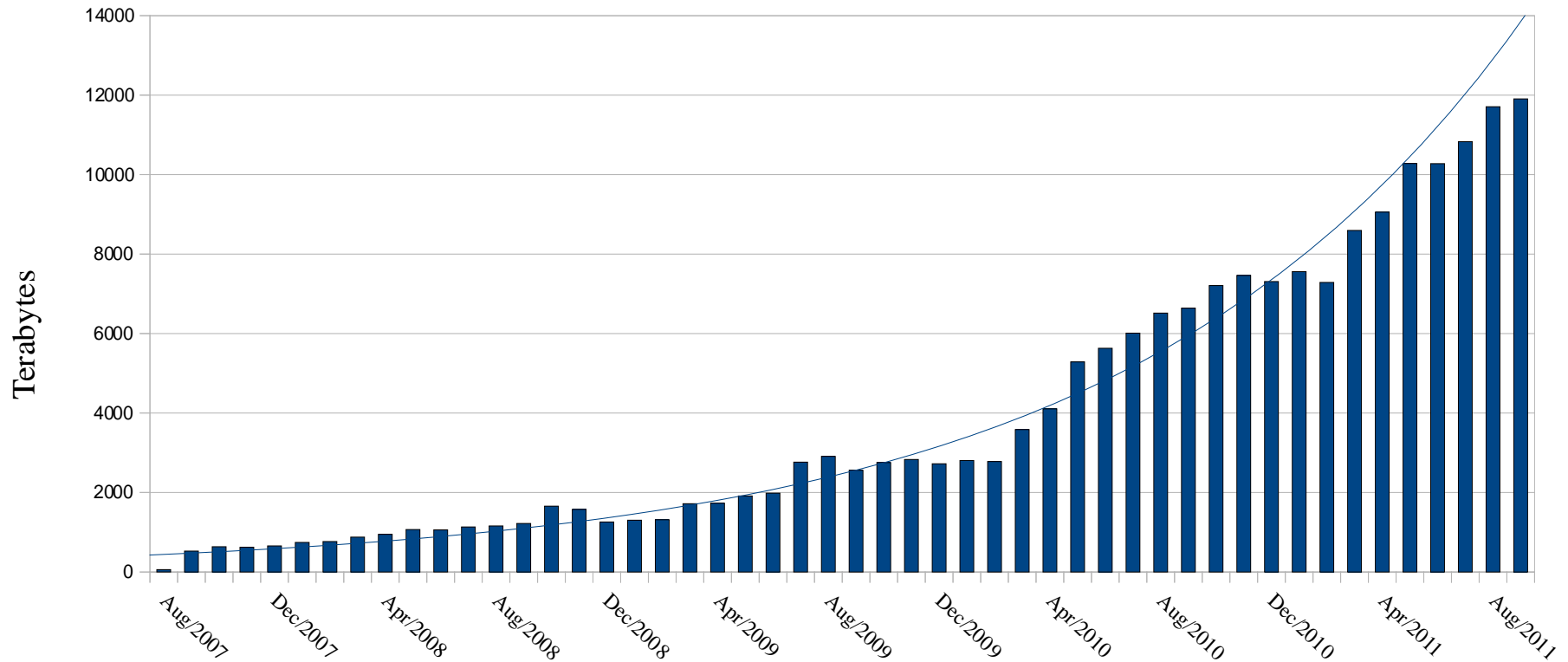
Locality	Traffic (Peak /day)	Tráficc (Average/day)	Growth (%)
Americana	15.5 Mbps	6.9 Mbps	-
Belém	-	-	-
Belo Horizonte	771 Mbps	450 Mbps	800
Brasília	1.3 Gbps	770 Mbps	77
Campina Grande	30 Mbps	13 Mbps	61
Campinas	1.12 Gbps	637 Mbps	49
Caxias do Sul	-	-	-
Curitiba	2.9 Gbps	1.5 Gbps	30
Florianópolis	255 Mbps	120 Mbps	13
Fortaleza	535 Mbps	280 Mbps	550

Brazilian Experience: the IXPs Case

Locality	Traffic (Peak/day)	Traffic (average/day)	Growth (%)
Goiânia	7 Mbps	2 Mbps	-
Londrina	780 Mbps	480 Mbps	400
Natal	-	-	-
Porto Alegre	1.8 Gbps	975 Mbps	-6
Recife	16 Mbps	3.4 Mbps	-
Rio de Janeiro	921 Mbps	540 Mbps	45
Salvador	1.33 Gbps	514 Mbps	750
São Jose dos Campos	166 Mbps	95 Mbps	-
São Paulo	60 Gbps	35 Gbps	72
Vitoria	4 Mbps	1 Mbps	-

Brazilian Experience: the IXPs Case

Traffic Transfer - Monthly



Brazilian Experience: the IXPs Case

■ Evolution of the number of participants

Beginning of operations: 09/2004

	ASNs	Traffic Gbps (average / day)	Traffic Gbps (peak / day)
NOV/07	73	2,7	4,6
NOV/08	91	5,6	8,77
NOV/09	122	10	19,1
NOV/10	200	25,5	40
NOV/11	322	41	70

Brazilian Experience: the IXPs Case

- Anatel's Actions - draft General Plan of Competition ("draft PGMC")
 - the PMS Operators will install PTT in each of 68 registration areas in Brazil's territory, covering, practically, all Brazilian territory
 - PMS Operators must interconnect ISPs, when required, to attend traffic originated and terminated on their networks.

Brazilian Experience: the IXPs Case

- The operation of the IXPs must be open, along the lines of PTTMetro, allowing the neutrality of operational procedures and the efficient traffic exchange with high availability
- PMS Operators must provide routing capability required for the requested IXPs demand, allowing the release of AS connected to your network

Conclusions

- As result of Brazilian's efforts, the IIC costs have decreasing along the years
- The decrease of IIC cost made possible a dramatically growth of number of small ISPs
- So, the competition also grew, and many peripheral markets have been covered by small providers
- The price is decreasing and we are observing that the service is reaching more people every year