



Aligning the Caribbean ICT Calendar & LACNIC Update 2016

CANTO2016 – San Juan, Puerto Rico

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Agenda

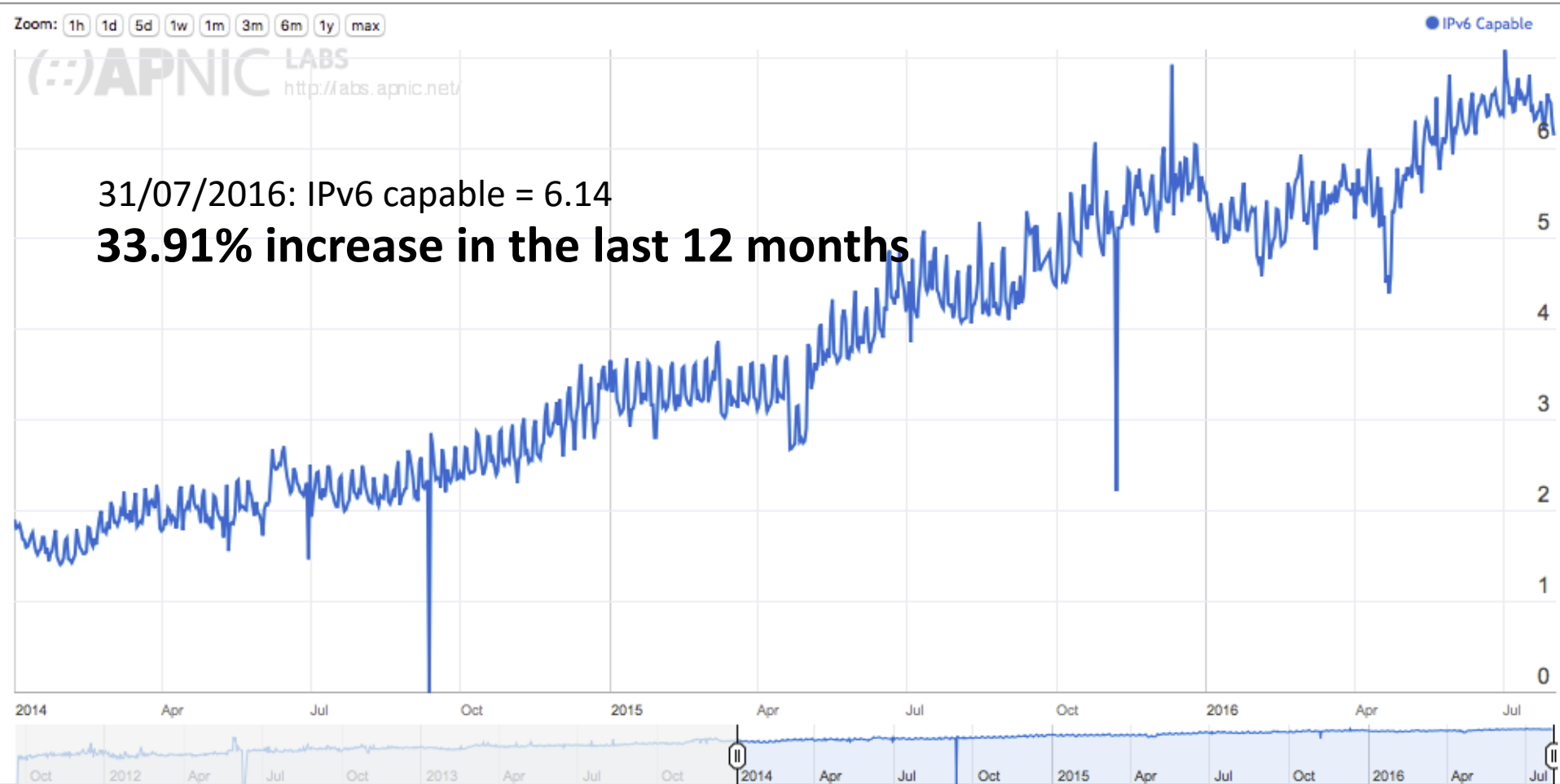
- **World IPv6 Capability**
- **IPv6 in Latin America and the Caribbean**
 - LACNIC/CAF IPv6 KPI – **ICA_{v6}**
 - Results across LACNIC economies
 - Case Studies
 - Financial Model
- **Outreach & Engagement**



IPv6 in the world

IPv6 measurement

End user readiness: World



<http://stats.labs.apnic.net/ipv6/XA> as of 01/08/2016

Top IPv6 Adopters – Country Level (according to Akamai)

Rank	IPv6	Country	Rank	IPv6	Country
1	35.1%	Belgium	14	8.7%	Austria
2	23.1%	Greece	15	8.5%	Japan
3	20.8%	USA	16	8.0%	Brazil
4	20.5%	Switzerland	17	7.4%	Czech Republic
5	20.2%	Germany	18	7.1%	Ireland
6	17.9%	Portugal	19	6.2%	Finland
7	17.1%	Ecuador	20	5.9%	Canada
8	16.2%	Malaysia	21	5.9%	Norway
9	15.7%	Luxembourg	22	5.7%	Australia
10	13.5%	Estonia	23	5.2%	Netherlands
11	12.2%	Peru	24	5.1%	Hungary
12	9.3%	United Kingdom	25	4.7%	Sweden
13	8.9%	France	26	4.3%	Trinidad and Tobago



IPv6 in Latin America and the Caribbean

Various ways to measure IPv6 adoption

Opendata Project by LACNIC: <http://stats.labs.lacnic.net/CAF-LACNIC> ICAv6 Index and Partial Indicators:

<http://portalipv6.lacnic.net/caf-lacnic/>

Google IPv6 Statistics: [global](#) and by [country](#)

APNIC Capability Measurements by [country](#) and [estimated population using IPv6 per ASN](#)

Akamai IPv6 Adoption Visualization:

<https://www.akamai.com/es/es/our-thinking/state-of-the-internet-report/state-of-the-internet-ipv6-adoption-visualization.jsp>

Various Measurements on the World IPv6 Launch Website:

<http://www.worldipv6launch.org/measurements/>

Cisco 6lab Project (very comprehensive information):

<http://6lab.cisco.com/index.php>

RIPE Statistics: <http://v6asns.ripe.net/v/6?s= ALL>

Special Report: IPv6 Deployment for Social and Economic Development in Latin America and the Caribbean

- LACNIC teamed up with CAF – Development Bank of Latin America to examine IPv6 deployment in Latin America and the Caribbean
- Results aim to clarify:
 - Why IPv6 adoption is still low in Latin America and the Caribbean compared to other regions
 - What can be done to improve deployment
- Conducted over 10-month period in 2015
- Results published at <http://portalipv6.lacnic.net>

Research included

- Surveys among LACNIC Members addressing deployment (or not) of IPv6
- LACNIC IPv6 KPI (ICAv6) based on Cisco's methodology for evaluating various stages of the Internet value chain
- 10-country sample comprising face-to-face interviews with ISPs, public entities and academic institutions
- Dynamic model to assist ISPs with the financial implications of various deployment strategies
- Successful cases, guidelines, recommendations

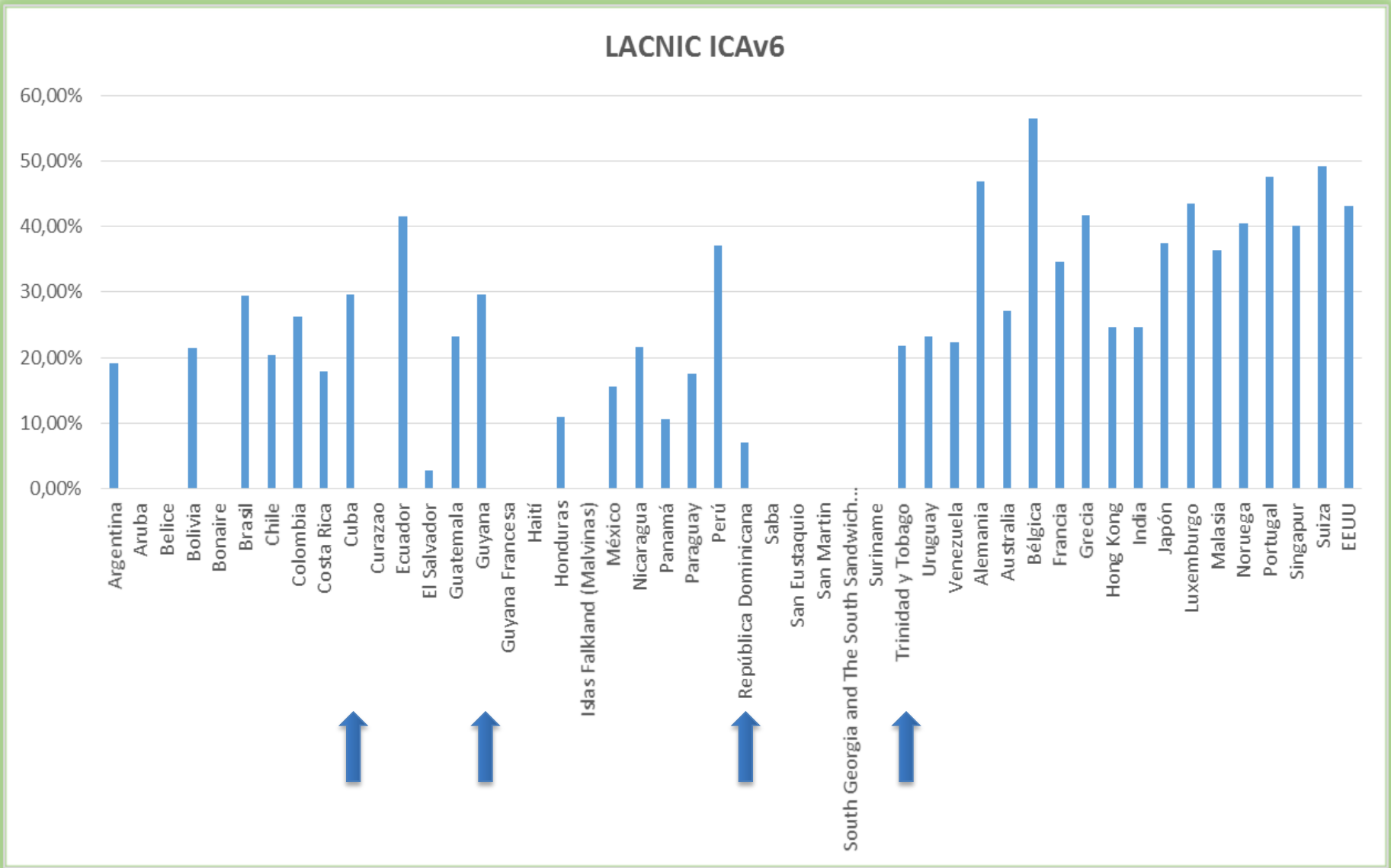
LACNIC ICAv6



1. PACTO (Planning): % of IPv6 allocated prefixes with observed traffic wrt total allocations.
2. ASTRAN (AS with IPv6 transit): AS transit with observed IPv6 traffic. Average of AS's providing IPv6 transit and IPv4 transit AS's that have an IPv6 assignment.
3. CONT (Content): Sum of the weighted % of IPv6 accessible sites plus the weighted % of IPv6 proof/test domains ("IPv6" embryos according to LACNIC).
4. USUARIOS (Users): percentage of IPv6-capable end-users

$$LACNIC\ ICAv6\ \% = 0,3 * (0,1 * PACTO + 0,9 * ASTRAN) + 0,7 * \sqrt{CONT * USUARIOS}$$

Results



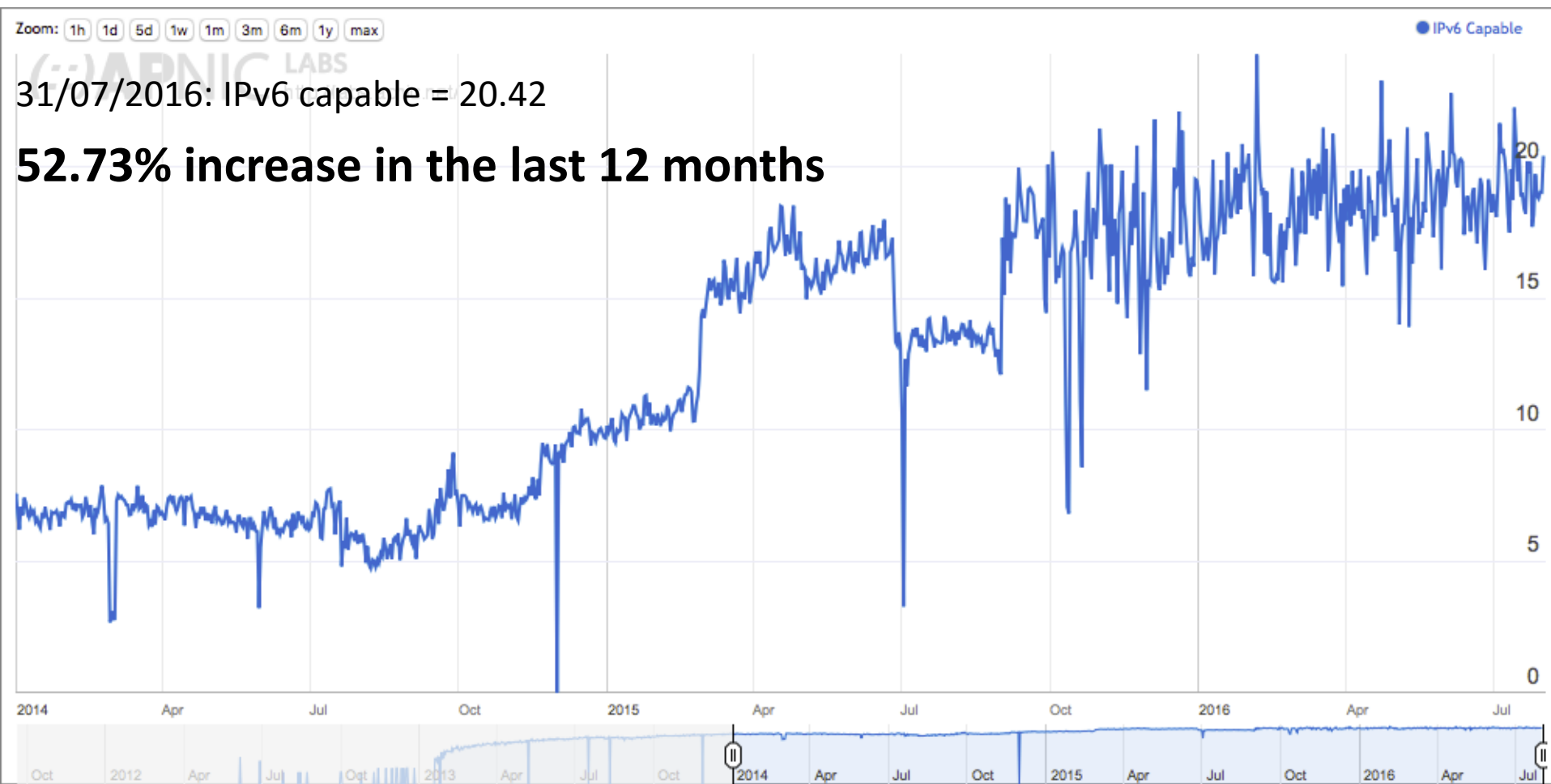
Field Work: Summary of findings

- Roughly only four (4) countries have more than 1% of users ready for IPv6 (Bolivia, Brazil, Ecuador and Peru). Most ISPs are still not offering IPv6 to end users (residential, mobile) but most have IPv6 deployed in their network core;
- 30% of organisations in the region are thinking about deploying IPv6 in 2016;
- Most commonly, the transition strategy adopted is Dual Stack with native IPv6 & private IPv4 + CGN44;
- Countries with large Internet penetration are the most delayed in IPv6 uptake (lower growth rate, IPv4 stock still enough for their *needs*)

Field Work: Summary of Findings con't

- ISPs:
 - So called “IPv6-ready” CPEs not so IPv6-ready
 - Provisioning systems & internal BSS software
 - Operations / help-desk training (but not a big issue)
- NRENs / Universities: IPv6 deployed in CPEs but some campus problems: Wi-Fi & firewalls generally not supporting IPv6 (or not configured)
- Governments: e-Gov systems, Government portals, community Wi-Fi networks not supporting IPv6

Peru



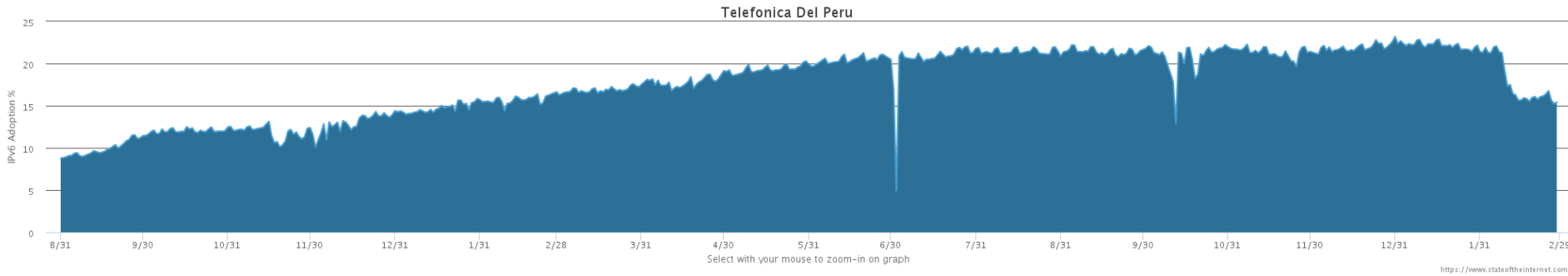
Peru IPv6 leaderboard (top networks)

ASN	Organization	IPv6 capable (%)
6147	Telefonica del Peru	24.61
262253	Econocable Media	0.19
27843	Optical Technologies	0.17
262235	Netline Peru	0.14
21575	Entel Peru	0.06
262210	Viettel Peru	0.06
12252	America Movil	0.02
19180	Americatel Peru	0.02

Telefónica – Peru

- **2008:** address shortage identified due to high growth rate of DSL customers
 - Internal planning involving all areas of the company
- **2010:** equipment and software testing
- **2012:** started ADSL IPv6 service
- IPv6 in HFC network is expected by 2016 and mobile in 2017

Telefónica – Peru



- CGN deployed due to IPv4 shortage (2012)
 - Corporate users and some DSL users get public IPs
 - Mobile uses CGN
 - IPv6: dual stack, CGN for IPv4 address sharing
- No problems identified in BSS
- Provisioning systems were part of the initial plan
- Help Desk: IP technology is irrelevant

Financial Model

Control Panel

I.1 NLV of the Costs of Each Alternative

	Net Present Value
Alternative 1, transition with dual-stack and CGNAT with CPE	\$4.910.952,82
Alternative 1, transition with dual-stack and CGNAT without CPE	\$2.312.338,22
Alternative 2, using CGNAT without implementing IPv6	\$6.192.207,28
Alternative 3, purchasing IPv4 addresses without NAT or IPv6	\$4.077.689,49

I.2 Main Parameters

Rate of opportunity cost of capital.	12%
Service life of dual-stack CPEs or timeframe for replacement of IPv4-only CPEs with dual-stack CPEs	5,0
Service life of IPv4-only CPEs. Alternative 2.	5,0
Total number of current residential customers	100.000
Idem but already served with IPv4 addresses (CGNAT or individual IPv4 addresses)	50.000
Annual customer base growth rate	15%
CGNAT operational capacity – simultaneous sessions – calculation module	10.000.000
Maximum average number of sessions per user without dual-stack	1.000
Minimum design number of sessions with CGNAT per user without dual-stack, by quality	1.000
% of IPv4 sessions per user with dual-stack (CONT indicator)	4,92%
Minimum design number of sessions with CGNAT per use with dual-stack, by quality	492
% of users connected simultaneously	30%
Average number of users per client	3
Annual drop in IPv4-only CPE prices	10%
Reduction of the price difference between dual-stack vs. IPv4-only CPEs = 0 in 5 years	20%
Annual ARPU per customer assumed to be constant	\$240,00



Outreach & Engagement

Two Main Events



LACNIC 25 (May Event)
2-6 May 2016 in Havana, Cuba
AGM, tech tutorials, IG,
open policy forums,
special meetings



LACNIC 26 – LACNOG 2016 (Sept/Oct Event)

26-30 Sept 2016 in San José, Costa Rica

Open policy forums, tech tutorials, seminars

**Open Policy Forums are key
features of our events**

LACNIC Campus - <http://campus.lacnic.net>



campus

Usted no se ha id

"TestingV6" comenzó el 21/06.



3 self-paced courses available: *IPv6 Basics*, *IPv6 Advanced*, *Testing IPv6*

LACNIC On The Move



Regional Internet Registry at your service!

EVENT SNAPSHOT

WHAT

LACNIC On The Move!

WHEN

Flexible dates

TARGET COUNTRIES

Central America and the Caribbean

MORE INFORMATION

<http://onthemove.lacnic.net>

WHY

To learn more about LACNIC, the Internet ecosystem, critical Internet number resources such as IPv6, live issues within Internet Governance debate and how to become more active within the LACNIC Community!

WHO

IT professionals, policy makers, regulator staff, technology writers, university students (engineering, computer sciences)

Development Projects



Useful Links



<http://eventos.lacnic.net/onthemove>



<http://programafrida.net>



<http://www.seedalliance.net>



<http://www.ayitic.net>



<http://www.proyectoamparo.net>



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<http://portalipv6.lacnic.net>

Ways to keep in touch!

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Mailing Lists

<http://www.lacnic.net/lists>



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Questions?



Thank You