APNIC 35 CONFERENCE

SINGAPORE
25 February - 1 March 2013

IPv6@APNIC

NIR-SIG, 26 February 2013, Singapore

Miwa Fujii <miwa@apnic.net>

Senior IPv6 Program Specialist

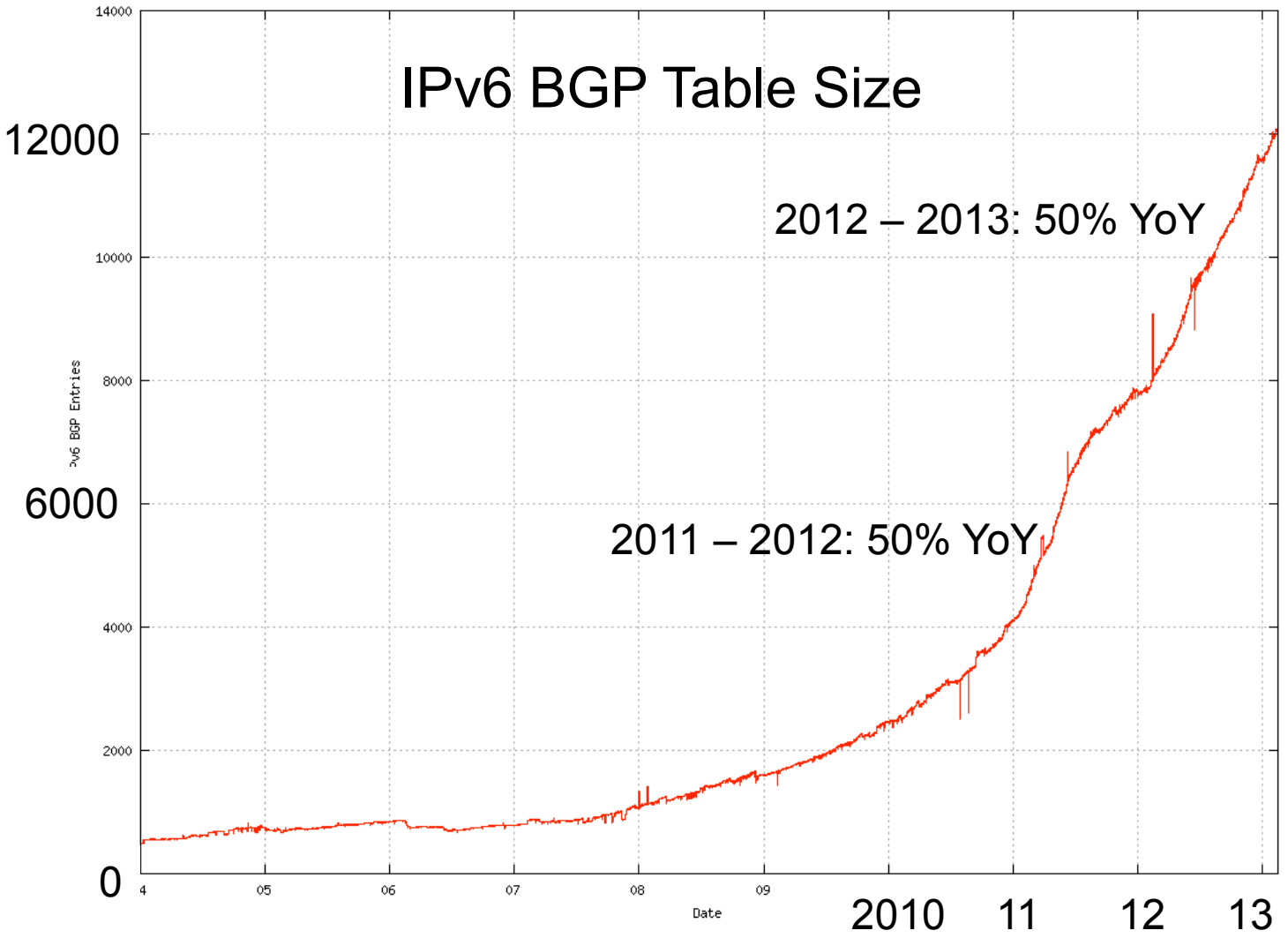
Overview

- IPv6: Where are we now?
  - IPv6 deployment by numbers
  - Data generated by labs.apnic.net
  - IPv6 transition technologies
- Current APNIC key IPv6 messages
- IPv6@APNIC
- Way forward

IPv6 deployment status by numbers

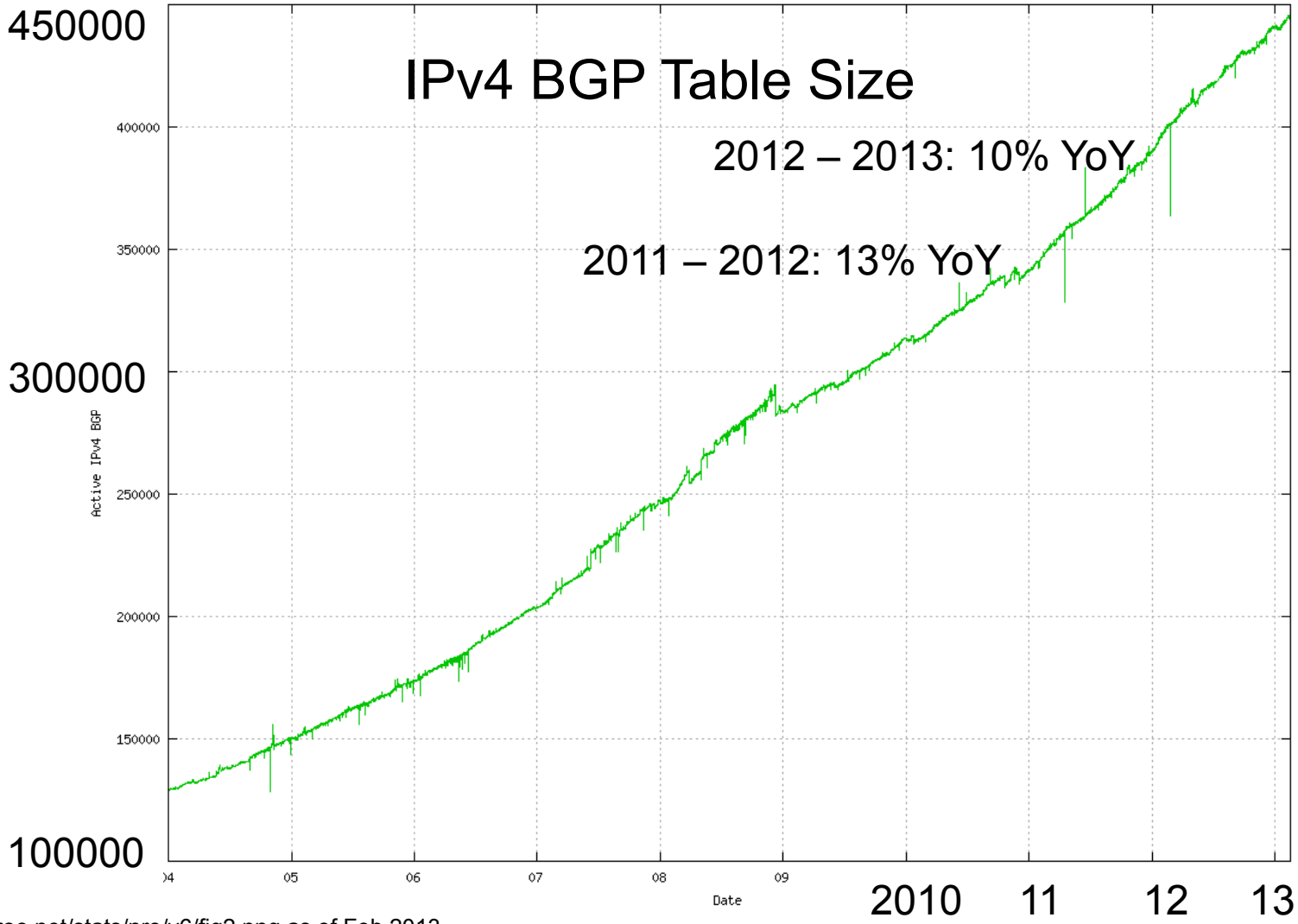
- Measuring IPv6 deployment
  - Network with IPv6
    - Statistics from Potaroo
    - Statistics from RIPE Labs
  - End user readiness with IPv6 measured by labs.apnic.net
    - Level of IPv6 deployment in different regions and economies
  - IPv6 connectivity by Google users
  - What's the outcome of World IPv6 Launch?

Network with IPv6



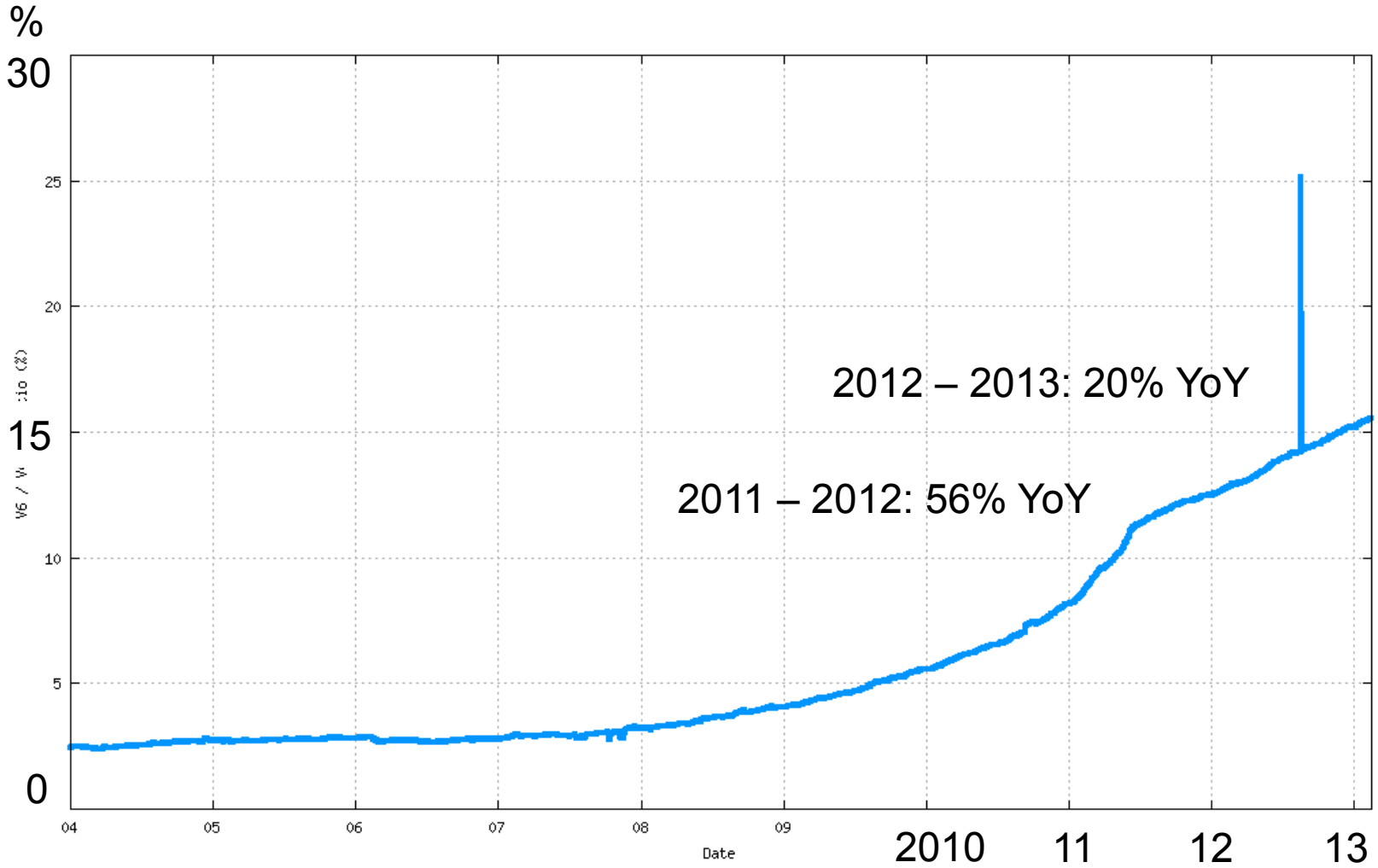
http://bgp.potaroo.net/stats/nro/v6/ as of Feb 2013

Network with IPv4



http://bgp.potaroo.net/stats/nro/v6/fig2.png as of Feb 2013

IPv4/IPv6 AS count ratio

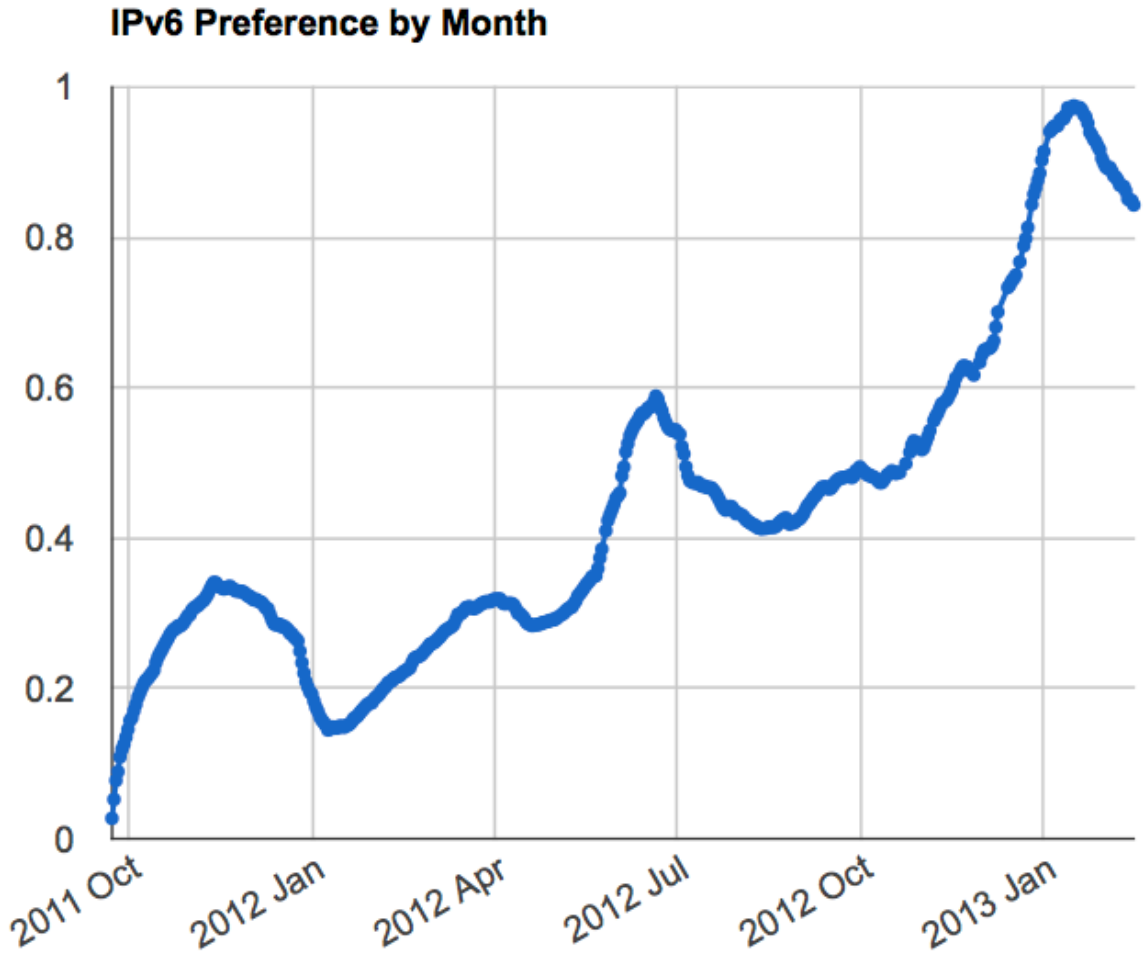


http://bgp.potaroo.net/stats/nro/v6/ as of Feb 2013

labs.apnic.net
IPv6 measurements

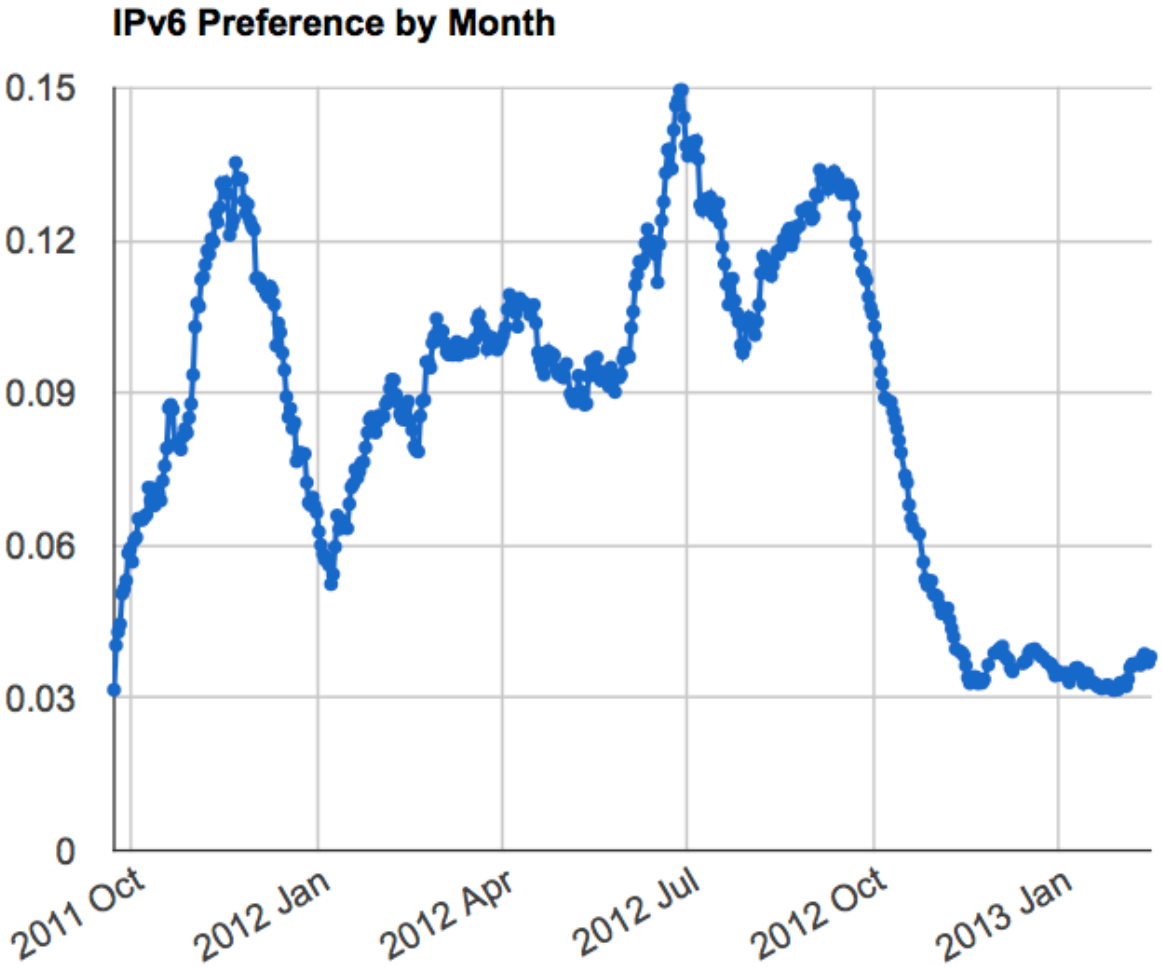
- IPv6 measurements by labs.apnic.net
  - To measure client's (host's) ability to successfully use IPv6
    - IPv6 deployment as seen by end users
  - To sample end users in a random but statistically significant fashion
    - Using advertising networks
    - A lot of unique IP addresses to measure
  - To analyse data with breakdowns by ASN, economy, region, and organization
    - 125+ economies provide >200 samples / week consistently
    - Over 35,000 ASN have been seen in 2012
    - 2,400 ASN provide graphable data

IPv6 measurement
End user readiness: World



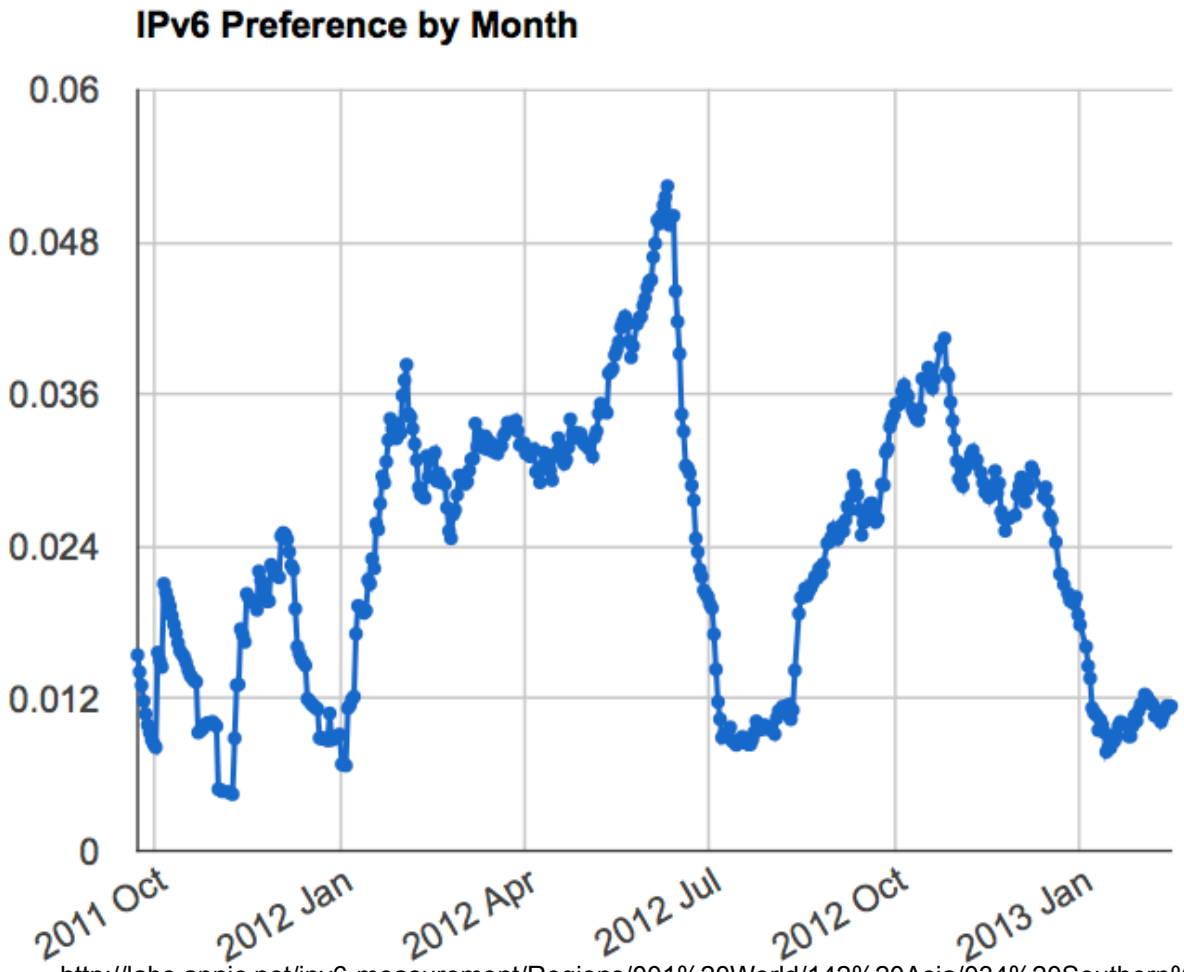
http://labs.apnic.net/ipv6-measurement/Regions/001%20World/ as of 18/02/2013

IPv6 measurement
End user readiness: South-Eastern Asia



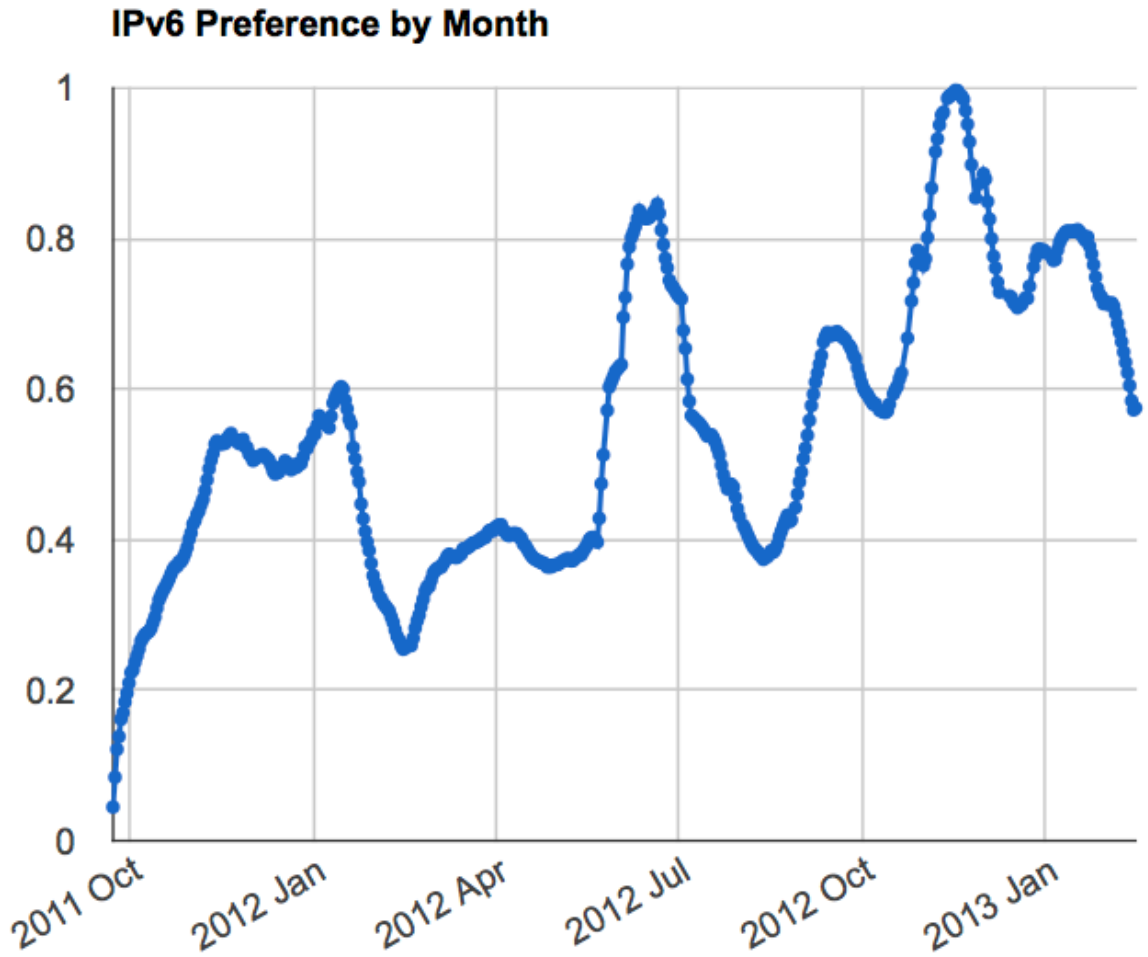
http://labs.apnic.net/ipv6-measurement/Regions/001%20World/142%20Asia/035%20South-Eastern%20Asia/ as of 18/02/2013

IPv6 measurement
End user readiness: Southern Asia



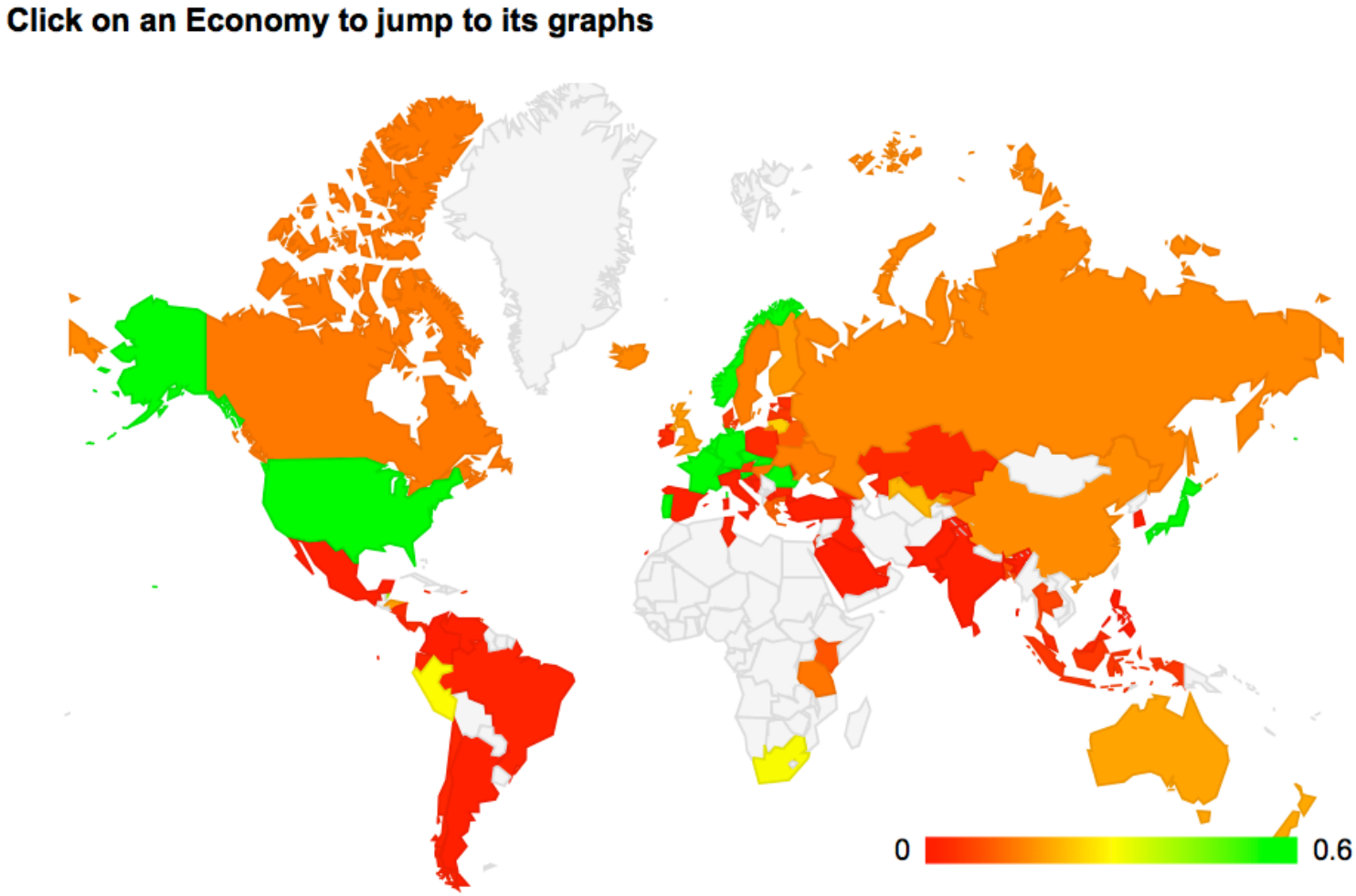
http://labs.apnic.net/ipv6-measurement/Regions/001%20World/142%20Asia/034%20Southern%20Asia/ as of 18/02/2013

IPv6 measurement
End user readiness: Eastern Asia



http://labs.apnic.net/ipv6-measurement/Regions/001%20World/142%20Asia/030%20Eastern%20Asia/ as of 18/02/2013

IPv6 users by economy



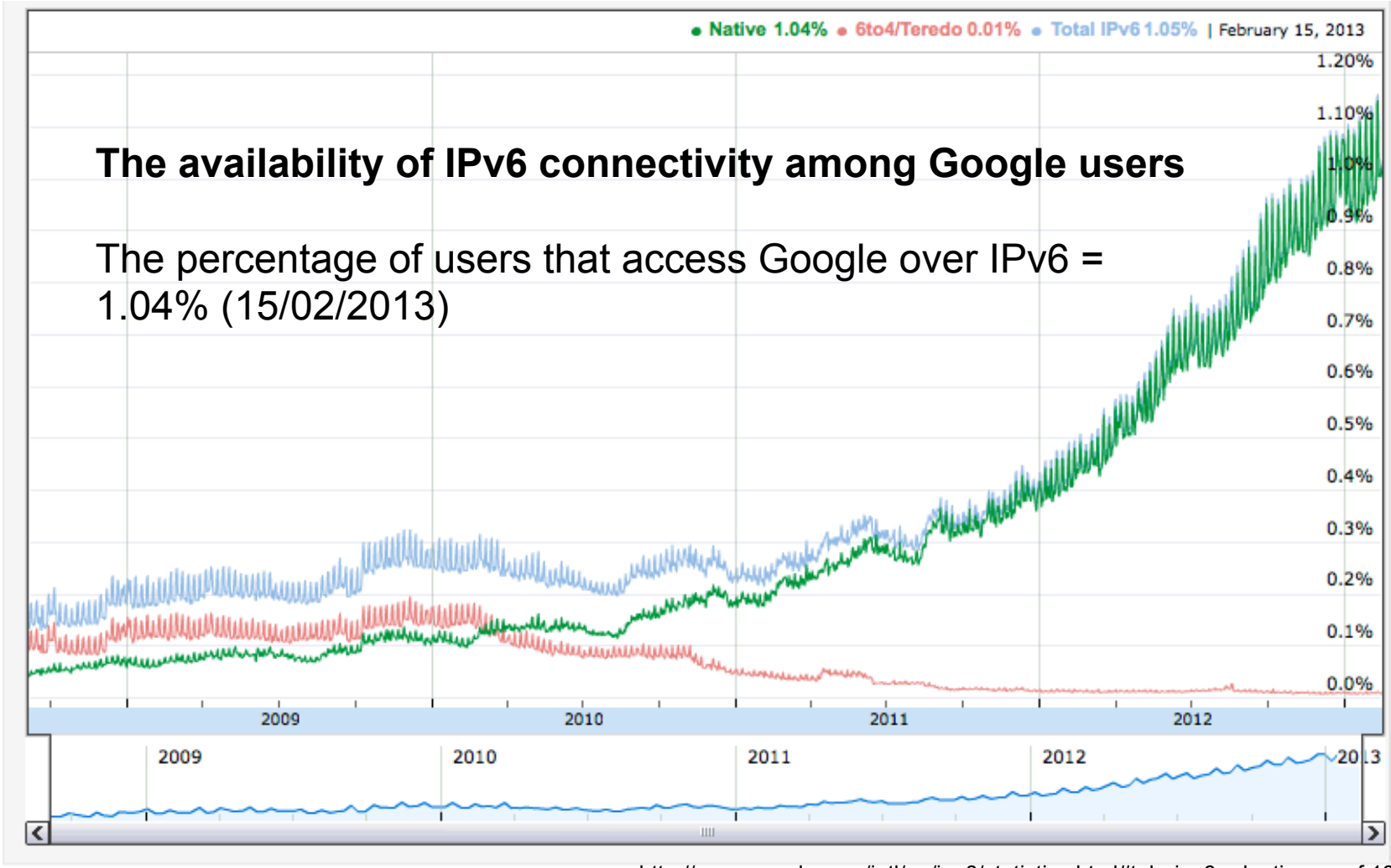
http://labs.apnic.net/index.shtml as of 18/02/2013

IPv6 preferred users by ASN

ASN	Economy	Operator	%
8708	RO	RDSNET RCS & RDS	24.8
12322	FR	Free	23.0
2516	JP	KDDI	19.6
22394	US	Verizon Wireless	16.3
181126	JP	Chubu Telecommunications	16.2
7018	US	AT&T	12.8
17412	NZ	Woosh Wireless	12.0
4738	AU	Internode	10.3
9503	NZ	FX Networks	8.8

http://labs.apnic.net/ipv6-measurement/AS/ as of 18/02/2013

Other IPv6 deployment measurements



http://www.google.com/intl/en/ipv6/statistics.html#tab=ipv6-adoption as of 18/02/2013

APNIC's IPv6 key messages

- A key goal for network operators
  - Avoiding multiple CPE swaps and migrations
- Large Scale NAT (LSN), Carrier Grade NAT (CGN), or any other type of technologies to provide IPv4-to-IPv4 NAT (NAT444) platforms are **NOT** a transition mechanism to IPv6
  - These technologies are IPv4 continuity solutions
  - Some operators need to consider IPv4 continuity solutions to manage IPv4 exhaustion while deploying IPv6 services

APNIC's IPv6 key messages

- Selection of transition technology should align with the long term vision of the operator
  - Less iteration to achieve such vision is better
  - Minimize iterations in order to keep lower CAPEX and OPEX
- Choices of transition technologies determines number of iteration of requirement of "transition"
  - Native IPv6 – once
  - Other choices – multiple iterations over long term

APNIC's IPv6 key messages

- IPv6 deployment has experienced large growth in the last two years
  - x8 growth in IPv6 enabled end users globally in the last 12 months
  - Given there is no other way to manage IPv4 address exhaustion, IPv6 is an ultimate solution
  - Some large network operators start seeing this fact and taking proactive actions by deploying IPv6
  - **New networks of service providers are a good place to start enabling IPv6: Default IPv6 for new customers**
  - **Service upgrade toward end users is a good chance to replace their CPE with IPv6 features**

APNIC's IPv6 key messages

- IPv6 on mobile networks
  - Some large service providers are making intentional decisions to deploy IPv6
    - Exponential growth in demand of IP addresses by always on smart devices
  - See APNIC 34 IPv6 Plenary: LTE on IPv6 – is it happening?
  - See APNIC 35 IPv6 Plenary: IPv6 in Mobile Networks – A Look Beyond the Horizon

IPv6 in mobile networks

- Deploying IPv6 in mobile networks comes with new challenges
  - IPv6 single bearer radio hardware?
  - IPv4 and IPv6 double bearer radio hardware?
    - It doubles the load of the network - network operators dislike it
  - Need IPv6 enabled radio hardware and Radio Interface Layer (RIL)
  - Convergence with > 3G networks
  - Changes in internal billing system to manage
  - Etc.

@APNIC 35

- IPv6 Plenary on 27/02/2013 (Wed)
  - IPv6 in Mobile Networks – A Look Beyond the Horizon
  - Speakers
    - Cameron Byrne (T-Mobile)
    - Jouni Korhonen (Renesas Mobile/3GPP)
    - Soohong Daniel Park (Samsung Electronics)
- APIPv6TF Meeting on 27/02/2013 (Wed)
  - Information exchange on IPv6 deployment by multi-stakeholders

IPv6@APNIC

- APNIC Survey 2012 revealed collective input from the AP Internet community
  - "APNIC should step up efforts regarding IPv6 deployment and training"
    - Best current practice information on IPv6 deployment
    - Advice and consultation on IPv6 deployment
    - More practical hands-on trainings on IPv6 deployment
    - Raise awareness among stakeholders on IPv6
    - More facilitation with local Internet communities to help IPv6 uptake
- APNIC is responding to such requests: Plans in 2013
  - More hands-on IPv6 trainings
  - Engineering assistance on IPv6 deployment
  - More community outreach on IPv6

Way forward

- APNIC is responding to requests from the community: Plans in 2013
  - More hands-on IPv6 trainings
  - Engineering assistance on IPv6 deployment
  - Constantly update the IPv6 website with up to date data and information to support real and tangible IPv6 deployment
    - www.apnic.net/ipv6
  - Continue community outreach on IPv6
    - Looking forward further close communication with all NIRs and their members
    - Welcome any suggestion to collaboration to support the transition!

APNIC 35 CONFERENCE

SINGAPORE
25 February - 1 March 2013

Thank you!