

# International Perspective on Philippine Internet Development

Internet20PH

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**APNIC**



# Agenda

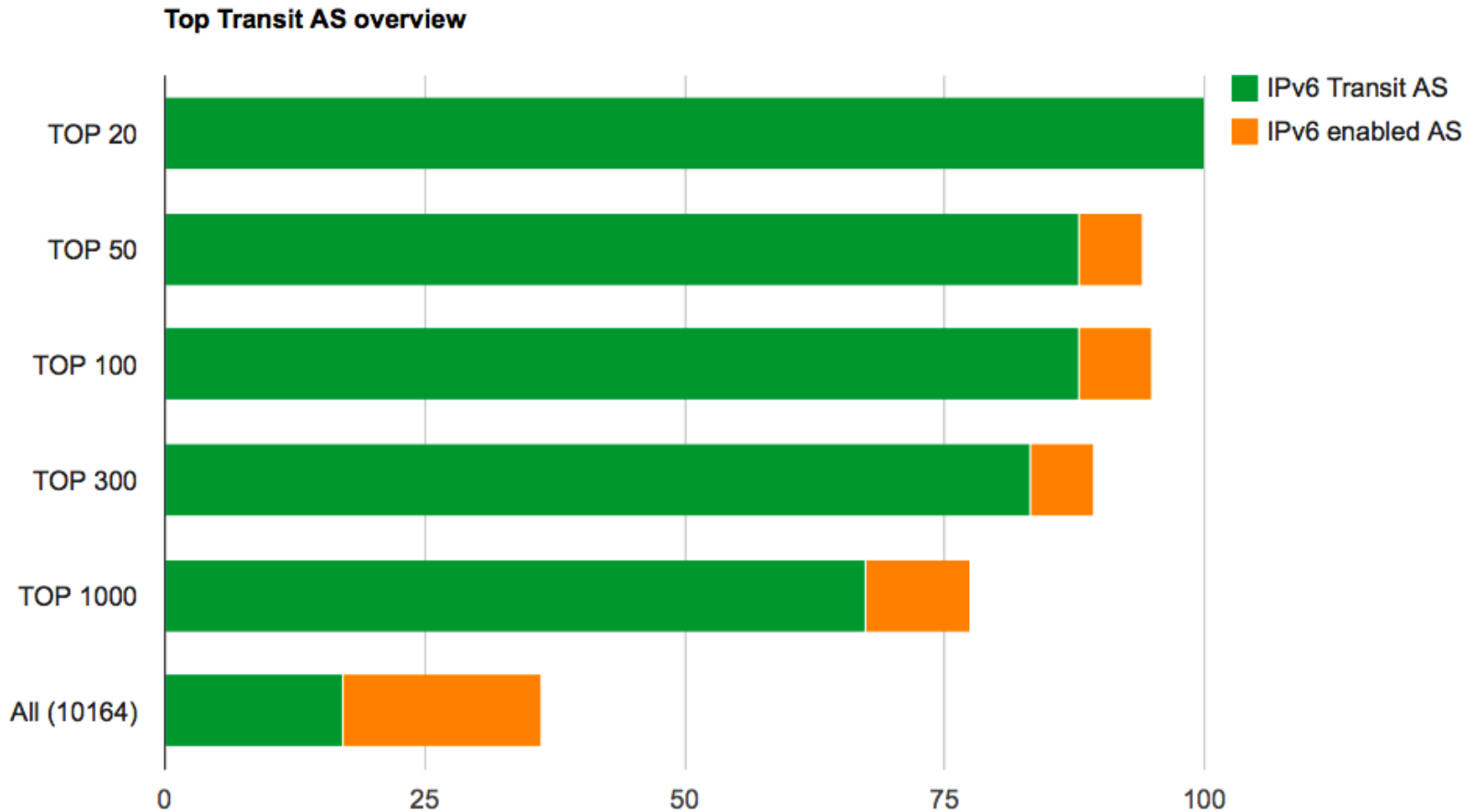
- A quick overview of IPv6 readiness among the AP region
  - Review of several statistics
  - Transit providers and Content Providers
  - IPv6 ready end users
- Governments' initiative in the AP region
- Growth path of the Internet

# IPv6 readiness in the world

Review of several statistics











# IPv6 adoption in Internet core networks

<http://6lab.cisco.com/stats/cible.php?country=world>









# World ranking IPv6 ready web sites

<http://www.vyncke.org/ipv6status/>

Rank	Country	Sample	Green	Orange
1	 <a href="#">Vanuatu</a>	39	48.7% (19)	0.0% (0)
2	 <a href="#">Czech Republic</a>	50	36.0% (18)	0.0% (0)
3	 <a href="#">Maldives</a>	13	30.8% (4)	0.0% (0)
4	 <a href="#">Central African Republic</a>	15	26.7% (4)	0.0% (0)
5	 <a href="#">Slovenia</a>	50	26.0% (13)	0.0% (0)
6	 <a href="#">Brazil</a>	50	24.0% (12)	0.0% (0)
7	 <a href="#">Singapore</a>	50	24.0% (12)	0.0% (0)
8	 <a href="#">Gabon</a>	26	23.1% (6)	0.0% (0)
9	 <a href="#">United States of America</a>	50	22.0% (11)	4.0% (2)
10	 <a href="#">Azerbaijan</a>	50	22.0% (11)	0.0% (0)



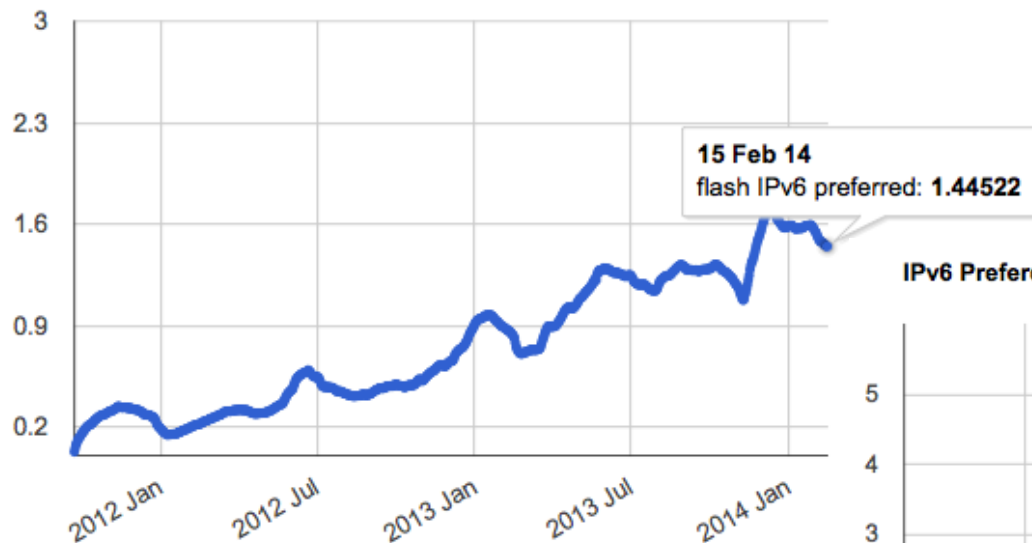
53	 <a href="#">Philippines</a>	50	8.0% (4)	2.0% (1)
54	 <a href="#">Sri Lanka</a>	50	8.0% (4)	2.0% (1)
55	 <a href="#">Palestinian Teritory</a>	50	8.0% (4)	2.0% (1)
56	 <a href="#">Poland</a>	50	8.0% (4)	2.0% (1)
57	 <a href="#">Australia</a>	50	8.0% (4)	0.0% (0)
58	 <a href="#">Ireland</a>	50	8.0% (4)	0.0% (0)

<http://www.vyncke.org/ipv6status/> 31/03/2014

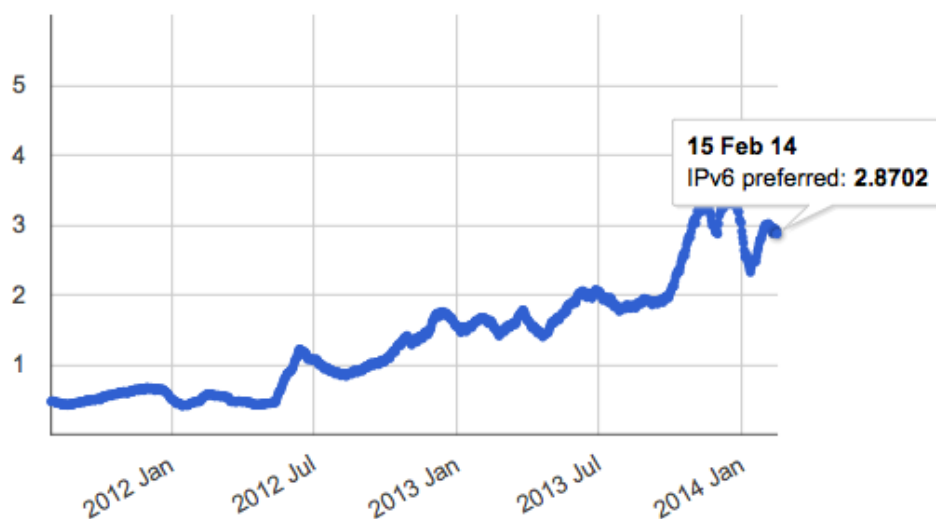
# IPv6 measurement

## End user readiness: World

IPv6 Preference by Month



IPv6 Preference by Month



Data source from “flash” and “JavaScript”  
and including viewers from mobile devices

<http://labs.apnic.net/ipv6-measurement/Regions/001%20World/> as of 6/2/2014

# IPv6 deployment leaderboard in the World (commercial operators)

ASN	Entity	Economy	IPv6 preferred rate
22394	Cellco Verizon Wireless	US	44.90
55430	STARHUBINTERNET-AS-NGNBN Starhub Internet Pte Ltd	SG	30.72
18126	CTCX Chubu Telecommunications Company; Inc.	JP	29.24
2516	KDDI CORPORATION	JP	27.20
8708	RSC & RDS SA	RO	23.88
3303	Swisscom (Switzerland)	CH	23.60
12322	PROXAD Free SAS	FR	20.98
20825	Unitymedia NRW GmbH	DE	18.51
4739	INTERNODE-AS Internode Pty Ltd	AU	16.55
6389	Bellsouth net Inc.	US	15.94
7922	Comcast Cable Communications	US	15.01
7018	AT&T Services Inc.	US	14.43
23655	Snap Internet Limited	NZ	12.20
4773	MobileOne Ltd Mobile/Internet Service Provider	SG	9.20

<http://labs.apnic.net/ipv6-measurement/AS/> 18/11//2013

# Observation

- IPv6 deployment status is varied among regions, economies and individual ASN (network operators)
  - IPv6 deployment is not happening all at once
  - Some economies have been very active in terms of IPv6 deployment
  - Some ASNs have been very active in terms of IPv6
- Let's look into some statistics and anecdotal evidences of some economies in the AP region



# Governments' initiative in the AP region

# China

- Announcement made by the Chinese State Council in Nov 2011
  - IPv6 mandates to the Industry
    - “China will put Internet Protocol version 6 (IPv6) into small-scale commercial pilot use and form a mature business model by the end of 2013, the State Council recently said at an executive meeting about the main goals and road map for the China Next Generation Internet project” (People’s Daily Online, Jan 2012, <http://english.people.com.cn/90778/7696495.html>)
    - 3 million users for each operators by 2013
    - 25 million users by 2015
  - SPs in China are responding to this mandate

# China

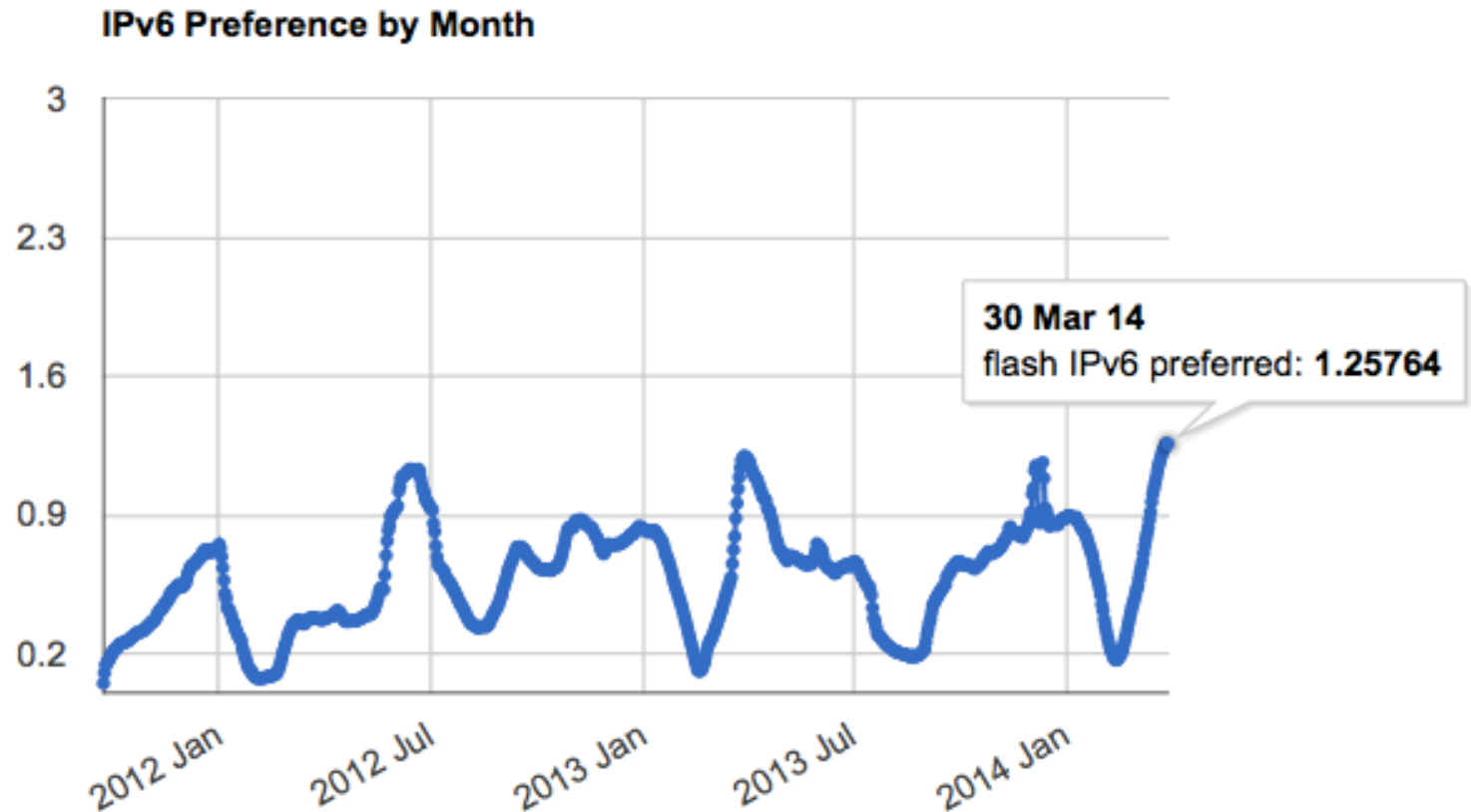


## IPv6 Plan of e-Government Extranet

- Chinese authorities pay great attention on the Next Generation Internet based on IPv6 and have issued a series of announcements to specify the target and roadmap of development of next generation Internet, providing policy and financial supporting measures
- Following the important principle ‘Government network must go first for the informatization’, national e-government extranet (e-government public infrastructure) will take the lead in the field of e-government planning, deployment and pilot IPv6 related technologies
- IPv6 is a must for the e-government extranet, because with the expanding coverage of e-government network and increasing services& applications, IPv4 shortage is a big barrier for system deployment and providing new services

[http://conference.apnic.net/data/36/cnnic-update\\_2013.8.27\\_1377563880.pdf](http://conference.apnic.net/data/36/cnnic-update_2013.8.27_1377563880.pdf)

# China: Stats

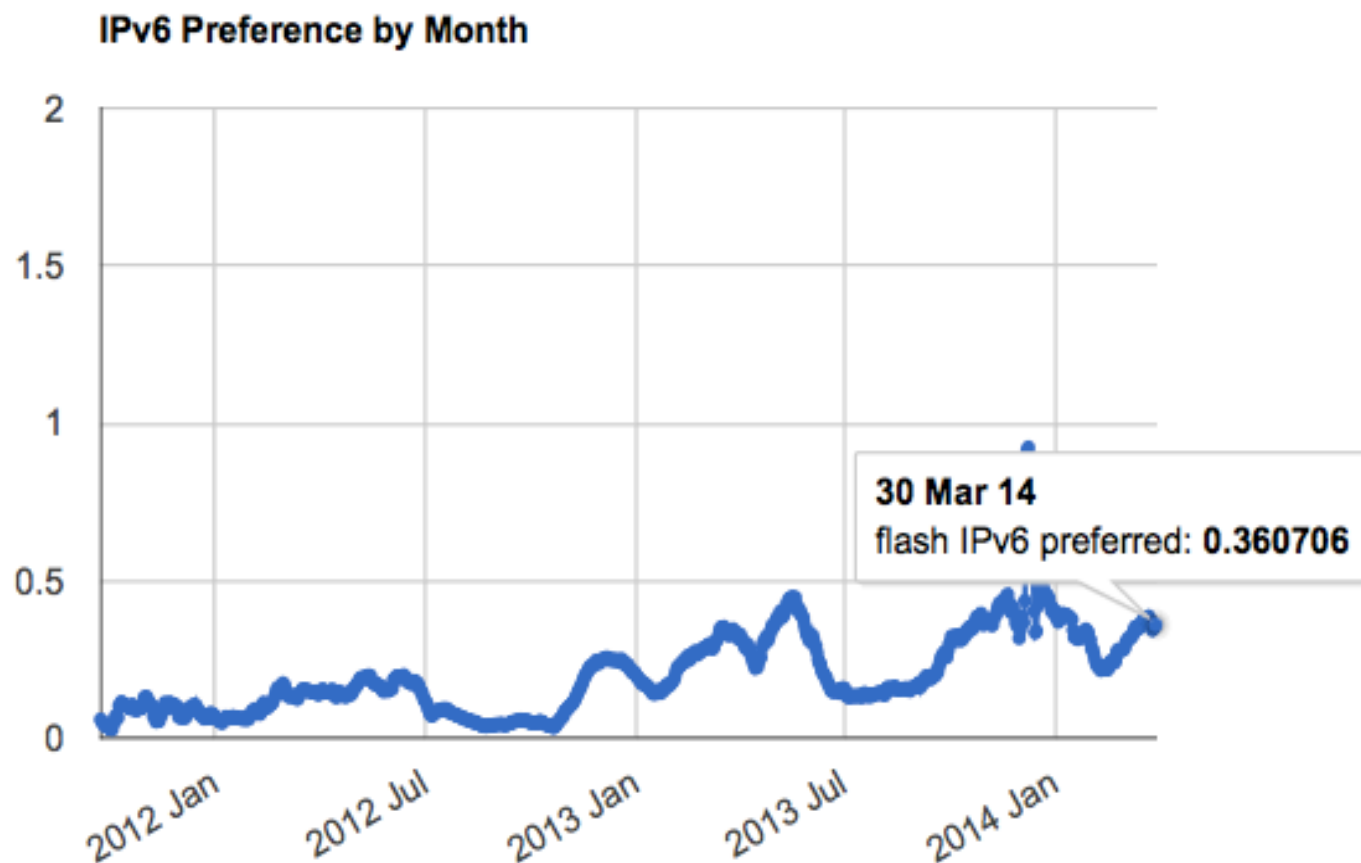


<http://labs.apnic.net/ipv6-measurement/Economies/CN/>

# Hong Kong

- Series of initiative provided by Hong Kong OGCIO
  - Supported academic research on IPv6 since 2003
  - Government backbone network was enabled with IPv6 in 2008
  - Government Internet Gateway systems was enabled with IPv6 in 2009
    - Public facing government services (200 website) are on IPv6
  - Supported the ISOC Hong Kong to organize the “IPv6 in Action!” project in 2012
    - APNIC provided our expertise for this project

# Hongkong: Stats



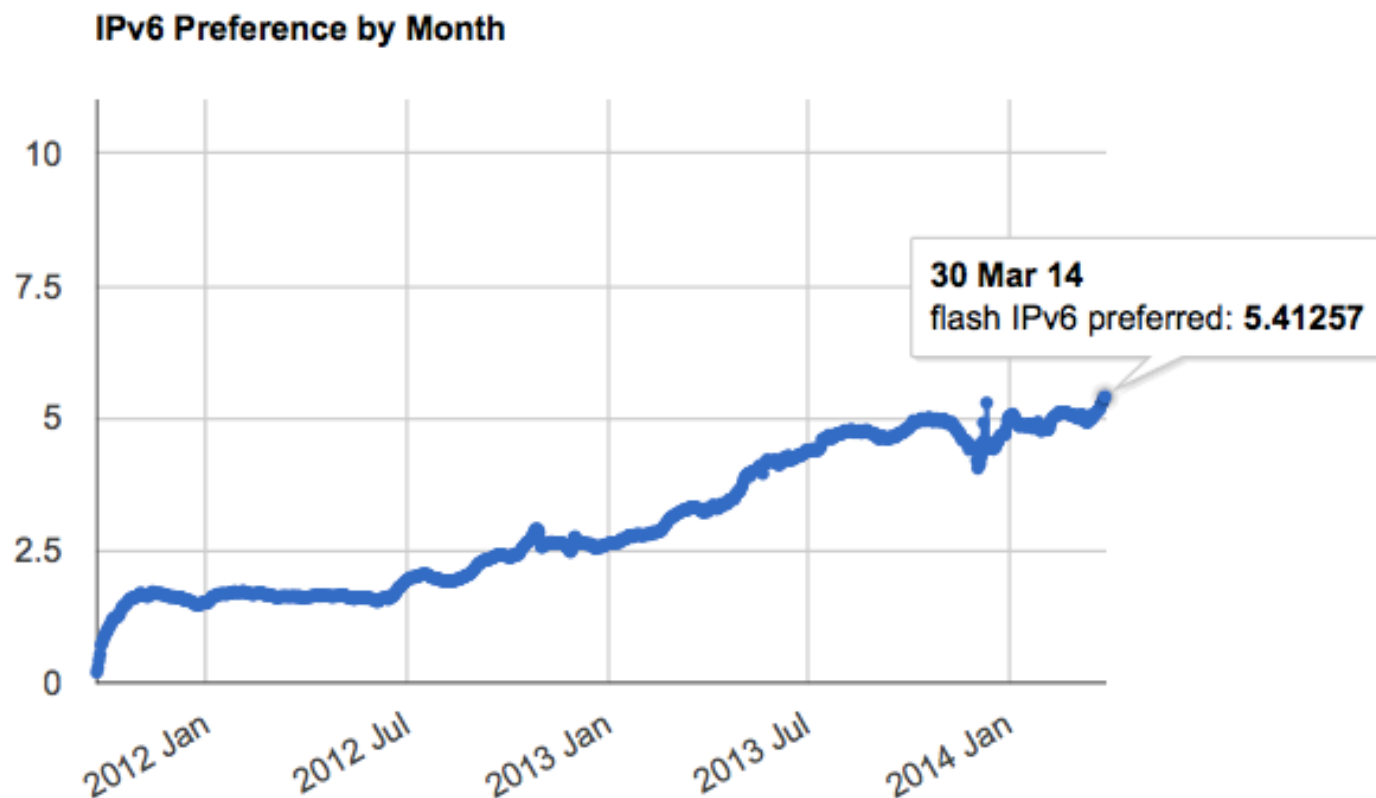
<http://labs.apnic.net/ipv6-measurement/Economies/HK/>

# Japan

- Ministry of Internal Affairs and Communications conducts regular IPv6 Study Group
  - Partnership between the public and private sectors
    - Detailed field level discussions
  - Most recent one on July 2013
    - Active discussion on CGN: concerns on its relatively high costs, possible negative impact to end users
    - Update on usage of existing IPv6 test bed (APs and CPs)
    - Discussion on potential formats of IPv6 service deliveries: Default IPv6 services
      - Some providers are experiencing positive result
    - Discussion on IPv6 services in mobile networks
    - Discussion on developing IPv6 security guidelines

[http://www.soumu.go.jp/main\\_sosiki/joho\\_tsusin/policyreports/chousa/ipv6\\_internet/02kiban04\\_03000222.html](http://www.soumu.go.jp/main_sosiki/joho_tsusin/policyreports/chousa/ipv6_internet/02kiban04_03000222.html)

# Japan: Stats



<http://labs.apnic.net/ipv6-measurement/Economies/JP/>

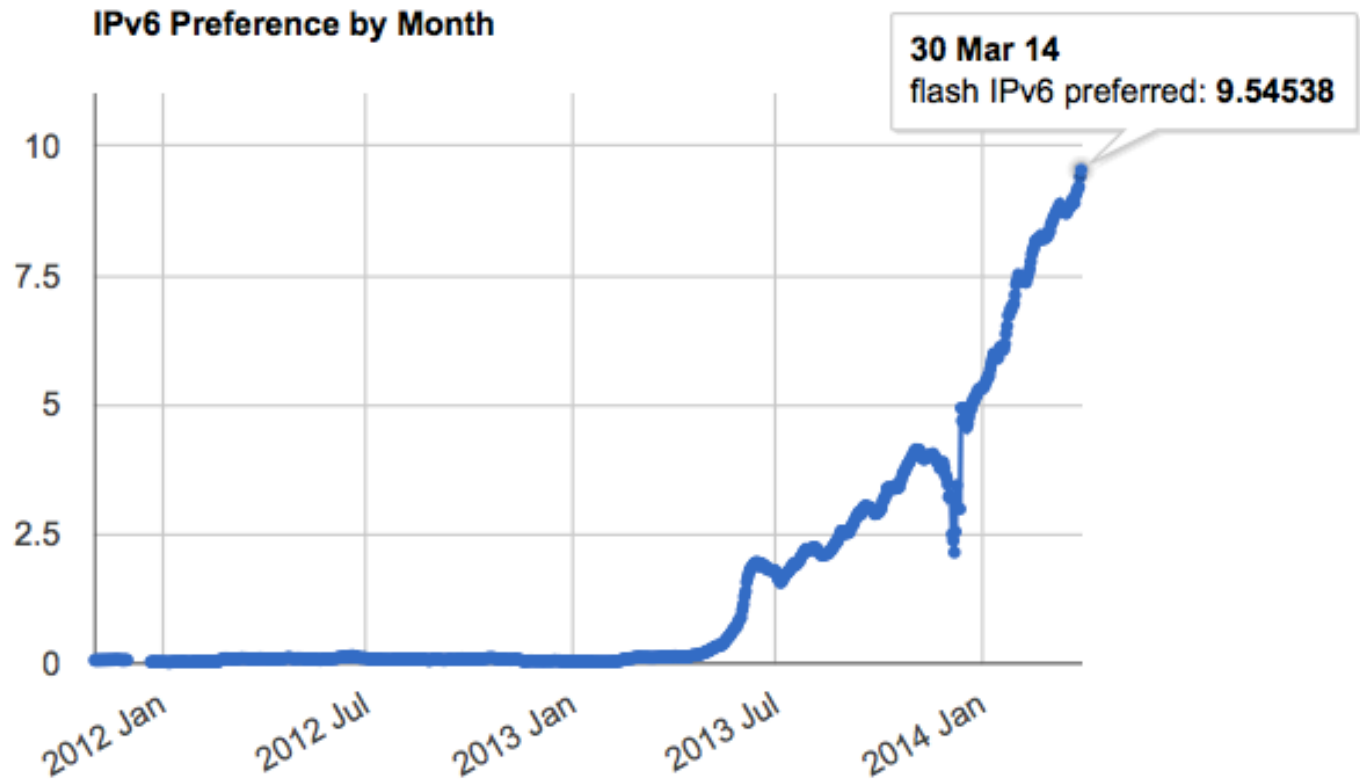


# Singapore

- IPv6 Transition Program lead by Infocomm Development Authority (IDA) of Singapore
  - To apply multi-stakeholder approach in conjunction with “pull” and “push” strategies to support IPv6 adoption
    - Create Initial IPv6 demand by enterprises, government agencies, content and application providers
    - Create IPv6 supply by network providers
    - Drive competency across multi-stakeholders
    - Ensure IPv6 and IPv4 performance equity by hardware and software vendors
    - Raise awareness on IPv6 across multi-stakeholders
    - Managing IPv4 address exhaustion mainly by network providers
  - To address the issue of IPv4 exhaustion and to facilitate the smooth transition of the Singapore ecosystem to IPv6
  - To promote IPv6 adoption in the local industry

<http://www.ida.gov.sg/Infocomm-Landscape/Technology/IPv6>

# Singapore: Stats



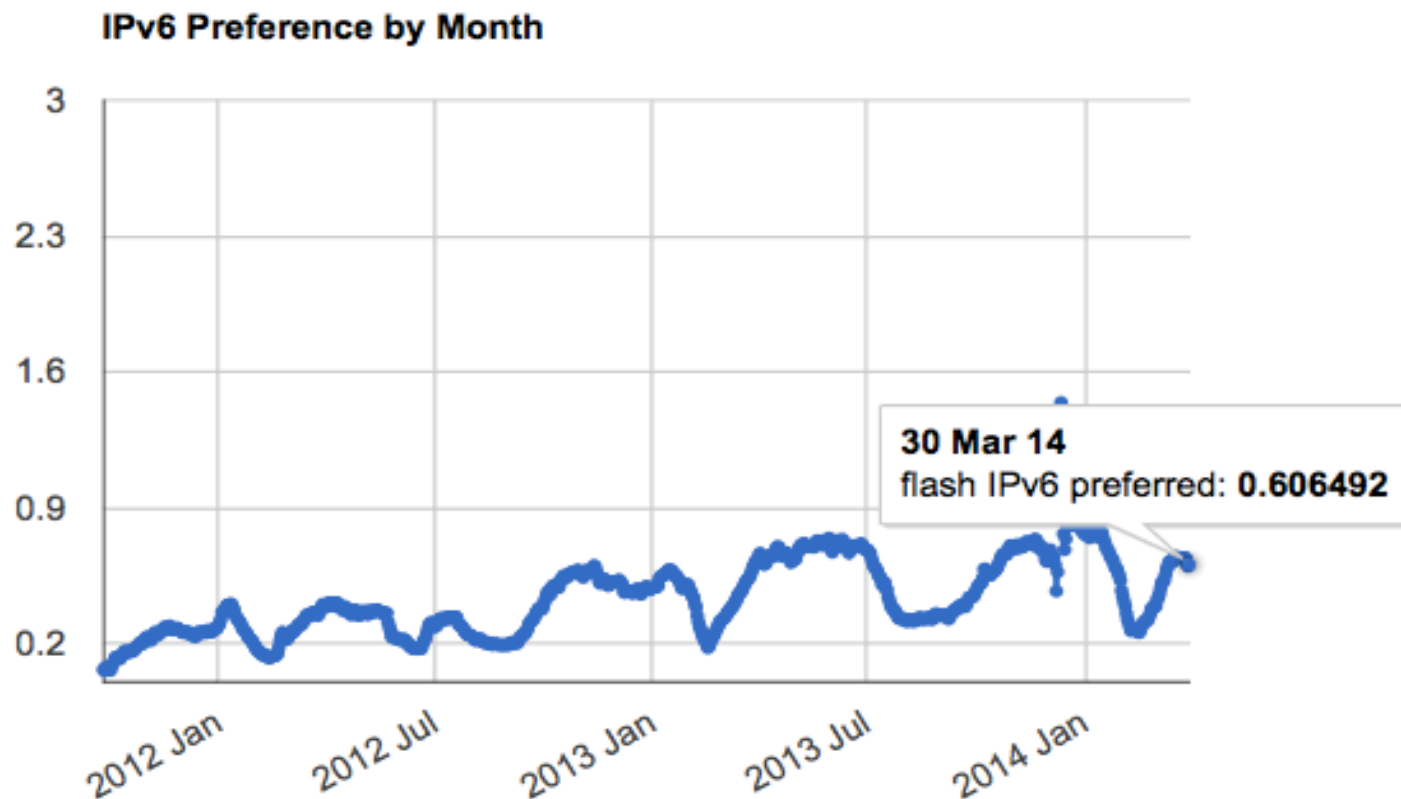
<http://labs.apnic.net/ipv6-measurement/Economies/SG/>

# Taiwan

- “IPv6 Upgrade Promotion Program” lead by Ministry of Transportation and Communications
- Objectives
  - Seamless transfer from IPv4 to IPv6 network environments in Chinese Taipei
  - National Information and Communication’s Initiative to actively promote the gradual upgrade to IPv6
    - By 2013: Enable dual stack among 50% of public network services (Web, DNS, email)
    - By 2015: Enable dual stack the remaining public network services
    - Around 2016: All governments related network services to be IPv6 enabled around 2016
  - Monitoring IPv6 deployment status
  - Active engagement among multi stakeholders

<http://conference.apnic.net/36/program#/speaker/Sheng-Wei%20Kuo>

# Taiwan: Stats



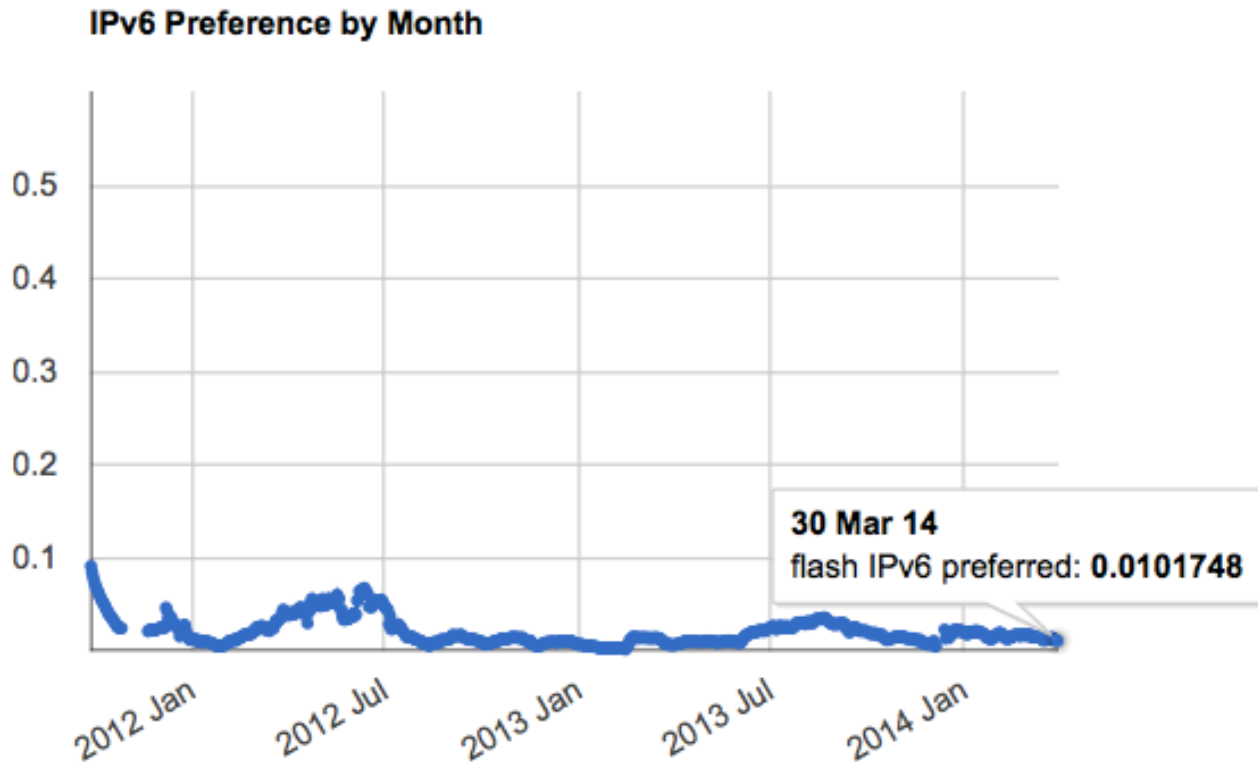
<http://labs.apnic.net/ipv6-measurement/Economies/TW/>

# Philippines

- IPv6 trials by government research arm (ASTI thru the AI3 project) from 1999 to present
- IPv6 enabled research network (PREGINET) since 2003
- IPv6-enabled local internet exchange launched in 2007 ([www.phopenix.net](http://www.phopenix.net))
  - APNIC helped on equipment donations and finding external support from PCH, Cisco and I-root
- Official IPv6 government policy launched in 2010 (<http://www.gov.ph/2010/06/18/executive-order-no-893/>)
- Government IPv6-enabled network before the end of 2014

*Reported by: Advanced Science and Technology Institute(ASTI) 01/04/2014*

# Philippines: Stats



<http://labs.apnic.net/ipv6-measurement/Economies/PH/>

# IPv6 and 4 Byte ASN in SEA

	ASNS allocated	4 byte ASN allocated	%	asns seen in v4 BGP	4byte ASN seen in v4 BGP	%	asns seen in v6 bgp	4byte asn seen in v6 bgp	%	routin g global unica st seen in experi ment	%
APNIC	9653	2168	22%	5793	876	15%	1199	114	10%	486	41%
MY	178	61	34%	127	34	27%	40	7	18%	20	50%
SG	333	92	28%	217	51	24%	81	14	17%	45	56%
TH	359	58	16%	250	41	16%	41	5	12%	23	56%
VN	227	110	48%	137	54	39%	15	1	7%	11	73%
PH	300	62	21%	190	38	20%	23	5	22%	9	39%
ID	823	194	24%	580	112	19%	101	7	7%	38	38%

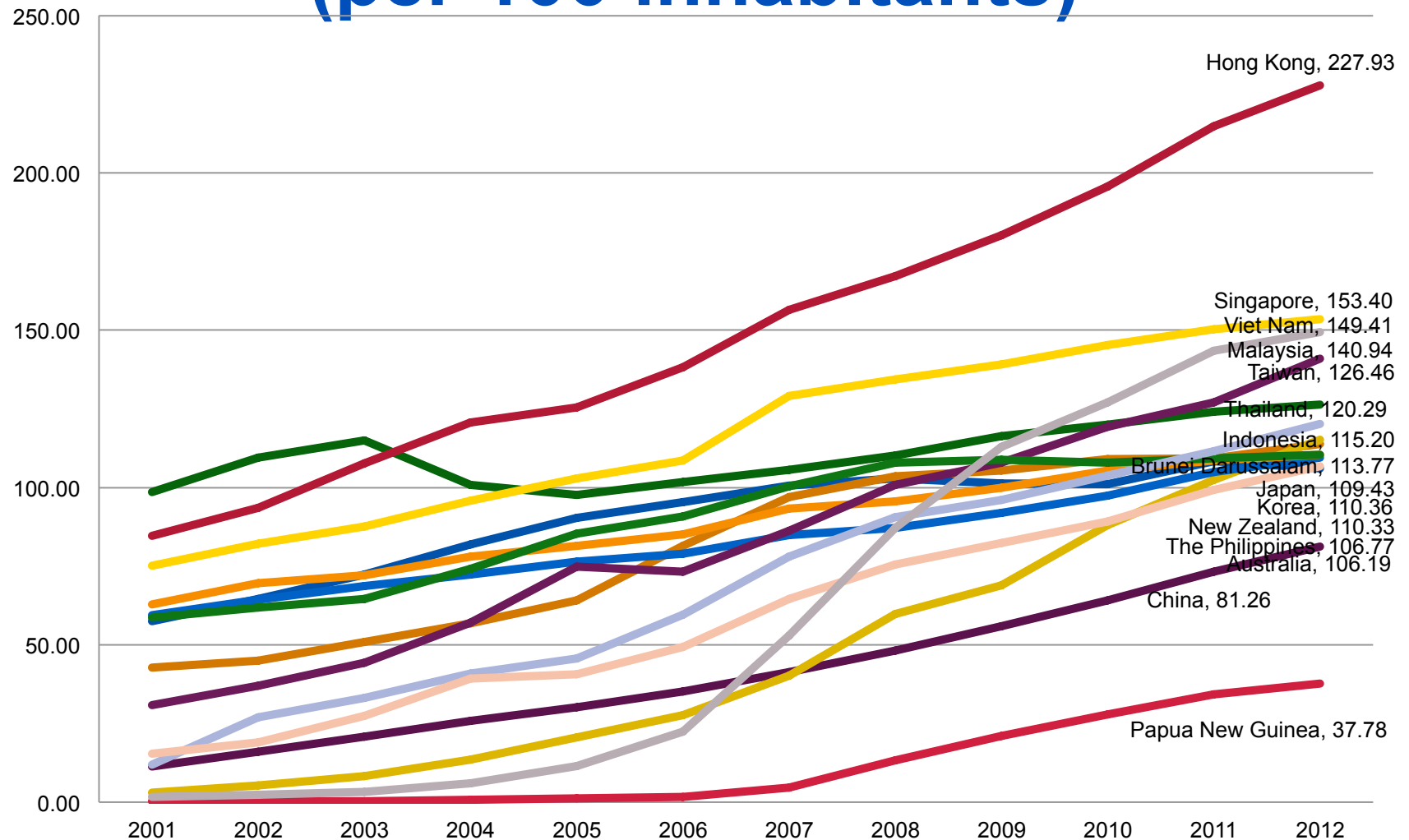
# South East Asia Leaderboard

CC	ASN	AS Name	Count	%v6pref
SG	AS10091	SCV-AS-AP StarHub Cable Vision Ltd	19094	90.97%
TH	AS133042	OBEC-AS-AP Office of the basic education commission	601	40.77%
SG	AS55430	STARHUBINTERNET-AS-NGNBN Starhub Internet Pte Ltd	21153	39.01%
SG	AS59211	ONEASIAHOST OneAsiaHost	1299	31.64%
MY	AS17564	GITN-PCN-AS-AP GITN (M) Sdn. Bhd.	219	30.14%
TH	AS9411	NONTRINET-AS-AP Kasetsart University	483	27.33%
ID	AS45287	VARNION-AS-ID Varnion Technology Semesta; PT	225	20.89%
MY	AS38044	GITN-NETWORK GITN-NETWORK	155	20.00%
TH	AS4621	UNSPECIFIED UNINET-TH	1270	15.51%
SG	AS4773	MOBILEONELTD-AS-AP MobileOne Ltd. Mobile/Internet Service Provider S	26283	10.20%
MY	AS24514	MYREN-MY Malaysian Research & Education Network	343	9.62%
ID	AS24521	DATAUTAMA-NET-AS-ID PT. DATA Utama Dinamika	158	6.96%
MY	AS2042	ERX-JARING JARING Communications Sdn Bhd.	380	6.32%
ID	AS4795	INDOSATM2-ID INDOSATM2 ASN	545	3.85%
ID	AS23951	CITRA-AS-ID PT JEMBATAN CITRA NUSANTARA	382	3.66%
VN	AS45896	VNPTGLOBAL-AS-VN VNPT Global JSC	303	2.64%
TH	AS7470	TRUEINTERNET-AS-AP TRUE INTERNET Co.;Ltd.	1527	2.36%
SG	AS9506	MAGIX-SG-AP Magix Broadband Network	110436	2.01%
MY	AS4788	TMNET-AS-AP TM Net; Internet Service Provider	93695	2.00%
ID	AS4787	ASN-CBN Internet Service Provider	604	1.82%
ID	AS9657	MELSANET-ID-AP Melsa-i-net AS	192	1.56%
ID	AS55666	GMEDIA-AS-ID PT Media Sarana Data	453	1.55%
TH	AS38794	BB-BROADBAND-TH-AS-AP BB-Broadband Co.; Ltd. Transit AS	588	1.53%
ID	AS9794	DNET-ID-AP PT. Core Mediatech (D-NET)	162	1.23%
SG	AS18106	VIEWQWEST-SG-AP Viewqwest Pte Ltd	890	0.90%
SG	AS10024	LGA-AS-SG-AP LGA International	520	0.77%
ID	AS17451	BIZNET-AS-AP BIZNET NETWORKS	3077	0.75%
SG	AS4657	STARHUBINTERNET-AS StarHub Internet Exchange	2987	0.70%
SG	AS45143	SINGTELMOBILE-AS-AP SINGTEL MOBILE INTERNET SERVICE PROVIDER Sin	6443	0.61%
ID	AS4800	LINTASARTA-AS-AP Network Access Provider and Internet Service Provide	497	0.60%
SG	AS9874	STARHUB-IX StarHub Broadband	6546	0.50%
VN	AS45539	VTCWLB-AS-VN VTC Wireless Broadband Company	223	0.45%
VN	AS7643	VNPT-AS-VN Vietnam Posts and Telecommunications (VNPT)	964	0.41%
PH	AS132199	GLOBE-MOBILE-5TH-GEN-AS Globe Telecom Inc.	2468	0.20%
PH	AS10139	SMARTBRO-PH-AP Smart Broadband; Inc.	4661	0.17%
PH	AS24106	DMPI-AS-AP DMPI; Digitel Mobile Philippines Inc.;	1174	0.17%
VN	AS45903	CMCTI-AS-VN CMC Telecom Infrastructure Company	4199	0.14%
PH	AS6648	BAYAN-TELECOMMUNICATIONS Bayan Telecommunications; Inc.	10570	0.06%



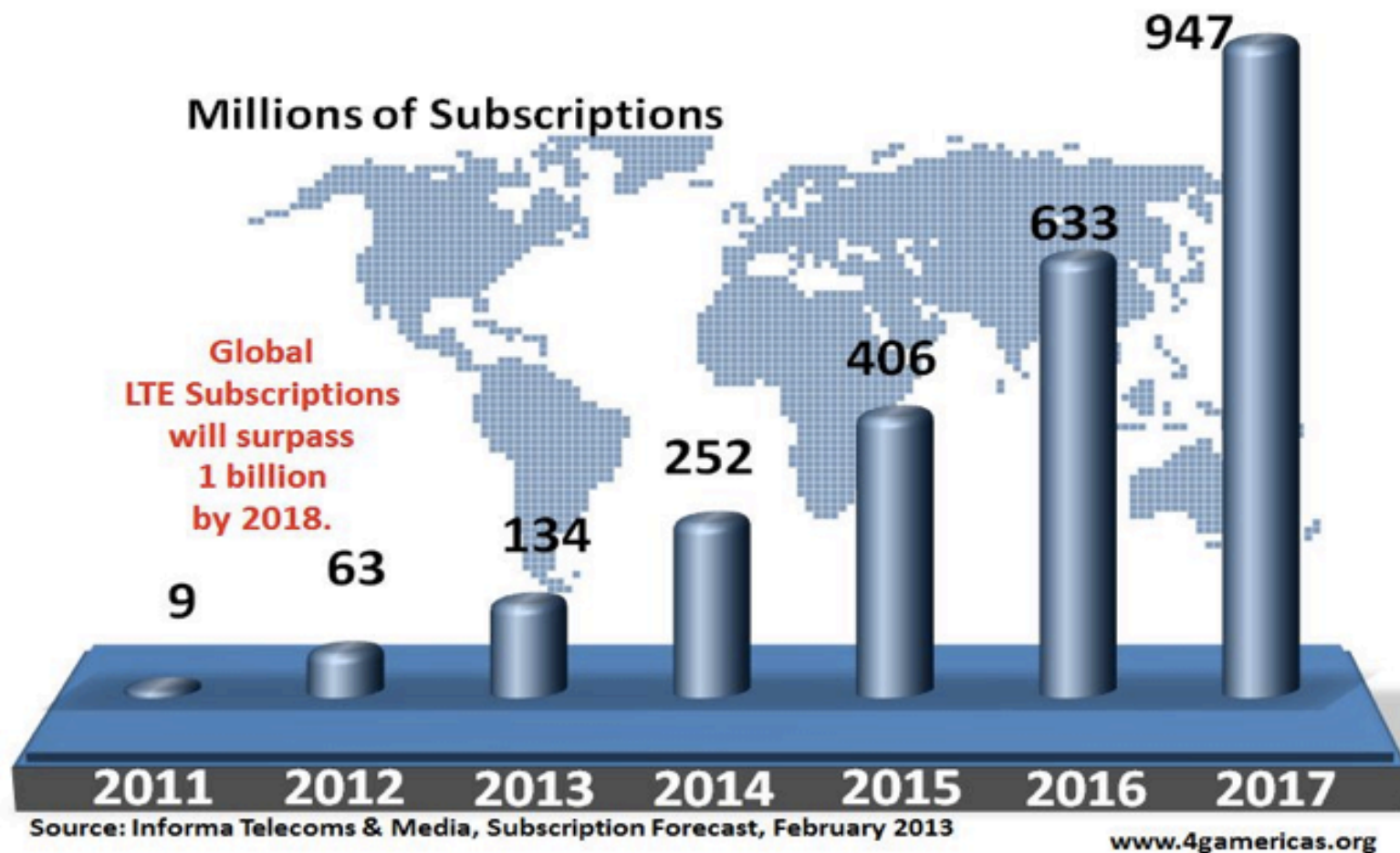
# Growth path of the Internet

# Mobile cellular subscription (per 100 inhabitants)



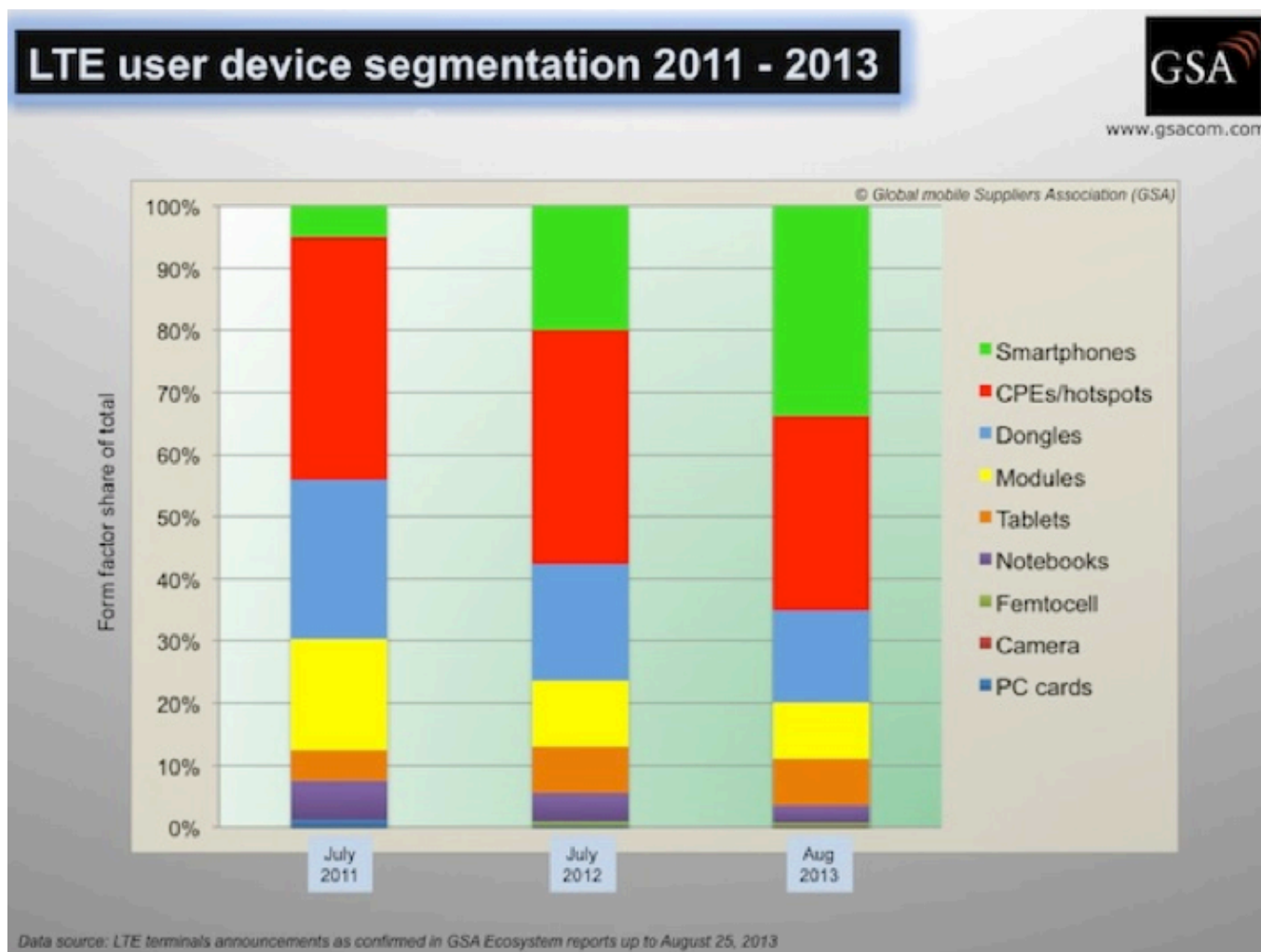
[http://statistics.apec.org/index.php/key\\_indicator/index](http://statistics.apec.org/index.php/key_indicator/index)

# Global LTE growth focus



www.4gamericas.org/index.cfm?fuseaction=page&pageid=1781

# LTE user devices 2011 - 2013



[http://www.gsacom.com/news/gsa\\_387.php](http://www.gsacom.com/news/gsa_387.php)

# Mobile networks

- The business competency of mobile network operators:
  - Shifting from being a traditional voice and messaging provider to a mobile broadband service provider
  - Services on voice, messaging and data are converging on IP based services
  - Rapidly increasing LTE deployment in the region
- Decision makers' (mobile network operators) view
  - Ready to move to Voice over LTE?
  - Mobile cloud computing on top of the LTE network?
  - What are key building blocks of all-IP strategy?

# Interesting tutorials at APRICOT2014

- IPv6 in Mobile Network (<http://2014.apricot.net/program#session/66936>)
  - By Sunny Yeung (Telstra Australia)
  - Circumstances around deploying and integrating IPv6 for Mobiles Carriers are very different to those in a fixed network.
  - What is involved? what are some of the key challenges? what variation of IPv6 should I use?
- 464XLAT: Breaking Free of IPv4 (<http://2014.apricot.net/program#session/66932>)
  - By Cameron Byrne (T-Mobile USA)
  - Review the 464XLAT architecture
  - How it applies to mobile and broadband networks to enable growth beyond IPv4
- Presentation files: <http://2014.apricot.net/program>

# Support the current and future growth

- The end-to-end Internet principle allows many stakeholders to interact directly, and provide foundation for innovation
  - The Internet is a highly diverse and flexible amalgam of many components
  - The speed of innovation is rapid
- Internet industry is at a critical turning point
  - Some may be left behind if their organisation does not learn how to provide both IPv4 and IPv6 services.
  - Choosing technologies that support the current business model, while establishing a foundation for a future business model is no simple task – there is no one strategy that fits all.
  - Key success factor: Information sharing and continuous collaboration among multi-stakeholders of the Internet

# Questions?