

UN IGF2016 BFP-IPv6

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□ Japan Network Information Center (JPNIC)

IGF2016 IPv6-BPF Session @ Guadalajara



Several colleagues in RIR community joined the panel discussions, and were key contributors to contents

<https://www.youtube.com/watch?v=g9EmjZXpscA>

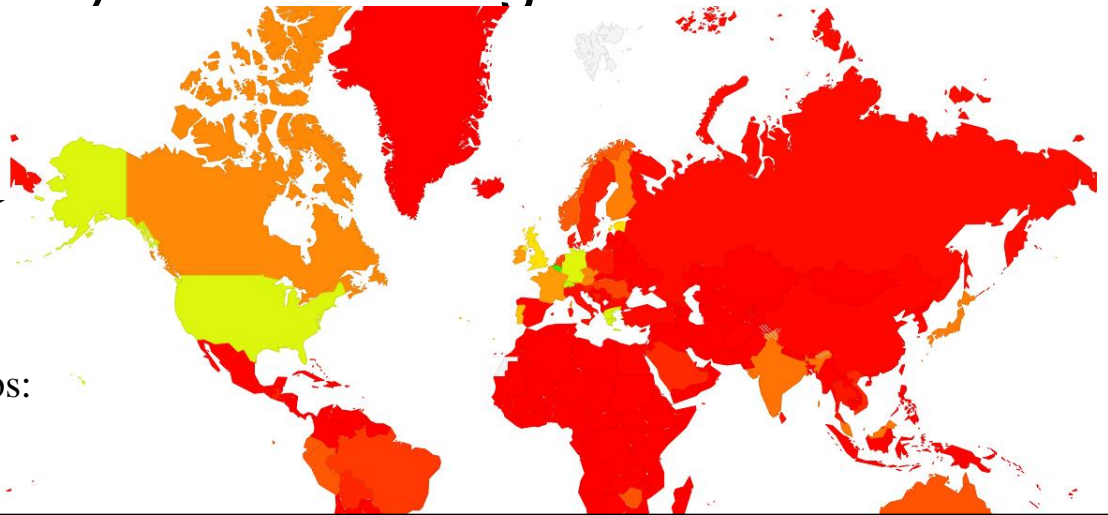


<http://www.intgovforum.org/multilingual/>

Goal of IPv6-BPF: Why IPv6 at IGF?

- ❑ IPv6 had good synergies with “Providing Access to the next billion” as Internet Governance issue
- ❑ Reach out to the stakeholders we cannot reach within technical community, collaborate to promote IPv6 deployment at the global level

World IPv6
Deployment rate:
less than 8%



APNIC Labs IPv6 Measurement Maps:
<http://stats.labs.apnic.net/ipv6/>

IPv6 has been discussed in Internet Governance arenas

- ◆ APEC TEL (2010), OECD(2014), IGF IPv6-BPF(2015), APrIGF(2016 @Taipei)
- ◆ IPv6 BPF this year in IGF is not totally a new initiative

Overview of BPF-IPv6 2016

□ IGF2016 BPF-IPv6

- 2016 focused on economic motivation of IPv6 deployment
- Developed based on feedback by participants, case studies
- MAG Coordinators: Sumon A Sabir & myself(Izumi Okutani)



□ Targets of the document

- Policy makers and business decision makers
- It is not BPF about technical IPv6 deployment; rather to share experience in technical community with others

□ Overview of contents

- Introduction: Summary of 2015 work and scope of 2016
- General Status of IPv6
- Observations on motivation of IPv6 deployment
- Remaining Challenges
- Summary and Conclusion

□ Next Step

- Publish finalised document on IGF website, outreach key stakeholders including Inter-governmental organisations

MAG = Multistakeholder Advisory Group

It is a way of calling IGF program committee, consists from diverse members

Case Studies

- ❑ Public call, over 20 cases collected across different regions
 - https://docs.google.com/document/d/15HP5OkTPfnWkK4z4Z5qNbyuqNmAAP1o_xlxuZjrkt28/edit
- ❑ NTIA of US DoC published request for comment: Microsoft, AT&T and a few other contributed
- ❑ Examples:
 - Contents : Kakao Talk (Korea)、UOL Diveo(Brazil)
 - Fixedlines: Fortnet (Greece), TMNet (Malaysia)
 - Mobile : SKTelecom (Korea), T-mobile (US)
 - IPv6 Multicast for nation-wide video streaming infrastructure: NTT East (Japan)
 - Smart Meter for electricity measurement : TEPCO (Japan)
 - Banking/security : WellsFargo, Rabobank
 - Corporate Network: Sony

Common incentives:

Long term business sustainability

Leading edge image

Some say cost is cheaper than ctu with IPv4

IPv6 deployment rate is not linked to GDP

	Country	IPv6 Capable
1	Belgium	53.83%
2	Switzerland	36.46%
3	United States of America	33.88%
4	Germany	31.02%
5	Greece	28.05%
6	Luxembourg	27.17%
7	Portugal,	23.14%
8	United Kingdom of Great Britain and Northern Ireland	22.11%
9	Peru	18.59%
10	Ecuador	18.17%
11	Estonia	17.54%
12	Canada	16.54%
13	Japan	15.96%
14	Malaysia	14.77%
15	France	13.73%
16	Trinidad and Tobago	13.58%
17	Finland	12.25%
18	India	11.01%
19	Brazil	10.95%
20	Norway	10.44%

Top 10

- 7 are European countries : No.1 is Belgium
- US: 3rd
- Latin American countries: 9th, 10th
- Asia Pacific: 0

LACNIC putting great efforts in the region



<http://portalipv6.lacnic.net/en/>

11~20th

- Asian countries rankin
 - Japan 13th
 - Malaysia 14th (Very close to Japan)
 - India 18th (Rapid Growth)
- From Caribbean, Trinidad and Tobago 16th

Taiwan = 42th, 2.01% IPv6 Capable

Recent Notable Announcements

□ Apple: Supporting IPv6-only Networks

- Starting June 1, 2016 all apps submitted to the App Store must support IPv6-only networking

<https://developer.apple.com/news/?id=05042016a>

□ IAB Statement on IPv6

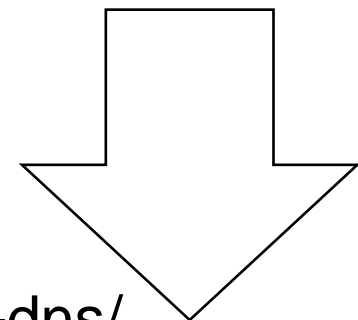
- IETF will stop requiring IPv4 compatibility in new or extended protocols.
- Future IETF protocol work will then optimize for and depend on IPv6.
- <https://www.iab.org/2016/11/07/iab-statement-on-ipv6/>

Mobile – Rapid Growth Observed

- Apple announcement
- Large scale native deployment in US: T-mobile, Verizon Wireless over 70% traffic in IPv6:
<http://www.worldipv6launch.org/measurements/>
- APAC: Reliance Jio over 70% traffic (India) , SKTelecom (Korea), MIC's study report sets milestone for JP mobile operators to provide IPv6 service by default in 2017(Japan)

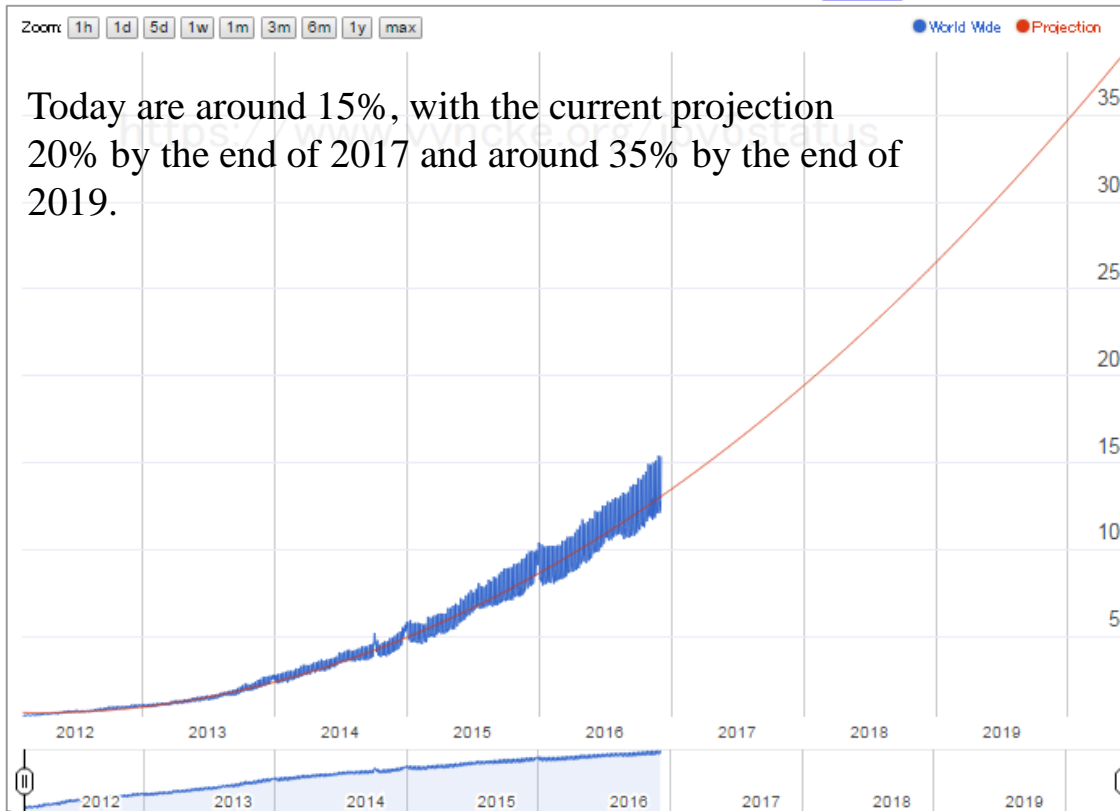
Enduser environment is getting ready

- Major global contents support IPv6
 - Google, youtube, facebook, Wikipedia, LinkedIn
- Major Cloud/CDN players support IPv6
 - Cloudflare, Akamai, MS Azure, Amazon AWS
 - Trend in providing by default
- Latest OS for general users supports IPv6
 - Windows, MacOS
- Deployment rate in DNS is higher
 - <https://blog.apnic.net/2016/10/20/ipv6-and-the-dns/>



If ISPs turn on IPv6 by default,
you can expect to get certain volume of IPv6 traffic

Projection of IPv6 % of IPv6-Enabled Web Browsers (courtesy Google) in World Wide



<https://www.vyncke.org/ipv6status/project.php?metric=p&timeforward=1280&timebackward=1280&country=ww>

Areas which need more work

□ Access line

- Backbone has been ready, more commercial IPv6 support needed in the last mile
- An observation: If top 30 ISPs deploy IPv6 (which cover over 40% of entire Internet traffic), deployment rate could rise to 20%

<http://www.potaroo.net/presentations/2015-05-14-ipv6-stats.pdf>

□ Contents

- Top Alexa website 22.50% IPv6 reachable (7th Dec 2016)
- More variety of contents need to be available in IPv6, esp. local contents

□ Data Centers and IXPs

- Sparse deployment observed

Common IPv6 Deployment Challenges

- ❑ In countries where IPv6 deployment low– ISPs don't take action due to no needs from customers
- ❑ Cost of staff training and human resources
- ❑ Customer CPEs do not support IPv6
- ❑ Some ISPs require customers to apply for IPv6 service
- ❑ Requires additional costs/limitation for small businesses
- ❑ Bugs and technical issues

- Limited/no v6 support in many operational and security tools (DDOS mitigation services, Intrusion detection, monitoring)
- For specific functionality: ND inspection OSPFv3 neighbor authentication, VXLAN overlay v6 transport, etc.

Take aways for Policy Makers

- ❑ Request vendors to support IPv6
- ❑ Awareness raising of consumers of IPv6 supported products
- ❑ Outreach to decision makers in the industry
- ❑ Training engineers for mid-small scale business/developing countries

Take aways for Business decision makers

- ❑ Chose IPv6 supported products in network update/renewal
- ❑ Training your staff is not hard if they know how to run IPv4 network
- ❑ When you deploy IPv6 commercially, turn it on by default (not make it opt-in)
- ❑ To vendors, have your products support IPv6

Take away for consumers

- Look around for your network environment at home whether they support IPv6

- If not, ask for IPv6 support
 - Equipment you connect from your home
 - Upstream ISPs
 - Contents you regularly view

Key messages of IPv6 BPF document

- ❑ Consider IPv6 for long term business
 - You are not likely be able to continue buying IPv4
 - CGN costs as well and lower operational cost to maintain IPv6

- ❑ IPv6 deployment no longer "insurance" for unexpected situation
 - Mobile has potential to grow in coming years, over 70% for some operators
 - Key global contents are IPv6 ready, large CDNs are IPv6 ready
 - % of IPv6 Web browsers today are around 15%, with the current projection 20% by the end of 2017 and around 35% by the end of 2019.

- ❑ Let's each do our part to prepare for the situation