APrIGF 2016 Workshop Report
IPv6 in the Asia Pacific Region

Wed, 28th July 14:30-16:00

Organizer
Izumi Okutani, Japan Network Information Center (JPNIC)

Moderator
Izumi Okutani, Japan Network Information Center (JPNIC)

Panelists
Paul Wilson: Director General, Asia Pacific Network Information Center (APNIC)
Shian Shyong Tseng: Chair of IPv6 Measurement BoF, APNIC/ Chairman of the board of directors of Taiwan Network Information Center (TWNIC)
Rajesh Chharia: President of Internet Service Providers Association of India (ISPAI), Executive Council Member of APNIC
Tatsuya Akagawa: Deputy Director, Ministry of Internal Affairs and Communications (MIC) of Japan
Billy Mooo Cheon: General Researcher, Korea Internet & Security Agency (KISA)

Background
Deployment of IPv6 is an issues which is getting increasing attention in the global internet governance arena in the context of providing access.

Encouraging IPv6 adoption is an effort which has close synergies with multistakeholder collaboration, not limited to technical communities. For wide spread adoption of IPv6 at national level and on the global Internet, it needs coordinated efforts by various stakeholders across different layers of networks and services. This will not only involve engineers who build IPv6 supported network but needs commitment by business decisions makers in commercial IPv6 adoption. There may also be a positive role governments can play in creating an environment which encourage IPv6 adoption in a

country/economy.

With such background, Best Practices document on "Creating an Enabling Environment for IPv6 Adoption" was developed by volunteer participants and published by the global IGF in 2015. The work continues in 2016, with focus on economic incentives for IPv6 adoption.

Outcome document for IGF2015 IPv6 BPF
http://www.intgovforum.org/cms/documents/best-practice-forums/creating-an-enabling-environment-for-the-development-of-local-content/581-igf2015-bpfipv6-finalpdf

BPF IPv6 2016
http://www.intgovforum.org/cms/best-practice-forums/bpf-ipv6

The objective of this session was to have discussions with focus on the perspective as the Asia Pacific region, which has synergy with the theme of "Universality" in APrIGF for 2016, by reviewing the status of deployment in our region, what challenges we observe, lessons learned from success/failures, and what we see as a way forward.

Workshop Summary

Each speaker set the scene with the following talking points:

- Paul Wilson: Why IPv6 adoption is important
- Shian Shyong Tseng: Statistics of IPv6 adoption rate, comparing IPv6 deployment rate per counties/economies
- Rajesh Chharia: The situation in India, challenges for a developing country
- Tatsuya Akagawa: Initiative by the MIC of Japan, a role a government can play
- Billy MooHo Cheon: Case of Korea for mobile, and comparing the case with Europe

Overview of talking points by each speaker is described below.

Paul Wilson: Why IPv6 adoption is important

- With exhaustion of unallocated IPv4 address space, and IPv4 no longer available for new distribution, IPv6 accommodates growing needs for new entrants on the

Internet with large address space.

- While technology exits to continue based on IPv4, there are limitations to rely on the Network Address Translation (NAT), which a technology to share addresses between collections of devices, if the Internet was to grow. The Internet would be more complicated and much less efficient than it is today with NAT.
- The key reason for IPv6 is precisely so that we can go on on the Internet for decades to come. Internet is growing with new entrants all the time. IPv6 allows the Internet to connect to every point on the Internet, which is the critical factor that we started the Internet with, which is the ability to connect any one point to any other point.
- There is no excuse for not deploying IPv6 as not being secure/not ready. There is large scale deployment in the US, more than 100 million users. It is very important for us to understand that this can be done now.

Shian Shyong Tseng: Statistics of IPv6 adoption rate, comparing IPv6 deployment rate per counties/economies

- IPv6 readiness was introduced from three criteria: BGP advertisement, service availability(mainly here focus on website) and user availability (It is hard to measure but it can be estimated by calculating the users who can access the popular and famous websites, e.g., Google, YouTube, Facebook)
  - BGP advisement: World average about 26%, from the APAC region, Asia Pacific region, Japan, Taiwan, Singapore are above 40%, Malaysia, New Zealand, Hong Kong, Thailand are above 30%
  - Service availability: The web service availability of the Alexa top one million websites is about 5.8%, and very low. In the APAC region, Hong Kong, Singapore, Thailand, Indonesia, India, and the Taiwan are above the average
  - User availability: Google's user availability is increasing by 1% every month, and currently over 10%. APNIC uses the data processing method to get a weighted average, which increases almost half of the Google's data. According to APNIC's statistics, from the APAC region, Japan, Malaysia, Singapore, Australia are above the world average.
- Presentation available at: https://aprigf2016.files.wordpress.com/2016/08/ipv6_measurement20160726-shian-shyong-tseng.pdf

Rajesh Chharia: The situation in India, challenges for a developing country

- Why deploy IPv6?
  - India, with the change in government two years, ago got the target of 600 million broadband connection under fiber to India by end of 2020, and 250,000 villages has to be connected with the optical fiber network. With exhaustion of IPv4, IPv6, accommodates growing number of Internet users.
  - The security monitoring agencies are also finding problem with CGN on IPv4 as record of port numbers are needed to track record of users
- The challenge
  - Life cycle of equipment is long and it takes time to upgrade to IPv6 supported equipment, to cover large population, especially when second hand equipment from metro area will then be used in rural areas.
- The Indian government is taking initiatives such as:
  - Next smart city has already been adopted, and the government is on the way to deploy the Smart City Project into the city, mandating that the smart city will be another IPv6 project.
  - 2017 is the deadline for all government websites to be IPv6 ready, including eGovernment/service applications, as well as for ISPs to start providing IPv6 connections to their customers.
- Mobile is an area where further work is needed. Until the time the mobile network is not getting converted to the IPv6, it is hard to see the true effect of IPv6.

Tatsuya Akagawa: Initiative by the MIC of Japan, a role a government can play

- Why does the Japanese government promote IPv6?
  - It is for the development of the Internet.
  - Development of the Internet leads to improves quality of daily life of the nation, and development of the industries in Japan as a whole.
  - Need to prepare for IPv4 exhaustion, for continued growth of the Internet
- Initiative by the MIC
  - Set up Study Group by key industry players and experts in 2009, which have produced 4 reports, which set milestones and actions by industry players.
  - They key is not only producing reports. Follow up on action plans with stakeholders are important, after producing reports, to make sure action plans are adopted. The process of involving key players in producing report is also important, that the contents are produced by private sector.
  - The study group produced 4th report in 2016, with focus on IoT and

mobile."IPv6 Mobile Launch": By 2017, achieve a situation where IPv6 is provided by default to smartphone

- Role of government in Japan
  - IPv6 deployment should be private-sector driven
  - Japanese government supports its private sector's activities:
    In areas challenging to conduct actions by private sector, which have synergies with such private sector activities such as:
    - ✧ Awareness raising to key stakeholders
    - ✧ Facilitating and publishing discussions by various key industry players
    - ✧ Setting up meetings to follow-up on actions from the report
- Presentation available at:
  https://aprigf2016.files.wordpress.com/2016/08/tatsuya_akagawa160728_mic_ipv6_aprigf_r04.pdf

Billy Mooho Cheon: Case of Korea for mobile, and comparing the case with Europe

- Several initiatives by Korean government was shared
  - All government ministries procedures to be IPv6 compatible by law since 2014
  - IPv6 deployment center: to provide helpdesk, training and testbed
  - Exemption of income and corporate tax for IPv6 purchase
- Case of SKTelecom
  - Deployed voice and data communications LTE network since Sept 2014
  - Followed by this, as a result of collaboration with KISA they have deployed IPv6 for commercial service, in 11 regions, with currently 60,000 subscribers
- Conducted hearing with some European ISPs, to compare with situation in Korea
  - See “Discussions outcome” Section - Observation on successful cases in Europe

View from Participants

- Challenge with customer CPE was shared, even if the infrastructure is IPv6 ready
  - What needs to happen is enough advanced planning from the ISPs; to actually be aware that when time comes to do an upgrade, they've got to make sure it's IPv6 compatible.
  - A case of Vietnam was shared, as a great example of how it can be deployed with good strategy and planning ahead. An ISP has made the decision to deploy IPv6, and this year now provides 80,000 connection, showing rapid growth in very short time frame.

- Security
  - As response to question from audience, a clarification was made that there is not IPv6 specific security issue, therefore s certain products not being ready for IPv6 for security should not be a big enough barrier for deployment
  - Question was asked on security of IPv6 for mobile network
- Whether there is some regulation needed to make IPv6 deployment to take place (Question from audience)
  - We should be very careful asking governments to specify technology. There are some successful approaches such as collaboration with APNIC and APEC TEL (for governments to link technology to vision) and Vietnamese government encouraging IPv6 adoption through carrot approach.
  - Co-Chair of GAG from Thailand shared that in ICANN, GAC received report from SSAC (SAC-079: https://www.icann.org/en/system/files/files/sac-079-en.pdf). This report implies huge cost on data retention if based on IPv4 CGN. There may be public policy standpoint on where to go on IPv6 and will keep the community updated. (GAC: Government Advisory Council, SSAC: Security and Stability Advisory Council)
- Lager population in the region
  - An observation made that Asia Pacific region has large population, It takes additional effort to have high IPv6 deployment rate, compared to countries with small population
- Issue with some ISPs requiring users to apply for IPv6
  - It was mentioned that it is creating additional hurdle for users to IPv6, if additional procedures are needed for users to have IPv6 connection

Discussion Outcome

This session hopefully has provided information on practices which work, as well as set some ground work in considering measures for challenges observed, and share experiences among stakeholders in case there has been successful way of handling challenges raised at the session.

Brief summary of discussions at this APrIGF were shared back to the global IGF IPv6 Best Practices Forum through the session moderator (Izumi Okutani), with some of the discussions reflected in the zero draft document of the global IPv6 BPF.

The discussions had following outcomes.

- IPv6 adoption is important for long term sustainability of the Internet which is growing with new entrants all the time, while at the same time restoring the original Internet model, as an efficient way to provide connectivity.

- Clarified the status of IPv6 deployment rate per countries/economies by different services, which helps identify area of strength/challenges in IPv6 adoption per country/economy
  - The speaker from the MIC made an observation at the session that while Japan has high IPv6 deployment rate for access, there is more work needed in the area of making local contents support IPv6
  - This is one example of what we can learn from statistics, in identifying remaining challenges in IPv6 adoption in a country/economy, as basis of considering strategy/way forward

- Discussed possible role governments can play
  - Carrot approach, rather than stick seems to be successful in some country
  - Stakeholders should be very careful about asking governments to specify technology
  - In ICANN, SSAC Report (SAC079) was introduced to the GAC, which raised attention to governments on implication of large scale use of NAT in IPv4 post exhaustion
  - Shared a concrete best practice example of a role a government can play in respecting the private sector initiative by;

  1. Providing a platform of discussions by key industry players and experts
  2. Raising awareness in the industry decision makers by publishing report with action for industry players
  3. Following up on the progress of actions, and discussing among industry players and experts, in case challenges are observed in taking actions, on what can be done to address it, and who needs to take action

- Identified remaining challenges, including challenges specific to a developing country
  - Rural areas need another cycle to upgrade to IPv6 equipment, when they

use second hand equipment

- Even if infrastructure is ready, there remains challenges to support IPv6 in customers legacy CPE (For new ones ISPs can ensure IPv6 supported CPE are used by customers)
- Even if an ISP provides IPv6 commercial service, if customers need to apply for IPv6 service, it gives additional hurdle for customers
- Having large population require additional efforts to have large scale of network to be IPv6 ready

- Observation on successful cases in Europe
  - Competitive multi-national environment, CGN creating legal problems in Europe, it helps if a CTO is in a position to make key decisions
  - It is likely to lead to high IPv6 adoption if there is a large ISP with over 30% share, and if this ISP adopts IPv6
  - No strong effect observed on action by governments and should be market driven. However, if local government starts Smart City project and adopts IPv6, this may be an approach governments can help encourage adoption.
  - Having active local Network Operators Groups (NOGs) was observed as a possible factor in encouraging IPv6 adoption