Workshop 144: IPv4 Markets and Legacy Space

Organizer: Mr German Valdez, Number Resource Organization

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Concise description

This workshop will focus on the importance of IPv6 deployment, in particular, its relationship with the possible emergence of an IPv4 market and the successful and proper implementation of inter-regional IPv4 transfer policies. It will also address issues related to legacy space.

Summary

Regardless of the advent of IPv4 transfers, and the possible emergence of an IPv4 market, the future growth and success of the Internet relies on the successful deployment of IPv6. IPv6 provides the only means to achieve long-term and scalable growth of the Internet while maintaining its critical technical features.

Currently two Regional Internet Registries (RIRs) allow transfers between their regions. APNIC and ARIN have worked with their communities to successfully implement IPv4 transfer policies following agreed procedures. Other regions have similar policies underway. The workshop will consider what aspects will enable balance, consistency, and fairness to define multiregional transfer policies.

Legacy IPv4 address space refers to those allocations made before the creation of the RIRs. This accounts for about 35% of total IPv4 space. What could be the actions of the RIR on this space and the cost benefit of engaging in a continuous recovering effort.

For many Internet stakeholders, the RIRs are entering into a new era where high-level principle documents like RFC2050 need to be reviewed or updated. What requires examination, in particular, are the possible effects of IPv4 address exhaustion on current RIR services and policies.

For example, what actions the community should take in order to mitigate the effect of IPv4 address exhaustion, while simultaneously incentivizing global IPv6 deployment. Requiring consideration are the roles government, Internet operators, academia and other Internet organization should play.

Panelists

- Izumi Okutani, JPNIC, Female, Technical Community, JAPAN, Asia-Pacific Group

- Andres Piazza, LACNIC, Male, Technical Community, ARGENTINA, Latin American and Caribbean Group - GRULAC
- Peter Thimmesch, Denuo/Addrex., Male, Private Sector, UNITED STATES, Western Europe and Others Group - WEOG
- Anne Rachel Inne, AFRINIC, Female, Technical Community, MAURITIUS, African Group
- Nick Hilliard, INEX, Male, Technical Community, IRELAND, Western Europe and Others Group - WEOG
- Paul Wilson APNIC, Male, Technical Community, Australia, Asia-Pacific Group

Moderators

- Martin Levy, Hurricane Electric, Male, Private Sector, UNITED STATES, Western Europe and Others Group - WEOG
- German Valdez, Number Resource Organization (NRO) [Remote Moderation]

Lessons from Panelists

Izumi Okutani shared the two approaches to the IPv4 address exhaustion from the perspective of the Japanese Internet Address Registry, JPNIC. She began with a brief overview of how Internet number resources are distributed within the Regional Internet Registry (RIR) system, noting participation in policy discussions are open to all. She discussed inter-regional transfers that are currently possible between the Asia Pacific (APNIC) and North American (ARIN) regions, and may be possible between other regions in the future. However, transfer of IPv4 space does not provide a long-term solution to worldwide IPv4 exhaustion. In the case of Japan, she mentioned the Japan IPv6 Task Force, which is a coordinating group of several relevant stakeholders to discuss approaches to exhaustion. The Japanese community is driven by the private sector, but there are dialogues with academia and government to keep track of issues and solutions to challenges.

Andres Piazza described the situation in the Latin American and part of the Caribbean region (LACNIC region) , which is different to the others in that there has not been significant movement in the IPv4 markets that are emerging in the ARIN and APNIC regions. LACNIC does not yet have a policy on inter-regional transfers. According to projections, LACNIC may enter the "soft landing" phase in May 2014. He said there is a big focus in the region on IPv6 deployment for service providers, as the top two providers alone would make a significant difference to the amount of total traffic over IPv6 if they were to adopt.

Anne Rachel Inne from the African (AFRINIC) region said that Africa has the largest remaining pool of IPv4 addresses, and that AFRINIC is the "youngest" registry. She said that the stakeholder most interested in IPv6 deployment are governments, which is good news because many African governments are more interested in deploying IPv6 than encouraging NAT deployments. Network Address Translation was deployed previously by international entities, and they are now being dismantled in favour of IPv6. Legacy space holders in Africa are mainly universities in South Africa, although there are some individuals. These are looking to AFRINIC for a means to transfer their excess space to networks in need of additional addresses or back to the AFRINIC pool. She said there has not so far been much enthusiasm for a transfer policy. She brought up the topic of IPv4 leasing, which is gaining some interest around the world.

Peter Thimmesch joined remotely from the US and spoke about the potential for address transfer facilitation from legacy space holders – or entities in the US such as hospitals, large retailers, local governments, and so forth, that have IPv4 address space that has been long unused. This space can be utilized by networks in the European/Middle East (RIPE NCC) and Asia Pacific regions, where the RIRs are now distributing only small blocks. He said the RIPE transfer market is the most robust (within the region, as there is no inter-regional transfer policy), and the distribution policies are very similar to APNIC. He said there does not seem to be any 'stashing' behaviour in the RIPE region, and the market is transparent and easy to use. He mentioned the accuracy of the registry is very important as IP addresses move around.

Nick Hilliard talked about the RIPE policy to clean up address spaces that may not have been tracked carefully in the past, as there are some legacy address holders that do not know they have the space. The RIPE NCC database has about four /8 blocks' worth of legacy address space. The community is considering a policy to create a registry to deal with legacy address space and legacy transfers. The difficulty for the RIPE region is to ensure any address transfers are reflected accurately in the registry databases. He mentioned the US Department of Defense has about 25% of the IPv4 legacy space in the world. Another policy under discussion in the RIPE region is to essentially deregulate the market by removing the "needs based" requirement to help facilitate transfers more easily, so they can be accurately recorded.

Paul Wilson opened the floor for questions from participants on any issues such as address leasing, IPv6 transition, IPv4 markets, and any related implications. He said there may be misunderstandings around some of the facts, and he was more interested in discussion.

Martin Levy mentioned there are some differences among the regions and first asked Anne Rachel about the question raised within the AFRINIC region whether some of the excess IPv4 space should be 'given up'. She responded that there is not much need for a needs based transfer policy in the region, and there have been organizations from other regions coming to AFRINIC asking for large address space. This may be an opportunity to set pricing for these arrangements. There has also been a suggestion from the community to give excess space to education networks, which are AFRINIC members, for reduced rates. These measures could bring IPv4 exhaustion quicker than current projections.

Martin asked Izumi how the operators are reacting in Japan to IPv4 exhaustion. She said there are multiple ways to address it. It is not realistic for everyone to transfer right away to IPv6, so those who need additional IPv4 space look to the transfer mechanisms for the short term. The major operators are deploying dual-stack solutions, and more than 70% of the ISPs are supporting IPv6 along with IPv4 to prepare for the next several years of transition. The next step is to encourage content providers in Japan to deploy IPv6.

Martin asked Nick about the inter-regional transfer policy that has been discussed in the RIPE region. He responded that RIPE does not have such a policy because of the alternative in discussion to drop the needs based requirement that facilitates more intra-regional transfers. Paul added that APNIC has long had a transfer policy for within the region to trial this model, and that policy was introduced in order to drop the needs based requirement at the time of regional exhaustion, so for a time there was a 'free market'. However, in trying to establish the inter-regional transfer policy

there was not agreement between the ARIN and APNIC regions on this requirement so the needs requirement was reintroduced to facilitate inter-regional transfers. He noted that if there would be a desire for inter-regional transfers in the future in the RIPE region, they might have compatibility issues in removing the needs based requirement.

Martin asked if it mattered whether the different regions have different mindsets. Paul responded that policy changes in the different regions are dependent on many factors, and the communities have different levels of experience, which leads to the varying timelines for policy discussions. For pragmatic reasons APNIC realigned policy to facilitate transfers with ARIN.

Question: The next billion online will be in emerging economies, and IPv6 is crucial for this. The Asia Pacific region is very diverse. What can the registry and different groups do to help support IPv6 deployment? Paul responded that IPv6 deployment is ultimately a global issue, and the motivation could come from encouraging an effective IPv4 transfer market to eventually reduce the value of IPv4 addresses.

Peter said there is truly more IPv4 space than everyone realizes through Network Address Translation mechanisms and there is no business reason to upgrade to IPv6 if customers' needs are met.

Question: As an IPv4 broker that 'recycles' IPv4, we do promote IPv6 as much as possible. Currently only 2% of the world is using IPv6 and there is some room to grow the IPv4 Internet while IPv6 gains momentum. Most content providers seem to provide content over IPv6, and ISPs can start connecting end users. He asked the RIR representatives that have and have not exhausted their IPv4 free pools, would the RIRs that still have IPv4 addresses see a global policy as the way forward to facilitate a global IPv4 market?

Andres responded that from the LACNIC perspective the focus is to promote an open, secure, and stable Internet within the region. Market needs as well as development needs need to be considered, for example the consensus is that every government should have a broadband plan and LACNIC is working with these government to support those plans; IPv6 deployment is necessarily part of those plans to enable the vast growth that is expected in the region. He said this may be a philosophical difference among regions in different stages of development. There is not a focus on inter-RIR transfers in the LACNIC region but many active members of the community are interested in IPv6 deployment. Overall traffic in the region is less than 2%, but more than 65% of LACNIC members have IPv6 allocations, so the next steps in promoting development and IPv6 deployment are of great interest to the LACNIC community.

Question to Anne Rachel: From your perspective, which African countries are most active in IPv6 deployment; what is the best multistakeholder approach to IPv6 deployment in the AFRINIC region? Why are universities requesting more IPv4 space rather than trying to move to IPv6?

Anne Rachel responded that AFRINIC considers development and training to build capacity is very important and works in partnership with universities and has online labs. Training activities have impacted more than 3,000 engineers in 49 countries. There is plenty of IPv4 for now but AFRINIC training does emphasize IPv6 as the future of growth and it is important for operators to gain these skills as well. Universities in the southern region have the most space, and in other countries

AFRINIC
The Internet Numbers Registry for Africa

APNIC

ARIN
American Registry for Internet Numbers

lacnic

RIPE
NCC

universities do not have enough. From a development perspective, any newcomers to the market need IPv4. Ultimately the community makes these decisions, so they will decide whether or not to 'give' excess space to universities.

Comment from ARIN CEO John Curran: A global policy mechanism means that regional discussions have to converge, and the strength of the system is the level of engagement and there is no dominating party.

Question: From a customer demand point of view, are the SMEs are willing to adopt to IPv6?

Nick answered that there is a range not well reflected in statistics, as many networks have allocations but are not yet using them.

As a final comment, Paul added that the network we're using today is available on IPv6 and many participants are using it.

Moderator's conclusion.

The workshop provided a great forum to discuss the state of the IPv4 marketplace; but even before that item was specifically discussed the various workshop participants got to explain the core issues relating to the PDP (Policy Development Process) that exists within each of the RIRs (Region Internet Registries). The membership of each RIR has carefully crafted individual policies appropriate for each region covered. The next major item covered was the cold-hard-facts of IPv4 exhaustion within the RIR structure. However, the core discussion revolved around the processes that enable IPv4 transfers to successfully occur. The workshop covered both the internal RIR transfer process along with commercial driven transfers.

The workshop can be classed as a success because the conversation, both from the panel and from the participants in the room, was lively and varied. The RIRs explained that there's clearly processes in place today to handle transfers and make sure that registration data is kept correct. While there was a fairly large discussion regarding the inter-RIR transfer, it was also clear that the RIRs differ in their policies. They differ because of their diverse membership base.

Finally it's important to restate what was mentioned by nearly every person in room. IPv6 is vitally important to the future of the Internet.

AFRINIC
The Internet Numbers Registry for Africa

APNIC

ARIN
American Registry for Internet Numbers

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RIPE
NCC