Input to the WTPF-13 from the Regional Internet Registries

19 April 2013

This document is submitted on behalf of the five Regional Internet Registries (RIRs). It specifically addresses some of the draft Opinions discussed by the Informal Expert Group (IEG) as they relate to the RIRs' areas of expertise and coordination.

The RIRs distribute and register Internet number resources including IP addresses (IPv4 and IPv6) and Autonomous System Numbers. The five RIRs are:

- AFRINIC – www.afrinic.net
- APNIC – www.apnic.net
- ARIN – www.arin.net
- Lacnic – www.lacnic.net
- RIPE NCC – www.ripe.net

Opinion 1: Promoting Internet Exchange Points (IXPs) as a long term solution to advance connectivity

The RIRs support this Opinion. As noted in the Opinion text, various independent and collaborative studies have demonstrated the efficacy of IXPs in advancing connectivity and reducing the cost of Internet access for all.

We note the inherently multi-stakeholder approach that the Opinion invites Sector and State Members to adopt. This case effectively illustrates the different responsibilities of stakeholder groups in facilitating infrastructural developments that can improve Internet efficiency and stability. We note also the coordination efforts of regional associations that promote best practices amongst IXPs, and also serve to support new entrants into IXP markets. These include EuroIX, APIX, LAC-IX, and others.

Since IXPs are critical in promoting the connectedness of ISPs through peering arrangements, the RIRs, in coordination with other Internet organizations, are also strong supporters of community and industry processes that promote and facilitate these arrangements. In particular, these include global and regional peering forums, including the recently launched African Peering Forum (AfPIF), the Middle East Peering Forum (MPF), APRICOT (Asia Pacific) Peering Forum meetings, and the Network Access Points Forum from Latin America (NAPLA).

Opinion 3: Supporting Capacity Building for the deployment of IPv6

The RIRs support the position that capacity building is an essential element in the deployment of IPv6. As noted in the Opinion text, issues regarding the depletion of the IPv4 address pool can be minimized by a properly planned transition to IPv6 and every effort should be undertaken to encourage and support this process.

With regards to capacity building the RIRs have developed various programs to create awareness as well as dedicated trainings focusing on the technical and managerial aspects of deploying IPv6 in IP networks:

- All RIRs operate dedicated websites such as www.ipv6actnow.org and www.getipv6.info, providing a platform not only for service providers, but also for content providers, enterprise users, governments and other stakeholders to exchange experiences and information regarding IPv6 deployment.

- RIPE NCC and APNIC, working with the Middle East Network Operators Group (MENOG), have developed a five-day technical training aimed at network engineers employed by governments and enterprises, in which they learn how to configure existing networks to support IPv6. More than 20 courses have been delivered around the Middle East and Asia, with planning underway to expand into the CIS region.

- Lacnic has delivered several training programs to more than 7000 engineers throughout its service region, working in partnership with various stakeholders, including the Latin American and Caribbean Network Operations Group (LACNOG), the European Union's 6DEPLOY program, telecommunication regulators and other governmental agencies, and intergovernmental organizations as the Inter-American Telecommunication Commission (CITEL).

- AFRINIC has developed a state-of-the-art IPv6 training course for Infrastructure Engineers and Decision Makers, which it has been delivering in Africa since 2009. In partnership with 6Deploy, AFRINIC has also created a specific course for IP service providers (called IPv6 for Sysadmins), for which participants receive a special IPv6Forum certificate. By certifying participants in these courses, AFRINIC provides engineers with the confidence necessary to engage their mangers in relation to IPv6 deployment issues. Through a partnership with the CTO and the African Telecommunication Union (ATU), AFRINIC has delivered its IP Number Resources for Policy Makers course back-to-back with various forums for regulators. Several of these sessions have received overwhelming appreciation, such the latest, which took place in Mauritius during the CTO forum, and as part of the ITU-T SG3 African regional meeting in Cairo.

- APNIC is working with the ITU-D Centre of Excellence (CoE) in Bangkok on IPv6 training activities for policy makers and others in the Asia Pacific region.

- The RIRs participate in global events such as the World IPv6 Launch and various regional and national IPv6 Task Forces and conferences, working with governments and other stakeholders to address issues including national IPv6 policies, training programs and industry coordination.

- The annual Global IPv6 Deployment Monitoring Survey, conducted every year since 2010 on behalf of the five RIRs, together with measurement programs undertaken by the various RIRs provide policy makers and the Internet community at large with insight into the progress of IPv6 deployment and have been used to identify obstacles that may exist at the national, regional or global level.

Following the completion of the IPv6 Group within the ITU, the RIRs have stated their commitment to continue working with the ITU-T and ITU–D sectors, and are talking with the Directors, with an aim to implement cooperative capacity building initiatives in all regions.

Regarding the transfers of IPv4 address space, the RIRs strongly feel that this issue is beyond the scope of Opinion 3, and refer to the position detailed in our response to Opinion 4.

Opinion 4: In Support of IPv6 Adoption and Transition from IPv4

The RIRs endorse many of the points made in this Opinion, particularly in regard to the importance of IPv6 adoption, the need to mitigate the negative effects of IPv4 exhaustion on operators, especially in the developing world, and the value of ensuring that all IP addresses are accurately registered in public, RIR-maintained databases, in accordance with community-developed policies.

The RIRs particularly agree with the Opinion's emphasis on the importance of the public sector in encouraging, facilitating, and supporting IPv6 adoption, especially via cooperative initiatives with the private sector particularly network Operators and Internet service Providers.

The RIRs would like to clarify certain issues raised at various points in this Opinion, in the hope of ensuring that WTPF participants are fully informed in their discussion of these issues.

New entrants to the Internet industry
The Opinion states:

c) that plans and policies should continue to be in place to allow new entrant ISPs to enter the market via access to a reasonable block of IPv4 addresses at reasonable prices;

The RIR communities have recognized the importance of catering for those building new networks, and have addressed the issue through various policy measures across the five RIR regions. AFRINIC, APNIC, Lacnic and the RIPE NCC have specific policies governing the distribution of their remaining pools of IPv4 address space. These policies ensure that small

"rations" of IPv4 address space will be available to organizations well into the future, with the goal of ensuring that new IPv6-based networks are interoperable with existing IPv4 networks.

Policies in some RIRs have also reserved IPv4 address blocks for use by new and existing Internet Exchange Points (IXPs), ensuring that these key pieces of Internet infrastructure can operate effectively and properly support the transition to IPv6.

The RIRs also note that, in reference to "reasonable prices", the RIRs are non-profit organizations, whose members themselves determine the membership and service fees that are reasonably required for funding of RIR activities.

"Legacy" IPv4 address space

Around 35% of the total IPv4 address space was assigned prior to the establishment of the RIRs, and is often referred to as "legacy space". While this space may be subject to specific policy conditions, all legacy space remains under the authority of the applicable RIR (for the region in which it is assigned), and the RIRs would like to highlight several points in relation to legacy space:

- It should be noted that even if 20% of the entire IPv4 address space were to become available for redistribution, this would provide for less than three years' worth of allocations, based on the global 2011 address consumption rate.
- It is impossible to accurately gauge the utilization rate of legacy address space. Even if the addresses are not visible on the public Internet, holders of this space may be using them on private networks. This does not violate current address usage policies or any IP addressing standard.
- The Internet registry system contains a significant incentive for legacy space holders to maintain accurate registration of their resources in a public, RIR-maintained database. Registration data for legacy address blocks is held in the RIR databases (transferred from the original records when the RIRs were established), and this data is often used by Internet Service Providers to make decisions regarding their routing policies. Stale or unmaintained registrations can erode operator trust in these address blocks and render the addresses unusable on the public Internet, as other operators decide to not accept the routing announcements for such blocks.
- The RIRs have taken steps to recover unused legacy addresses and return them to the Internet Assigned Numbers Authority (IANA). A global policy for the return of unused IPv4 addressed space to IANA was implemented in 2012, with the stipulation that returned space will be distributed back to the RIRs based on demonstrated need. To date, three RIRs have recovered and returned the following addresses to IANA:
    - APNIC: 2.31 million
    - RIPE NCC: 1.31 million
    - ARIN: ~16 million (slightly less than a /8)

IP address transfers

As noted at several points in the Opinion, the transfer of IPv4 address space between operators (particularly operators in different RIR service regions) is currently emerging as an

issue in the IP addressing space. The RIRs strongly support the principle underpinning the Opinion, that there is a need to accurately register transferred space in the RIR-maintained databases.

The RIR community policy development processes have addressed, or are addressing, the policy issues raised by this development. Two RIR communities (ARIN and APNIC) have so far implemented policies allowing for the inter-region transfer of address space (meaning operators in these two regions can currently transfer space). In the AFRINIC, Lacnic and RIPE communities, relevant policy proposals are currently under discussion.

In relation to the requirement for transfer recipients to demonstrate their need for the addresses, we note that the two current inter-RIR transfer policies (APNIC and ARIN) both include this requirement. Such a requirement is also being discussed in relation to the policy proposals in the three other RIR communities. The RIRs stress that these policies are developed in an open, transparent, and bottom-up manner by the regional communities. If ITU Member States feel that a need requirement is an essential element of such policies, it is important that they contribute to RIR community discussions and make that view known.

In this vein, the RIRs strongly support the final point in the Opinion regarding Member State participation in the "multi-stakeholder institutions responsible for the development of technical policy and allocation of these resources", and invite all ITU Members to contribute to RIR community policy discussions.

Opinion 5: Supporting Multi-stakeholderism in Internet Governance

The RIRs strongly agree with this call to support the multi-stakeholder model of Internet governance. We identify the following characteristics as essential to successful multi-stakeholder governance:

- Open to all interested parties;
- Transparent in decision-making processes;
- Respectful of the specific roles and responsibilities of all stakeholder groups;
- Bottom-up engagement of those directly affected.

The RIR policy development processes are themselves examples of the kind of multi-stakeholder governance that has been an essential factor in the spectacular growth of the Internet over recent decades. These processes have produced IP address-related policies that are dynamically responsive to the evolution of technology, industry and society. They have successfully encompassed the advent of IPv6 and its specific policy requirements. They have facilitated the expansion of the RIR system from three institutions to five, ensuring that regional communities can develop policies that reflect specific regional concerns. They have provided for the orderly run-out of unused IPv4 addresses in two regions already (APNIC in April 2011 and RIPE NCC in September 2012), and they are addressing the interests and concerns of all stakeholders in relation to the inter-regional transfer of IPv4 address blocks. Finally, and at the same time, they have provided continuous support for the Internet through a period of phenomenal growth and success.

As the scope of Internet governance expands, it is important that all stakeholders embrace the multi-stakeholder model. Since the adoption of the Tunis Agenda, we have already seen major steps towards realizing multi-stakeholder Internet governance, including the establishment of the global Internet Governance Forum (now preparing for its seventh annual event) and many regional and national Internet governance events, where the RIRs have been actively involved (Lacnic as a promoter and active player in LACIGF, the RIPE NCC's support for the Arab IGF and AFRINIC's support for regional IGFs throughout Africa). We have also seen many existing governance structures evolve to better incorporate the input and participation of all stakeholder groups.

The ITU itself has taken steps toward a more multi-stakeholder model, including the public release of some documents in the lead-up to 2012's World Conference on International Telecommunications (WCIT). Various regional ITU coordination forums have also opened up their activities to increased participation from non-governmental stakeholder groups (including the RIRs). ITU members should build on these initial steps to take this evolution to the next level – an all-encompassing multistakeholder ITU will be essential to the organization's future relevance and authority. This process should be completed.

Opinion 6: On supporting operationalizing the Enhanced Cooperation Process

The RIRs welcome this support for operationalizing Enhanced Cooperation, and agree that this process is vital to the development of Internet governance structures that can effectively address the public policy issues raised by the rapid growth and ubiquity of the Internet. This conviction is reflected by the participation of a representative from the RIRs (Andres Piazza of Lacnic) in the CSTD Working Group on Enhanced Cooperation, and we look forward to the output of that group.

The RIRs would like to highlight the success that our organizations have had in operationalizing Enhanced Cooperation. The participation of the RIRs in the ITU IPv6 Group and this WTPF process reflect a shift that has occurred over the past decade in how the RIR communities engage with governments, and especially with traditional inter-governmental forums.

More broadly, each RIR has developed a range of strategies designed to increase engagement with the public sector and other stakeholders. Such strategies include:

- Dedicated community working groups
- Roundtable meetings for governments and regulators
- Bilateral consultations with governments in the region
- Participation in a wide range of global and regional inter-governmental organizations

The results that flow from the increased level of public-private engagement are of great benefit to all parties. Partnerships between government and the Internet technical community (facilitated in many cases by one or more of the RIRs) have launched a range of practical

projects and initiatives that directly benefit Internet users, especially those in developing countries. Examples include:

- Training and education programs (including the MENOG IPv6 Roadshow, AFRINIC's IPv6 For Decision Makers course, APNIC's work with ITU Centre of Excellence, and Lacnic's cooperative activities with Latin American governments and international governmental organizations)
- Cooperative initiatives to promote and develop infrastructure, including IXPs and root name server instances
- Internet technical community input into a wide range of public policy-making activities, both directly and by informing policy makers

This Opinion concludes with a recognition of the need for all stakeholders to work on this issue. The RIRs strongly agree that realizing the full potential of Enhanced Cooperation will require the input, commitment, energy and innovation of all stakeholder groups.