Building an enabling environment for access to the Internet
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Individual contribution

I, Michael Joseph Oghia, welcome the decision of the Council Working Group on international Internet-related public policy issues to hold this open consultation regarding how to enable an environment for Internet access. As an Independent consultant working in the Internet governance community, I am pleased that such initiatives can complement existing fora and activities, such as the Internet Governance Forum's (IGF) Connecting and Enabling the Next Billion(s) program.

In the space below, I address three of the six questions that were posted in the call for input, which are specific to the subject of this contribution.

What are the elements of an enabling environment to promote Internet connectivity?

There are four key solutions to take into account when discerning an enabling environment to promote Internet connectivity:

1. More widespread internet infrastructure, which also includes wider availability of Internet exchange points (IXPs), Internet Protocol version 6 (IPv6), and Internationalized Domain Names (IDNs);
2. More easy-to-use and affordable services;
3. Relevant local digital content and local language support; and
4. Higher digital literacy skills.[1]

For the purpose of this contribution, however, I would like to emphasize the importance of IPv6 to the future of Internet connectivity since basic connection via infrastructure is a prerequisite for the other three solutions to enable an environment of Internet accessibility.

One of my roles within the Internet governance community since 2015 has been working with the IGF's intersessional activities as an Internet Society (ISOC) IGF ambassador, notably the Best Practice Forum (BPF) on IPv6 and the BPF on IXPs. The BPFs are a direct response to the call by a report produced by the United Nations General Assembly Economic and Social Council (ECOSOC) Working Group on Improvements to the IGF, which called for the development of more tangible outputs to "enhance the impact of the IGF on global Internet governance and policy." With the goal to produce a central resource for individuals, businesses, governments, and other organizations searching for best practices for IPv6 adoption, stakeholders from the technical community, government, private sector, and civil society

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[1] E.g., see: http://www.worldbank.org/en/publication/wdr2016;
https://education.gov.mt/elearning/Documents/Green%20Paper%20Digital%20Literacy%20v6.pdf; and/or
http://digitalinclusionnewslog.itu.int/tag/digital-literacy/.

worked together to produce the IPv6 BPF outcome document, which provides an in-depth exploration of why IPv6 is important to the future of networking.

IPv6 and accessibility

Generally speaking, devices connect to the Internet via Internet Protocol addresses (IP addresses). The first pool of IP address numbers was created in the 1970s and contained approximately 4 billion unique numbers. This is the Internet's legacy addressing system: Internet Protocol version 4 (IPv4). The growth of the Internet has virtually exhausted the IPv4 address pool, however. A new addressing system, IPv6, was developed in 1995 by the Internet Engineering Task Force (IETF) to deal with IPv4 exhaustion. The IPv6 address pool is huge by comparison.

Historically, the adoption rate of IPv6 has been slow-growing, but now things are starting to pick up. At the same time, though, there is still a long way to go. Anyone running the old protocol needs to adopt the new one in order to support the increasing demand on the global network as more people – and the Internet of Things (IoT) – come online. There are different costs of switching from IPv4 to IPv6 – from upgrading networks, to training, planning, and the plain adaptation to change. Certain technologies such as network address translation (NAT) and carrier-grade NAT (CGN) have been developed to extend the life of IPv4. And even though they should only be considered as temporary solutions, they are sometimes relied upon to forestall what should be considered as ultimately inevitable for business, government, and end users: IPv6 adoption. The downside is clear as well. NAT and CGN increase network complexity and also increase latency on the network.[2] Their use raises operational support costs, introduces complications for law enforcement (in tracking IP addresses, for example), and requires additional computing and memory resources. While such particular disadvantages are localized to NAT users, the aggregate cost of NAT on the Internet is significant. Finally, the widespread use of NAT can harm Internet openness by limiting future innovations that depend on being able to see how machines in a network connect at the IP level.

Hence, IPv6 is critical to the goal of promoting Internet connectivity because as more and more devices come online, users will face significant problems if proper implementation of IPv6 is not enabled across networks around the world.

What are the elements of an enabling environment to promote the quality of access to the Internet?

IPv6 has numerous benefits for quality of access as well. For instance, it is entirely possible for content providers to host and deliver all content over IPv6, which will improve performance and lower latency. In one example, Facebook measured a direct performance

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[2] Latency is the time elapsed between the transmission of IP packets from the originator and reception of those IP packets at the receiver.

benefit to IPv6-enabled mobile handsets, as "Users' News Feeds load[ed] 20 to 40 percent faster."

What is the role of Governments in building an enabling environment?

When it comes to IPv6 adoption, the fact is that there are still many hurdles, including the lack of capacity, hardware and software support, and the unwillingness of Internet service providers (ISPs) and telecommunications companies to adopt IPv6. Governments, as key policymakers and catalyzers of economic growth and development, have a central role to play in assisting with the adoption of IPv6. In fact, governments are in a powerful position to create an enabling environment for IPv6 adoption. They can lead by example by requiring the public administration to adopt IPv6. They can require IPv6 in information and communications technology (ICT) procurement policies, which, in turn, obligates businesses tendering for government contracts to provide IPv6-capable products and services.

In addition to providing regulatory oversight, governments can work with bodies such as the International Telecommunications Union (ITU) and the Groupe Spécial Mobile Association (GSMA) to help encourage the private sector to adopt IPv6. Governments can also incentive the private sector to adopt IPv6 through well-informed policy recommendations, legislation, and supporting programs that help train IPv6 specialists and engineers. Moreover, governments can support initiates like the IGF and the BPFs, which draw on multi-stakeholder collaboration to address key issues related to the Internet, or support IPv6 task forces.

Conclusion

IPv6 adoption is such a significant issue to the future of the Internet that the IGF's Multistakeholder Advisory Group (MAG) decided to extend the mandate of the IPv6 BPF another year. In 2015, the BPF IPv6 discussed "Why adopt IPv6?" and collected best practice examples of initiatives that help to create enabling environments for IPv6 adoption – IPv6 task forces and capacity building projects, for example. In 2016, the IPv6 BPF focuses on the economic incentives and commercial drivers behind the decision to adopt IPv6, which governments and bodies like the ITU have a key role in facilitating.

For more information and resources, see the 2015 IPv6 BPF outcome document: http://www.intgovforum.org/cms/documents/best-practice-forums/creating-an-enabling-environment-for-the-development-of-local-content/581-igf2015-bpfipv6-finalpdf/file.

Additional resources

1. IPv6 info center (RIPE NCC) – https://www.ripe.net/publications/ipv6-info-centre
2. IPv6 Now – http://www.ipv6now.com.au/resources.php
3. NRO: IPv6 – https://www.nro.net/ipv6
4. IPv6 Info Center (ARIN) – https://www.arin.net/knowledge/ipv6_info_center.html
5. IPv6@APNIC – https://www.apnic.net/community/ipv6-program

6. Sad Tale of an ISP That Didn't Deploy IPv6 (LACNIC) – http://bit.ly/2bemdFz
7. IPv6 resources (AFRINIC) – https://www.afrinic.net/services/ipv6-programme/704
8. IPv6 (Internet Society) – http://www.internetsociety.org/deploy360/ipv6/
9. Additional IPv6 Resources (NTIA) – http://www.ntia.doc.gov/page/additional-ipv6-resources
10. Cisco and IPv6 – https://www.cisco.com/c/en/us/solutions/ipv6/overview.html