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Deploying IPv6 Technology

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Abstract: *The issue of deploying IPv6 Technology has been a topic of debate for more than a decade now. Professionals have been discussing on the transition from Internet Protocol version 4 (IPVv4) to Internet Protocol version 6 (IPv6) due to the fact that the IPv4 address space would soon be exhausted.*

In this paper, we analyse the IPv4 and IPv6 technologies and look at the benefits of migrating to IPv6, its social implications, risks & challenges and the opportunities the IPv6 migration offers.

I. Introduction:

The issue of deploying IPv6 Technology has been a hot topic for more than a decade now. Business and IT professionals have been discussing on the transition from Internet Protocol version 4 to Internet Protocol version 6. One of the major reasons for the IPv6 transition is because the allocation of IPv4 address space is running out of control and is gradually being exhausted. Though the Regional Internet Registries of all the continents are still allocating IPv4 addresses. Lots of companies in Europe, Asia and America are already using IPv6 networks. According to NRO (2014), "AFRINIC, APNIC, ARIN,

LACNIC and the RIPE NCC will continue to issue out IPv4 addresses to their individual members until their pool of IPv4 addresses are depleted". According to Google (2014), as at July 1st, 2014, 3.5% of the internet traffic are on IPv6. From this statistics, we can deduce that though 96.5% of the traffic are on IPv4, the rate of IPv6 network users are gradually increasing. This is also depicted in Figure 1 which shows the increasing numbers of users who access google on IPv6.

The issue of Address Space Exhaustion has been a major concern. Murphy & Malone (2005) argued that the address space exhaustion is one of the reasons why IPv6 was being recommended. They explained that IPv6 also have such advantages as higher performance, mobility, security and flexibility. DeployingIPv6 is an urgent issue. Companies should take advantage of the technology. Delaying the deployment could have a negative impact on the current internet ecosystem. In the same way, there has been a robust deployment of IPv4 (which is now gradually been depleted), there is now need for a robust deployment of IPv6 addresses. The C-level management of company must understand the current internet business environment so they can make sound decisions (APNIC, 2013).

Annually hundreds of millions of new smart phones that require internet connectivity are being sold. These demand for mobile phone has made the demand for internet connectivity to be increasing exponentially.

We are in the age of smart mobile devices, social networking, and cloud computing and other new internet developments that are linked to the internet. There is need for Service Providers to ensure there is good, smooth and reliable internet connectivity via IP addresses. These makes IP addresses critical resources that sustain the business growth of service providers and also sustains an exponential economic growth generated through the internet. As hundreds of millions of mobile users are connected to the internet, there is need for a network that is ready for an internet that have both IPv4 and IPv6 addresses (APNIC, 2013). This explains why there is now need for all internet stakeholders (internet service providers, network operators, vendors, regulators, governmental organizations and end-users) to adopt and integrate transition mechanisms and have a co-existence of both IPv4 and IPv6 protocols.

According to AfriNIC (2013), "IPv4 and IPv6 networks are not directly interoperable but the technologies used in the transition mechanisms allow hosts on either network to be involved in networking with opposing networks". The transition mechanisms include:

- Dual Stack Techniques
- IPv6 over IPv4 tunneling techniques: 6to4 tunnel, Tunnel broker, Manually Configured Tunnel, ISATAP tunnels, IPv6 over IPv4 GRE tunnel.
- IPv6 over MPLS (6PE) technique
- NAT PT technique
- NAT 64 technique

The migration of IPv4 to IPv6 is something all internet stakeholders should consider because sooner or later, the IPv4 addresses would be exhausted anddepleted and the RIR would stop allocating IPv4 address. Though managing two systems and simultaneously providing reliable service is a major challenge. These decision could give such ISPs a competitive advantage in the future (APNIC, 2013). According to Hagen

(2006), the migration to IPv6 has already brought a positive widespread change in Asia, Europe and in USA. This goes to show that companies that are being IPv6 ready today are better of managers of the internet of today and the internet of the future (APNIC, 2013).

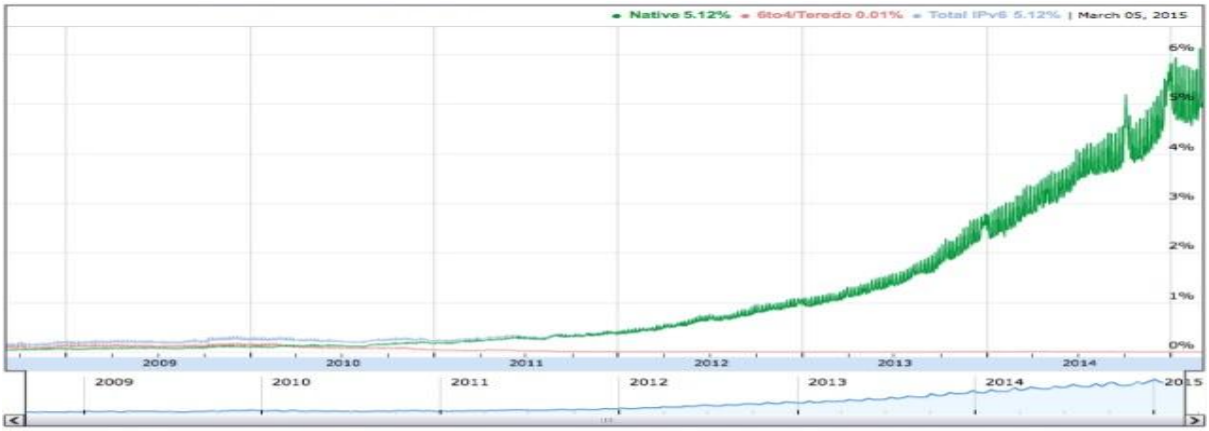

Figure 1. A graph showing the percentage of users who access google over IPv6 (Google, 2015).

II. Social Implications of IPv6 Technology

IPv6 technology has many social implications. The technology could bring about current and future business sustainability. It has improved mobility, better traffic flow, enhanced security capabilities and better security compared to IPv4(Eslambochi, 2013). It has better flow resource allocation with flow labels and also better attribute extended headers for security, quality of service and encryption (Mcfarland et al, 2011). Furthermore, it could be used on end to end communications, for crime control and also for disaster prevention. IPv6 would also be found useful in the educational section, in many technological innovations and also for network security control, deployment of new networks, reduction of digital divide and automatic connectivity (Inno group - Zaltana, 2007).

III. Risks and challenges of IPv6 Technology

IPv6 technology has its own risks and challenges, even though it has many social implications. Over the years, the risks attached to implementing the technology include: lack of coordination amongst concerned international bodies, spill-over of market and also technology spill-over as a result of slow adoption of IPv6. The challenges presently being faced include: lack of understanding of the benefit of IPv6, the issue of NAT workaround, the allocation mechanism and the need for increased address space (Inno group - Zaltana, 2007).

IV. Opportunities of IPv6 Technology

The opportunities of the IPv6 technology are immense. The opportunities outweigh the risks and challenges. Note that all the social implications mentioned earlier are also part of the opportunities. Some of the other opportunities IPv6 deployment could bring include: rapid exponential business growth, development of new IPv6 based applications, reduction in costs, new service opportunities, globalization and upgrade of the equipmentspresently on IPv4 (Mcfarland et al, 2011).

V. Conclusion

Having explained the IPv6 technology and its social implications to you, we hope you will consider migrating to IPv6. You have been given you all the information needed to help you make the right business decision concerning the deployment and implementation of an IPv6 network. This information is for the general public. You are the internet stakeholders. It doesn't matter whether you are an internet service provider, a network operator, a vendor, a regulator, a governmental organization or an end-user. IPv6 technology is for you. It is the future of the internet. Make the right decision now by investing in the future now. Think IPv6!

References:

[1]. AfriNIC (2014). Introduction to IPv6. Retrieved from: http://www.afrinic.net/en/services/ipv6-programme/704
[2]. APNIC (2013), IPv6 for Decision Makers, Retrieved from: http://www.apnic.net/community/ipv6-program/ipv6-for-decision-makers/ipv6_for_decision_makers.pdf
[3]. Chandler N. (2012), Business Case For Delivering IPv6 Service now. Retrieved from: http://www.cisco.com/c/dam/en/us/solutions/collateral/ios-nx-os-software/enterprise-ipv6-solution/idc_ipv6_economics.pdf
[4]. Eslambochi (2013), IPv6 Migration & Its Contingencies, Complexities & Implication, Part 6, Retrieved from: https://www.linkedin.com/today/post/article/20130729172819-5213223-ipv6-migration-its-contingencies-complexities-implications-part-6#
[5]. Google (2014), Per Country IPv6 Adoption. Retrieved from: https://www.google.com/intl/en/ipv6/statistics.html#tab=per-country-ipv6-adoption
[6]. Google (2015), IPv6 Adoption. Retrieved from: https://www.google.com/intl/en/ipv6/statistics.html.
[7]. Hargen, S. (2006). IPV6 Essentials (2nd Edition). Sebastopol, CA: O''Reilly
[8]. Inno Group - Zaltana (2007), The Impact of IPv6 on Vertical Markets. Retrieved from: http://www.ipv6council.de/fileadmin/documents/IPv6_vertical_markets.p df
[9]. Mcfarland S., Sambi M., Sharma N., Hooda S. (2011), IPv6 for Enterprise Networks (First Edition).Indianapolis, USA : Cisco Press
[10]. Murphy N.R., Malone D. (2005). IPv6 Network Administration (First Edition). Sebastopol, CA: O`Reilly
[11]. The Number Resource Organization (2014). IPv4 Depletion and IPv6 Deployment FAQs. Retrieved from: https://www.nro.net/ipv6/nro_depletion_deployment_faq