IPv6 - the Internet protocol with a twist

By Dean Young

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The adoption and overall success of a new global technology is often driven by a number of factors, such as user acceptance, infrastructure readiness or even accessibility. Irrespective of whether the technology offers genuine and numerous benefits, users tend to delay the inevitable - it's human nature after all.

Internet Protocol version 6 (IPv6) - the latest revision of the Internet Protocol (IP) - undoubtedly falls into this category. Developed by the Internet Engineering Task Force (IETF), it deals with the IPv4 address exhaustion. IPv6 uses a 128-bit address, allowing for more than 7.9×1028 times as many as IPv4 (32-bit) that caters for only 4.3 billion addresses.

Whilst IPv6 benefits are obvious, the switchover is not. And it is for this reason that enterprises are planning to transition their working environment to the protocol in the next few years rather than months.

Switchover might be closer than you think

However, the switchover might be closer than you think; already end-points, such as PCs and Macs as well as smartphones and tablets, feature IPv6.

Said online ICT publication PC World: "The simple fact of the matter is that IPv6 will soon be the only option for adding new devices or hosts on the Internet. SMBs should be transitioning to IPv6 so they're prepared when the inevitable day comes that IPv4 is no longer supported. Embracing IPv6 sooner rather than later will allow SMBs to operate with the peace of mind that the extinction of IPv4 won't impact their businesses."

So, with this said, what can companies expect when moving to IPv6 and, most importantly, what are the tangible benefits once the switchover is achieved?

Noteworthy benefits to organisations

Apart from the obvious increased number of IP addresses, IPv6 also offers some other noteworthy benefits to organisations. For example, it features a mandatory network-layer security. It handles IPsec traffic as standard, delivering packet encryption and authentication while remaining protocol-agnostic.

IPv6, unlike its predecessor, uses two distinct types of headers: Main/Regular IPv6 Header and IPv6 Extension Headers. The main IPv6 header is equivalent to the basic IPv4 with some field differences, whereas the Extension Headers form an intrinsic part of protocol supporting basic functions and services such as Destination EH, which is utilised in IPv6 Mobility

as well as support of certain applications.

From a mobility perspective, it allows users to move from one network to another while maintaining a permanent (or at least sticky) IP address, which, in turn, allows for stable data downloads and voice usage. Usually with IPv4, when switching from a 2G to a 3G network on a mobile device partially downloaded files can become unusable, and voice/video calls could glitch as the transition is made.

IPv6 also saves on bandwidth as it enables multicasting; the ability to transmit multiple recipients with a single operation, rather than having to specify each recipient individually.

Another important - albeit very technical - benefit is IPv6's impacts software-defined networking (SDN). SDN is an approach to networking in which control is decoupled from hardware and given to a software application called a controller.

Respond quickly to changing business requirements

The benefit is that network administrators can respond quickly to changing business requirements. In a SDN, a network administrator can shape traffic from a centralised control console without having to touch individual switches.

IPv6 enables SDNs to scale more easily. In essence, with IPv6 it's easier to create service-oriented overlays and it becomes possible to create a level of persistency with these overlays that couldn't be created in an IPv4 context.

Another benefit of IPv6 is that it facilitates and simplifies virtualisation across the entire infrastructure, including network, compute and storage resources.

And the switchover? For one, straightforward switchover can't happen because IPv4 and IPv6 aren't compatible protocols. Dual-network stacks that support both protocols will be necessary for the foreseeable future.

For example, equipment must support IPv6, especially core communication equipment that connects everything and itself to the network. This could be as simple as a patch or firmware upgrade, or could require completely new hardware or software.

The above will often results in some form of hardware and software investment, which again emphasises why companies are reluctant to adopt the new protocol.

Additionally, in South Africa, for example, there is a current lack of local skills to implement security for new IPv6 networks. The good news is there are local ICT providers that feature international experience which can overcome this interim skill shortage and enable companies to move over to IPv6.

Already there have been a number of high-profile SA tertiary organisations that have made the switch to IPv6 with great success.

With this said; who should start switching over? Optimistically, everyone; however it is technology providers such as ISPs that should already feature IPv6.

Larger organisations will also soon be faced with the reality that they will have to start running parallel networks featuring the two protocols, which will be cumbersome to manage. A complete switchover is the prudent choice here.

As for individual users, we'll all have to move over eventually.

ABOUT THE AUTHOR

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