Internet Protocol Version 6 (IPv6)

Why it is Time to Update and Configure Zebra Printers

Introduction

Every internet-connected device, such as a computer, smartphone, or networked printer, requires a numerical IP address to communicate with other devices. However, with more than 16 billion connected devices currently in use worldwide and continuing to grow exponentially, the original IP address scheme – Internet Protocol version 4, better known as IPv4 – will soon run out of addresses.[1]

For example, the Réseaux IP Européens Network Coordination Centre (RIPE NCC), the regional internet registry for Europe, the Middle East and parts of Central Asia, has made its final IPv4 allocations from the last remaining addresses in its available pool.[2] The Latin America and Caribbean Network Information Centre (LACNIC), has also similarly made its final IPv4 allocations.[3]

In light of the rapid depletion of IPv4 addresses, this paper will introduce its successor, IPv6. It will consider its benefits, both generally and more specifically with regard to the deployment of network printers. It will explore why organizations should upgrade their operating systems to the next-generation IP address standard and configure their networked printers to work within an IPv6 environment to ensure they can continue to accommodate more devices as their business grows.

[1]IoT Connections Forecast 2022-2023 - Transforma Insights, 7th June, 2024
[2]The RIPE NCC has run out of IPv4 Addresses - RIPE NCC, 25th November, 2019
[3]IPv4 Exhaustion: LACNIC Has Assigned the Last Remaining Address Block – LACNIC, 19th August, 2020

IPv6 – an Overview

Based on 32-bit addressing, IPv4 was limited to providing a total of 4.3 billion IP addresses. IPv6, on the other hand, is based on 128-bit addressing, which makes it capable of supporting 340 undecillion[4] unique IP addresses. This is more than enough to support the predicted explosion in internet users and connected digital devices.

The primary purpose of IPv6 is, of course, to fulfill the need for more IP addresses. But its design also contains many improvements based on the Internet Engineering Task Force's (IETF) experience of working with IPv4. To that end, IPv6 is more than simply a replacement for its predecessor: it is a suite of standard protocols for the network layer of the internet, designed to solve a range of issues present in the current version such as complex network configuration and inefficient routing at scale. In addition, IPv6 extends the current capabilities of the internet to enable new applications such as peer-to-peer and mobile applications.

IPv4 addresses began to run out in 2011, although the deadline for their complete depletion and subsequent switch to IPv6 continues to be pushed back.[5] Until that date arrives, IPv4 and IPv6 will continue to coexist. Many organizations, though, especially those with plans to expand their networks, will have factored an IPv6 switchover into their business plans and will capitalize on its benefits now and long into the future.

Exploring the Benefits of IPv6

Alongside accommodating the exponentially growing number of internet-connected devices and users, a key benefit of IPv6 includes a more efficient "plug and play" approach to network management. Essentially, every time a new device is added to an organization's network, IPv6 will automatically configure and allocate an IP address with little or no need for human intervention.

Alongside its other improvements over IPv4, including saving bandwidth by enabling the simultaneous transmission of large data packages, the ability to advertise and identify local routers, and a more flexible traffic routing mechanism.

In summary, IPv6 is a considerable improvement over IPv4 in many respects for both internet use in general and, more specifically, for connected devices within a business-like network printers.

[4] Undecillion is 340 trillion trillion

[5] Available Pool of Unallocated IPv4 Internet Addresses Now Completely Emptied – ICANN, 3rd February, 2011

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For more information on Link-OS, and to upgrade and configure your printers' operating system for an IPv6 environment, please visit:

www.zebra.com/link-os

The Advantages of Upgrading Network Printers to IPv6

Many of the benefits outlined above will apply to the deployment of network printers. The extent to which these will be felt will depend on the make-up of each organization's IT infrastructure. But factors such as more efficient routing and auto-configuration will help make the lives of IT and network administrators significantly easier.

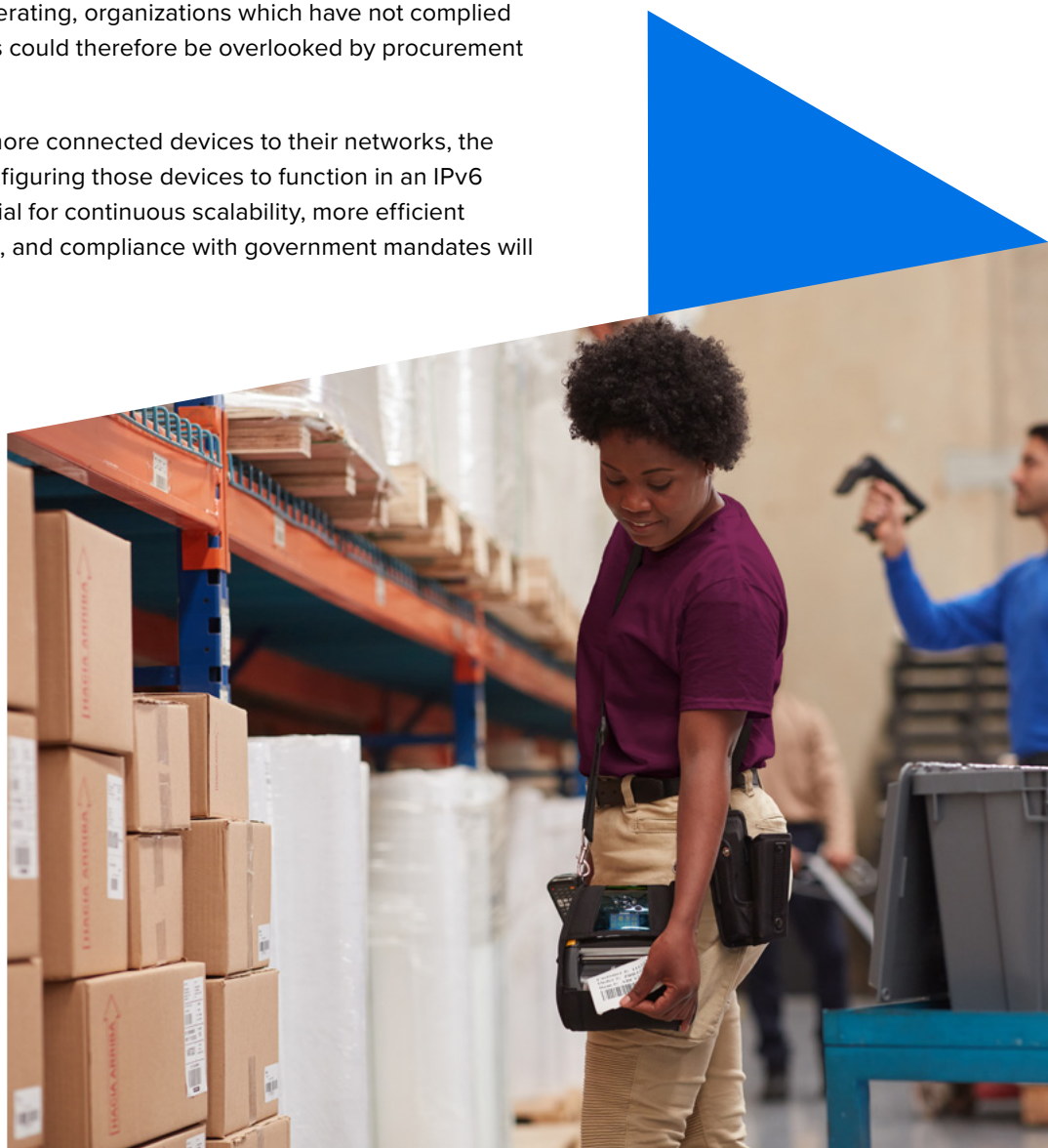
For most businesses, though, the main concern is the pending depletion of IPv4 addresses. Larger organizations in particular will require an increasingly large address space to enable them to accommodate ever more connected devices at the enterprise level. And it's here, of course, that the primary benefit of IPv6 comes to the fore with its expansive IP addressing capacity.

One further important driving factor for upgrading to IPv6 is the growing need to follow government mandates. The US Federal Government, for instance, has mandated that at least 80% of IP-enabled assets (such as network printers) on Federal networks must be operating in IPv6-only environments by the end of the 2025 financial year.[5]

In China, the government has taken this a step further. Its goal for universal IPv6 support and a full transition to IPv6-only environments by the end of 2030 will be achieved by simply forbidding IPv4 support on new networks from 2024.[6] The European Commission, on the other hand, although it is expected to take steps towards making IPv6 mandatory, is yet to announce any formal guidance.

Depending on where they are operating, organizations which have not complied with mandated IPv6 requirements could therefore be overlooked by procurement teams for lucrative opportunities.

As organizations grow, and add more connected devices to their networks, the advantages of upgrading and configuring those devices to function in an IPv6 environment are clear: the potential for continuous scalability, more efficient device and network management, and compliance with government mandates will all work in an organization's favor.



[5]FCC Information Technology (IT) Internet Protocol Version 6 (IPv6) Compliance Policy – US Federal Communications Commission, 21st April, 2021

Conclusion

The supply of IPv4 addresses, currently used by many internet-connected devices and users to communicate with other devices, is running out. Its successor, IPv6, will eventually replace IPv4, working alongside it until that day comes. In contrast to IPv4, the latest iteration is capable of supporting an unimaginably large number of IP addresses, far more than is needed to meet the current - and exponentially growing – volume of devices being connected to the internet.

But it is not just a vast addressing resource. From the auto-assignment of addresses to its capacity for more efficient routing and its compliance with governmental regulations, IPv6 offers a range of benefits for connected businesses.

Whether it's laptops, smartphones, or network printers, organizations everywhere can take advantage of these benefits today by upgrading and configuring their connected devices and operating systems to operate in an IPv6 environment.

[6] Notice on Accelerating the Large-Scale Deployment and Application of Internet Protocol Version 6 (IPv6) – Cyberspace Administration of China, 23rd July, 2021

Click **here** for information on how to upgrade your Link-OS printers to the latest firmware version. You can also contact us at the regional addressed below.

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