

IPv6 Migration at Cisco: Motivations and Process

Cisco, like many of its federal customers, is today in the midst of a global migration from IPv4 to IPv6. The new version of IP, which Cisco has been working with since 1996, supports a much larger address space and enables new types of applications for communication and collaboration.

"Migration to IPv6 is strategic for Cisco because it is both an answer to a threat and a new opportunity," says Craig Huegen, a Cisco Distinguished Engineer. The threat is the specter of IPv4 address exhaustion. With support for billions of addresses for every square meter on the planet's surface, IPv6 dispels previous limits on the number of devices and sensors that Cisco can connect to its wired and wireless networks.

The new opportunity that IPv6 creates is deploying new types of applications for communication and collaboration that will create a competitive advantage. One plan at Cisco, for example, is to integrate IPv6-based environmental sensors and actuators into construction to create intelligent buildings that save energy costs. At the Department of Education, Director of Converged Communications Peter Tseronis envisions connecting to streaming video or a live video conference from his BlackBerry or iPod.

Cisco is beginning its transition to IPv6 now so that it can compile and share best practices with its federal government customers, according to Huegen.

The Cisco IPv6 Transition Plan, In Brief

"It's a common misconception that a company can flip a switch to turn on IPv6," Huegen says. "In fact, each of five network layers must be prepared, and each can be transitioned to IPv6 during normal lifecycle processes." The layers are:

- Basic network infrastructure, including switches and routers
- Infrastructure services such as VPN access, load balancing, and security services
- Network-connected devices, such as servers, PCs, printers, IP phones, sensors, and controllers such as ID badge readers
- Applications
- Web content management. "During the transition, we will need to serve content from an IPv6 as well as an IPv4 infrastructure," says Huegen.

Currently, Cisco is readying its infrastructure of routers and switches for the transition by ensuring that they have the required memory and version of the Cisco IOS® Software. "Rather than trying to make a business case for upgrading our network devices to support IPv6, we perform the upgrades during our usual hardware lifecycle processes," says Huegen. "By ensuring that our switches and routers have the necessary memory and software now, we will be able to quickly turn on IPv6 when we are ready."

The transition is happening gradually. "A ground rule for our approach is to not risk the integrity of the existing IPv4 network as we deploy IPv6, and to manage the transition in a way that ensures business continuance," Huegen says. As Cisco gradually adopts IPv6 in different parts of its global network, Cisco IT will retain many of the same processes it currently uses for IPv4. Examples of

processes that will remain the same include applying for and assigning IP addresses and troubleshooting protocol issues.

A Peaceful Co-Existence Between IPv4 and IPv6

Organizations do not have to wait to turn on IPv6 throughout the network before experiencing its benefits. Cisco, for example, is already providing a basic level of IPv6 service to development labs that need connectivity to each other as well as to the IPv6 Internet. Internal routers are configured with IPv6 to create tunnels between the labs, and an external router provides access to the IPv6 Internet. Lab employees connect securely to the tunnels through IPv6 firewalls. As Cisco turns on IPv6 in more of its networks, the tunnels through the current IPv4 network will no longer be needed.

Huegen concludes, "IPv4 and IPv6 will co-exist for many years. It might be more accurate to refer to Cisco's efforts as an integration as opposed to a short-term migration."

For more information on Cisco IPv6 migration services, see www.cisco.com/go/fedipv6.



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