



IPv6: Frequently Asked Questions and Responses

A Work Product of the HIT Technical Task Force's IPv6 Work Group

May 20, 2008

What is IPv6?

IPv6 is short for "Internet Protocol version 6." IPv6 is the "next generation" protocol designed by The Internet Engineering Task Force (www.ietf.org) to replace the current version of Internet Protocol -- IP version 4 (IPv4). IPv4 has a number of problems, especially a limited range of available IPv4 addresses. IPv6 improves routing and network configuration, as well as dramatically expanding address space. Because of its expanded addressing, IPv6 can allocate sufficient addresses so that every IP device truly has a unique address.

Most of today's Internet activity uses IPv4, which is now nearly 20 years old. IPv4 has been resilient, but it is beginning to have problems.

IPv6 fixes a number of problems in IPv4, such as the limited number of available IPv4 addresses. It also adds many improvements to IPv4 in areas such as routing and network auto-configuration. IPv6 is expected to gradually replace IPv4, with the two coexisting for a number of years, during a transition period.

What does IPv6 mean to me and my organization?

IPv4 has demonstrated a flexible and powerful design, but it is starting to present problems as the demand in IP addresses increases.

New users in densely inhabited countries add new technologies with constantly connected devices (e.g., xDSL, cable, PLC, PDAs, UMTS mobile telephones) and are causing the exhaustion of available IPv4 addresses.

IPv6 resolves this problem by means of creating a new IP address format, so each device will have a unique IP address.

IPv6 also adds a lot of improvements in areas such as routing and network auto configuration. New devices that connect to the Internet will be plug and play devices. With IPv6, it is not critical to configure DNS IPs, the gateway, the sub network mask or any other parameters. The equipment is plugged into the network and acquires, in the same way, all configuration data.



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IPv6 will improve the capabilities in security, privacy, location-based services, networking, and mobility for applications and devices. As healthcare becomes more mobile and remote, vendors can be expected to adopt IPv6 to provide exact and unique addressing for all computer devices including handhelds, Internet appliances, and mobile services. Furthermore, IPv6 will support the continued deployment of healthcare concepts like telemedicine and other remote services.

What if I don't migrate to IPv6?

Eventually, you will run out of IP addresses, and the applications that run over your network will stop working.

Government agencies are rapidly speeding towards adoption of IPv6. Currently, 70% of government agencies have either adopted or are migrating toward IPv6. All applications and vendors will eventually migrate their solutions to IPv6. Although migrating to IPv6 may be an evolution, in time your organization will be forced to migrate to IPv6.

Am I required to do something? If so, by when?

The IETF, in designing/releasing IPv6, does not assume that everyone will migrate all devices overnight. There are standards, protocols and procedures for the coexistence of IPv4 and IPv6: tunneling IPv6 in IPv4, tunneling IPv4 in IPv6, running IPv4 and IPv6 on the same system (dual stack) for an extended period of time including mixing and matching the two protocols in a variety of environments.

Why is IPv6 a topic of interest?

IPv6 offers several advantages over IPv4 which are summarized as follows:

Scalability: IPv6 has 128 bits addresses versus 32 bits IPv4 addresses. The number of available IP addresses multiplies by $7.9 * 10^{28}$. IPv6 offers a 2128 space (340.282.366.920.938.463.463.374.607.431.768.211.456).

Security: IPv6 includes security in its specifications like information encryption and authentication of the source of this information.



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Real time applications: IPv6 provides better support for real time traffic for videoconferencing. IPv6 includes flows labeled in its specifications. By means of this mechanism, routers can recognize the end-to-end flow to which transmitted packets belong.

Plug and play: IPv6 includes in its standard the "plug and play" mechanism to facilitate the connection of equipment to the network. This configuration is automatic.

Mobility: IPv6 includes more efficient and stronger mobility mechanisms.

Clearer and more optimized specifications: IPv6 will follow the good practices of IPv4 and remove the obsolete IPv4 characteristic.

Addressing and routing: IPv6 improves the addressing and routing hierarchy.

Extensibility: IPv6 has been designed to be extensible and offers optimized support for new options and extensions.

What is the source of the topic?

IPv4 can no longer support the current allocation of Internet addresses, specifically due to the rise in mobile devices, always-on network devices, and Internet users. IPv6 mitigates this problem by increasing the overall Internet address range to 128 bits, which theoretically expands the total number of address to almost 18 quintillion.

What is the impact to my healthcare facility's infrastructure? To my hardware?

Start preparing for IPv6 now. The good news is that IPv4 and IPv6 can run in the same environment. As you are changing/upgrading your network infrastructure, verify that applications can utilize IPv6.

Existing IPv4 hosts can be upgraded at any time, independent of the upgrade of other hosts or routers.



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New hosts, using only IPv6, can be added at any time, without dependencies on other hosts or routing infrastructure.

Existing IPv4 hosts, with IPv6 installed, can continue to use their IPv4 addresses and do not need additional addresses.

Little preparation is required to either upgrade existing IPv4 nodes to IPv6 or deploy new IPv6 nodes.

Address concern about creating vulnerabilities in existing IPv4 networks by deploying IPv6 and its transition mechanisms.

Ongoing need for interaction with IPv4 enclaves outside of the organization requires transition mechanisms to be planned accordingly.

Many of the standards supporting value-added IPv6 features are still evolving

4.0 Acknowledgements

Special thanks and recognition to the following members of the HIMSS Healthcare Information Technology Task Force's IPv6 Work Group:

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