

IPv6 for Consumer Electronics

Internet Protocol Version 6 (IPv6) is a critical enabling technology that will help ensure the Internet can support a growing user base and the increasingly large number of IP-enabled consumer electronics devices. The current Internet Protocol Version 4 (IPv4) has served as the underlying protocol for the Internet for almost 30 years and is showing its limitations. Its robustness, scalability, and limited feature set is now challenged by the growing need for millions of new unique IP addresses, spurred in large part by the rapid growth of new IP broadband network-aware consumer devices. Thus the need for the more comprehensive IPv6 protocol.

Networked IP Enabled Consumer Devices:

The digital media revolution is captivating the imagination of consumers. Networked Consumer Electronics (nCE) are devices connected to both the external Internet and home media network whereas the media is routed and rendered to a high definition audio-video system. The opportunity is virtually unlimited to integrate the richness and intelligence of the PC networked world with everyday devices such as home automation, set top boxes, mobile phones, baby monitors, wireless speakers, home appliances, digital cameras, digital camcorders, musical instruments, digital media receivers, home entertainment systems and high definition televisions. The potential effect of increasingly popular IP broadband home networks creates a vast opportunity for PC and CE device manufacturers, application developers, and content creators to deliver new uses and value for consumers.

Some Advantages of IPv6:

The IT industry is supporting the transition from an IPv4 world to IPv6 enabled protocols and devices to meet the demands of both corporate and home environments. Fundamental to this transition are the following salient features of IPv6:

- **More Addresses**

In the late 1970s when the IPv4 address space was designed, it was unimaginable that it could be exhausted. However, due to changes in technology and an allocation practice that did not anticipate the recent explosion of devices on the Internet, the IPv4 address space was consumed to the point that by 1992 it was clear a replacement would be necessary. The size of an address in IPv6 is 128 bits, which allows for 3.4×10^{38} possible IP addresses.

- **More Efficient Routing Infrastructure**

On the IPv6 Internet, backbone routers have much smaller routing tables, corresponding to the routing infrastructure of global Internet service providers (ISPs). This yields more

efficient routing and bandwidth optimizations, in turn allowing more efficient and compelling media experiences.

- **Better Security**

In addition to the aspects of IP based consumer electronics equipment, the US national security infrastructure is relying on IPv6 to provide a backbone for the Next Generation Network. The Department of Defense has mandated that all internal procurements of network devices be IPv6 ready by FY 2007. In IPv6, IPSec support is a protocol requirement. This requirement provides a standards-based solution for network security needs for devices, applications and services, and promotes interoperability between different IPv6 implementations.

- **Mobility**

Mobile IPv6 allows an IPv6 node to arbitrarily change its location on an IPv6 network and still maintain existing connections. With Mobile IPv6, the mobile node is always reachable through one permanent address. A connection is established with a specific permanent address assigned to the mobile node and remains connected no matter how many times the mobile node changes locations and addresses.

- **Better Quality of Service (QoS)**

New fields in the IPv6 header define how traffic is handled and identified. Because the traffic is identified in the IPv6 header, support for QoS is part and parcel of the protocol of IPv6. This will translate into more consistent media rendering across seemingly disparate networks.

Conclusion

Development and deployment of the IPv6 protocol-based products, solutions and networks are underway. Working IPv6 networks and devices will be steadily increasing as the IT industry, consumers, and businesses migrate from IPv4 to IPv6 to improve efficiency and reduce networking costs and congestion. The deployment of IPv6 will enable worldwide IP-based devices to seamlessly communicate and interoperate in a much more efficient and secure manner. This will allow the CE industry to design, produce and sell a whole new era of advanced devices with demonstrable advantages over current IPv4 based offerings.