| | |
|---|---|
| Internet Area Working Group | W. George |
| Internet-Draft | Time Warner Cable |
| Updates: 1812, 1122, 4084 (if approved) | C. Donley |
| Intended status: Standards Track | Cablelabs |
| Expires: December 19, 2011 | C. Liljenstolpe |
| | Telstra |
| | L. Howard |
| | Time Warner Cable |
| | June 17, 2011 |

IPv6 Support Required for all IP-capable nodes
draft-ietf-intarea-ipv6-required-00

## Abstract

Given the global lack of available IPv4 space, and limitations in IPv4 extension and transition technologies, this document deprecates the concept that an IP-capable node MAY support IPv4 _only_, and redefines an IP-capable node as one which supports either IPv6 _only_ or IPv4/ IPv6 dual-stack. This document updates RFC1812, RFC1122 and RFC4084 to reflect the change in requirements.

## Status of this Memo



## Copyright Notice

## Table of Contents



## 1. Introduction

IP version 4 (IPv4) has served to connect public and private hosts all over the world for over 30 years. However, due to the success of the Internet in finding new and innovative uses for IP networking, billions of hosts are now connected via the Internet and requiring unique addressing. This demand has led to the exhaustion of the IANA global pool of unique IPv4 addresses [IANA-exhaust], and will be followed by the exhaustion of the free pools for each Regional Internet Registry (RIR), the first of which is APNIC [APNIC-exhaust]. While transition technologies and other means to extend the lifespan of IPv4 do exist, nearly all of them come with tradeoffs that prevent them from being optimal long-term solutions when compared with deployment of IP version 6 (IPv6) as a means to allow continued growth on the Internet. See [I-D.ietf-intarea-shared-addressing-issues] and [I-D.donley-nat444-impacts] for some discussion on this topic.

IPv6 [RFC1883] was proposed in 1995 as, among other things, a solution to the limitations on globally unique addressing that IPv4's 32-bit addressing space represented, and has been under continuous refinement and deployment ever since. [RFC2460]. The exhaustion of IPv4 and the continued growth of the internet worldwide has created the driver for widespread IPv6 deployment.

However, the IPv6 deployment necessary to reduce reliance on IPv4 has been hampered by a lack of ubiquitous hardware and software support throughout the industry. Many vendors, especially in the consumer space have continued to view IPv6 support as optional. Even today they are still selling "IP capable" or "Internet Capable" devices which are not IPv6-capable, which has continued to push out the point at which the

natural hardware refresh cycle will significantly increase IPv6 support in the average home or enterprise network. They are also choosing not to update existing software to enable IPv6 support on software-updatable devices, which is a problem because it is not realistic to expect that the hardware refresh cycle will single-handedly purge IPv4-only devices from the active network in a reasonable amount of time. This is a significant problem, especially in the consumer space, where the network operator often has no control over the hardware the consumer chooses to use. For the same reason that the average consumer is not making a purchasing decision based on the presence of IPv6 support in their Internet-capable devices and services, consumers are unlikely to replace their still-functional Internet-capable devices simply to add IPv6 support - they don't know or don't care about IPv6, they simply want their devices to work as advertised.
This lack of support is making the eventual IPv6 transition considerably more difficult, and drives the need for expensive and complicated transition technologies to extend the life of IPv4-only devices as well as eventually to interwork IPv4-only and IPv6-only hosts. While IPv4 is expected to coexist on the Internet with IPv6 for many years, a transition from IPv4 as the dominant Internet Protocol towards IPv6 as the dominant Internet Protocol will need to occur. The sooner the majority of devices support IPv6, the less protracted this transition period will be.

### 1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 *[RFC2119]*.

## 2. Requirements and Recommendation

This draft updates the following documents:
Updates [RFC1812] to note that IP nodes SHOULD no longer support IPv4 only. This is to ensure that those using it as a guideline for IP implementations use the other informative references in this document as a guideline for proper IPv6 implementations.
Updates [RFC1122] to redefine generic "IP" support to include and require IPv6 for IP-capable nodes and routers.
Updates [RFC4084] to move "Version Support" from Section 4, "Additional Terminology" to Section 2, "General Terminology." This is to reflect the idea that version support is now critical to defining the types of IP service, especially with respect to Full Internet Connectivity.
From a practical perspective, the requirements proposed by this draft mean that:

- *New IP implementations MUST support IPv6.

- *Current IP implementations SHOULD support IPv6.

*IPv6 support MUST be equivalent or better in quality and functionality when compared to IPv4 support in an IP implementation.

*Helpful informative references can be found in [RFC4294], soon to be updated by [I-D.ietf-6man-node-req-bis] and in [RFC6204]

*Current and new IP Networking implementations SHOULD support IPv4 and IPv6 coexistence (dual-stack), but MUST NOT require IPv4 for proper and complete function.

*It is expected that many existing devices and implementations will not be able to support IPv6 for one or more valid technical reasons, but for maximum flexibility and compatibility, a best effort SHOULD be made to update existing hardware and software to enable IPv6 support.

## 3. Acknowledgements

Thanks to the following people for their reviews and comments: Marla Azinger, Brian Carpenter, Victor Kuarsingh, Jari Arkko, Scott Brim, Margaret Wasserman, Joe Touch

## 4. IANA Considerations

This memo includes no request to IANA.

## 5. Security Considerations

There are no direct security considerations generated by this document, but existing documented security considerations for implementing IPv6 will apply.

## 6. References

### 6.1. Normative References


| | |
|---|---|
| **[RFC2119]** | Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997. |
| **[RFC1812]** | Baker, F., "Requirements for IP Version 4 Routers", RFC 1812, June 1995. |
| **[RFC1122]** | Braden, R., "Requirements for Internet Hosts - Communication Layers", STD 3, RFC 1122, October 1989. |
| **[RFC4084]** | Klensin, J., "Terminology for Describing Internet Connectivity", BCP 104, RFC 4084, May 2005. |


### 6.2. Informative References


| | |
|---|---|
| **[RFC1883]** | |

| | |
|---|---|
| | Deering, S.E. and R.M. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", RFC 1883, December 1995. |
| **[RFC2460]** | Deering, S.E. and R.M. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", RFC 2460, December 1998. |
| **[RFC4294]** | Loughney, J., "IPv6 Node Requirements", RFC 4294, April 2006. |
| **[I-D.ietf-intarea-shared-addressing-issues]** | Ford, M, Boucadair, M, Durand, A, Levis, P and P Roberts, "Issues with IP Address Sharing", Internet-Draft draft-ietf-intarea-shared-addressing-issues-05, March 2011. |
| **[I-D.donley-nat444-impacts]** | Donley, C, Howard, L, Kuarsingh, V, Berg, J and U Colorado, "Assessing the Impact of Carrier-Grade NAT on Network Applications", Internet-Draft draft-donley-nat444-impacts-03, November 2011. |
| **[RFC6204]** | Singh, H., Beebee, W., Donley, C., Stark, B. and O. Troan, "Basic Requirements for IPv6 Customer Edge Routers", RFC 6204, April 2011. |
| **[I-D.ietf-6man-node-req-bis]** | Jankiewicz, E, Loughney, J and T Narten, "IPv6 Node Requirements", Internet-Draft draft-ietf-6man-node-req-bis-11, May 2011. |
| **[IANA-exhaust]** | IANA, "IANA address allocation", 2011. |
| **[APNIC-exhaust]** | APNIC, "APNIC Press Release", 2011. |


## Authors' Addresses


Wesley George George Time Warner Cable 13820 Sunrise Valley Drive Herndon, VA 20171 US Phone: +1 703-561-2540 EMail: wesley.george@twcable.com

Chris Donley Donley Cablelabs 858 Coal Creek Circle Louisville, CO 80027 US Phone: +1-303-661-9100 EMail: C.Donley@cablelabs.com

Christopher Liljenstolpe Liljenstolpe Telstra Level 32/242 Exhibition Street Melbourne, VIC 3000 AU Phone: +61-3-8647-6389 EMail: cdl@asgaard.org

Lee Howard Howard Time Warner Cable 13820 Sunrise Valley Drive Herndon, VA 20171 US Phone: +1-703-345-3513 EMail: lee.howard@twcable.com