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1 + /64s as IPv6 Standard Access Model
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Abstract

This document proposes the "standard" address assignment scheme for IPv6 access network which uses RA or DHCPv6 to assign an global IPv6 address to the WAN interface of the CPE and DHCPv6 PD on the upstream link of CPE to delegate one or more /64 prefixes to the CPE.

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1. Introduction

This document describes about the "standard" address assignment scheme for IPv6 access network for especially residential or SOHO service.

2. General Considerations

In IPv4 environment, there is a de-fact standard method to subscribe ISP service. Usually, PPP (Point to Point Protocol) is used as an abstraction of the user subscription in IPv4 only environment. A PPP connection connects an access concentrator and a customer premises equipment (CPE). One single global IPv4 address is assigned to the WAN interface of the CPE. If CPE is a router, typically, CPE does "network address translation (NAT)" and gives [\[RFC1918\]](#) based private addresses to the hosts behind the CPE such as an personal computer (PC) and so on. Even if the CPE is a bridging device, a PC beyond CPE terminates PPP (PPPoE maybe) by itself and receives a global IPv4 address to be used. In each cases, from an access concentrator point of view, there is no difference. The model is quite simple. It gives to the "customer" one global IPv4 address. That's all.

On the other hand, if we think about IPv6 ISP, this model does not work well, because there is no NAT in IPv6. Simply, we cannot use "One global IPv6 address" model to assign global IPv6 addresses to all machines behind the CPE router. We have to rely on some different model.

3. 1+/64s scheme

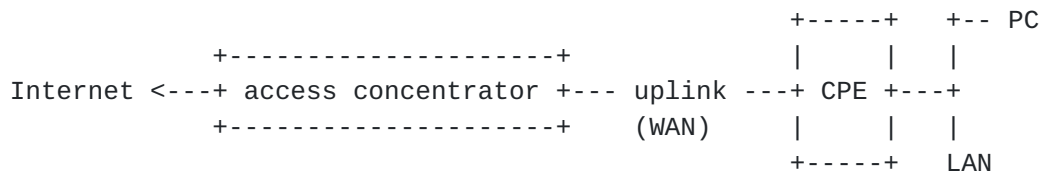


Figure 1: Network Model

"1+/64s" is quite simple scheme.

- (A) Use RA or DHCPv6 to assign an global IPv6 address to the WAN interface of the CPE. Do not leave the link between the access concentrator and the CPE (the upstream link) link-local address only.

- (B) Use DHCPv6 PD the upstream link to delegate one or more /64 prefixes to the CPE so that it can use those prefixes to configure LANs behind it.

4. Discussion

The reason why the condition (A) is needed is that there are "strong model" implementations of the Internet Protocol. When we wrote [\[RFC4241\]](#) ("A Model of IPv6/IPv4 Dual Stack Internet Access Service" an Informational RFC describing NTT Communications' native IPv4/v6 dual stack ADSL service specification), we believed that there is no need to use any global IPv6 address for the uplink. But, at the year 2007, when Microsoft Vista was released to the market, we found that that operating system employs the strong host model shown in [\[RFC1122\]](#).

In this case, if the WAN interface of the CPE has only link-local address, any application on the CPE cannot use the global ip address even if this CPE has delegated prefix for LAN interface but chose the link-local address as its source address towards any destination on the Internet. So, we need to assign a global IPv6 address to the WAN interface on the CPE.

5. IANA Considerations

There are no IANA considerations.

6. Security Considerations

TBD

7. Normative References

- [RFC1122] Braden, R., "Requirements for Internet Hosts - Communication Layers", STD 3, [RFC 1122](#), October 1989.
- [RFC1918] Rekhter, Y., Moskowitz, R., Karrenberg, D., Groot, G., and E. Lear, "Address Allocation for Private Internets", [BCP 5](#), [RFC 1918](#), February 1996.
- [RFC4241] Shirasaki, Y., Miyakawa, S., Yamasaki, T., and A. Takenouchi, "A Model of IPv6/IPv4 Dual Stack Internet Access Service", [RFC 4241](#), December 2005.

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