

Home Networking
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Ensuring Home Network Visibility to Home Gateway
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Abstract

This memo describes a mechanism designed to increase the home gateway visibility on the home network that it is serving. This includes knowledge of all IPv6 addresses configured using prefixes assigned by the home gateway and advertised by router(s) attached to it.

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Internet-Draft

Home Gateway Visibility

October 2011

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1. Introduction

With the expected proliferation of "smart home" networks, enabling multiple features and capabilities may require installing additional routers within the home that will connect to one or multiple home gateway (HGW(s)). In such scenario, it can be useful for the HGW(s) to keep track of all IPv6 addresses configured by different types of end devices that get attached to the home network via router(s) connected to the HGW(s).

This memo describes a mechanism designed to address this scenario by increasing the HGW visibility on the home network that it is serving, without incurring any change on the end devices.

2. Conventions used in this document

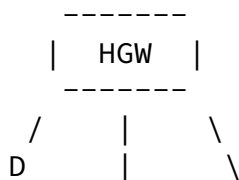
The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

[3.](#) Motivation

Future smart home networks are all about deploying new services within homes and enabling average users (i.e., the vast majority of Internet users) to easily interact with them. For this purpose, enabling automatic services/features discovery as well as associated home device(s) configuration (i.e., specifically for end devices that are not directly connected to the HGW) is a useful feature to provide. In fact, such feature would help assisting average user to seamlessly manage and configure home devices.

[4.](#) Proposal

For simplicity and better clarity, we consider in the following a home network composed of one HGW, two additional routers (R1) and (R2) and a set of home devices that are spread around the three network entities, i.e., both (R1) and (R2) are connecting a subset of home devices while the remaining ones are directly connected to the HGW. Such topology is shown in figure 1.



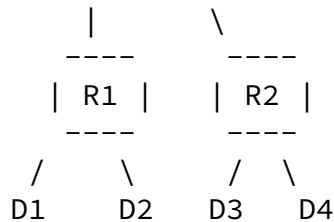


Figure 1

In this topology, one home device (D) is attached to the HGW WLAN interface in addition to (R1) and (R2). Two home devices {(D1), (D2)} are connected to (R1) and a second pair {(D3), (D4)} is connected to (R2). Finally, we assume that the HGW is able to delegate prefixes to both routers, and home devices are using stateless address autoconfiguration (described in [\[RFC4862\]](#)), in order to generate their IPv6 addresses.

Our goal is to keep the HGW fully aware of the four IPv6 addresses configured by the set of devices {D1, D2, D3, D4} despite not being directly connected to the HGW.

Our suggested proposal is described in the following steps:

- a. when delegating prefixes to (R1) and (R2) as described in [\[RFC3633\]](#), the HGW issues an explicit request to get notified about IPv6 addresses that appears on each router link, i.e., IPv6 addresses configured using the corresponding delegated prefix. Such request can be sent to the requesting routers (i.e., (R1) and/or (R2)) by inserting, for example, a new IA_PD option in the DHCP (Reply) message sent by the delegating router (i.e., HGW).

- b. upon receiving a request to convey IPv6 addresses that are (auto)-configured using the delegated (and advertised) prefix, (R1) proceeds to collect and store all IPv6 addresses which pass the duplicate address detection (DAD) procedure performed on its link. In our example, (R1) should convey to HGW all IPv6 addresses that are configured by (D1) and (D2) while (R2) should convey the addresses that are configured by (D3) and (D4).

- c. (R1) sends the collected IPv6 addresses to HGW using one (or multiple) new ICMP unicast message called "ICMP Notify (ICMP_NTY)". Such message may be sent whenever a new IPv6 address is successfully tested on the link or may be used to carry a set of IPv6 addresses. Other parameter(s) that are specific to the end device may also be sent in the ICMP_NTY message, along with the device's IPv6 address(es) (e.g., MAC address).
- d. After receiving a valid ICMP_NTY message, the HGW SHOULD send an acknowledgment to the sending router. For this purpose, we introduce another ICMP message called "ICMP Notify Acknowledgment (ICMP_NTA)". It follows that ICMP_NTA message MUST be sent only by the delegating router.

Note that the pair of new ICMP messages is also used to convey IPv6 addresses to the HGW when end devices configure their IPv6 addresses using DHCPv6 mechanism (described in [[RFC3315](#)]).

In more complicated scenarios, (R1) can be directly connected to one or multiple routers on the downstream path in which case, the prefix delegation functionality is not limited to the HGW. In such case, the suggested IPv6 address notification procedure requires the requesting router to send the ICMP_NTY messages directly to the HGW. For this purpose, the HGW address is sent by the delegating router in the DHCP Reply message (e.g., using another IA_PD option).

TBD

[6.](#) Security Considerations

TBD

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[7.](#) IANA Considerations

TBD

8. Normative References

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