BESS Workgroup
Internet Draft

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Propagation of IPv6 Neighbor Advertisement Flags in EVPN
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Abstract

The MAC/IP Advertisement route specified in [RFC7432] can optionally carry IPv4 and IPv6 addresses associated with a MAC address. Remote PEs can use this information to reply locally (act as proxy) to IPv4 ARP requests and IPv6 Neighbor Solicitation messages and reduce/suppress the flooding produced by the Address Resolution procedure. However, if the Neighbor information is learnt via EVPN, the PE would not know if a particular IPv6->MAC pair belongs to a host, a router or a host with an anycast address as this information is not carried in the MAC/IP route advertisements. This document proposes an OPTIONAL advertisement of the Flags defined in [RFC4861] along with the EVPN MAC/IP Advertisement routes, so that an EVPN PE implementing a proxy-ND function can reply to Neighbor Solicitations with the correct Flag information in Neighbor Advertisements.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on January 8, 2017.

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1. Introduction

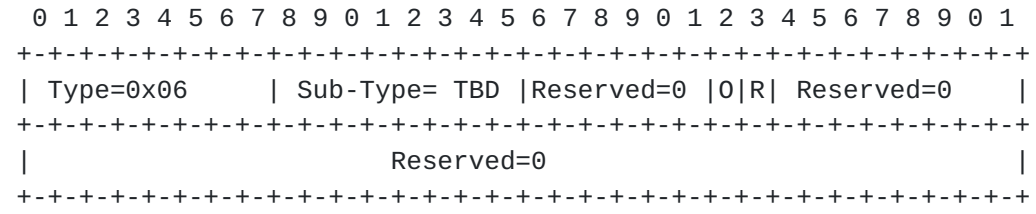
The MAC/IP Advertisement route specified in [RFC7432] can optionally carry IPv4 and IPv6 addresses associated with a MAC address. Remote PEs can use this information to reply locally (act as proxy) to IPv4 ARP requests and IPv6 Neighbor Solicitation messages and reduce/suppress the flooding produced by the Address Resolution procedure. However, if the Neighbor information is learned via EVPN, the PE would not know if a particular IPv6->MAC pair belongs to a host or a router as this information is not carried in the MAC/IP route advertisements.

This document proposes the OPTIONAL advertisement of the Flags defined in [RFC4861] along with the EVPN MAC/IP Advertisement routes, so that an EVPN PE implementing a proxy-ND function can issue Neighbor Advertisement messages conveying the correct Flag information.

The Flags are carried in the Neighbor Discovery (ND) EVPN Extended Community, as described in the following sections.

2. The EVPN Neighbor Discovery (ND) Extended Community

This document defines a new EVPN Extended Community with a Type field value of 0x06 and a Sub-Type TBD. It MAY be advertised along with EVPN MAC/IP Advertisement routes that carry an IPv6 address.



The following Flags are defined in the third octet of the Extended Community:

R - Router flag.

The low-order bit of the third octet is defined as the "Router flag". When set, the R-bit indicates that the IPv6->MAC pair advertised along with the MAC/IP Advertisement route belongs to a router. If the R-bit is zero, the IPv6-MAC pair belongs to a "host". The receiving PE implementing the proxy-ND function will use this information in Neighbor Advertisement messages for the associated IPv6 address.

O - Override flag

The second bit of the third octet is defined as the "Override flag". An egress PE will normally advertise IPv6->MAC pairs with the O-bit set, and only when IPv6 "anycast" is enabled in the EVI, the PE will send an IPv6->MAC pair with the O-bit = 0. The ingress PE will install the proxy-ND entry with the received O-bit and will use this information when replying to a Neighbor Solicitation for the IPv6 address.

3. Use of the EVPN ND Extended Community

An EVPN PE supporting a proxy-ND function and implementing the propagation of the Neighbor Advertisement Flags will follow this procedure:

a) Transmission of the EVPN ND Extended Community

A PE may learn the IPv6->MAC pair and its associated ND Flags in the management plane or snooping Neighbor Advertisement messages coming from the CE. Either way, the PE SHOULD send a MAC/IP Advertisement route including the learned IPv6->MAC pair and MAY send the ND Extended Community carrying its associated "R" and "O" Flags. This new Extended Community does not have any impact on the rest of the procedures described in [RFC7432], including the advertisement of the MAC Mobility Extended Community along with the MAC/IP Advertisement route.

b) Reception of the EVPN ND Extended Community

In addition to the procedures specified in [RFC7432] a PE receiving a MAC/IP Advertisement route containing an IPv6 address and the ND Extended Community SHOULD add the R and O Flags to the proxy-ND entry for the IPv6->MAC entry and use that information in Neighbor Advertisements when replying to a Solicitation for the IPv6 address.

A PE that implements the proxy-ND function SHOULD have an administrative option to define the default Flag to be used in case no EVPN ND Extended Community is received for a given IPv6->MAC entry.

4. 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 RFC-2119 [RFC2119].

In this document, these words will appear with that interpretation only when in ALL CAPS. Lower case uses of these words are not to be interpreted as carrying RFC-2119 significance.

In this document, the characters ">>" preceding an indented line(s) indicates a compliance requirement statement using the key words listed above. This convention aids reviewers in quickly identifying or finding the explicit compliance requirements of this RFC.

5. Security Considerations

The same security considerations described in [RFC7432] apply to this document.

6. IANA Considerations

This document requests the registration of a new EVPN Extended Community sub-type:

Sub-Type	Name	Reference
0xXX	ND Extended Community	[this document]

7. References

7.1. Normative References

[RFC4861] Narten, T., Nordmark, E., Simpson, W., and H. Soliman, "Neighbor Discovery for IP version 6 (IPv6)", RFC 4861, DOI 10.17487/RFC4861, September 2007, <http://www.rfc-editor.org/info/rfc4861>.

[RFC7432] Sajassi, A., Ed., Aggarwal, R., Bitar, N., Isaac, A., Uttaro, J., Drake, J., and W. Henderickx, "BGP MPLS-Based Ethernet VPN", RFC 7432, DOI 10.17487/RFC7432, February 2015, <http://www.rfc-editor.org/info/rfc7432>.

7.2. Informative References

8. Acknowledgments

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