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Link Scoped IPv6 Multicast Addresses
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Status of this Memo

Abstract

This document specifies an extension to the multicast addressing architecture of the IPv6 protocol. The extension allows for the use of interface-ID to allocate multicast addresses. When the link-local unicast address is configured at each interface of host, interface ID is uniquely determined. By delegating multicast addresses at the same time as interface ID, each host can identify their multicast addresses automatically at Layer 1 without running an intra- or inter-domain allocation protocol in the serverless environments.

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1. Introduction

This specification defines an extension to the multicast portion of the IPv6 addressing architecture [ADDRARCH]. The current architecture does not contain any built-in support for dynamic address allocation. The extension allows for using interface-ID to allocate multicast addresses. When the link-local unicast address is configured at each interface of host, interface ID is uniquely determined. By delegating multicast addresses at the same time as interface ID, each host can identify its multicast addresses automatically without running an intra- or inter-domain allocation protocol in the serveless environments.

The current multicast address allocation architecture [RFC 2908] is based on a multi-layered, multi-protocol system. The goal of this proposal is to reduce the number of protocols and servers to get dynamic multicast address allocation.

The use of interface ID-based multicast address allocation will, at a minimum, remove the need to run the Multicast Address Allocation Protocol (AAP) [AAP WORK][RFC 2909] and the Multicast Address Allocation servers [RFC 2908].

This document specifies encoded information in the link scoped multicast address to allow for dynamic allocation of IPv6 multicast addresses.

2. Terminology

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].

3. Applicability

The allocation technique in this document is designed to be used in any environment in which link-local scope IPv6 multicast addresses are assigned or selected. Especially, this method goes well with nodes supplying multicast services in a zeroconf environment. For example, multicast addresses less than or equal to link-local scope are generated itself by nodes supplying multicast services.

Consequently, this technique is limited to use by multicast scope. If you want to use greater multicast addresses than link-local, you need to get other methods.

4. Link scoped multicast address format

Section 2.7 of [ADDRARCH] defines the following operational format of IPv6 multicast addresses:

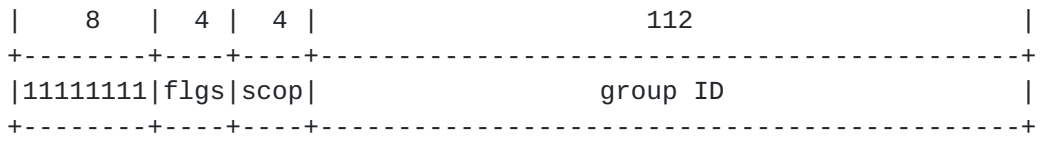


Figure 1: Generic IPv6 multicast address format

This document introduces new formats that incorporate interface ID information in the multicast address. The idea delegating multicast addresses at the same time as interface ID, can be applicable to link-local.

Figure 2 illustrates the new format for link-local multicast addresses.

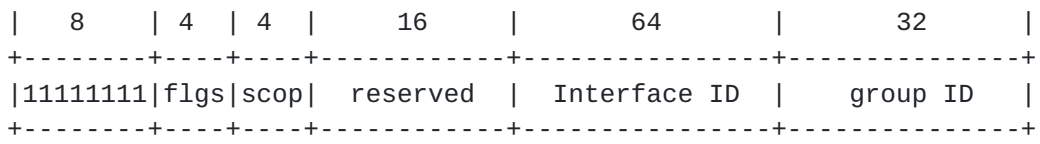
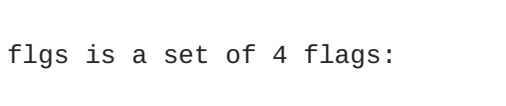


Figure 2: link scoped multicast address format



- o P = 0 indicates a multicast address that is not assigned based on the interface ID.
- o P = 1 indicates a multicast address that is assigned based on the interface ID.
- o If P = 1, T MUST be set to 1, otherwise the setting of the T bit is defined in Section 2.7 of RFC 2373.

flgs should use the same flag defined in section 3 of [UNIMULTI]. That is, this document proposes the third bit of 'flgs' field to indicates a Interface ID-based multicast addresses. Additionly, it is required to distinguish between Inteface ID-based multicast address and unicast-prefix-based multicast address.

scop <= 2. The scope of this multicast address MUST be independent

of the scope of the unicast address, which derives the interface ID embedded in the multicast address.

The reserved field MUST be zero.

interface ID field is used to distinguish each host from others. And this value is obtained from IEEE EUI-64 based interface identifier of the link-local unicast IPv6 address.

group ID is generated to indicate multicast application and is used to guarantee its uniqueness only in host. Also, it may be set based on the guidelines outlined in [IPV6 GID].

The lifetime of a Interface ID-based multicast address has no dependency to the Valid Lifetime field in the Prefix Information option, corresponding to the unicast address being used, contained in the Router Advertisement message [RFC 2461].

5. Examples

This is an example for interface ID-based multicast address with link-local scope. For example in ethernet environment, if the IEEE 48-bit MAC's address is 12:34:56:78:90:AB, the mutlicast prefix of a host is FF32:0:1234:56FF:FE78:90AB::/96.

6. Considerations

This draft considers only the link-local multicast addresses. For this purpose, P flag is used in figure 2. [UNIMULTI] draft also use the P flag to indicate multicast address that is assigned based on network prefix. For consistency, some modifications in [UNIMULTI] draft are required. For example, by restrictng the syntax to scope > 2 in [UNIMULTI].

7. Security considerations

[RFC3041] describes the privacy extension to IPv6 stateless address autoconfiguration for interface ID. So, [RFC3041] satisfied our requirements.

8. References

[RFC 2373]
R. Hinden and S. Deering, "IP Version 6 Addressing Architecture", RFC 2373, July 1998.

[RFC 2460]
S. Deering and R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", RFC 2460, December 1998.

[RFC 2461]
Narten, T., Nordmark, E., Simpson, W., "Neighbor Discovery for IP Version 6 (IPv6)", RFC 2461, December 1998.

[RFC 2464]
M. Crawford, "Transmission of IPv6 Packets over Ethernet Networks," RFC2464, December 1998

[RFC 2908]
D. Thaler, M. Handley and D. Estrin, "Th Internet Multicast Address Allocation Architecture," RFC2908, September 2000.

[RFC 2909]
Radoslavov, P., Estrin, D., Govindan, R., Handley, M., Kumar, S. and D. Thaler, "The Multicast Address-Set Claim (MASC) Protocol", RFC 2909, September 2000.

[RFC 3041]
T. Narten and R. Draves, "Privacy Extensions for Stateless Address Autoconfiguration in IPv6," RFC 3041, January 2001.

[RFC 3138]
Meyer, D., "Extended Assignments in 233/8", RFC 3138, June 2001.

[RFC 3180]
Meyer, D. and P. Lothberg, "GLOP Addressing in 233/8", RFC 3180, September 2001.

[AAP WORK]
Handley, M. and S. Hanna, "Multicast Address Allocation Protocol (AAP)", Work in Progress.

[ADDRARCH]
R. Hinden and S. Deering, "IP Version 6 Addressing Architecture", Work In Progress, July 2001.

[UNIMULTI]
B. Haberman and D. Thaler, "Unicast-Prefix-based IPv6 Multicast Addresses," Work In Progress, December 2001.

[IPV6 GID]
B. Haberman, "Dynamic Allocation Guidelines for IPv6 Multicast Addresses," Work In Progress, October 2001.

9. Acknowledgements

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