6man Working Group
Internet-Draft
Updates: 3306,3956,4607,4291 (if approved)
Intended status: Standards Track
Expires: October 10, 2013

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April 08, 2013

Updates to the IPv6 Multicast Addressing Architecture
draft-ietf-6man-multicast-addr-arch-update-00

Abstract

This document updates the IPv6 multicast addressing architecture by defining the 17-20 reserved bits as generic flag bits. The document provides also some clarifications related to the use of these flag bits.

This document updates RFC 3956, RFC 3306, RFC 4607 and RFC 4291.

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].

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 October 10, 2013.

Table of Contents

1. Introduction

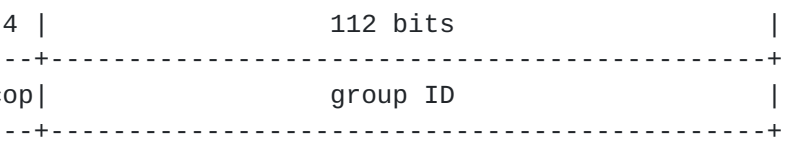
This document updates the IPv6 multicast addressing architecture [RFC4291] by defining the 17-20 reserved bits as generic flag bits (Section 2). The document provides also some clarifications related to the use of these flag bits (Section 3.1) and also about IANA assigned SSM blocks (Section 3.2).

This document updates [RFC3956], [RFC3306], [RFC4607] and [RFC4291].

2. Addressing Architecture Update

Bits 17-20 of a multicast address are defined in [RFC3956] and [RFC3306] as reserved bits. This document defines these bits as generic flag bits so that they apply to any multicast address. Figure 1 and Figure 2 show the updated structure of the addressing architecture. The first diagram shows the update of the base IPv6 addressing architecture, and the second shows the update of so-called Embedded-RP.

OLD:



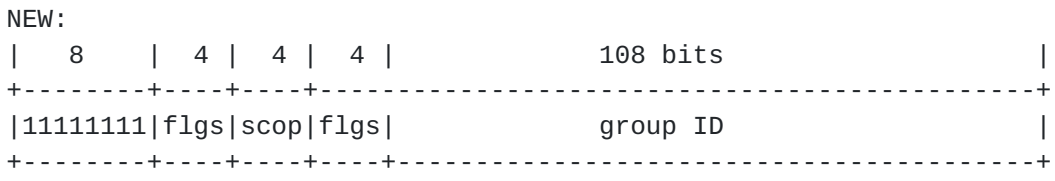


Figure 1: Updated IPv6 Multicast Addressing Architecture

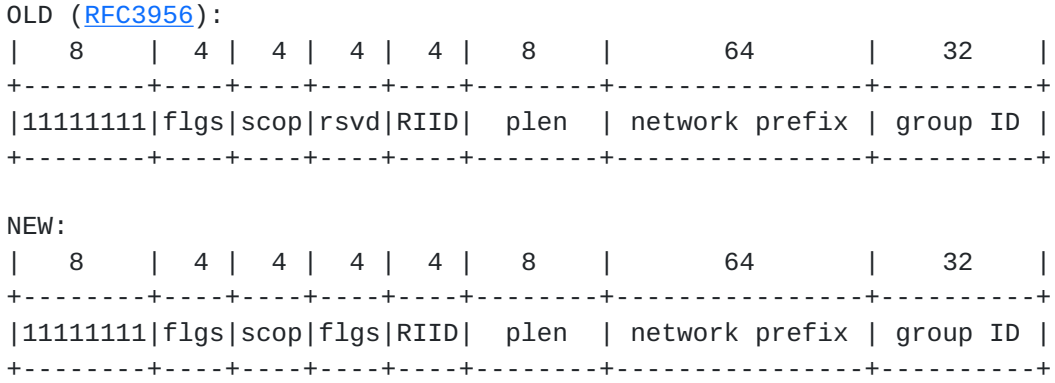


Figure 2: Embedded-RP with Updated IPv6 Multicast Address Arch.

Further specification documents may define a meaning for these flag bits. Defining the bits 17-20 as flags for all IPv6 multicast addresses allows addresses to be treated in a more uniform and generic way, and allows for these bits to be defined in the future for different purposes, irrespective of the specific type of multicast address.

3. Clarifications

3.1. Flag Bits

Some implementations and specification documents do not treat the flag bits as separate bits but tend to use their combined value as a 4-bit integer. This practice is a hurdle for assigning a meaning to the remaining flag bits. Below are listed some examples for illustration purposes:

- the reading of [RFC4607] may lead to conclude that ff3x::/32 is the only allowed SSM IPv6 prefix block.

- [RFC3956] states only ff70::/12 applies to Embedded-RP. Particularly, implementations should not treat the fff0::/12 range as Embedded-RP.

To avoid such confusion and to unambiguously associate a meaning with the remaining flags, the following recommendation is made

Implementations MUST treat flag bits as separate bits.

3.2. IANA Assigned SSM Block

Another issue related to SSM is the IANA assigned SSM address block. Per [RFC4607], ff3x::4000:0001 through ff3x::7fff:fff is the block for IANA assignments (http://www.iana.org/assignments/ipv6-multicast-addresses/ipv6-multicast-addresses.xml). However, IANA assignments are permanent addresses and should not have the transient bit set. Quoting from [RFC4607]:

> "T = 1 indicates a non-permanently-assigned ("transient") multicast address.".

4. IANA Considerations

This document may require IANA updates. However, at this point it is not clear exactly what these updates may be.

5. Security Considerations

Security considerations discussed in [RFC3956], [RFC3306], [RFC4607] and [RFC4291] MUST be taken into account.

6. Acknowledgements

Many thanks to B. Haberman for the discussions prior to the publication of this document.

7. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC3306] Haberman, B. and D. Thaler, "Unicast-Prefix-based IPv6 Multicast Addresses", RFC 3306, August 2002.

[RFC3956] Savola, P. and B. Haberman, "Embedding the Rendezvous Point (RP) Address in an IPv6 Multicast Address", RFC 3956, November 2004.

[RFC4291] Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture", RFC 4291, February 2006.

[RFC4607] Holbrook, H. and B. Cain, "Source-Specific Multicast for IP", RFC 4607, August 2006.

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