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IANA Guidelines for IPv4 Multicast Address Assignments

Abstract

This document provides guidance for the Internet Assigned Numbers Authority (IANA) in assigning IPv4 multicast addresses. It obsoletes RFC 3171 and RFC 3138 and updates RFC 2780.

Status of This Memo

This memo documents an Internet Best Current Practice.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on BCPs is available in Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc5771.

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1. Introduction

The Internet Assigned Numbers Authority (IANA) (www.iana.org) is charged with allocating parameter values for fields in protocols that have been designed, created, or are maintained by the Internet Engineering Task Force (IETF). RFC 2780 [RFC2780] provides the IANA guidance in the assignment of parameters for fields in newly developed protocols. This memo expands on section 4.4.2 of RFC 2780 and attempts to codify existing IANA practice used in the assignment of IPv4 multicast addresses.

This document is a revision of RFC 3171 [RFC3171], which it obsoletes. It also obsoletes RFC 3138 [RFC3138] and updates [RFC2780].

The terms "Specification Required", "Expert Review", "IESG Approval", "IETF Review", and "Standards Action", are used in this memo to refer to the processes described in [RFC5226].

In general, due to the relatively small size of the IPv4 multicast address space, further assignment of IPv4 multicast address space is recommended only in limited circumstances. Specifically, the IANA should only assign addresses in those cases where:

- the dynamic selection Session Description Protocol/Session Announcement Protocol (SDP/SAP);

- GLOP (not an acronym);

- Source-Specific Multicast (SSM); or

- Administratively Scoped address spaces cannot be used.

The guidelines described below are reflected in [IANA-protocols]. Network operators should also be aware of the availability of IPv6 multicast addresses and consider using them where feasible.

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 BCP 14, RFC 2119 [RFC2119].

The word "allocation" designates a block of addresses managed by a registry for the purpose of making assignments and allocations. The word "assignment" designates a block of addresses, or a single address, registered to an end-user for use on a specific network or set of networks.

3. Definition of Current Assignment Practice

Unlike IPv4 unicast address assignment, where blocks of addresses are delegated to Regional Internet Registries (RIRs), IPv4 multicast addresses are assigned directly by the IANA. Current registration groups appear as follows [IANA]:

Address Range	Size	Designation
224.0.0.0 - 224.0.0.255	(/24)	Local Network Control Block
224.0.1.0 - 224.0.1.255	(/24)	Internetwork Control Block
224.0.2.0 - 224.0.255.255	(65024)	AD-HOC Block I
224.1.0.0 - 224.1.255.255	(/16)	RESERVED
224.2.0.0 - 224.2.255.255	(/16)	SDP/SAP Block
224.3.0.0 - 224.4.255.255	(2 /16s)	AD-HOC Block II
224.5.0.0 - 224.255.255.255	(251 /16s)	RESERVED
225.0.0.0 - 231.255.255.255	(7 /8s)	RESERVED
232.0.0.0 - 232.255.255.255	(/8)	Source-Specific Multicast Block
233.0.0.0 - 233.251.255.255	(16515072)	GLOP Block
233.252.0.0 - 233.255.255.255	(/14)	AD-HOC Block III
234.0.0.0 - 238.255.255.255	(5 /8s)	RESERVED
239.0.0.0 - 239.255.255.255	(/8)	Administratively Scoped Block

The IANA generally assigns addresses from the Local Network Control, Internetwork Control and AD-HOC blocks. Assignment guidelines for each of these blocks, as well as for the Source-Specific Multicast, GLOP, and Administratively Scoped blocks, are described below.

4. Local Network Control Block (224.0.0/24)

Addresses in the Local Network Control Block are used for protocol control traffic that is not forwarded off link. Examples of this type of use include OSPFIGP All Routers (224.0.0.5) [RFC2328].

4.1. Assignment Guidelines

Pursuant to section 4.4.2 of [RFC2780], assignments from the Local Network Control Block follow an Expert Review, IESG Approval, or Standards Action process. See IANA [IANA] for the current set of assignments.

5. Internetwork Control Block (224.0.1/24)

Addresses in the Internetwork Control Block are used for protocol control traffic that MAY be forwarded through the Internet. Examples include 224.0.1.1 (Network Time Protocol (NTP) [RFC4330]) and 224.0.1.68 (mdhcpdiscover [RFC2730]).

5.1. Assignment Guidelines

Pursuant to section 4.4.2 of [RFC2780], assignments from the Internetwork Control Block follow an Expert Review, IESG Approval, or Standards Action process. See IANA [IANA] for the current set of assignments.

6. AD-HOC Blocks (I, II, and III)

Addresses in the AD-HOC blocks (including 224.0.2.0 - 224.0.255.255, 224.3.0.0 - 224.4.255.255, and 233.252.0.0 - 233.255.255.255) were traditionally used for assignments for those applications that don't fit in either the Local or Internetwork Control blocks. These addresses MAY be globally routed and are typically used by applications that require small blocks of addressing (e.g., less than a /24). Future assignments of blocks of addresses that do not fit in the Local Network or Internetwork Control blocks will be made in AD-HOC Block III.

6.1. Assignment Guidelines

In general, the IANA SHOULD NOT assign addresses in the AD-HOC blocks. However, the IANA MAY, under special circumstances, assign addresses from these blocks. Pursuant to section 4.4.2 of [RFC2780], assignments from the AD-HOC blocks follow an Expert Review, IESG Approval, or Standards Action process. See [IANA] for the current set of assignments.

7. SDP/SAP Block (224.2/16)

Addresses in the SDP/SAP Block are used by applications that receive addresses through the Session Announcement Protocol [RFC2974] for use via applications like the session directory tool (such as [SDR]).

7.1. Assignment Guidelines

Since addresses in the SDP/SAP Block are chosen randomly from the range of addresses not already in use [RFC2974], no IANA assignment policy is required. Note that while no additional IANA assignment is required, addresses in the SDP/SAP Block are explicitly for use by SDP/SAP and MUST NOT be used for other purposes.

8. Source-Specific Multicast Block (232/8)

SSM [RFC4607] is an extension of IP Multicast in which traffic is forwarded to receivers from only those multicast sources for which the receivers have explicitly expressed interest and is primarily targeted at one-to-many (broadcast) applications. Note that this block was initially assigned to the Versatile Message Transaction Protocol (VMTP) transient groups [IANA].

8.1. Assignment Guidelines

Because the SSM model essentially makes the entire multicast address space local to the host, no IANA assignment policy is required. Note, however, that while no additional IANA assignment is required, addresses in the Source-Specific Multicast Block are explicitly for use by SSM and MUST NOT be used for other purposes.

9. GLOP Block (233/8)

Addresses in the GLOP Block are globally-scoped, statically-assigned addresses. The assignment is made, for a domain with a 16-bit Autonomous System Number (ASN), by mapping a domain's autonomous system number, expressed in octets as X.Y, into the middle two octets of the GLOP Block, yielding an assignment of 233.X.Y.0/24. The mapping and assignment is defined in [RFC3180]. Domains with a 32-bit ASN MAY apply for space in AD-HOC Block III, or consider using IPv6 multicast addresses.

9.1. Assignment Guidelines

Because addresses in the GLOP Block are algorithmically pre-assigned, no IANA assignment policy is required.

9.2. AD-HOC Block III

[RFC3138] delegated to the RIRs the assignment of the GLOP sub-block (233.252.0.0 - 233.255.255.255) mapped by the private Autonomous System (AS) space (64512-65534) and the IANA reserved ASN 65535 [RFC1930]. This space was known as Extended GLOP (EGLOP). RFC 3138 should not have asked the RIRs to develop policies for the EGLOP space because [RFC2860] reserves that to the IETF. It is important to make this space available for use by network operators, and it is therefore appropriate to obsolete RFC 3138 and classify this address range as available for AD-HOC assignment as per the guidelines in section 6.

The first /24 in this range, 233.252.0.0/24, is assigned as "MCAST-TEST-NET" for use in documentation and example code. 233.252.0.0/24 SHOULD be used in conjunction with the [RFC2606] domain names example.com or example.net in vendor and protocol documentation. Addresses within 233.252.0.0/24 MUST NOT appear on the public Internet.

10. Administratively Scoped Block (239/8)

Addresses in the Administratively Scoped Block are for local use within a domain and are described in [RFC2365].

10.1. Assignment Guidelines

Since addresses in this block are local to a domain, no IANA assignment policy is required.

10.1.1. Relative Offsets

The relative offsets [RFC2365] are used to ensure that a service can be located independent of the extent of the enclosing scope (see [RFC3180] for details). Since there are only 256 such offsets, the IANA should only assign a relative offset to a protocol that provides an infrastructure supporting service. Examples of such services include the Session Announcement Protocol [RFC2974]. Pursuant to section 4.4.2 of [RFC2780], assignments of relative offsets follow an Expert Review, IESG Approval, or Standards Action process. See [IANA] for the current set of assignments.

11. Application Form

Requests for multicast address assignments can be submitted through the application form on the IANA web site at [IANA-registration]. It is important to submit sufficient detail to allow the IESG designated expert to review the application. If the details given in the request are not clear, or further information is needed, the IESG designated expert may request additional information before assigning an address.

11.1. Size of Assignments of IPv4 Multicast Addresses

Occasionally, more than one multicast address is required. In these cases, multiple addresses are available in AD-HOC Block III. Where there is a requirement for a very large number of addresses, the assignment will be staged. The additional stages will only be made after the complete use of the initial assignment(s).

A separate document describing the policy governing assignment of addresses in the AD-HOC blocks I, II, and III will be developed and published. The format, location, and content has not yet been decided and so these will be documented in a future version of this document.

12. Annual Review

Given the dynamic nature of IPv4 multicast and its associated infrastructure, and the previously undocumented IPv4 multicast address assignment guidelines, the IANA should conduct an annual review of currently assigned addresses.

12.1. Address Reclamation

During the review described above, addresses that were mis-assigned should, where possible, be reclaimed or reassigned.

The IANA should also review assignments in the AD-HOC, "DIS Transient Groups", and ST Multicast Groups [RFC1819] blocks and reclaim those addresses that are not in use on the global Internet (i.e., those applications that can use SSM, GLOP, or Administratively Scoped addressing, or are not globally routed).

12.2. Positive Renewal

It is occasionally appropriate to make temporary assignments that can be renewed as necessary. In cases where this happens the registrant needs to positively request an extension to the temporary assignment or the addresses assigned. When the IANA has not received a request to renew the registration of a temporary assignment within 30 days of the expiry of the assignment, it MUST be removed from the multicast registry.

Addresses returned to the IANA when a temporary assignment ends MUST NOT be assigned to anyone other than the last registrant for at least one calendar year.

13. Use of IANA Reserved Addresses

Applications MUST NOT use addressing in the IANA reserved blocks.

14. IANA Considerations

IANA has updated its IPv4 multicast request and assignment procedures to reflect this document.

15. Security Considerations

The assignment guidelines described in this document do not alter the security properties of either the Any Source or Source-Specific Multicast service models.

16. Acknowledgments

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