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IANA Guidelines for IPv4 Multicast Address Assignments
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Abstract

The Internet Assigned Numbers Authority is charged with allocating parameter values for fields in protocols which have been designed, created or are maintained by the Internet Engineering Task Force. This document provides guidelines for the assignment of the IPv4 IP multicast address space.

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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 which 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 IPv4 multicast addresses.

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](#) [[RFC 2119](#)].

2. Definition of Current Assignment Practice

Unlike IPv4 unicast address assignment, where blocks of addresses are delegated to regional registries, IPv4 multicast addresses are assigned directly by the IANA. Current assignments appear as follows [[IANA](#)]:

224.0.0.0	- 224.0.0.255	(224.0.0/24)	Local Network Control Block
224.0.1.0	- 224.0.1.255	(224.0.1/24)	Internetwork Control Block
224.0.2.0	- 224.0.255.0		AD-HOC Block
224.1.0.0	- 224.1.255.255	(224.1/16)	RESERVED
224.2.0.0	- 224.2.255.255	(224.2/16)	SDP/SAP Block
224.3.0.0	- 231.255.255.255		RESERVED
232.0.0.0	- 232.255.255.255	(232/8)	Source Specific Multicast Block
233.0.0.0	- 233.255.255.255	(233/8)	GLOP Block
234.0.0.0	- 238.255.255.255		RESERVED
239.0.0.0	- 239.255.255.255	(239/8)	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.

3. 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](#)].

3.1. Assignment Guidelines

Pursuant to [section 4.4.2 of RFC 2780](#) [[RFC2780](#)], assignments from the Local Network Control block follow an Expert Review, IESG Approval or Standards Action process. See [[IANA](#)] for the current set of assignments.

4. Internetwork Control Block (224.0.1/24)

Addresses in the Internetwork Control block are used for protocol control that must be forwarded through the Internet. Examples include 224.0.1.1 (NTP [[RFC2030](#)]) and 224.0.1.68 (mdhcpdiscover [[RFC2730](#)]).

4.1. Assignment Guidelines

Pursuant to [section 4.4.2 of RFC 2780](#) [[RFC2780](#)], assignments from the Internetwork Control block follow an Expert Review, IESG Approval or Standards Action process. See [[IANA](#)] for the current set of assignments.

5. AD-HOC Block (224.0.2/24 - 224.0.255/24)

Addresses in the AD-HOC block have traditionally been assigned for those applications that don't fit in either the Local or Internetwork Control blocks. These addresses are globally routed and are typically used by applications that require small blocks of addressing (e.g., less than a /24).

5.1. Assignment Guidelines

In general, the IANA SHOULD NOT assign addressing in the AD-HOC Block. However, the IANA may under special special circumstances, assign addressing from this block. Pursuant to section 4.4.2 of [RFC 2780](#) [[RFC2780](#)], assignments from the AD-HOC block follow an Expert Review, IESG Approval or Standards Action process. See [[IANA](#)] for the current set of assignments.

6. 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 [[SDR](#)]).

6.1. 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.

7. Source Specific Multicast Block (232/8)

The Source Specific Multicast (SSM) 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 as initially assigned to the VMTP transient groups [[IANA](#)].

7.1. 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 SSM block are explicitly for use by SSM and MUST NOT be used for other purposes.

8. GLOP Block (233/8)

Addresses in the GLOP block are globally scoped statically assigned addresses. The assignment is made by mapping a domain's autonomous system number into the middle two octets of 233.X.Y.0/24. The mapping and assignment is defined in [[RFC2770](#)].

8.1. Assignment Guidelines

Because addresses in the GLOP block are algorithmically pre-assigned, no IANA assignment policy is required. In addition, [RFC 3138](#) [[RFC3138](#)] delegates assignment of the GLOP sub-block mapped by the [RFC 1930](#) [[RFC1930](#)] private AS space (233.252.0.0 - 233.255.255.255) to the Internet Routing Registries. Note that while no additional IANA assignment is required, addresses in the GLOP block are assigned for use as defined in [RFC 2770](#) and MUST NOT be used for other purposes.

9. Administratively Scoped Address Block (239/8)

Addresses in the Administratively Scoped Address block are for local use within a domain and are described in [[RFC2365](#)].

9.1. Assignment Guidelines

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

9.1.1. 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 [RFC 2770](#) 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 RFC 2780](#) [[RFC2780](#)], assignments of Relative Offsets follow an Expert Review, IESG Approval or Standards Action process. See [[IANA](#)] for the current set of assignments.

10. 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.

10.1. 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 reclaim those addresses that are not in use on the global Internet (i.e, those applications which can use SSM, GLOP, or Administratively Scoped addressing, or are not globally routed).

11. Usable IPv4 Multicast Addresses

Multicast datagrams that match the criteria in this section SHOULD NOT be used, even on local, unrouted subnetworks.

11.1. IGMP-snooping switches

[RFC 1112](#) [[RFC1112](#)] describes the mapping of IPv4 Multicast Group addresses to Ethernet MAC addresses, as follows:

An IP host group address is mapped to an Ethernet multicast address by placing the low-order 23-bits of the IP address into the low-order 23 bits of the Ethernet multicast address 01-00-5E-00-00-00 (hex). Because there are 28 significant bits in an IP host group address, more than one host group address may map to the same Ethernet multicast address.

Now, note that multicast group addresses in the 224.0.0.0/24 range are used for local subnetwork control (see [section 3](#) above). Under the [RFC 1112](#) mapping, this maps to the Ethernet multicast address range 01-00-5E-00-00-XX, where XX is 00 through FF. Ethernet frames within this range are always processed in the control plane of many popular network devices, such as IGMP-snooping switches.

Because of the many-to-one mapping of IPv4 Multicast Group Addresses to Ethernet MAC addresses, it is possible to overwhelm the control plane of network devices by sending to group addresses that map into the 01-00-5E-00-00-XX (hex) range.

IGMP-snooping network devices must also flood these frames to all outgoing ports, so the damage may extend to end systems and routers.

11.2. Unusable Inter-domain Groups

Multicast datagrams that match the criteria in this section SHOULD NOT be routed between administrative domains.

11.2.1. Administratively Scoped Addresses

[RFC 2365](#) [[RFC2365](#)] defines 239.0.0.0/8 for use within an administrative domain. As such, datagrams with group addresses that match 239.0.0.0/8 SHOULD NOT be passed between administrative domains.

11.2.2. Special Use IPv4 Source Addresses

[RFC 1918](#) [[RFC1918](#)] defines certain ranges of IPv4 unicast addresses that can be used within an administrative domain. Multicast datagrams are no exception to the rule that datagrams addressed within these ranges SHOULD NOT be passed between administrative domains. Examples include 127.0.0.0/8, which is widely used for internal host addressing, and is generally not valid on datagrams passed between hosts. 0.0.0.0/8 and 169.254.0.0/16 are also valid only in the context of local links. Such source addresses are not valid for datagrams passed between networks[RFC330]. Finally 192.0.2.0/24 is reserved for documentation and example code. [[RFC3330](#)].

12. Use of IANA Reserved Addresses

Applications MUST NOT use addressing in the IANA reserved blocks.

13. IANA Considerations

This document provides guidelines for the IANA to use in assigning IPv4 multicast addresses. It does not create any new namespaces for the IANA to manage [[RFC2434](#)].

14. Acknowledgments

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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. Normative References

- [RFC1112] Deering, S., "Host extensions for IP multicasting", [RFC 1112](#), August, 1989.
- [RFC1918] Rekhter, Y. et. al., "Address Allocation for Private Internets", [RFC 1918](#), February, 1996.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [RFC 2119](#), March, 1997.
- [RFC2365] Meyer, D., "Administratively Scoped IP Multicast", [RFC 2365](#), July 1998.
- [RFC3330] IANA, "Special-Use IPv4 Addresses", [RFC 3330](#), September, 2002.

17. Informative References

- [IANA] <http://www.iana.org/assignments/multicast-addresses>
- [RFC2026] Bradner, S., "The Internet Standards Process -- Revision 3", [RFC 2026](#)/BCP 9, October, 1996.
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- [RFC2434] Narten, T., and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [RFC 2434](#)/BCP 26, October 1998.

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