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                 Multicast Addresses for Documentation
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Abstract

   This document discusses which multicast addresses should be used for
   documentation purposes and reserves multicast addresses for such use.
   Some multicast addresses are derived from AS numbers or unicast
   addresses. This document also explains how these can be used for
   documentation purposes.

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1. Introduction

   It is often useful in documentation, IETF documents, etc., to provide
   examples containing IP multicast addresses. For documentation where
   examples of general purpose multicast addresses are needed, one
   should use multicast addresses that never will be assigned or in
   actual use. There is a risk that addresses used in examples may
   accidentally be used. It is then important that the same addresses
   are not used by other multicast applications or services. It may
   also be beneficial to filter out such addresses from multicast
   signalling and multicast data sent to such addresses.

   For unicast there are both IPv4 and IPv6 addresses reserved for this
   purpose, see [RFC5737] and [RFC3849] respectively. This document
   reserves multicast addresses for this purpose.

   There are also some multicast addresses that are derived from AS
   numbers or unicast addresses. For examples where such addresses are
   desired, one should derive them from the AS numbers and unicast
   addresses reserved for documentation purposes. This document also
   discusses the use of these.

2. **IPv4 multicast documentation addresses**

   For Any-Source Multicast (ASM), the IPv4 multicast addresses
   allocated for documentation purposes are 233.252.0.0 - 233.252.0.255
   (233.252.0.0/24).

   For Source-Specific Multicast (SSM) it is less important which
   multicast addresses are used, since a host/application joins a
   channel identified by both source and group. Any source addresses
   used in SSM examples should be unicast addresses reserved for
   documentation purposes. There are three unicast address ranges
   provided for documentation use in [RFC5737]. The ranges are
   192.0.2.0/24, 198.51.100.0/24 and 203.0.113.0/24.

   Sometimes one wants to give examples where a specific type of address
   is desired. E.g. for text about multicast scoping, one might want
   the examples to use addresses that are to be used for administrative
   scoping. See below for guidance on how to construct specific types
   of example addresses.

2.1. **Administratively scoped IPv4 multicast addresses**

   Administratively scoped IPv4 multicast addresses [RFC2365] are
   reserved for scoped multicast. They can be used within a site or an
   organization. Apart from a small set of scope relative addresses,
   these addresses are not assigned. The high order /24 in every scope
   is reserved for relative assignments. A relative assignment is an
   integer offset from the highest address in the scope and represents
   an IPv4 address. For documentation purposes, the integer offset is
   TBD1. This provides one multicast address per scope.

   For example in the Local Scope 239.255.0.0/16, the multicast address
   for documentation purposes is 239.255.255.255-TBD1.

2.2. **GLOP multicast addresses**

   GLOP [RFC3180] is a method for deriving IPv4 multicast group
   addresses from 16-bit AS numbers. For examples where GLOP addresses
   are desired, the addresses should be derived from the AS numbers
   reserved for documentation use.

   The 16-bit AS numbers reserved for documentation use in [RFC5398] are
   64496 - 64511. By use of [RFC3180], we then get 16 /24 multicast
   prefixes for documentation use. The first one 233.251.240.0/24, and
   the last 233.251.255.0/24.

2.3. Unicast prefix based IPv4 multicast addresses

IPv4 multicast addresses can be derived from IPv4 unicast prefixes,
see [RFC6034]. For examples where this type of addresses are
desired, the addresses should be derived from the unicast addresses
reserved for documentation purposes, see [RFC5737].

There are three unicast address ranges provided for documentation use
in [RFC5737]. The ranges are 192.0.2.0/24, 198.51.100.0/24 and
203.0.113.0/24. Using [RFC6034] this leaves us with the unicast
prefix based IPv4 multicast addresses 234.192.0.2, 234.198.51.100 and
234.203.0.113.

3. IPv6 multicast documentation addresses

For Any-Source Multicast (ASM) the IPv6 multicast addresses allocated
for documentation purposes are TBD2. This is a /96 prefix so that it
can be used with group IDs according to the allocation guidelines in
[RFC3307]). Also note that for these addresses the transient flag,
the T-flag as defined in [RFC3513], is zero. This is because they
are permanently assigned. There can be no permanently assigned
addresses for documentation purposes with the transient flag set to
one, since the flag set to one means that they are not permanently
assigned.

For Source-Specific Multicast (SSM) it is less important which
multicast addresses are used, since a host/application joins a
channel identified by both source and group. Any source addresses
used in SSM examples should be unicast addresses reserved for
documentation purposes. The IPv6 unicast prefix reserved for
documentation purposes is 2001:DB8::/32, see [RFC3849].

Sometimes one wants to give examples where a specific type of address
is desired. E.g. for text about multicast scoping, one might want
the examples to use addresses that are to be used for administrative
scoping. See below for guidance on how to construct specific types
of example addresses.

3.1. Unicast prefix based IPv6 multicast addresses

IPv6 multicast addresses can be derived from IPv6 unicast prefixes,
see [RFC3306]. For examples where this type of addresses is desired,
the addresses should be derived from the unicast addresses reserved
for documentation purposes.

The IPv6 unicast prefix reserved for documentation purposes is 2001:
DB8::/32, see [RFC3849]. This allows a wide range of different IPv6
multicast addresses. Using just the base /32 prefix, one gets the
IPv6 multicast prefixes FF3X:20:2001:DB8::/64, one for each available
scope X. One can also produce longer prefixes from this. Just as an
example, one can pick say a /64 prefix 2001:DB8:DEAD:BEEF::/64 which
gives the multicast prefixes FF3X:40:2001:DB8:DEAD:BEEF::/96, one for
each available scope X.

3.2. Embedded-RP IPv6 multicast addresses

There is a type of IPv6 multicast addresses called Embedded-RP
addresses where the IPv6 address of a Rendezvous-Point is embedded
inside the multicast address, see [RFC3956]. For examples where this
type of addresses is desired, the addresses should be derived from
the unicast addresses reserved for documentation purposes, see

[RFC3849].

For documentation purposes, the RP address can be any address from
the range 2001:DB8::/32 that follows the constraints specified in
[RFC3956]. One example address could be 2001:DB8::1. The
embedded-RP multicast prefixes might then be FF7X:120:2001:DB8::/96.
Another example could be the RP address 2001:DB8:BEEF:FEED::7 which
gives the prefixes FF7X:740:2001:DB8:BEEF:FEED::/96. See also the
examples in [RFC3956].

4. Security Considerations

   The use of specific multicast addresses for documentation purposes
   has no negative impact on security.

5. IANA Considerations

   IANA is requested to add a reference to this document for the IPv4
   MCAST-TEST-NET allocation, so that all the different documentation
   multicast assignments reference this document.

   IANA is requested to assign a scope relative IPv4 address for
   documentation purposes.

   This paragraph contains some further instructions for IANA in order
   to clarify. It should be deleted before publishing. The string TBD1
   in this document should be replaced by the assigned offset. Also the
   string 255-TBD1 should be replaced by the value of 255 minus the
   assigned offset. The next available offset seems currently to be 10.
   Look in the registry for where it says "10-252 Reserved - To be
   assigned by the IANA". If the value 10 is chosen, then we would like
   to add "10 MCAST-TEST-NET-2 [RFCxxxx]" to the table. TBD1 would then
   be 10.   TBD1 is used in two places apart from the IANA
   considerations. In one place it says just TBD1, that should be
   replaced by "10". The other place it says "239.255.255.255-TBD1".
   That should then be replaced by "239.255.255.245". In the unlikely
   event that 10 is not available, please use the first available value
   accordingly. MCAST-TEST-NET-2 is suggested here, since the existing
   allocation is named MCAST-TEST-NET.

   IANA is requested to assign "variable scope" IPv6 multicast addresses
   for documentation purposes. This should be a /96 prefix.

   This paragraph contains some further instructions for IANA in order
   to clarify. It should be deleted before publishing. The word TBD2
   in this text should be replaced with the assigned prefix. The prefix
   should be of the form FF0X:.../96. In order to make this
   documentation prefix easily recognizable, the authors would like to
   request the prefix FF0X::DB8:0:0/96 if possible. This makes it
   somewhat similar to the IPv6 unicast prefix 2001:DB8::/32. We
   suggest they are denoted as "Documentation Addresses" with a
   reference to this document.

6. Acknowledgments

   The authors thank Roberta Maglione, Leonard Giuliano and Dave Thaler
   for providing comments on this document.

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