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                    IPv6 Multicast Address Scopes
                draft-ietf-6man-multicast-scopes-02.txt

Abstract

   This document updates the definitions of IPv6 multicast scopes.

Status of This Memo

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1. Definition of IPv6 Multicast Address Scopes (Updates RFC 4291)

RFC 4291 [RFC4291] defines "scop is a 4-bit multicast scope value
used to limit the scope of the multicast group." scop 3 is defined as
"reserved" in RFC 4291. The multicast protocol specification in
draft-ietf-roll-trickle-mcast [I-D.ietf-roll-trickle-mcast] desires
to use multicast scop 3 for transport of multicast traffic scoped to
a network of nodes connected in a mesh. The use of this scop value
is to accommodate a multicast scope that is greater than Link-Local
but is also automatically determined by the network architecture.

The following table updates the definitions in RFC 4291:

0 reserved

1 Interface-Local scope

2 Link-Local scope

3 Realm-Local scope

4 Admin-Local scope

5 Site-Local scope

6 (unassigned)

7 (unassigned)

8 Organization-Local scope

9 (unassigned)

A (unassigned)

B (unassigned)

C (unassigned)

D (unassigned)

E Global scope

F reserved

The following change is applied to section 2.7 of RFC 4291:

OLD:

Admin-Local scope is the smallest scope that must be administratively configured, i.e., not automatically derived from physical connectivity or other, non-multicast-related configuration.

NEW:

Interface-Local, Link-Local, and Realm-Local scope boundaries are automatically derived from physical connectivity or other, non-multicast related configuration. Global scope has no boundary. The boundaries of all other non-reserved scopes of Admin-Local or larger are administratively configured. For reserved scopes, the way of configuring their boundaries will be defined when the semantics of the scope is defined.

According to RFC 4007 [RFC4007], the zone of a Realm-Local scope must fall within zones of larger scope. Because the zone of a Realm-Local scope is configured automatically, while the zones of larger scopes are configured manually, care must be taken in the definition of those larger scopes to ensure that inclusion contraint is met.

2. Definition of Realm-Local scopes

The definition of any Realm-Local scope for a particular network technology should be published in an RFC. For example, such a scope definition would be appropriate for publication in an "IPv6-over-foo" RFC.

Any RFCs that include the definition of a Realm-Local scope will be listed in the IANA "IPv6 Multicast Address Scopes" registry.

Section 4 gives the definition of scop 3 for IEEE 802.15.4 [IEEE802.15.4] networks.

3. Definition of automatic and administratively configured scopes (updates RFC 4007)

Section 5 of RFC 4007 [RFC4007] and section 2.7 of RFC 4291 disagree about the way in which multicast scope 3 is configured. To resolve that disagreement, change the last bullet in the list in section 5 of RFC 4007 as follows:

OLD:

   o The boundaries of zones of a scope other than interface-local,
      link-local, and global must be defined and configured by network
      administrators.

NEW:

   o The boundaries of zones of a scope are defined by the IPv6
      addressing architecture [RFC4291].

4. Definition of Realm-Local Scope for IEEE 802.15.4

   When used in an IP-over-IEEE802.15.4 network, "scop 3" is defined to
   include all interfaces sharing a PAN ID.

5. IANA Considerations

   IANA is asked to establish a sub-registry titled "IPv6 Multicast
   Address Scopes" in the existing "Internet Protocol version 6 (IPv6)
   Multicast Address Allocations" registry. The "IPv6 Multicast Address
   Scopes" is to be populated with the scope values given in section 1,
   with a note associated with scope 3 listing all RFCs that define
   Realm-Local scoping rules that use scope 3.

6. Acknowledgments

   Robert Cragie, Kerry Lynn, Jinmei Tatuya, Dave Thaler and Stig Venaas
   all contributed text and/or review to ensure that the updates to RFC
   4007 and RFC 4291 are correct

7. Security Considerations

   This document has no security considerations beyond those in RFC 4291
   [RFC4291].

8. References

8.1. Normative References

   [RFC4007] Deering, S., Haberman, B., Jinmei, T., Nordmark, E., and
              B. Zill, "IPv6 Scoped Address Architecture", RFC 4007,
              March 2005.

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

8.2. Informative References

   [I-D.ietf-roll-trickle-mcast]
              Hui, J. and R. Kelsey, "Multicast Protocol for Low power
              and Lossy Networks (MPL)", draft-ietf-roll-trickle-
              mcast-05 (work in progress), August 2013.

   [IEEE802.15.4]
              IEEE Std 802.15.4-2006, "IEEE Standard for Information
              technology - Telecommunications and information exchange
              between systems - Local and metropolitan area networks -
              Specific requirements; Part 15.4: Wireless Medium Access
              Control (MAC) and Physical Layer (PHY) Specifications for
              Low-Rate Wireless Personal Area Networks (WPANs)", October
              2006.

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