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IS-IS Protocol Extension For Building Distribution Trees
draft-yong-isis-ext-4-distribution-tree-03

Abstract

   This document proposes an IS-IS protocol extension to support IGP
   based multicast transport architecture and solution [IGP-MCAST].

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Table of Contents

[1](). Introduction

   This document proposes an IS-IS protocol extension to support IGP
   based multicast transport architecture and solution [[IGP-MCAST]()].

  1.1. Conventions used in this document

   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]()].

[2](). IS-IS Protocol Extension

  2.1. RTADDR sub-TLV

   This is a sub-TLV that is used in either a Router Capabilities TLV
   or an MT Capabilities TLV. Each RTADDR sub-TLV contains a root IPv4
   address and multicast group addresses that associate to the tree. A
   router may use multiple RTADDR sub-TLVs to announce multiple root
   addresses and associated multicast groups with each root. RTADDR
   sub-TLV format is below.

```
   +-+-+-+-+-+-+-+-+
   |subType=RTADDR |                  (1 byte)
   +-+-+-+-+-+-+-+-+
   |   Length      |                  (1 byte)
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                    Root IPv4 Address                     |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |S|D|RESV       |                  (1 byte)
   +-+-+-+-+-+-+-+-+
   | Tree Priority |                  (1 byte)
   +-+-+-+-+-+-+-+-+
   |Num of Groups  |                  (1 byte)
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                    Group Address (1)                     |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                     Group Mask (1)                       |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   ~                                                          ~
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                    GROUP Address (N)                     |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                     Group Mask (N)                       |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

   Where:

     subType: RTADDR (TBD)

     Length: variable depending on the number of associated groups

     Root IPv4 Address: IPv4 Address for a router that is a tree root

     S bit: When set, the rooted tree for single area only. Otherwise,
     the rooted tree crosses multiple areas.

     D bit: When set, the tree root is as of default tree root.
     Otherwise, the default tree is auto-calculated. [IGP-MCAST] When
     clear, the tree root is another distribution tree beside the
     default tree.

     RESV: 6 reserved bits. MUST be sent as zero and ignored on receipt.

     Tree Priority: An eight bit unsigned integer where larger
     magnitude means higher priority. Zero means no priority.

   Num of Groups: the number of group addresses. When D bit sets, the
number of group addresses is 0, which means that indicated tree root
is the default tree root (supersede the auto-calculate one).

   Group Address: IPv4 Address for the group

   Group Mask: Group Mask: multicast groups mask. If the mask bit is a one,
the
   Group Address bit must match that corresponding bit in the packet
destination
   address to be associated with the tree whose root is given.

   One router may be the root for multiple trees. Each tree associates
   to a set of multicast groups. In this case, a router encodes
   multiple RTADDR sub-TLVs to announce root addresses, one for each
   root, in either a Router Capabilities TLV or an MT Capabilities TLV.
   The group address/mask in different sub-TLVs can overlap. See [IGP-
   MCAST] for details.

 2.2. RTADDRV6 sub-TLV

   This sub-TLV is used in an IPv6 network. It has the same format and
   usage except that the addresses are in IPv6.

```
   +-+-+-+-+-+-+-+-+
   |subTyp=RTADDRV6|                 (1 byte)
   +-+-+-+-+-+-+-+-+
   |    Length     |                 (1 byte)
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                                                              |
   +                                                              +
   |                                                              |
   +                      Root IPv6 Address                       +
   |                                                              |
   +                                                              +
   |                                                              |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |S|D|RESV        |                 (1 byte)
   +-+-+-+-+-+-+-+-+
   | Tree Priority |                 (1 byte)
   +-+-+-+-+-+-+-+-+
   |Num of Groups  |                 (1 byte)
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                                                              |
   +                                                              +
   |                                                              |
   +                   Group IPv6 Address (1)                     +
   |                                                              |
   +                                                              +
   |                                                              |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                                                              |
   +                                                              +
   |                                                              |
   +                         MASK(1)                              +
   |                                                              |
   +                                                              +
   |                                                              |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   ~                                                              ~
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

2.3. The Group Address Sub-TLV

   The Group Address TLV and a set of Group Address sub-TLVs are
   defined in RFC 7176 [RFC7176]. The GIP-ADDR and GIPV6-ADDR sub-TLVs
   are used in this solution. An edge router uses the GIP-ADDR sub-TLV
   or GIPV6-ADDR to announce its interested multicast groups. The GIP-

ADDR sub-TLV applies to an IPv4 network and GIPV6-ADDR sub-TLV for IPv6 network.

When using a GIP-ADDR or GIPV6-ADDR sub-TLV for IGP multicast, the field VLAN-ID MUST set to zero and be ignored. Other field usage remains the same as [RFC7176]

3. Security Considerations

See Security Considerations in [IGP-MCAST].

4. IANA Considerations

IANA is requested to assign two new sub-TLV numbers for RTADDR and RTADDRV6 as specified in Sections 2.1 and 2.2. These sub-TLVs can be used under both the Router Capability (#242) and MT Capability (#144) TLVs. To avoid confusion, each sub-TLV should be assigned the same sub-Type number under each of these two TLVs.

5. Acknowledgements

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[Editor note: the previous draft has been split into two drafts: draft-yong-isis-ext-4-distribution-tree-03 and draft-yong-rtgwg-igp-multicast-arch-00 based on AD and chair's suggestion.]

6. References

6.1. Normative References

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

[RFC7176] Eastlake 3rd, D., Senevirathne, T., Ghanwani, A., Dutt, D., and A. Banerjee, "Transparent Interconnection of Lots of Links (TRILL) Use of IS-IS", RFC 7176, May 2014.

6.2. Informative References

[IGP-MCAST] Yong, L., Hao, W., Eastlake, D., Qu A., Hudson, J., and Chunduri, "IGP Multicast Architecture", draft-yong-rtgwg-igp-mutlicast-arch-00, work in progress.

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