Updates to Anycast Property advertisement for OSPF
draft-chen-lsr-anycast-flag-00

Abstract

   Both SR-MPLS prefixes-SID and IPv4/IPv6 prefix may be configured as
   anycast and as such the same value can be advertised by multiple
   routers. It is useful for other routers to know that the
   advertisement is for an anycast identifier.

   This document updates [RFC7684] and [RFC8362], by defining a new flag
   in OSPFv2 Extended Prefix Opaque LSA [RFC7684] and Prefix Options
   [RFC8362] to advertise the anycast property, and also updates the
   corresponding interpretation of the Flags field of the Prefix
   Attribute Flags TLV in [RFC9085].

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1. Introduction

Both SR-MPLS prefixes-SID and IPv4/IPv6 prefix may be configured as
anycast and as such the same value can be advertised by multiple
routers. It is useful for other routers to know that the
advertisement is for an anycast identifier.

[RFC7684] defines OSPFv2 Opaque LSAs based on Type-Length-Value (TLV)
tuples that can be used to associate additional attributes with
prefixes or links. The OSPFv2 Extended Prefix TLV that is contained
in the OSPFv2 Extended Prefix Opaque LSA is used to advertise
additional attributes associated with the prefix, but the definition
of anycast flag to identify the prefix as anycast has not yet been
defined.

[RFC8362] extends the LSA format by encoding the existing OSPFv3 LSA
information in Type-Length-Value (TLV) tuples and allowing
advertisement of additional information with additional TLVs. Each
prefix is advertised along with an 8-bit field of capabilities,by
using the Prefix Options, but the definition of anycast capability
bit to identify the prefix as anycast has not yet been defined.

[RFC9085] defines the Prefix Attribute Flags TLV carries IPv4/IPv6
prefix attribute flags information, and the Flags field of this TLV
is interpreted according to OSPFv2 [RFC7684] and OSPFv3 [RFC8362],
but the anycast flag isnot included.

This document updates [RFC7684] and [RFC8362], by defining a new flag
in OSPFv2 Extended Prefix Opaque LSA [RFC7684] and Prefix Options
[RFC8362] to advertise the anycast property, and also updates the
corresponding interpretation of the Flags field of the Prefix
Attribute Flags TLV in [RFC9085].

1.1. Requirements Language

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. Updates to Anycast Property advertisement for OSPFv3

The prefix may be configured as anycast and it is useful for other
routers to know that the advertisement is for an anycast identifier.

A new flag in Prefix Options [RFC8362] is defined to advertise the
anycast property, The figure below shows the position of the A-bit in
the prefix options.

```
 0  1  2  3  4  5  6  7
+--+--+--+--+--+--+--+--+
|  | A| N|DN| P| x|LA|NU|
+--+--+--+--+--+--+--+--+
```

Figure 1

When the prefix is configured as anycast, the A-flag SHOULD be set.
Otherwise, this flag MUST be clear.If both N-flag and A-flag are set,
the receiving routers MUST ignore the N-flag.

A-flag MUST be preserved when the prefix is propagated between areas.

The same prefix can be advertised by multiple routers, and that if at
least one of them sets the A-Flag in its advertisement, the prefix
SHOULD be considered as anycast.

3. **Updates to Anycast Property advertisement for OSPFv2**

   [RFC7684] defines one-octet field contains flags applicable to the
   prefix, and it only defines two flag (A-Flag (Attach Flag) and N-Flag
   (Node Flag). This section extends a new flag: An(Anycast Flag).

   An-flag: A new flag in OSPFv2 Extended Prefix Opaque LSA [RFC7684] is
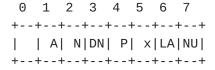   defined to advertise the anycast property. When the prefix is
   configured as anycast, the An-flag SHOULD be set. Otherwise, this
   flag MUST be clear.If both N-flag and An-flag are set, the receiving
   routers MUST ignore the N-flag.

   An-flag MUST be preserved when the prefix is propagated between
   areas.

   The same prefix can be advertised by multiple routers, and that if at
   least one of them sets the An-Flag in its advertisement, the prefix
   SHOULD be considered as anycast.

4. **Updates to Anycast Property advertisement for BGP-LS**

   [RFC9085] defines the Prefix Attribute Flags TLV carries IPv4/IPv6
   prefix attribute flags information, and the Flags field of this TLV
   is interpreted according to OSPFv2 [RFC7684]and OSPFv3 [RFC8362].This
   section extends the interpretation of the Flags field of the Prefix
   Attribute Flags TLV.

   Flags:

   * IS-IS flags refer to Section 2.3.2 of [RFC9085] .

   * OSPFv2 flags correspond to the Flags field of the OSPFv2 Extended
      Prefix TLV defined in Section 2.1 of [RFC7684] and extended in
      Section 3 of this draft.

   * OSPFv3 flags map to the Prefix Options field defined in
      Appendix A.4.1.1 of [RFC5340] and extended in Section 3.1 of
      [RFC8362] and Section 4 of this draft.

5. **Acknowledgements**

   TBD.

6. **IANA Considerations**

   This document requests allocation for the following bits registry.

6.1. OSPFv3 Prefix Options

This document adds a new bit in the "OSPFv3 Prefix Options" registry:

A-flag (Anycast Flag).

6.2. OSPFv2 Extended Prefix TLV

This document adds a new bit in the "OSPFv2 Extended Prefix TLV" registry:

An-flag (Anycast Flag).

7. Security Considerations

Procedures and protocol extensions defined in this document do not affect the OSPFv2 , OSPFv3 and BGP-LS security model. See the "Security Considerations"section of [RFC7684] for a discussion of OSPFv2 security, the "Security Considerations"section of [RFC8362] for a discussion of OSPFv3 security and the "Security Considerations"section of [RFC9085] for a discussion of SR BGP-LS security.

8. References

8.1. Normative References

[RFC2119]   Bradner, S., "Key words for use in RFCs to Indicate
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[RFC7684]   Psenak, P., "Key words for use in RFCs to Indicate
            Requirement Levels", RFC 7684, DOI 10.17487/RFC7684,
            November 2015, <https://www.rfc-editor.org/info/rfc7684>.

[RFC8362]   Lindem, A., "OSPFv3 Link State Advertisement (LSA)
            Extensibility", RFC 8362, DOI 10.17487/RFC8362, April
            2018, <https://www.rfc-editor.org/info/rfc8362>.

[RFC9085]   Previdi, S., "Border Gateway Protocol - Link State (BGP-
            LS) Extensions for Segment Routing", RFC 9085,
            DOI 10.17487/RFC9085, August 2021,
            <https://www.rfc-editor.org/info/rfc9085>.

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