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OSPFv2 Anycast Property Advertisement
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Abstract

An IP 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 defines a new flag in the OSPFv2 Extended Prefix TLV Flags to advertise the anycast property.

Status of This Memo

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This Internet-Draft will expire on 15 March 2026.

Table of Contents

1. Introduction

An IP 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 a prefix.

Extensions related to the anycast property of prefixes have been specified for IS-IS [RFC9352] and OSPFv3 [RFC9513], even though those documents are related to Segment Routing over IPv6, the anycast property applies to any IP prefix advertisement. This document defines a flag to advertise the anycast property for a prefix advertisement in OSPFv2 in the Flags field of the OSPFv2 Extended Prefix TLV Flags (section 2.1 of [RFC7684]).

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. Use-case

Section 3.3 of [RFC8402] describes an IGP-Anycast Segment and its use with SR-MPLS. The use of an anycast segment as a waypoint in a SR TE path is a use-case that requires consistent use of labels both for the anycast segment but also the segment following it if that is an adjacency SID or binding SID allocated dynamically or from the SRLB. However, there is no indication available in OSPFv2 to convey to the entity performing path computation using the OSPF LSDB that specific prefix segments are anycast segments.

When computing TI-LFA [I-D.ietf-rtgwg-segment-routing-ti-lfa] repair paths using SR segments, the requirement is to pick specific nodes that need to be traversed to ensure loop free characteristics. This requires picking prefix segments of those nodes that uniquely identify those nodes. The selection of anycast prefix segments advertised by those nodes for the TI-LFA repair path may result in loops as the traffic may get rerouted to another node advertising the same anycast segment. Hence, only node segments (with or without the N-flag) and not anycast segments (with the AC-flag) are to be used for TI-LFA repair paths.

3. OSPFv2 Anycast Property Advertisement

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

A bit is introduced in OSPFv2 Extended Prefix TLV Flags [RFC7684] to advertise the anycast property:

Value: TBD

Description: Anycast Flag (AC-flag)

When a prefix is configured as anycast, the AC-flag MUST be set. Otherwise, this flag MUST be clear.

The AC-flag and the N-bit MUST NOT both be set. If both N-flag and AC-flag are set, the receiving routers MUST ignore the N-flag.

The AC-flag MUST be preserved when re-advertising the prefix across areas.

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

A prefix that is advertised by a single node and without an AC-flag is considered node-specific prefix.

4. BGP-LS Advertisement

[RFC9085] defines the Prefix Attribute Flags TLV for BGP-LS that carries prefix attribute flags information, and the Flags field of this TLV is interpreted according to OSPFv2 [RFC7684]. Thus the Flags field of the BGP-LS Prefix Attribute Flags TLV also conveys the anycast property introduced by this document.

5. YANG Data Model

YANG [RFC7950] is a data definition language used to define the contents of a conceptual data store that allows networked devices to be managed using NETCONF [RFC6241] or RESTCONF [RFC8040].

This section defines a YANG data model that can be used to configure and manage the usage of OSPFv2 Anycast Property as defined in this document, which augments the OSPF YANG data model [RFC9129] and the YANG Data Model for Routing Management [RFC8349].

5.1. Tree for the YANG Data Model

This document uses the graphical representation of data models per [RFC8340].

The following show the tree diagram of the module:

```
module: ietf-ospf-anycast-flag

  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas/ospf:area
            /ospf:interfaces/ospf:interface:
    +--rw anycast-flag?   boolean
```

5.2. YANG Data Model for OSPFv2 Anycast Property Advertisement

The following is the YANG module:

```
<CODE BEGINS> file "ietf-ospf-anycast-flag@2025-08-28.yang"
module ietf-ospf-anycast-flag {
  yang-version 1.1;
  namespace
    "urn:ietf:params:xml:ns:yang:ietf-ospf-anycast-flag";
  prefix ospf-anycast-flag;

  import ietf-routing {
    prefix rt;
    reference
      "RFC 8349: A YANG Data Model for Routing
       Management (NMDA Version)";
  }
  import ietf-ospf {
    prefix ospf;
    reference
      "RFC 9129: YANG Data Model for the OSPF Protocol";
  }

  organization
    "IETF LSR - Link State Routing Working Group";
  contact
    "WG Web:   <https://datatracker.ietf.org/wg/lsr/>
     WG List:  <mailto:lsr@ietf.org>

     Author:   Ran Chen
               <mailto:chen.ran@zte.com.cn>
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     Author:   Peter Psenak
               <mailto:ppsenak@cisco.com>
     Author:   Ketan Talaulikar
               <mailto:ketant.ietf@gmail.com>
     Author:   Changwang Lin
               <mailto:linchangwang.04414@h3c.com>";

  description
    "This YANG module adds the support of configuring an OSPFv2
     prefix as anycast.

     This YANG module conforms to the Network Management
     Datastore Architecture (NMDA) as described in RFC 8342.

     Copyright (c) 2025 IETF Trust and the persons identified as
     authors of the code.  All rights reserved.

     Redistribution and use in source and binary forms, with or
     without modification, is permitted pursuant to, and subject to
```

```
        the license terms contained in, the Revised BSD License set
        forth in Section 4.c of the IETF Trust's Legal Provisions
        Relating to IETF Documents
        (https://trustee.ietf.org/license-info).

        This version of this YANG module is part of RFC XXXX;
        see the RFC itself for full legal notices.";
      reference
        "RFC XXXX";

      revision 2025-08-28 {
        description
          "Initial version";
        reference
          "RFC XXXX: OSPFv2 Anycast Property Advertisement";
      }

      identity ac-flag {
        base ospf:ospfv2-extended-prefix-flag;
        description
          "Anycast flag.  When set, it indicates that the prefix
           is configured as anycast.";
      }

      /* Configuration */
      augment "/rt:routing/rt:control-plane-protocols/"
            + "rt:control-plane-protocol/ospf:ospf/"
            + "ospf:areas/ospf:area/ospf:interfaces/ospf:interface" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
           + "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
          description
            "This augments the OSPFv2 interface configuration.";
        }
        description
          "This augments OSPFv2 interface configuration with anycast
           property advertisement.";
        leaf anycast-flag {
          type boolean;
          default "false";
          description
            "Sets the prefix as an anycast address.";
        }
      }
    }
    <CODE ENDS>
```

6. Acknowledgements

The authors would like to thank Acee Lindem for aligning the terminology with existing OSPF documents and for editorial improvements. The author would also like to thank Yingzhen Qu for providing the YANG model and tree, as well as for valuable editorial comments.

7. IANA Considerations

This document requests allocation for the following registry.

7.1. OSPFv2 Extended Prefix TLV Flags Registry

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

AC-flag (Anycast Flag).

7.2. OSPFv2 Anycast Flag YANG Module Registry

IANA is requested to register the following URI in the "ns" registry within the "IETF XML Registry" group ([RFC3688]):

URI: urn:ietf:params:xml:ns:yang:ietf-ospf-anycast-flag
Registrant Contact: The IESG.
XML: N/A, the requested URI is an XML namespace

IANA is requested to register the following YANG module in the "YANG Module Names" registry ([RFC6020]) within the "YANG Parameters" registry group.

name: ietf-ospf-anycast-flag
Maintained by IANA? N
namespace: urn:ietf:params:xml:ns:yang:ietf-ospf-anycast-flag
prefix: ospf-anycast-flag
reference: RFC XXXX

8. Security Considerations

Procedures and protocol extensions defined in this document do not affect the OSPFv2 security model. See the "Security Considerations"section of [RFC7684] for a discussion of OSPFv2 security.

The ietf-ospf-anycast-flag YANG module defines a data model that is designed to be accessed via YANG-based management protocols, such as NETCONF [RFC6241] and RESTCONF [RFC8040]. These protocols have to use a secure transport layer (e.g., SSH [RFC4252], TLS [RFC8446], and QUIC [RFC9000]) and have to use mutual authentication.

The NETCONF Access Control Model (NACM) [RFC8341] provides the means to restrict access for particular NETCONF or RESTCONF users to a pre-configured subset of all available NETCONF or RESTCONF protocol operations and content.

The following data nodes defined in the YANG module that are writable/creatable/deletable (i.e., config true). The modifications to these data nodes without proper protection could have prevent interpreting the IPv4 prefix as anycast.

```
/ospf:ospf/ospf:areas/ospf:area/ospf:interfaces/ospf:interface/
ospf-anycast-flag:anycast-flag
```

Some of the readable data nodes in this YANG module may be considered sensitive or vulnerable in some network environments. Exposure of the OSPF link state database may be useful in mounting a Denial-of-Service (DoS) attacks. These are the readable data nodes:

```
/ospf:ospf/ospf:areas/ospf:area/ospf:interfaces/ospf:interface/
ospf-anycast-flag:anycast-flag
```

9. References

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