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R. Chen
D. Zhao
ZTE Corporation
P. Psenak
K. Talaulikar
Cisco Systems
C. Lin
H3C
3 September 2025

OSPFv2 Anycast Property Advertisement
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Abstract

An IPv4 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.

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1. Introduction

An IPv4 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 an IPv4 prefix, but the definition of anycast flag to identify the IPv4 prefix as anycast has not yet been defined.

The flags field of the OSPFv2 Extended Prefix TLV (Section 2.1 of [RFC7684]) can be found in "OSPFv2 Extended Prefix TLV Flags" IANA registry [IANA-OSPFv2-EPF].

This document defines a new flag in the OSPFv2 Extended Prefix TLV Flags [RFC7684] to advertise the anycast property for an IPv4 prefix.

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

In the absence of the N-flag, the node specific prefixes need to be identified from the anycast prefixes. A prefix that is advertised by a single node and without an Anycast Flag (AC-flag) MUST be considered node specific.

3. OSPFv2 Anycast Property Advertisement

An IPv4 prefix may be configured as anycast and it is useful for other routers to know that the advertisement is for an anycast identifier.

[RFC7684] defines one-octet field contains flags applicable to the prefix, and it has been defined the below flags(see "OSPFv2 Extended Prefix TLV Flags" IANA registry [IANA-OSPFv2-EPF]):

Value	Description	Reference
0x80	A	[RFC7684]
0x40	N	[RFC7684]
0x02	E-Flag	[RFC9089]

Table 1: OSPFv2 Extended Prefix
TLV Flags

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

Value: TBD

Description: Anycast Flag (AC-flag)

When a prefix is configured as anycast, the AC-flag SHOULD 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 SHOULD be considered as anycast.

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

4. BGP-LS Anycast Property advertisement

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

Flags:

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

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>
    Author:    Detao Zhao
               <mailto:zhao.detao@zte.com.cn>
    Author:    Peter Psenak
               <mailto:ppsenak@cisco.com>
    Author:    Ketan Talaulikar
               <mailto:ketan.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.

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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 prevented 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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Authors' Addresses

Ran Chen
ZTE Corporation
Nanjing
China
Email: chen.ran@zte.com.cn

Detao Zhao
ZTE Corporation
Nanjing
China
Email: zhao.detao@zte.com.cn

Peter Psenak
Cisco Systems
Email: ppsenak@cisco.com

Ketan Talaulikar
Cisco Systems
Email: ketan.ietf@gmail.com

Changwang Lin
H3C
Email: linchangwang.04414@h3c.com