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Updates to Anycast Property advertisement for OSPF  
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## Abstract

Each prefix is advertised along with an 8-bit field of capabilities, by using the Prefix Options [RFC8362] and the flag field in the OSPFv2 Extended Prefix TLV [RFC7684], but the definition of anycast flag to identify the prefix as anycast has not yet been defined. However, almost all bits of the Flag field have been assigned already. Thus, it is also required to extend the flag field for future use.

This document updates [RFC7684] and [RFC8362], by defining a new variable length Prefix attributes Sub-TLVs for OSPFv2 and OSPFv3 and a new flag in the Prefix attributes Sub-TLV to advertise the anycast property.

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Internet-Draft

Anycast Property advertisement

November 2021

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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. 8-bit field of the OSPFv2 Extended Prefix TLV 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. However, three bits have 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 flag to identify the prefix as anycast has not yet been defined.

However, only the final bit in the Prefix Options is not allocated.

This document updates [[RFC7684](#)] and [[RFC8362](#)], by defining a new variable length Prefix attributes Sub-TLVs for OSPFv2 and OSPFv3 and a new flag in the Prefix attributes Sub-TLV to advertise the anycast property.

### 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. Variable length Prefix attributes Sub-TLV

This document creates a new variable length Prefix attributes Sub-TLV for OSPFv2 and OSPFv3. This Sub-TLV specifies a variable flag fields to advertise additional attributes associated with the prefix.

The format of each TLV is:

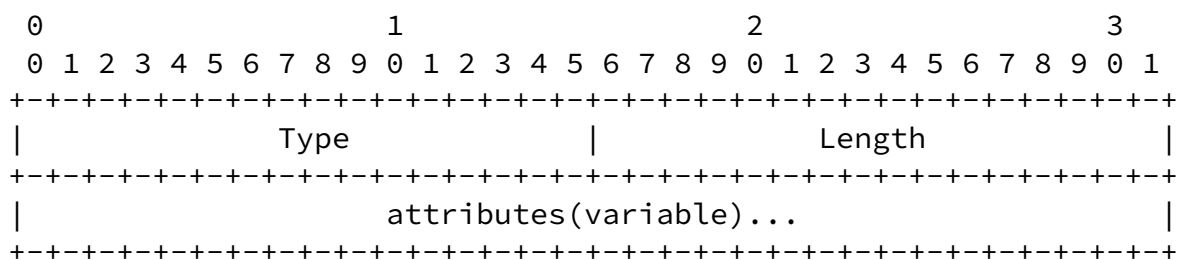


Figure 1

where:

Type: TBA.

Length: Variable, dependent on the included attributes.

Attributes: Variable. The extended flag fields, and the first 8 bits are reserved for the flag field previously defined by OSPFv2 and OSPFv3.

In the case of OSPFv2, the Prefix attributes Sub-TLVs is a sub-TLV of the OSPFv2 Extended Prefix TLV as defined in [RFC7684]. Figure 2 below is the definition of attribute field.

Attributes: The following flags are defined and the first 8 bits are reserved for the previously defined one-octet field contains flags in OSPFv2 Extended Prefix TLV [RFC7684]:

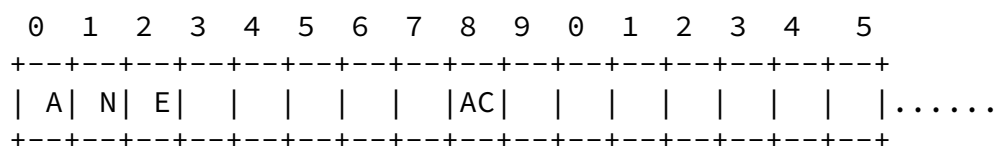


Figure 2

Where:

E-Flag: Refer to [RFC9089] .

N/A-Flag: Refer to [RFC7684].

AC-flag: A new flag is used to advertise the anycast property. When the prefix is configured as anycast, the AC-flag SHOULD be set. Otherwise, this flag MUST be clear. If both N-flag and AC-flag are set, the receiving routers MUST ignore the N-flag.

AC-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 AC-Flag in its advertisement, the prefix SHOULD be considered as anycast.

The other bits are reserved for future use.

In the case of OSPFv3, the Prefix attributes Sub-TLVs is a sub-TLV of the following OSPFv3 TLVs as defined in [RFC8362]:

- \* Intra-Area Prefix TLV
- \* Inter-Area Prefix TLV
- \* External Prefix TLV

Figure 3 below is the definition of attribute field.

Attributes: The following flags are defined and the first 8 bits are reserved for the previously defined OSPFv3 Prefix Options:

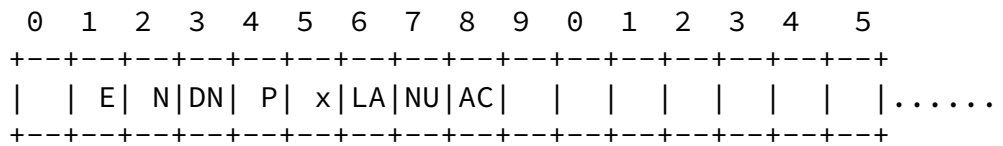


Figure 3

Where:

E-Flag: Refer to [[RFC9089](#)] in [section 3.1](#).

N-Flag: Refer to [[RFC8362](#)] in [section 3.1.1](#).

P/x/LA/NU-Flag: Refer to [[RFC5340](#)].

AC-Flag: A new flag is used to advertise the anycast property. When the prefix is configured as anycast, the AC-flag SHOULD be set. Otherwise, this flag MUST be clear. If both N-flag and AC-flag are set, the receiving routers MUST ignore the N-flag.

AC-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 AC-Flag in its advertisement, the prefix SHOULD be considered as anycast.

The other bits are reserved for future use.

### [3.](#) Processing

If there is an device in the network that does not support the Extension of the Prefix attributes Sub-TLV, then the device that support the Extension of the Prefix attributes Sub-TLV should advertise the field of capabilities of the Prefix by using prefix-options[RFC8362]or prefix-flags[RFC7684], and the Prefix attributes Sub-TLV. Otherwise, only use the Prefix attributes Sub-TLV to advertise the field of capabilities of the Prefix.

If prefix is advertised along with the field of capabilities, by using the Prefix attributes Sub-TLV, then the field of capabilities of the Prefix in the OSPFv2/OSPFv3 Prefix attributes Sub-TLV shall prevail.

As long as the Prefix attributes Sub-TLV is used to advertise the field of capabilities and the device support the Extension of the Prefix attributes Sub-TLV, then the field of capabilities in the Prefix attributes Sub-TLV shall prevail.

If prefix is advertised along with the field of capabilities, by using only the prefix-options[RFC8362]or prefix-flags[RFC7684], then the field of capabilities in the prefix-options[RFC8362]or prefix-flags[RFC7684] shall prevail.

### [4.](#) Acknowledgements

TBD.

### [5.](#) IANA Considerations

This document requests allocation for the following registry.

#### [5.1.](#) OSPFv2 Extended Prefix Sub-TLV Registry

This document requests allocation for OSPFv2 Extended Prefix Sub-TLV Registry:

Value	Description	Reference
TBA	OSPFv2 Prefix attributes Sub-TLV	This document

Figure 4

This document adds a new bit in the "OSPFv2 Prefix attributes Sub-TLV" registry:

AC-flag (Anycast Flag).

## 5.2. OSPFv3 Extended LSA Sub-TLV Registry

This document requests allocation for OSPFv3 Extended LSA Sub-TLV Registry:

Value	Description	Reference
TBA	OSPFv3 Prefix attributes Sub-TLV	This document

Figure 5

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

AC-flag (Anycast Flag).

## 6. Security Considerations

Procedures and protocol extensions defined in this document do not affect the OSPFv2 , OSPFv3 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.

## 7. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.
- [RFC5340] Coltun, R., Ferguson, D., Moy, J., and A. Lindem, "OSPF for IPv6", [RFC 5340](#), DOI 10.17487/RFC5340, July 2008, <<https://www.rfc-editor.org/info/rfc5340>>.
- [RFC7684] Psenak, P., Gredler, H., Shakir, R., Henderickx, W., Tantsura, J., and A. Lindem, "OSPFv2 Prefix/Link Attribute Advertisement", [RFC 7684](#), DOI 10.17487/RFC7684, November 2015, <<https://www.rfc-editor.org/info/rfc7684>>.
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- [RFC9089] Xu, X., Kini, S., Psenak, P., Filsfils, C., Litkowski, S., and M. Bocci, "Signaling Entropy Label Capability and Entropy Readable Label Depth Using OSPF", [RFC 9089](#), DOI 10.17487/RFC9089, August 2021, <<https://www.rfc-editor.org/info/rfc9089>>.

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