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**Prefix Flag Extension for OSPFv2 and OSPFv3
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Abstract

Within OSPF, each prefix is advertised along with an 8-bit field of capabilities, by using the Prefix Options (OSPFv3) and the flag field in the OSPFv2 Extended Prefix TLV (OSPFv2). However, for OSPFv3, all the bits of the Prefix Options have already been assigned, and for OSPFv2, there are not many undefined bits left in the OSPFv2 Extended Prefix TLV.

This document solves the problem of insufficient existing flags, and defines the variable length Prefix Attribute Flags Sub-TLVs for OSPFv2 and OSPFv3 respectively for the extended flag fields.

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1. Introduction

Within OSPF, each prefix is advertised along with an 8-bit field of capabilities, by using the Prefix Options[RFC5340] and the flag field in the OSPFv2 Extended Prefix TLV [RFC7684]. However, for OSPFv3, all the bits of the Prefix Options have already been assigned, and for OSPFv2, there are not many undefined bits left in the OSPFv2 Extended Prefix TLV.

For OSPFv2, as defined in [RFC7684], the length of the Flag field is 8 bits, and there are not many undefined bits left in the OSPFv2 Extended Prefix TLV that are undefined as shown in Table 1.

Value	Description	Reference
0x80	A	[RFC7684]
0x40	N	[RFC7684]
0x20	E-Flag(ELC Flag)	[RFC9089]
TBD	U	[I-D.ietf-lsr-igp-ureach-prefix-announce]
TBD	UP	[I-D.ietf-lsr-igp-ureach-prefix-announce]

Table 1: OSPFv2 Extended Prefix TLV Flags (8 bits)

For OSPFv3, as defined in [RFC5340], the length of the Flag field is 8 bits, and all of the bits have already been defined as shown in Table 2.

Value	Description	Reference
0x01	NU-bit	[RFC5340]
0x02	LA-bit	[RFC5340]
0x04	Deprecated	[RFC5340]
0x08	P-bit	[RFC5340]
0x10	DN-bit	[RFC5340]
0x20	N-bit	[RFC8362]
0x40	E-Flag (ELC Flag)	[RFC9089]
0x80	AC-bit	[RFC9513]

Table 2: OSPFv3 Prefix Options (8 bits)

This document solves the problem of insufficient existing flags, and defines the variable length Prefix Attribute Flags Sub-TLVs for OSPFv2 and OSPFv3 respectively for the extended flag fields.

1.1. Requirements Language

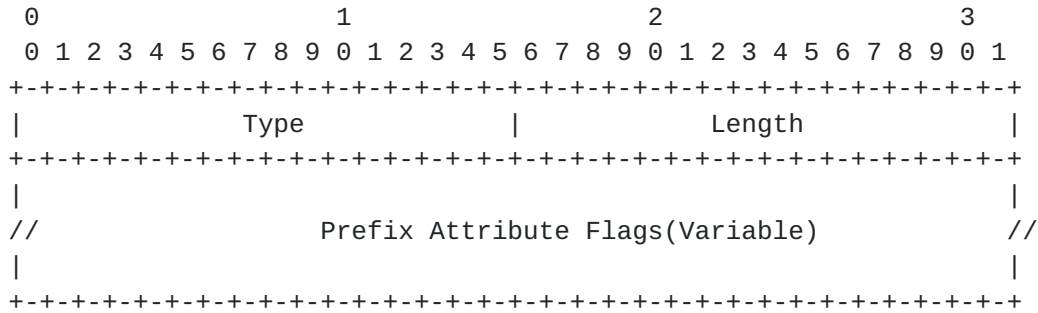
The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. Variable length Prefix Attribute Flags Sub-TLVs

This document creates the variable length Prefix Attribute Flags Sub-TLVs for OSPFv2 and OSPFv3 respectively. These Sub-TLVs specify the variable flag fields to advertise additional attributes associated with the prefix.

2.1. OSPFv2 Prefix Attribute Flags Sub-TLV

The format of OSPFv2 Prefix Attribute Flags Sub-TLV is:



where:

Type: TBD1.

Length: Variable, dependent on the included Prefix Attribute Flags. It MUST be a multiple of 4 octets.

Prefix Attribute Flags: Variable. The extended flag fields. This contains an array of units of 32-bit flags numbered from the most significant as bit zero. Currently, no bits are defined in this document.

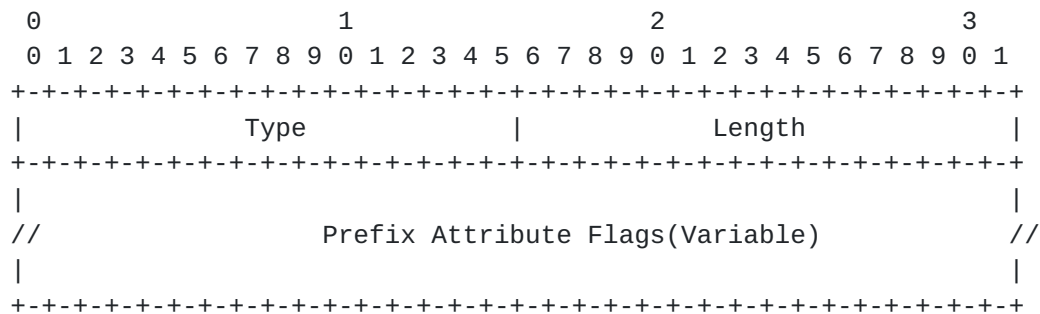
Unassigned bits MUST be set to zero on transmission and MUST be ignored on receipt.

Bits that are NOT transmitted MUST be treated as if they are set to 0 on receipt.

OSPFv2 Prefix Attribute Flags Sub-TLV is a sub-TLV of the OSPFv2 Extended Prefix TLV as defined in [[RFC7684](#)].

2.2. OSPFv3 Prefix Attribute Flags Sub-TLV

The format of OSPFv3 Prefix Attribute Flags Sub-TLV is:



where:

Type: TBD2.

Length: Variable, dependent on the included Prefix Attribute Flags. It MUST be a multiple of 4 octets.

Prefix Attribute Flags: Variable. The extended flag fields. This contains an array of units of 32-bit flags numbered from the most significant as bit zero. Currently, no bits are defined in this document.

Unassigned bits MUST be set to zero on transmission and MUST be ignored on receipt.

Bits that are NOT transmitted MUST be treated as if they are set to 0 on receipt.

OSPFv3 Prefix Attribute Flags Sub-TLV is a sub-TLV of the following OSPFv3 TLVs as defined in [[RFC8362](#)]:

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

3. Processing

The Extended Flags field is an array of units of 32 flags that are allocated starting from the most significant bit. The bits of the Extended Flags field will be assigned by future documents. This document does not define any flags. Flags that an implementation is not supporting MUST be set to zero on transmission. Implementations that do not understand any particular flag MUST ignore the flag.

Note that devices MUST handle varying lengths of the Prefix Attribute Flags Sub-TLV.

If a device receives the Prefix Attribute Flags Sub-TLV of a length more than it currently supports or understands, it MUST ignore the bits beyond that length.

If a device receives the Prefix Attribute Flags Sub-TLV of a length less than the one supported by the implementation, it MUST act as if the bits beyond the length were not set.

An OSPFv2 router receiving multiple OSPFv2 Prefix Attribute Flags Sub-TLVs in the same OSPFv2 Extended Prefix TLV MUST select the first advertisement of this sub-TLV and MUST ignore all remaining occurrences of this sub-TLV in the OSPFv2 Extended Prefix TLV.

An OSPFv3 router receiving multiple OSPFv3 Prefix Attribute Flags Sub-TLVs in the the same parent TLV MUST select the first advertisement of this sub-TLV and MUST ignore all remaining occurrences of this sub-TLV in the parent TLV.

4. Backward Compatibility

The Prefix Attribute Flags Sub-TLV defined in this document does not introduce any backward compatibility issues. An implementation that does not understand or support the Prefix Attribute Flags Sub-TLV MUST ignore the TLV.

Further, any additional bits in the OSPFv2/OSPFv3 Prefix Attribute Flags Sub-TLV that are not understood by an implementation MUST be ignored.

5. Acknowledgements

The authors thank Shraddha Hegde and Changwang Lin and many others for their suggestions and comments.

6. IANA Considerations

This document requests allocation for the following registry.

6.1. OSPFv2 Prefix Attribute Flags Sub-TLV Registry

This document requests the allocation of "OSPFv2 Prefix Attribute Flags" in the "OSPFv2 Extended Prefix TLV Sub-TLVs" registry:

Value	Description	Reference
TBD1	OSPFv2 Prefix Attribute Flags	This document

6.1.1. OSPFv2 Prefix Extended Flags Field Registry

This document requests an allocation of "OSPFv2 Prefix Extended Flag Field" Registry under "Open Shortest Path First v2 (OSPFv2) Parameters". The new registry defines the bits in the 32-bit Flags field in the OSPFv2 Prefix Attribute Flags Sub-TLV. New bits can be allocated via IETF Review or IESG Approval [[RFC8126](#)]. Each bit should be tracked with the following qualities:

- * Bit number (counting from bit 0 as the most significant bit)
- * Description
- * Reference

No values are currently defined. Bits 0-31 are initially marked as "Unassigned". Bits with a higher ordinal than 31 will be added to the registry in future documents if necessary.

6.2. OSPFv3 Prefix Attribute Flags Sub-TLV Registry

This document requests the allocation of "OSPFv3 Prefix Attribute Flags" in the "OSPFv3 Extended-LSA Sub-TLVs" registry:

Value	Description	Reference
TBD2	OSPFv3 Prefix Attribute Flags	This document

6.2.1. OSPFv3 Prefix Extended Flags Field Registry

This document requests an allocation of "OSPFv3 Prefix Extended Flag Field" registry under "Open Shortest Path First v3 (OSPFv3) Parameters". New bits can be allocated via IETF Review or IESG Approval [[RFC8126](#)]. Each bit should be tracked with the following qualities:

- * Bit number (counting from bit 0 as the most significant bit)
- * Description
- * Reference

Bits 0-31 are initially marked as "Unassigned". Bits with a higher ordinal than 31 will be added to the registry in future documents if necessary.

7. 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.

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