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Prefix Flag Extension for OSPFv2 and OSPFv3
draft-ietf-lsr-ospf-prefix-extended-flags-06

Commenté [MB1]: Should we have configuration parameter to control the use of the flags (e.g., rfc8362#appendix-A)?

Abstract

Each OSPF prefix can be advertised with an 8-bit field to indicate specific properties of that prefix. However, all the OSPFv3 Prefix Options bits have already been assigned and only a few bits remain unassigned in the flags field of the OSPFv2 Extended Prefix TLV.

This document solves thise problem ~~of insufficient prefix options bits~~ by defining variable-length Prefix Attribute Flags ~~Sub~~sub-TLV for OSPF. This sub-TLV is applicable to OSPFv2 and OSPFv3.

Commenté [MB2]: Consistent with the use in rfc8362.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction

Each OSPF prefix can be advertised with an 8-bit field to indicate specific properties of that prefix. This is done using the OSPFv3 Prefix Options (Appendix A.4.1.1 of [RFC5340]) and the ~~flags~~ Flags field in the OSPFv2 Extended Prefix TLV (Section 2.1 of [RFC7684]). The rest of this document refers to these 8-bit fields in both OSPFv2 and OSPFv3 as the "existing fixed-size prefix attribute flags".

However, all the OSPFv3 Prefix Options bits have already been assigned (see "OSPFv3 Prefix Options (8 bits)" ~~OSPFv3 Prefix Options~~ IANA ~~registries~~ registry [IANA-OSPFv3-PO]. ~~and~~ Also, only 5 bits remain unassigned (at the time of publication of this document) in the F~~f~~lags field of the OSPFv2 Extended Prefix TLV (see "OSPFv2 Extended Prefix TLV Flags" IANA ~~registries~~ registry [IANA-OSPFv2-EPF]).

This document solves the problem of insufficient flag bits for the signaling of prefix properties in OSPF by defining variable-length Prefix Attribute Flags Sub-TLVs for OSPFv2 and OSPFv3.

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-TLV~~s~~

This document defines variable-Length Prefix Attribute Flags ~~Sub~~sub-TLV~~s~~

Commenté [MB3]: Double check. This is to help reader to find where to look.

Commenté [MB4]: Double check. This is to help reader to find where to look.

Commenté [MB5]: Be consistent with the IANA registry name

Commenté [MB6]: Split the long sentence

Commenté [MB7]: Should we have a recommendation whether the remaining flags are assigned first vs. use of the sub-TLV?

for OSPFv2 and OSPFv3. ~~These~~ Such Sub-TLV~~s~~ ~~specify~~ specifies the variable-flag
fields to advertise additional attributes associated with OSPF ~~prefixs~~prefixes. ~~i.e.,~~ ~~the~~ The advertisement and processing of the existing fixed-
size prefix attribute flags ~~remains~~remain unchanged.

The format of OSPFv2/OSPFv3 Prefix Attribute Flags s~~S~~ub-TLV~~s~~ is shown in Figure 1.~~:~~

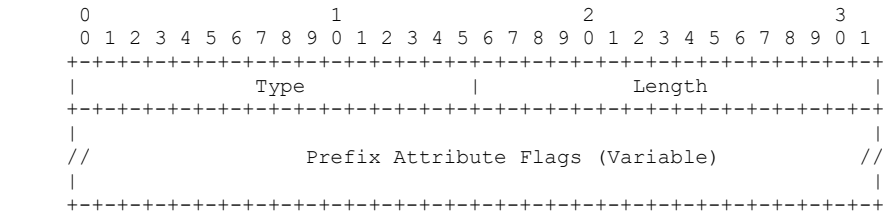

Figure 1: Format of OSPFv2/OSPFv3 Prefix Attribute Flags Sub-TLV

where:

Type (2 octets): 11 for OSPFv2 and 37 for OSPFv3.

Length (2 octets): Variable, dependent on the included Prefix Attribute Flags.
This indicates the length of the value portion in bytes. The length MUST be a multiple of 4 octets. If the length is not a multiple of 4 octets, the Link State Advertisement (LSA) MUST be considered malformed.

Prefix Attribute Flags (~~:~~ Variable)~~:~~. The extended flag field. This field contains a variable number of 32-bit flags. Currently, no bits are
defined in this document.

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

An implementation MUST limit the length of the sub-TLV so as to signal the bits that are set to 1. Defined prefix flags that are not transmitted due to being beyond the transmitted length MUST be treated as being set to 0. If any trailing 32-bit block(s) are received without any bit being set in it, then the LSA MUST be considered malformed.

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

OSPFv3 Prefix Attribute Flags ~~Sub~~sub-TLV is advertised as a ~~Sub~~sub-TLV of
the following OSPFv3 TLVs:

* Inter-Area-Prefix TLV (Section 3.4 of [RFC8362]).

Commenté [MB8]: Exapnd

Commenté [MB9]: While still being multiple of 4.

Commenté [MB10]: What is meant here?

Commenté [MB11]: Should we indicate/remind the behavior when supplied in other TLVs?

* Intra-Area-Prefix TLV (Section 3.7 of [RFC8362]).

* External-Prefix TLV (Section 3.6 of [RFC8362]).

* SRv6 Locator TLV [RFC9513].

When multiple instances of ~~an~~ the OSPFv2/OSPFv3 Prefix Attribute Flags s~~S~~ub-TLV~~s~~ are received within the same TLV, an implementation MUST use only the first occurrence of the s~~S~~ub-TLV and MUST ignore all subsequent instances of the s~~S~~ub-TLV.

Commenté [MB12]: May be list them in the same 8362 order

Commenté [MB13]: Should this be logged?

3. Backward Compatibility

The Prefix Attribute Flags ~~Sub~~sub-TLV~~s~~ ~~defined in this document~~ does not introduce any backward compatibility issues. An implementation that does not recognize the OSPFv2/OSPFv3 Prefix Attribute Flags ~~Sub~~sub-TLV MUST silently ignore the ~~Sub~~sub-TLV.

Commenté [MB14]: «Unrecognized TLVs and sub-TLVs are ignored » is already stated in rfc8362#section-6

4. Acknowledgements

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

The authors would like to thank Acee Lindem for aligning the terminology with existing OSPF documents and for editorial improvements.

5. IANA Considerations

This document requests allocation for the following ~~registry~~registries.

5.1 OSPFv2

5.1.1 OSPFv2 Prefix Attribute Flags Sub-TLV Registry

This document requests IANA to make permanent the early allocation of the following codepoint for the "OSPFv2 Prefix Attribute Flags" in the "OSPFv2 Extended Prefix TLV Sub-TLVs" registry to be made permanent:

Value	Description	Reference
11	OSPFv2 Prefix Attribute Flags	This document

5.1.~~1~~2. OSPFv2 Prefix Extended Flags Field Registry

This document requests the creation of "OSPFv2 Prefix Extended Flag Field" Registry under "Open Shortest Path First v2 (OSPFv2) Parameters" registry group. The registry defines the bits in the Prefix Attribute Flags field in the OSPFv2 Prefix Attribute Flags ~~Sub~~sub-TLV as specified in ~~section~~ Section 2. The bits are to be allocated via IETF Review [RFC8126]. Each bit definition will include:

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

No bits are currently defined. Bits 0-31 are to be initially marked as "Unassigned". IANA is requested to add subsequent blocks of 32 bits upon exhaustion of the preceding 32-bit block.

5.2 OSPFv3

5.2.1. OSPFv3 Prefix Attribute Flags Sub-TLV Registry

This document requests IANA to make permanent the early allocation of the following codepoint for the "OSPFv3 Prefix Attribute Flags" in the "OSPFv3 Extended-LSA Sub-TLVs" registry:

Value	Description	Reference
37	OSPFv3 Prefix Attribute Flags	This document

5.2.~~1~~2. OSPFv3 Prefix Extended Flags Field Registry

This document requests the creation of "OSPFv3 Prefix Extended Flag Field" registry under "Open Shortest Path First v3 (OSPFv3)" ~~Parameters~~registry group. The registry defines the bits in the Prefix Attribute Flags field in the OSPFv2 Prefix Attribute Flags ~~Sub~~sub-TLV as specified in S~~s~~ection 2. The bits are to be allocated via IETF Review [RFC8126]. Each bit definition will include:

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

No bits are currently defined. Bits 0-31 are to be initially marked as "Unassigned". IANA is requested to add subsequent blocks of 32 bits upon exhaustion of the preceding 32-bit block.

6. Security Considerations

Procedures and protocol extensions defined in this document do not affect the OSPFv2 or OSPFv3 security models. See the "Security Considerations" S~~s~~ection of [RFC7684] for a discussion of OSPFv2 TLV-encoding considerations, and the "Security Considerations" S~~s~~ection of [RFC8362] for a discussion of OSPFv3 security.

7. References

7.1. 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

Commenté [MB15]: Not sure if this is assumed, but should we be explicit that groups of bits (2 bits) may be allocated for one single purpose?

Commenté [MB16]: Group the request per version

Commenté [MB17]: Idem as previous comment

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>.

[RFC8126] Cotton, M., Leiba, B., and T. Narten, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 8126, DOI 10.17487/RFC8126, June 2017, <https://www.rfc-editor.org/info/rfc8126>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

[RFC8362] Lindem, A., Roy, A., Goethals, D., Reddy Vallem, V., and F. Baker, "OSPFv3 Link State Advertisement (LSA) Extensibility", RFC 8362, DOI 10.17487/RFC8362, April 2018, <https://www.rfc-editor.org/info/rfc8362>.

[RFC9513] Li, Z., Hu, Z., Talaulikar, K., Ed., and P. Psenak, "OSPFv3 Extensions for Segment Routing over IPv6 (SRv6)", RFC 9513, DOI 10.17487/RFC9513, December 2023, <https://www.rfc-editor.org/info/rfc9513>.

7.2. Informative References

[IANA-OSPFv2-EPF] "OSPFv2 Extended Prefix TLV Flags", <https://www.iana.org/assignments/ospfv2-parameters/ospfv2-parameters.xhtml#extended-prefix-tlv-flags>.

[IANA-OSPFv3-PO] "OSPFv3 Prefix Options (8 bits)", <https://www.iana.org/assignments/ospfv3-parameters/ospfv3-parameters.xhtml#ospfv3-parameters-4>.

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