

Extensions to OSPF for Advertising Prefix/Link Administrative Tags
draft-acee-ospf-admin-tags-00.txt

Abstract

It is useful for routers in an OSPFv2 or OSPFv3 routing domain to be able to associate tags with prefixes and links. Previously, OSPFv2 and OSPFv3 were relegated to a single tag for AS External and Not-So-Stubby-Area (NSSA) prefixes. With the flexible encodings provided by OSPFv2 Prefix/Link Attribute Advertisement and OSPFv3 Extended LSAs, multiple administrative tags may be advertised for all types of prefixes and links. These administrative tags can be used for many applications including route redistribution policy, selective prefix prioritization, selective IP Fast-ReRoute (IPFRR) prefix protection, and many others.

The ISIS protocol supports a similar mechanism that is described in [RFC 5130](#).

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1. Introduction

It is useful for routers in an OSPFv2 [[OSPF](#)] or OSPFv3 [[OSPF](#)] routing domain to be able to associate tags with prefixes and links. Previously, OSPFv2 and OSPFv3 were relegated to a single tag for AS External and Not-So-Stubby-Area (NSSA) prefixes. With the flexible encodings provided by OSPFv2 Prefix/Link Attribute Advertisement ([[OSPFV2-PREFIX-LINK](#)]) and OSPFv3 Extended LSA ([[OSPFV3-EXTENDED-LSA](#)]), multiple administrative tags may be advertised for all types of prefixes and links. These administrative tags can be used many applications including (but not limited to):

1. Controlling which routes are redistributed into other protocols for readvertisement.
2. Prioritizing selected prefixes for faster convergence and installation in the forwarding place.
3. Identifying selected prefixes for Loop-Free Alternative (LFA) protection.

The ISIS protocol supports a similar mechanism that is described in [RFC 5130](#) [[ISIS-ADMIN-TAGS](#)].

1.1. Requirements notation

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-KEYWORDS](#)].

1.2. Acknowledgments

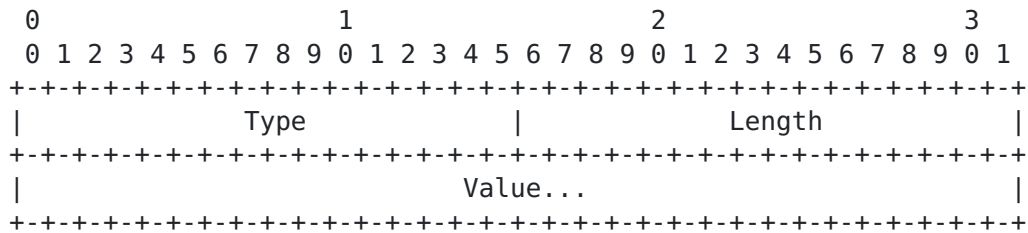
The authors of [RFC 5130](#) are acknowledged since this document draws upon both the ISIS specification and deployment experience.

The RFC text was produced using Marshall Rose's xml2rfc tool.

2. Administrative Tag Sub-TLVs

This document creates two new Administrative Tag sub-TLVs for OSPFv2 and two for OSPFv3. These TLVs specify one or more 32-bit or 64-bit unsigned integers that may be associated with an OSPF advertised prefix or OSPF Link. The precise usage of these tags is beyond the scope of this document.

The format of these TLVs is the same as the format used by the Traffic Engineering Extensions to OSPF [TE]. The LSA payload consists of one or more nested Type/Length/Value (TLV) triplets. The format of each TLV is:



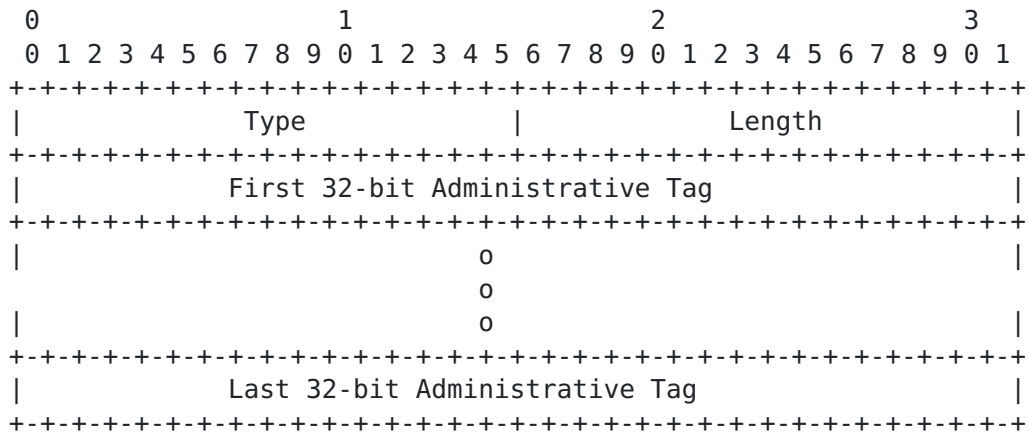
TLV Format

The Length field defines the length of the value portion in octets (thus a TLV with no value portion would have a length of 0). The TLV is padded to 4-octet alignment; padding is not included in the length field (so a 3-octet value would have a length of 3, but the total size of the TLV would be 8 octets).

2.1. 32-Bit Administrative Tag Sub-TLV

This sub-TLV will carry one or more 32-bit unsigned integer values that will be used as administrative tags.

The format of the 32-bit Administrative Tag TLV is as follows:



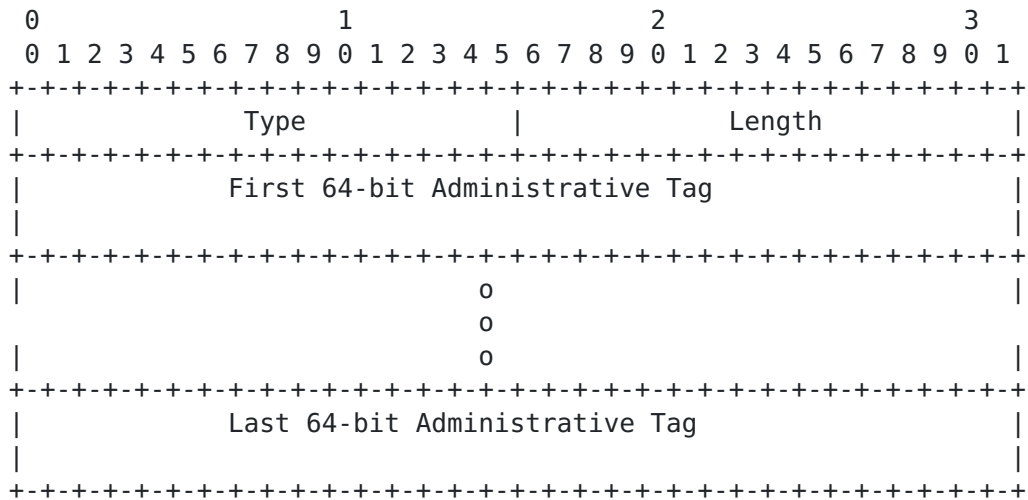
- Type** A 16-bit field set to TBD. The value MAY be different depending upon the registry from which it is allocated.
- Length** A 16-bit field that indicates the length of the value portion in octets and will be a multiple of 4 octets dependent on the number of administrative tags advertised. If the sub-TLV is specified, at least one administrative tag must be advertised.
- Value** A variable length list of one or more administrative tags.

32-bit Administrative Tag TLV

2.2. 64-Bit Administrative Tag Sub-TLV

This sub-TLV will carry one or more 64-bit unsigned integer values that will be used as administrative tags.

The format of the 64-bit Administrative Tag TLV is as follows:



Type A 16-bit field set to TBD. The value MAY be different depending upon the registry from which it is allocated.

Length A 16-bit field that indicates the length of the value portion in octets and will be a multiple of 8 octets dependent on the number of administrative tags advertised. If the sub-TLV is specified, at least one administrative tag must be advertised.

Value A variable length list of one or more 64-bit administrative tags.

64-bit Administrative Tag TLV

3. Administrative Tag Applicability

The administrative tag TLVs specified herein will be valid as sub-TLVs of the following TLVs specified in [[OSPFV2-PREFIX-LINK](#)]:

1. Extended Prefix TLV advertised in the OSPFv2 Extended Prefix LSA
2. Extended Link TLV advertised in the OSPFv2 Extended Prefix LSA

The administrative tag TLVs specified herein will be valid as sub-TLVs of the following TLVs specified in [[OSPFV3-EXTENDED-LSA](#)]:

1. Router-Link TLV advertised in the E-Router-LSA
2. Inter-Area-Prefix TLV advertised in the E-Inter-Area-Prefix-LSA
3. Intra-Area-Prefix TLV advertised in the E-Link-LSA and the E-Intra-Area-LSA
4. External-Prefix TLV advertised in the E-AS-External-LSA and the E-NSSA-LSA

4. Protocol Operation

An OSPF router supporting this specification **MUST** propagate administrative tags when acting as an Area Border Router and originating summary advertisements into other areas. Similarly, an OSPF router supporting this specification and acting as an ABR for a Not-So-Stubby Area (NSSA) **MUST** propagate tags when translating NSSA routes to AS External advertisements [[NSSA](#)]. The number of tags supported **MAY** limit the number of tags that are propagated.

An OSPF router supporting this specification **MUST** be able to advertise and interpret one 32-bit tag for prefixes and links. An OSPF router supporting this specification **SHOULD** be able to advertise and interpret one 64-bit tag for prefixes and links. An OSPF router supporting this specification **MAY** be able to advertise and propagate multiple 32-bit and 64-bit tags. The maximum tags that an implementation supports is a local matter depending upon supported tag applications.

When a single tag is advertised for AS External or NSSA LSA prefix, the existing tag encoding **SHOULD** be utilized.

5. Security Considerations

This document describes both a generic mechanism for advertising administrative tags for OSPF prefixes and links. The administrative tags are generally less critical than the topology information currently advertised by the base OSPF protocol. The security considerations for the generic mechanism are dependent on the future application and, as such, should be described as additional capabilities are proposed for advertisement. Security considerations for the base OSPF protocol are covered in [[OSPF](#)] and [[OSPFV3](#)].

6. IANA Considerations

The following values should be allocated from the OSPF Extended Prefix TLV Sub-TLV Registry [[OSPFV2-PREFIX-LINK](#)]:

- o TBD - 32-bit Administrative Tag TLV
- o TBD - 64-bit Administrative Tag TLV

The following values should be allocated from the OSPF Extended Link TLV Sub-TLV Registry [[OSPFV2-PREFIX-LINK](#)]:

- o TBD - 32-bit Administrative Tag TLV
- o TBD - 64-bit Administrative Tag TLV

The following values should be allocated from the OSPFv3 Extended-LSA Sub-TLV Registry [[OSPFV3-EXTENDED-LSA](#)]:

- o TBD - 32-bit Administrative Tag TLV
- o TBD - 64-bit Administrative Tag TLV

7. References

7.1. Normative References

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Authors' Addresses

Acee Lindem (editor)
Cisco Systems
301 Midenhall Way
Cary, NC 27513
USA

Email: acee@cisco.com

Peter Psenak
Cisco Systems
Apollo Business Center
Mlynske nivy 43
Bratislava, 821 09
Slovakia

Email: ppsenak@cisco.com