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Passive Interface Attribute
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Abstract

This document describes the mechanism that can be used to differentiate the passive interfaces from the normal interfaces within ISIS or OSPF domain.

Status of This Memo

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1. Introduction

Passive interfaces are used commonly within an operators enterprise or service provider networks. One of the most common use cases for passive interface is in a data center Layer 2 and Layer 3 Top of Rack(TOR) switch where the inter connected links between the TOR switches and uplinks to the Core switch are only a few links and a majority of the links are Layer 3 VLAN switched virtual interface trunked between the TOR switches serving Layer 2 broadcast domains. In this scenario all the VLANs are made passive as it is recommended to limit the number of network LSAs between routers and switches to avoid unnecessary hello processing overhead.

Another common use case is an inter-as routing scenario where the same routing protocol but different IGP instance is running between the adjacent BGP domains. Using passive interface on the inter-as connections can ensure that prefixes contained within a domain are only reachable within the domain itself and not allow the link state database to be merged between domain which could result in undesirable consequences.

For operator which runs different IGP domains that interconnect with each other via the passive interfaces, there is desire to obtain the inter-as topology information as described in [I-D.ietf-idr-bgpls-inter-as-topology-ext]. If the router that runs BGP-LS within one IGP domain can distinguish passive interfaces from

other normal interfaces, it is then easy for the router to report these passive links using BGP-LS to a centralized PCE controller.

Draft [I-D.dunbar-lsr-5g-edge-compute-ospf-ext] describes the case that edge compute server attach the network and needs to flood some performance index information to the network to facilitate the network select the optimized application resource. The edge compute server will also not run IGP protocol.

And, passive interfaces are normally the boundary of one IGP domain, knowing them can facilitate the operators to apply various policies on such interfaces, for example, to secure their networks, or filtering the incoming traffic with scrutiny.

But OSPF and ISIS have no position to flag such passive interface and their associated attributes now.

This document defines the protocol extension for OSPF and ISIS to indicate the passive interfaces and their associated attributes.

2. Conventions used in this document

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 [RFC2119] .

3. Consideration for flagging passive interface

ISIS [RFC5029] defines the Link-Attributes Sub-TLV to carry the link attribute information, but this Sub-TLV can only be carried within the TLV 22, which is used to described the attached neighbor. For passive interface, there is no ISIS neighbor, then it is not appropriate to use this Sub-TLV to indicate the passive attribute of the interface.

OSPFv2[RFC2328] defines link type field within Router LSA, the type 3 for connections to a stub network can be used to identified the passive interface. But in OSPFv3 [RFC5340], type 3 within the Router-LSA has been reserved. The information that associated with stub network has been put in the Intra-Area-Prefix-LSAs.

It is necessary to define one general solution for ISIS and OSPF to flag the passive interface and transfer the associated attributes then.

4. Passive Interface Attribute

The following sections define the protocol extension to indicate the passive interface and associated attributes in OSPFv2/v3 and ISIS.

4.1. OSPFv2 Extended Stub-Link TLV

[RFC7684] defines the OSPFv2 Extended Link Opaque LSA to contain the additional link attribute TLV. Currently, only OSPFv2 Extended Link TLV is defined to contain the link related sub-TLV. Because passive interface is not the normal link that participate in the OSPFv2 process, we select to define one new top TLV within the OSPFv2 Extended Link Opaque LSA to contain the passive interface related attribute information.

The OSPFv2 Extended Stub-Link TLV has the following format:

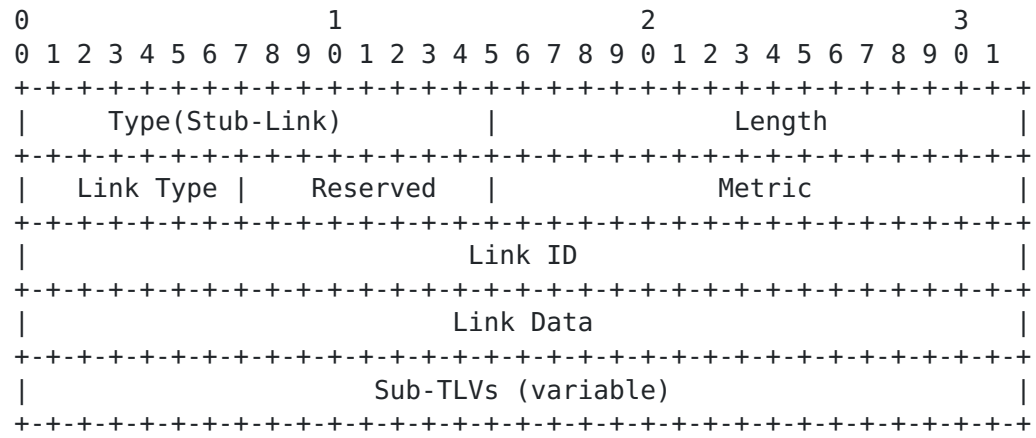

Figure 1: OSPFv2 Extended Stub-Link TLV

Type: The TLV type. The value is 2(TBD) for this stub-link type

Length: Variable, dependent on sub-TLVs

Link Type: Define the type of the stub-link. This document defines the followings type:

- 0: Reserved
- 1: AS boundary link
- 2: Loopback link
- 3: Vlan interface link
- 4-255: For future extension

Metric: Link metric used for inter-AS traffic engineering.

Link ID: Link ID is defined in Section A.4.2 of [RFC2328]

Link Data: Link Data is defined in Section A.4.2 of [RFC2328]

Sub-TLVs: Existing sub-TLV that defined within "OSPFv2 Extended Link TLV Sub-TLV" can be included if necessary, the definition of new sub-TLV can refer to Section 4.4

If this TLV is advertised multiple times in the same OSPFv2 Extended Link Opaque LSA, only the first instance of the TLV is used by receiving OSPFv2 routers. This situation SHOULD be logged as an error.

If this TLV is advertised multiple times for the same link in different OSPFv2 Extended Link Opaque LSAs originated by the same OSPFv2 router, the OSPFv2 Extended Stub-Link TLV in the OSPFv2 Extended Link Opaque LSA with the smallest Opaque ID is used by receiving OSPFv2 routers. This situation may be logged as a warning.

It is RECOMMENDED that OSPFv2 routers advertising OSPFv2 Extended Stub-Link TLVs in different OSPFv2 Extended Link Opaque LSAs re-originate these LSAs in ascending order of Opaque ID to minimize the disruption.

This document creates a registry for Stub-Link attribute in Section 6.

4.2. OSPFv3 Router-Stub-Link TLV

[RFC8362] extend the LSA format by encoding the existing OSPFv3 LSA [RFC5340] in TLV tuples and allowing advertisement of additional information with additional TLV.

This document defines the Router-Stub-Link TLV to describes a single router passive interface. The Router-Stub-Link TLV is only applicable to the E-Router-LSA. Inclusion in other Extended LSA MUST be ignored.

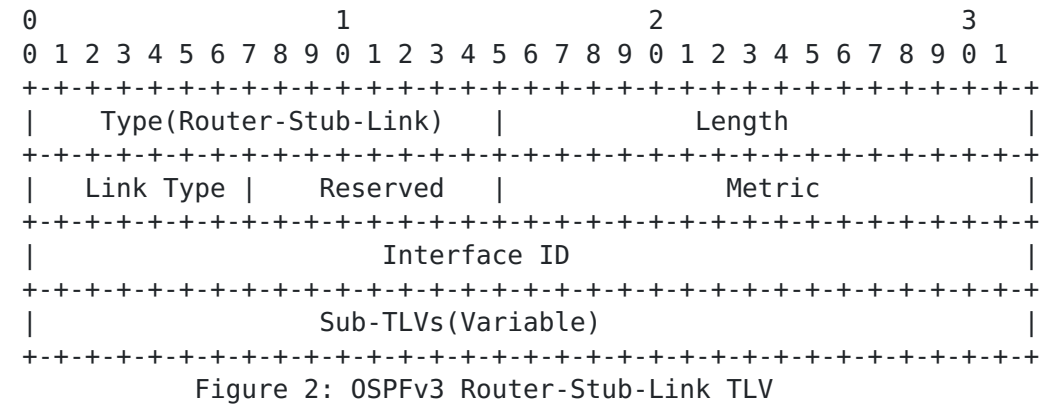

Figure 2: OSPFv3 Router-Stub-Link TLV

Type: OSPFv3 Extended-LSA TLV Type. Value is 10(TBD) for Router-Stub-Link TLV.

Length: Variable, dependent on sub-TLVs

Link Type: Define the type of the stub-link. This document defines the followings type:

- 0: Reserved
- 1: AS boundary link
- 2: Loopback link
- 3: Vlan interface link
- 4-255: For future extension

Metric: Link metric used for inter-AS traffic engineering.

Interface ID: 32-bit number uniquely identifying this interface among the collection of this router's interfaces. For example, in some implementations it may be possible to use the MIB-II IfIndex [RFC2863].

Sub-TLVs: Existing sub-TLV that defined within "OSPFv3 Extended-LSA Sub-TLV" can be included if necessary. The definition of new sub-TLV can refer to Section 4.4.

4.3. ISIS Stub-link TLV

This document defines one new top TLV to contain the passive interface attributes, which is shown in Figure 4:

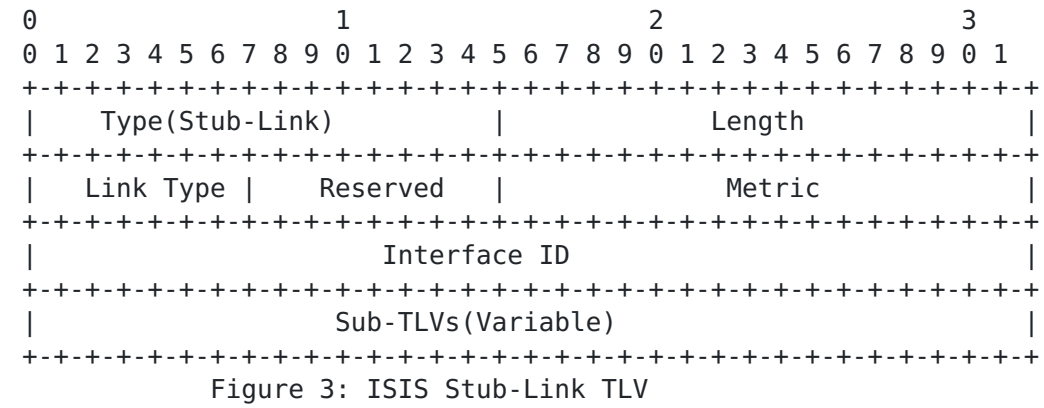

Figure 3: ISIS Stub-Link TLV

Type: ISIS TLV Codepoint. Value is 28(TBD) for stub-link TLV.

Length: Variable, dependent on sub-TLVs

Link Type: Define the type of the stub-link. This document defines the followings type:

- 0: Reserved
- 1: AS boundary link
- 2: Loopback link
- 3: Vlan interface link
- 4-255: For future extension

Metric: Link metric used for inter-AS traffic engineering.

Interface ID: 32-bit number uniquely identifying this interface among the collection of this router's interfaces. For example, in some implementations it may be possible to use the MIB-II IfIndex [RFC2863].

Sub-TLVs: Existing sub-TLV that defined within "Sub-TLVs for TLVs 22, 23, 25, 141, 222, and 223" can be included if necessary. The definition of new sub-TLV can refer to Section 4.4.

4.4. Stub-Link Prefix Sub-TLV

This document defines one new sub-TLV that can be contained within the OSPFv2 Extended Stub-Link TLV , OSPFv3 Router-Stub-Link TLV or ISIS Stub-Link TLV, to describe the prefix information associated with the passive interface.

The format of the sub-TLV is the followings:

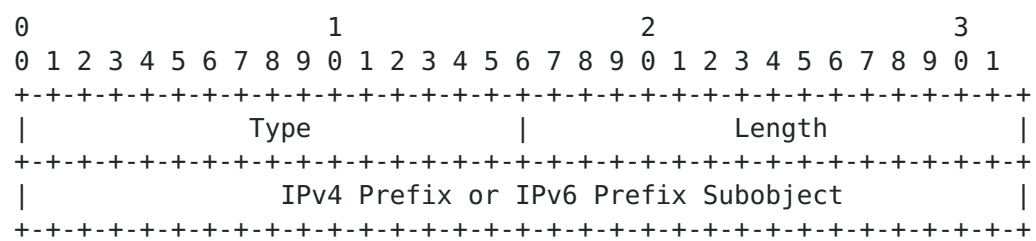

Figure 4: Stub-Link Prefix Sub-TLV

Type: The TLV type. The value is 01(TBD) for this Stub-Link Prefix type

Length: Variable, dependent on associated subobjects

Subobject: IPv4 prefix subobject or IPv6 prefix subobject, as that defined in [RFC3209]

If the passive interface has multiple address, then multiple subobjects will be included within this sub-TLV.

5. Security Considerations

Security concerns for ISIS are addressed in [RFC5304] and[RFC5310]

Security concern for OSPFv3 is addressed in [RFC4552]

Advertisement of the additional information defined in this document introduces no new security concerns.

6. IANA Considerations

IANA is requested to the allocation in following registries:

Registry	Type	Meaning
OSPFv2 Extended Link Opaque LSA TLV	2	Stub-Link TLV
OSPFv3 Extended-LSA TLV	10	Router-Stub-Link TLV
IS-IS TLV Codepoint	28	Stub-Link TLV

Figure 5: Newly defined TLV in existing IETF registry

IANA is requested to allocate one new registry that can be referred by OSPFv2, OSPFv3 and ISIS respectively.

New Registry	Meaning
Stub-Link Attribute	Attributes for stub-link

Figure 6: Newly defined Registry for stub-link attributes

One new sub-TLV is defined in this document under this registry codepoint:

Registry	Type	Meaning
Stub-Link Attribute	0	Reserved
	1	Stub-Link Prefix sub-TLV
	2-65535	Reserved

Figure 7: Stub-Link Prefix Sub-TLV

7. Acknowledgement

Thanks Shunwan Zhang, Tony Li, Les Ginsberg, Acee Lindem, Dhruv Dhody, Jeff Tantsura and Robert Raszuk for their suggestions and comments on this idea.

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