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                      Passive Interface Attribute
               draft-wang-lsr-passive-interface-attribute-08

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

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

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   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on January 13, 2022.

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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:

```
    0                   1                   2                   3
    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |      Type(Stub-Link)          |             Length            |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |   Link Type  |     Reserved   |             Metric            |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                            Link ID                            |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                            Link Data                          |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                        Sub-TLVs (variable)                    |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
              Figure 1: OSPFv2 Extended Stub-Link TLV
```
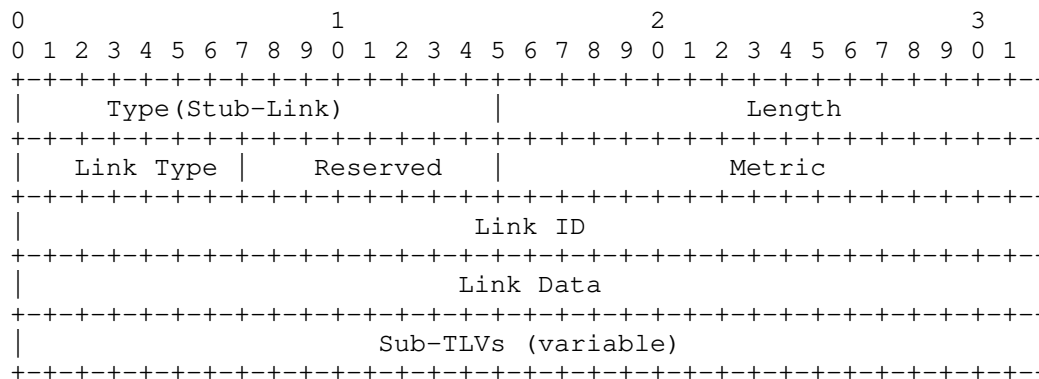
   Type: The TLV type. The value is 2(TBD) for this stub-link type

   Length: Variable, dependent on sub-TLVs

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

   o 0: Reserved

   o 1: AS boundary link

   o 2: Loopback link

   o 3: Vlan interface link

   o 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
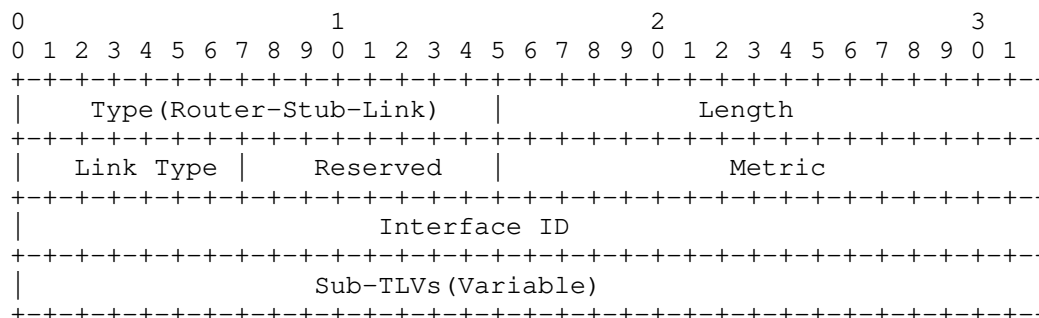   be ignored.

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|       Type(Router-Stub-Link)  |              Length           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Link Type  |    Reserved    |              Metric           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Interface ID                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Sub-TLVs(Variable)                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
           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:

   o 0: Reserved

   o 1: AS boundary link

   o 2: Loopback link

   o 3: Vlan interface link

   o 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
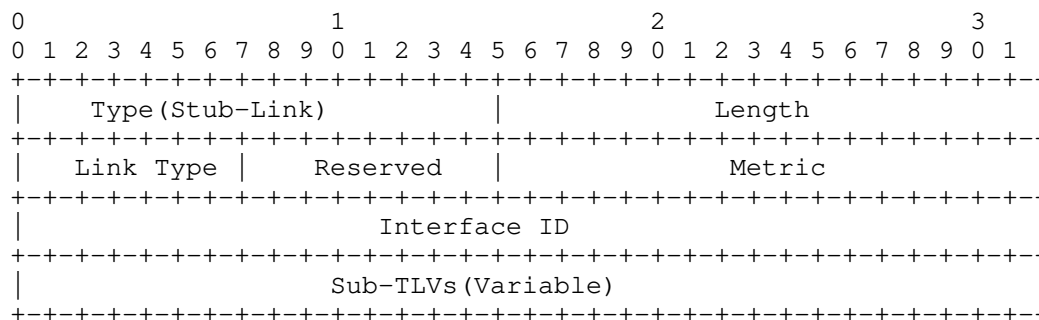   interface attributes, which is shown in Figure 4:

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|        Type(Stub-Link)        |              Length           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Link Type   |    Reserved   |              Metric           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Interface ID                         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Sub-TLVs(Variable)                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
              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:

o 0: Reserved

o 1: AS boundary link

o 2: Loopback link

o 3: Vlan interface link

o 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.
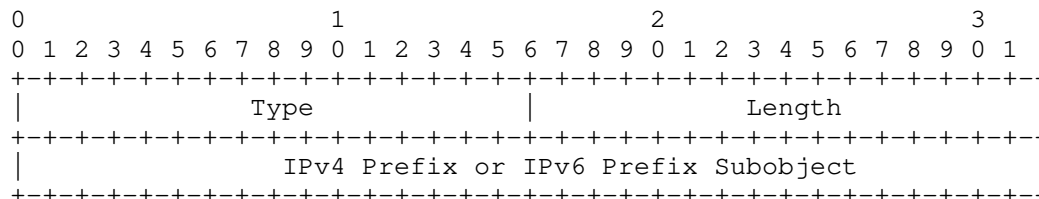
The format of the sub-TLV is the followings:

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|            Type               |             Length            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|             IPv4 Prefix or IPv6 Prefix Subobject              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
             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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