IS-IS TE attributes per application

draft-ginsberg-isis-te-app-03

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Motivation

TE Link Attribute Advertisements presume enablement of RSVP-TE on a link

When multiple TE applications are in use:

- **no way to indicate what applications are using attribute values on a given link**
- **no way to advertise application specific values**

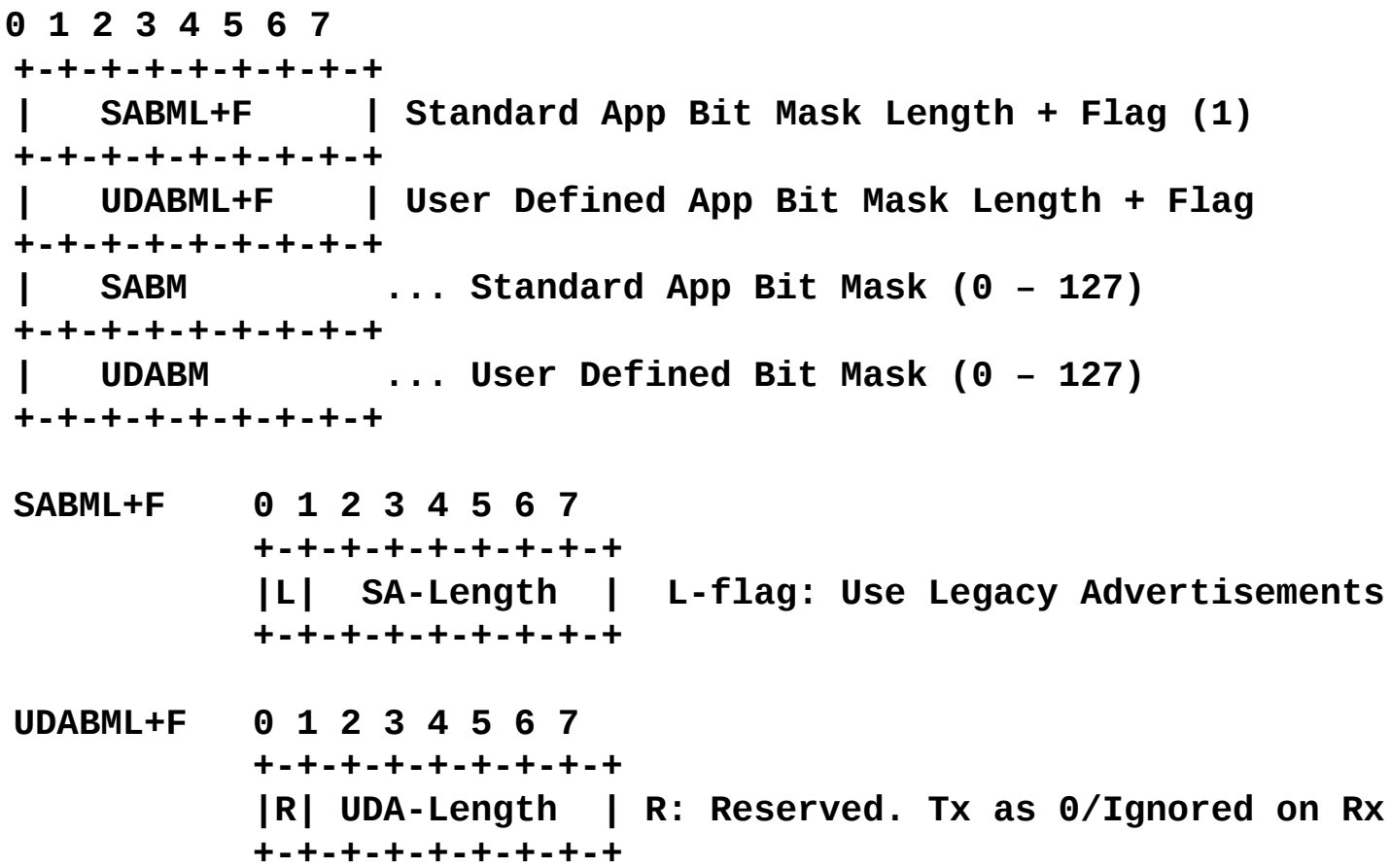
Inspired by and functionally equivalent to

draft-ppsenak-ospf-te-link-attr-reuse

Requirements

- **Per application/per link attribute usage**
  - NOT enablement
- **Per application attribute values**
- **Efficient encoding**
  - (avoid duplicate advertisements when possible)
- **Support incongruent topologies/application**
- **Extensible to new applications**
- **Support partial deployment**
- **Backwards Compatible**
  - No changes to legacy routers required
- **Allow BGP-LS/Controller supports of apps**

Application Identifier Bit Mask
(changed from V00)



Standard Application Bit Mask (changed from V00)

SABM (variable length)

This is omitted if SA-Length is 0. Legacy Bit moved to flags.

```
 0 1 2 3 4 5 6 7 ...
+-+-+-+-+-+-+-+-+...
|R|S|F|         ...
+-+-+-+-+-+-+-+-+...
```

R-bit: RSVP-TE
S-bit: Segment Routing Traffic Engineering
F-bit: Loop Free Alternate

New sub-TLV for TLV 22,23,141,222,223

Application Bit Mask (variable)

Link Attribute sub-sub-TLVs – one for each of:

3 Administrative group (color)
9 Max link bandwidth
10 Max reservable link bandwidth
11 Unreserved bandwidth
14 Extended Administrative Group
33 Unidirectional Link Delay
34 Min/Max Unidirectional Link Delay
35 Unidirectional Delay Variation
36 Unidirectional Link Loss
37 Unidirectional Residual Bandwidth
38 Unidirectional Available Bandwidth
39 Unidirectional Utilized Bandwidth

Only one new sub-TLV required

Sub-sub-TLVs match corresponding sub-TLV code point/format

New TLV for Application Specific SRLG

Neighbor System-ID + pseudo-node id (7 octets)

Application Bit Mask (variable)

Length of sub-TLVs (1 octet)

Link Identifier sub-TLVs (variable)

0 or more SRLG values (4 octets/SRLG)

Unlike existing SRLG (TLVs 138 and 139) this supports IPv4, IPv6, and unnumbered Link Identifiers:

Type	Description
4	Link Local/Remote Identifiers (see [RFC5307])
6	IPv4 interface address (see [RFC5305])
8	IPv4 neighbor address (see [RFC5305])
12	IPv6 Interface Address (see [RFC6119])
13	IPv6 Neighbor Address (see [RFC6119])

Deployment Cases:
1)RSVP-TE only

Use Legacy advertisements

Deployment Cases:
2)Multiple Apps – one of which is RSVP-TE
Common Attributes
Congruent Topologies

Use Legacy advertisements

Advertise new sub-TLV once/link w L-flag set

Backwards compatible

No advertisement duplication

3 extra bytes/link independent of how many attributes are advertised

Deployment Cases:
3)Multiple Apps – All Attributes NOT shared w RSVP-TE and/or incongruent topologies

Use Legacy advertisements for RSVP-TE

Use new advertisements w L-flag clear

Backwards compatible

Advertisement duplication in cases where some attributes are shared w RSVP-TE

Some Use Cases for Application Specific Attributes

- Using TE metric/bandwidth to influence LFA selection.
- Incongruent topologies for different applications
- Use different attributes for SR-TE vs RSVP-TE engineered paths.
- Defining a separate set of SRLGs in support of rerouting around a non-local catastrophic event e.g. a natural disaster affecting all traffic through a particular geographic area.

Alternative Proposal

- draft-hegde-isis-advertising-te-protocols-02/draft-bowers-isis-te-attribute-set-00
- draft-hegde-ospf-advertising-te-protocols-00
- At IETF 97 it was agreed that one proposal needs to be selected by the WG
- Both OSPF and IS-IS should select functionally equivalent proposals

WG Adoption Requested

Chairs initiated poll on 6/28/2017

13 in favor/1 against/1 neutral

Comparison

Requirement	ginsberg-isis-te-app/ppsenak-ospf-te-link-attr-reuse	hegde-isis-advertising-te-protocols/bowers-isis-te-attribute-set
Per application/link usage	Supported	App enablement
Per application attribute value	Supported – explicit indication	Supported – Legacy assumed unless overridden
Avoid duplication	Supported	Supported
Incongruent app topologies	Supported	Legacy advertisements used in absence of app specific
Backwards Compatibility	Supported (uses duplicate advertisements)	Not supported
Partial Deployment	Supported (uses duplicate advertisements)	Supported w config changes on legacy routers
Extensible to new applications	Yes	Yes
BGP-LS/Controller Support	For standard applications	No
User Defined Apps	Supported	Supported