

**draft-psenak-ospf-segment-routing-ospf-extension-03**

**draft-psenak-ospf-segment-routing-ospfv3-extension-00**

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# Related Drafts

- <http://www.ietf.org/internet-drafts/draft-filsfils-rtgwg-segment-routing-use-cases-02.txt>
- <http://www.ietf.org/internet-drafts/draft-filsfils-rtgwg-segment-routing-01.txt>
- <http://www.ietf.org/internet-drafts/draft-francois-sr-frr-00.txt>
- <http://www.ietf.org/internet-drafts/draft-previdi-isis-segment-routing-extensions-03.txt>
- <http://www.ietf.org/internet-drafts/draft-filsfils-spring-segment-routing-mpls-00.txt>
- <http://tools.ietf.org/html/draft-gredler-spring-mpls-01>
- **Merged draft:**
  - <http://tools.ietf.org/html/draft-gredler-ospf-label-advertisement-03>

# OSPFv2/OSPFv3 SR requirements

- Advertisements of prefix SID/Label
  - SID/Label associated with the prefix. Global significance and advertised in a form of an index inside the label space.
- Advertisement of adjacency SID/Label
  - local significance, advertised in a form of a SID/Label value
- Advertisement of the SID/Label binding
  - for a given destination FEC from a given router
  - SID/Label advertised has local significance to the advertising router
- Advertisements of SR capabilities

# OSPFv2 extensions

- Current LSAs do not provide a way to advertise additional per-prefix or per-link attributes
- Two new Opaque LSAs are defined
  - OSPFv2 Extended Prefix Opaque LSA type – EP-LSA
  - OSPFv2 Extended Link Opaque LSA – EL-LSA
- EP-LSA and EL-LSAs are generic multi purpose containers that can be used to advertise any prefix and link related attributes
  - usage not limited to segment-routing
  - example: tags for intra/inter prefixes, SRLGs for non-TE case, etc.

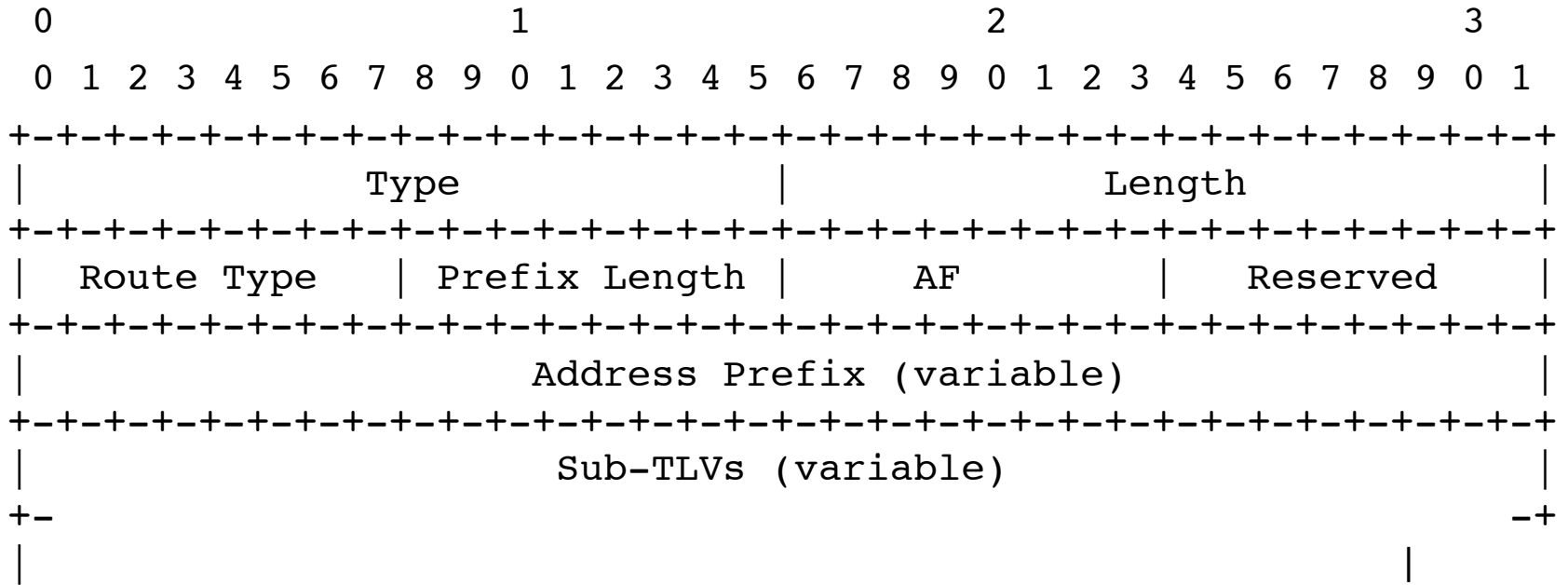
# Extended Prefix/Link LSAs

- The format of the TLVs within the body of these LSAs is the same as the format used by TE Opaque LSA [RFC3630].
- These new Opaque LSAs are complementary to the existing LSAs and are not aimed to replace any of the existing LSAs.
  - EP-LSA does not advertise reachability of the prefix, only its attributes
  - EL-LSA does not advertise presence of the link in any topology, only its additional attributes

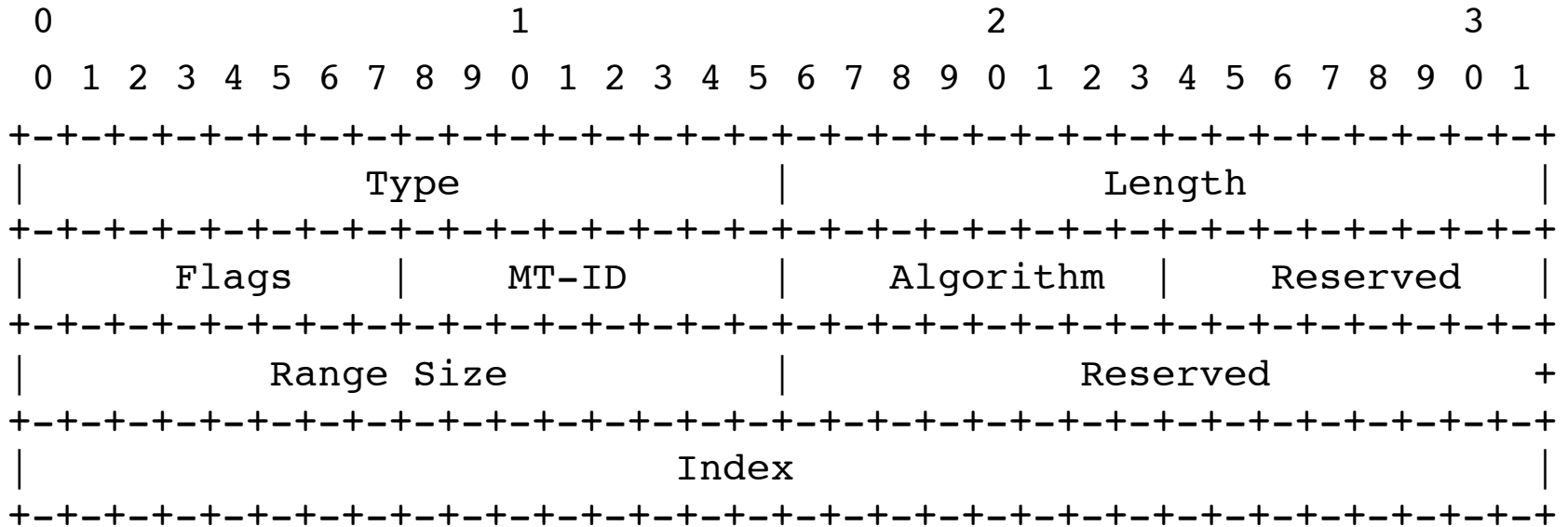
# OSPF Extended Prefix TLV

- Top level TLV of OSPFv2 EP-LSA
  - multiple can be carried in a single EP-LSA, assuming the flooding scope is considered
- Carries attributes of the prefix
- Sub-TLV-s defined:
  - 1 - SID/Label sub-TLV
  - 2 - Prefix SID sub-TLV
  - 3 - SID/Label Binding sub-TLV
  - 4 - IPv4 ERO sub-TLV
  - 5 - Unnumbered Interface ID ERO sub-TLV
  - 6 - IPv4 Backup ERO sub-TLV
  - 7 - Unnumbered Interface ID Backup ERO sub-TLV
  - 8 - ERO Metric sub-TLV

# OSPFv2 Extended Prefix TLV (cont.)

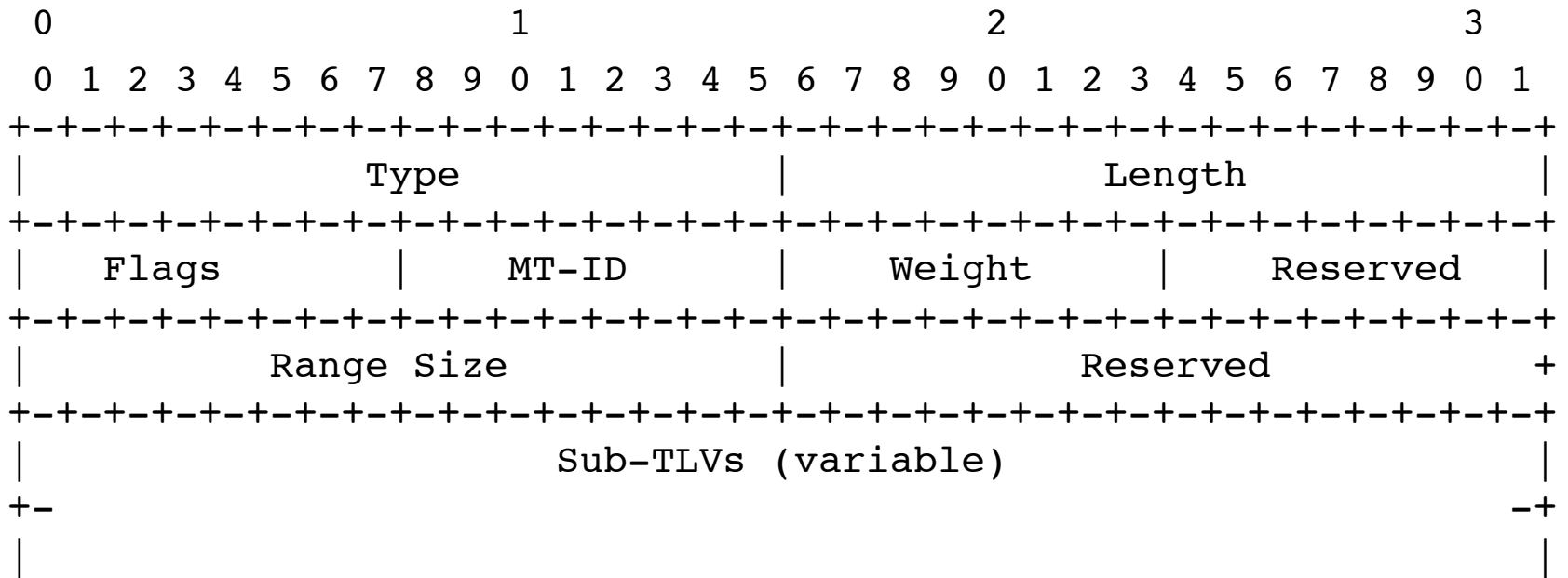


# OSPFv2 Prefix SID sub-TLV

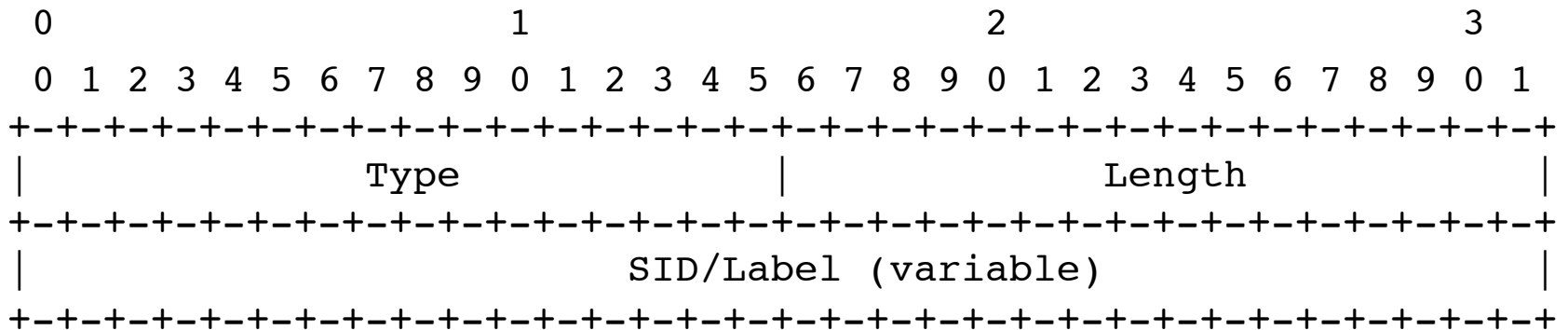




# OSPFv2 SID Label Binding sub-TLV



# SID/Label sub-TLV

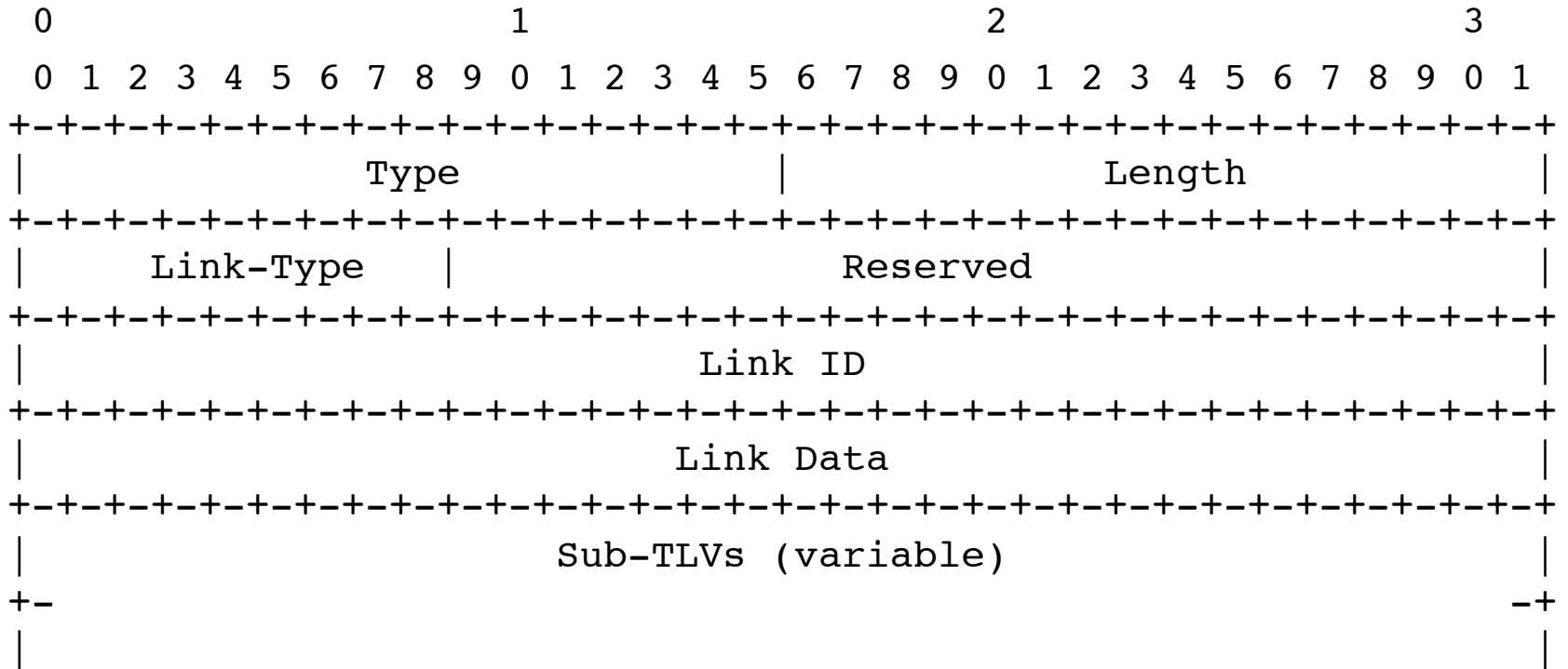


Length: 3 or 4 bytes

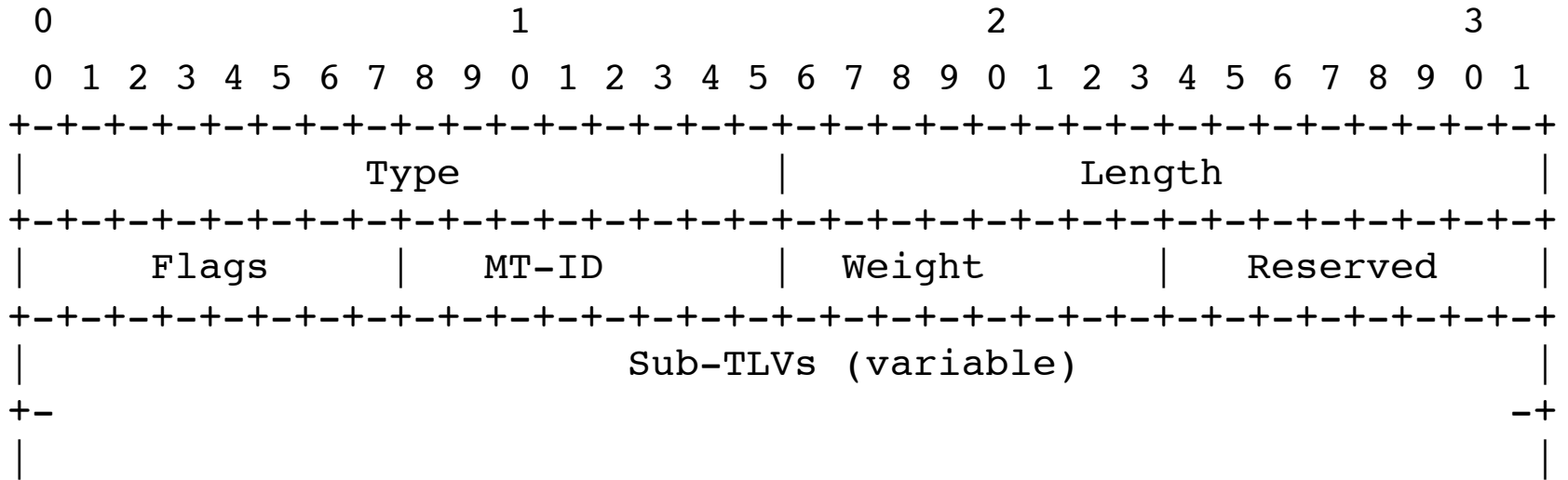
# OSPFv2 Extended Link TLV

- Top level TLV of OSPFv2 EL-LSA
  - current drafts suggests only a single Extended Link TLV is carried in EL-LSA – can be changed if considered useful
- Carries attributes of the link
- Sub-TLV-s defined:
  - 1 - SID/Label sub-TLV
  - 2 - Adj-SID sub-TLV
  - 3 - LAN Adj-SID/Label Sub-TLV

# OSPFv2 Extended Link TLV (cont.)



# Adj-SID sub-TLV



# OSPFv3 extensions

- OSPFv3 LSA Extendibility provides the foundation for SR extensions in OSPFv3
  - <http://datatracker.ietf.org/doc/draft-ietf-ospf-ospfv3-lsa-extend/>
  - New sub-TLVs used inside Inter-Area Prefix TLV, External Prefix TLV, Intra-Area-Prefix TLV:

1 - SID/Label sub-TLV

2 - Prefix SID sub-TLV

3 - SID/Label Binding sub-TLV

4 - IPv4 ERO sub-TLV

5 - IPv6 ERO sub-TLV

6 – Unnum. Intf ID ERO sub-TLV

7 - IPv4 Backup ERO sub-TLV

8 - IPv6 Backup ERO sub-TLV

9 - Unnum. Intf. ID Backup ERO sub-TLV

13 - ERO Metric sub-TLV

# OSPFv3 extensions (cont.)

- New sub-TLVs used inside Router-Link TLV:
  - 10 - Adj-SID sub-TLV
  - 11 - LAN Adj-SID sub-TLV

# Segment Routing Capabilities

- Segment Routing requires some additional capabilities of the router to be advertised to other routers in the area.
- Applicable to both OSPFv2 and OSPFv3
- New OSPF Router Information (RI) TLVs
  - 8 - SR-Algorithm TLV
    - advertises the SR capability and ‘algorithm’ supported when calculating reachability (e.g. metric based SPT)
  - 9 - SID/Label Range TLV
    - advertises the supported SID/Label range of the node



# OSPFv2/v3 SR drafts

- We ask for WG adoption
- Comments welcome!