IGP Extensions for Advertising Hop-by-Hop Options Header Processing Action

draft-wang-lsr-hbh-process-00

Yali Wang, Tianran Zhou, Zhibo Hu @Huawei

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Background and Motivation

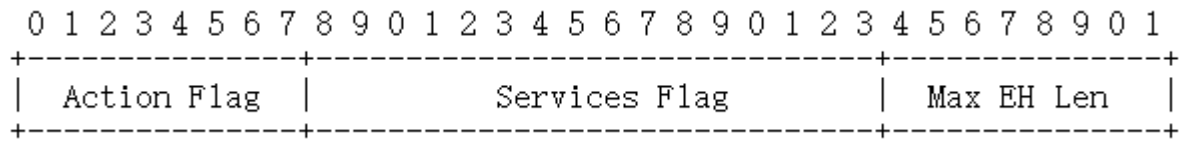
- [RFC8200] specifies the Hop-by-Hop Options header is **only examined and processed** by nodes along a packet's delivery path if they are **explicitly configured** to process.
- Nodes **may be configured** to ignore the Hop-by-Hop Options header, drop packets containing a Hop-by-Hop Options header, or assign packets containing a Hop-by-Hop Options header to a slow processing path.
- Devices can be configured to process the HbH Options header **in different ways**.

- The HbH Options header has been used, for example,
  - IOAM-tracing options are represented as an IPv6 options in Hop-by-Hop extension header.
  - Alternate Marking technique can be carried by the Hop-by-Hop Options header.
  - If nodes are not explicitly configured to process the Hop-by-Hop Option header, they may ignore them. In this case, the performance measurement does not account for all links and nodes along a path.

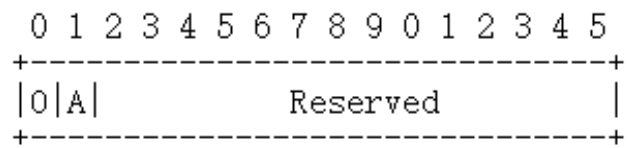
This document defines **a mechanism to signal the configured processing action of the Hop-by-Hop Options header and supported services at node and/or link granularity** using IS-IS, OSPFv2 and OSPFv3.
Such advertisement can be useful for entities to **generate a topology** base on the HbH processing action advertisement and **compute paths** for a specific service carried by the HbH Options header.

HbH Options Header Processing Action

- Define the information of **HbH processing action** formed of a 8-bit Action Flag field, a 8-bit Max EH Len field, and a 16-bit Services Flag.



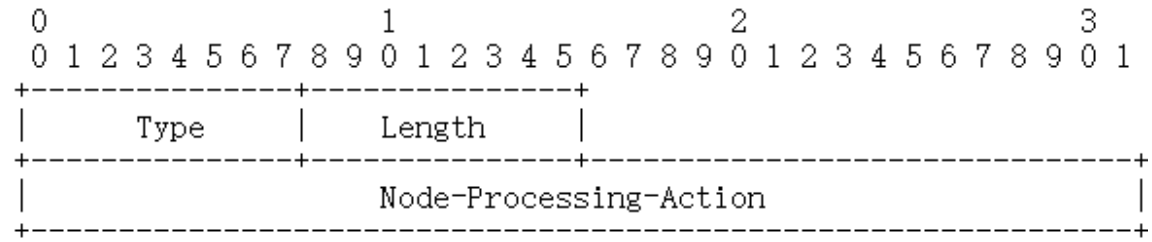
  - Action Flag: A 8-bit field. **The highest-order 3-bit indicates the processing action**, i.e., 000 - drop packets; 001 - dispatch to control plane; 010 - forward, skip to Next Header; 011 - forward, ignoring all extension Options header; 100 - examine and process.
  - Max EH Len: A one octet field. **The maximum length of the Extension Header in 8-octet units can be examined and processed** at node or link granularity. The definition is same as the Next Header Length in [RFC8200].
  - Services Flag: A 16-bit bitmap.



    - O (IOAM Trace Option) is a one-bit flag. The O flag is set to 1 if the IOAM Trace Option is supported at node or link granularity.
    - A (Alternate Marking) is a one-bit flag. The A flag is set to 1 if the Alternate Marking method is supported at node or link granularity.
    - R - reserved bits for future use. These flags MUST be zeroed on transmit and ignored on receipt.

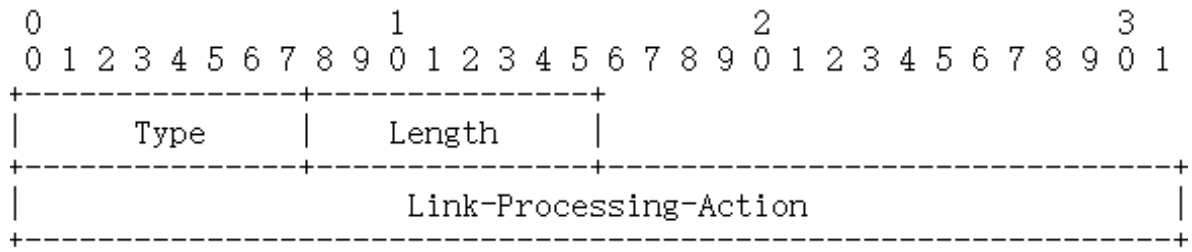
Signaling Processing Action using IS-IS

- **Node Processing-Action Sub-TLV is extended to IS-IS Router CAPABILITY TLV** to carry the action of the router originating the IS-IS Router CAPABILITY TLV.



  - Node-Processing-Action: A 4-octet field, which is same as Processing Action defined in the previous slide.

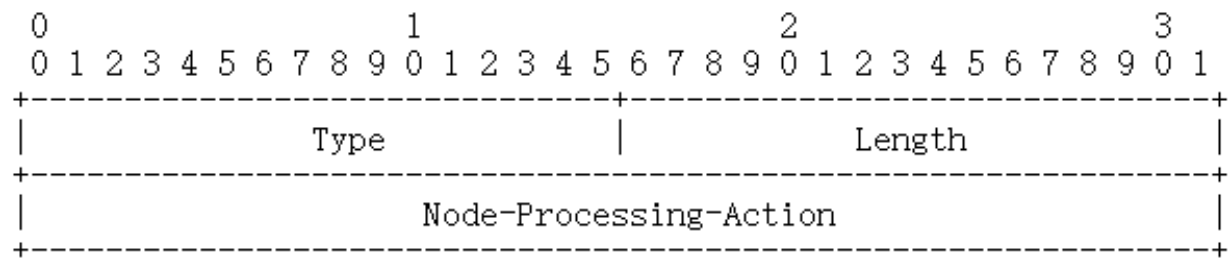
- **Link Processing-Action Sub-TLV is extended to TLVs 22, 23, 25, 141, 222, and 223** to carry the action of the interface associated with the link.



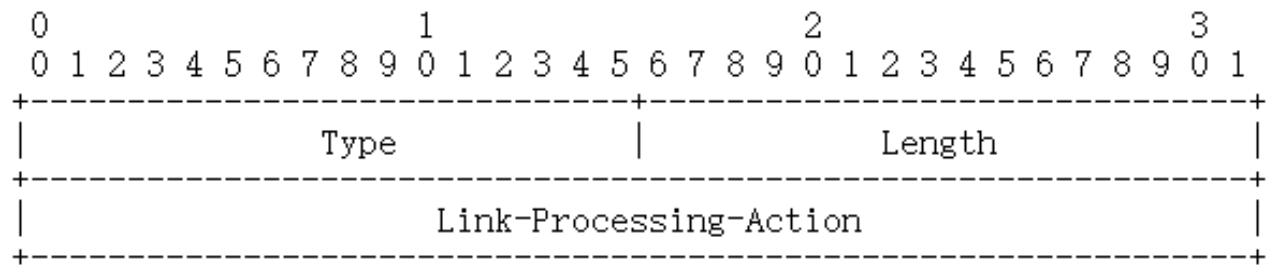
  - Link-Processing-Action: A 4-octet field, which is same as Processing Action defined in the previous slide.

Signaling Processing Action using OSPF

- **Node Processing-Action TLV is extended to the OSPF RI Opaque LSA** to carry the action of the router originating the RI LSA.



- **Link Processing-Action Sub-TLV** is defined to carry the action of the interface associated with the link.
  - For OSPFv2, the Link-level Processing-Action is advertised as an optional sub-TLV of the **OSPFv2 Extended Link TLV**.
  - For OSPFv3, the Link-level Processing-Action is advertised as an optional sub-TLV of the **E-Router-LSA TLV**.



Next Steps

- Comments are welcome
- Refine the document accordingly

Thank you