DetNet SRv6 Data Plane Encapsulation

draft-geng-dp-sol-srv6-01

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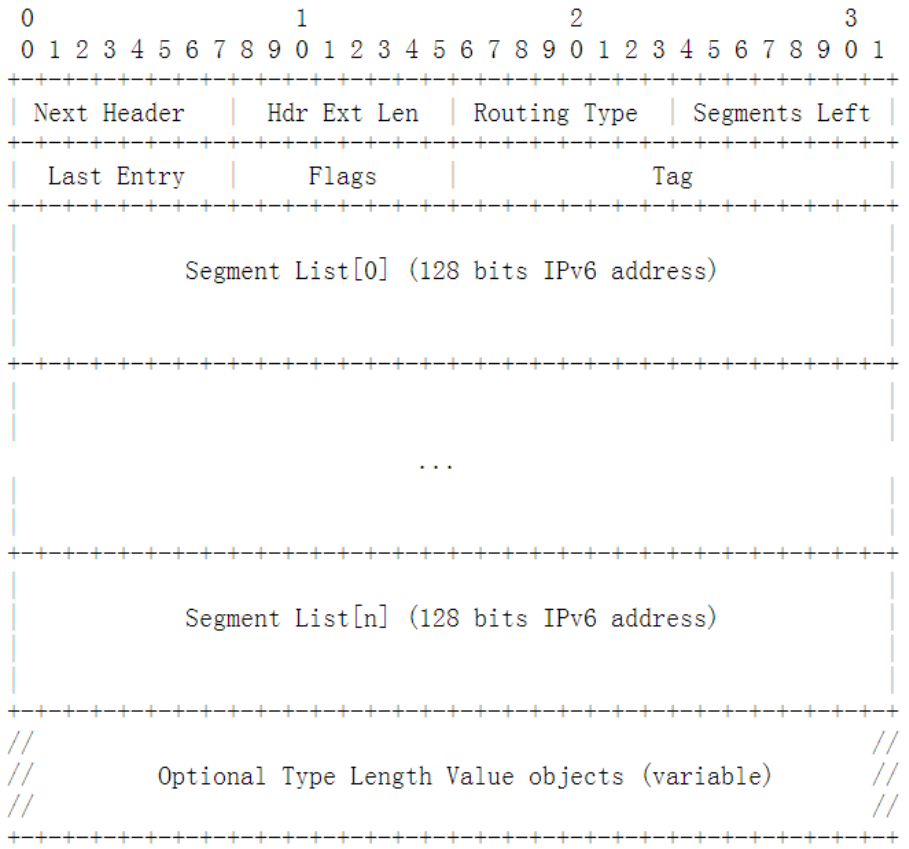
Overview of SRv6

- SRH
  - Segment Routing can be applied to the IPv6 data plane using a new type of Routing Extension Header, which is SRH;
- Segment List
  - The Segment List is encoded starting from the last segment of the SR Policy, which can steer the packet through an indicated path;
- Optional TLVs
  - TLVs behind the Segment List;
- Network Programming
  - Each segment can be an instruction, which represents a function to be called at a specific location in the network;



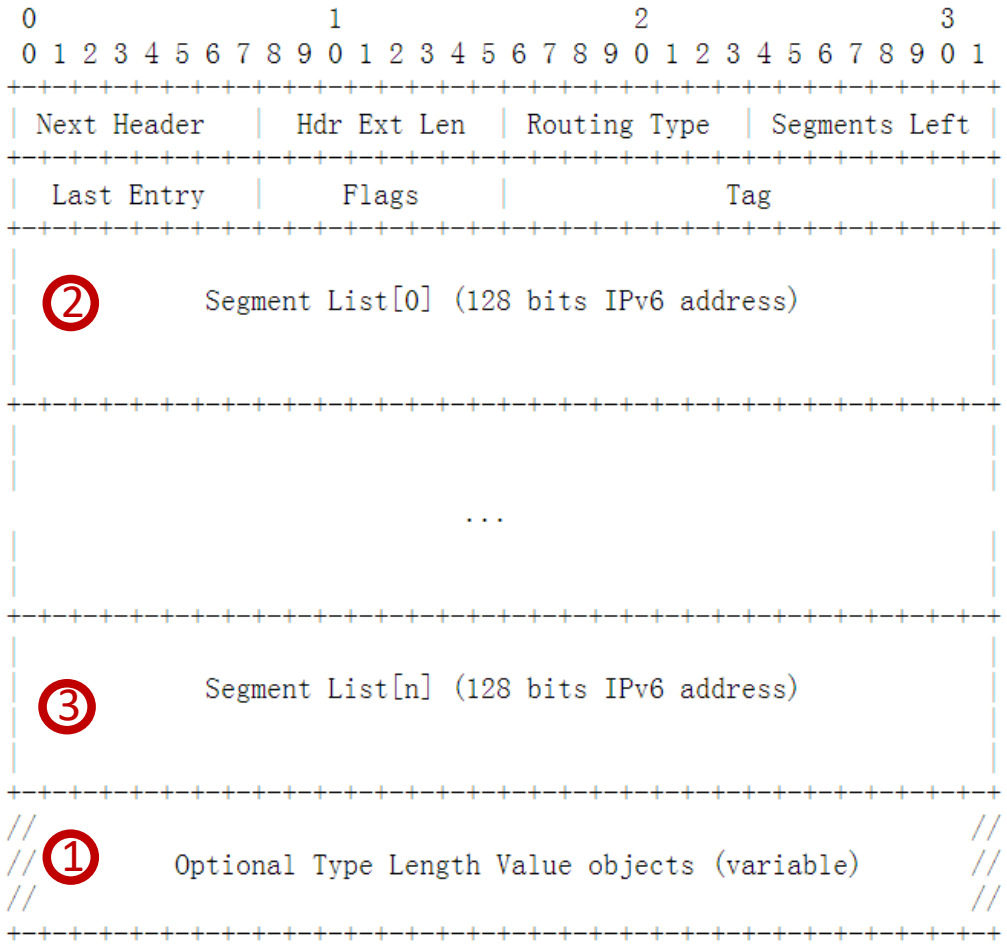
DetNet SRv6 Data Plane Requirement

- A method of identifying the SRv6 payload type;
- A suitable explicit route to deliver the DetNet flow ; (e.g., Segment List in SRH)
- A method of indicating packet processing, such as PREOF(Packet Replication/Elimination/Ordering Function); (detailed in next slides)
- A method of identifying the DetNet flow; (detailed in next slides)
- A method of carrying DetNet sequence number; (detailed in next slides)
- A method of carrying queuing and forwarding indication to do congestion protection; (not covered in the current version)

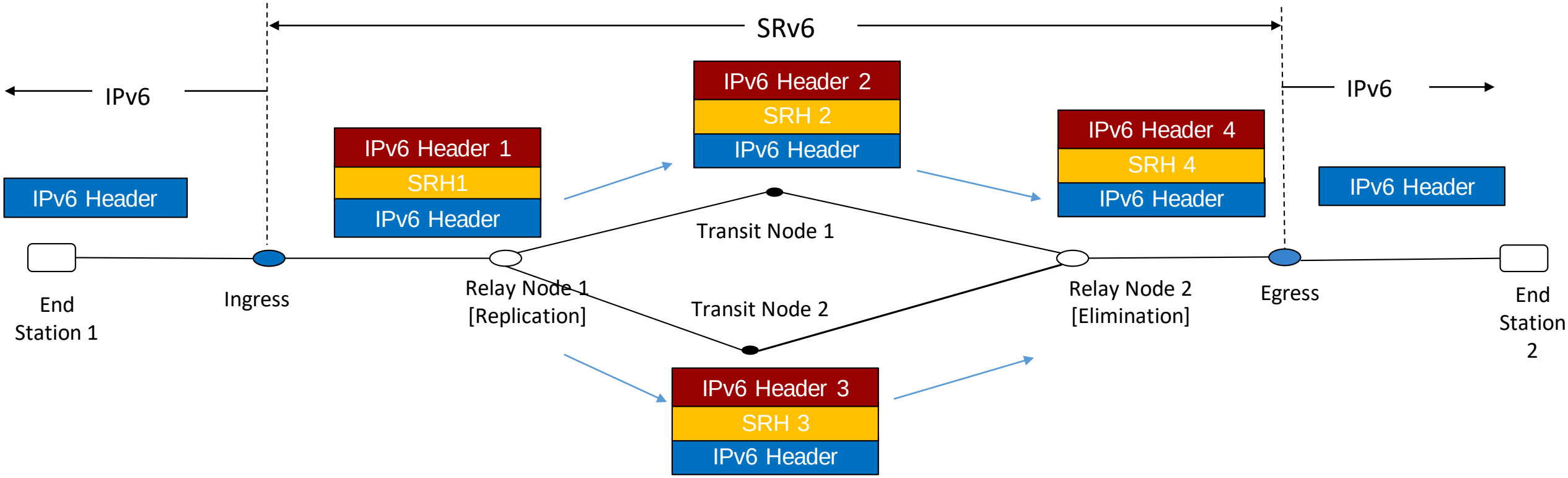
DetNet SRv6 Data Plane Solution

Flow Identification(20bits) and Sequence Number(28bits) are carried in:

- **Option1:** SRH TLVs
- **Opiton2 :** arguments in the SID for Relay Node
- **Option3:** DetNet SID in segment list



SRv6 Based PREOF



What’s next?

- Aim to become a WG Document
- More comments are welcome
- WG Adoption?

Thanks

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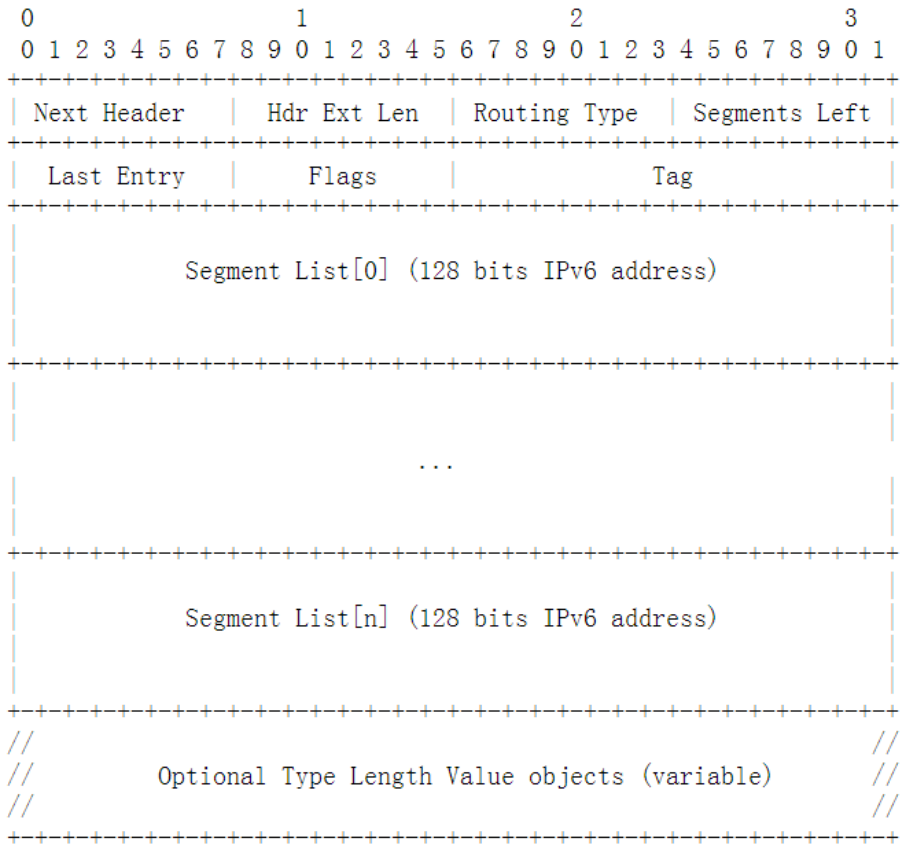
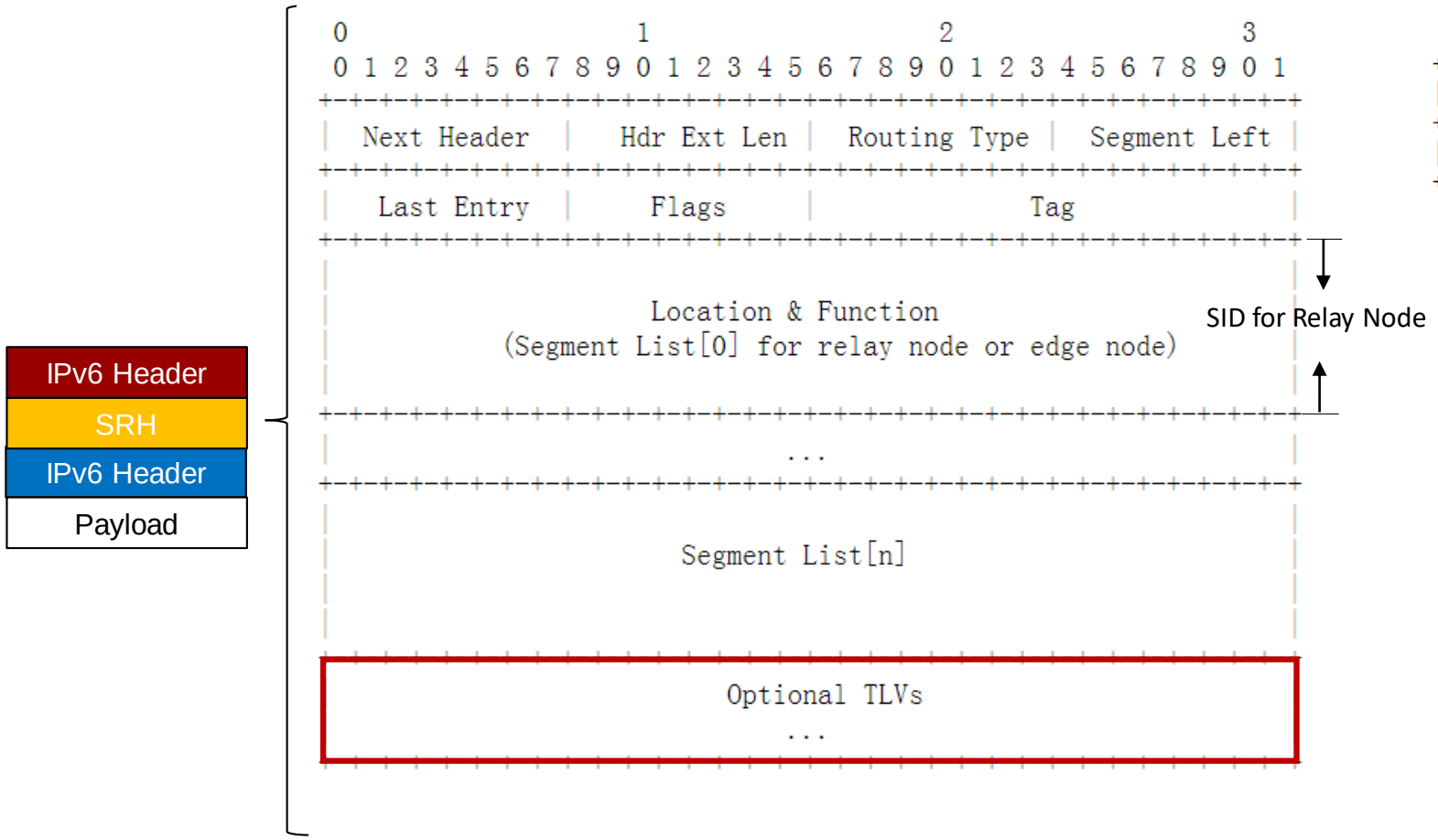
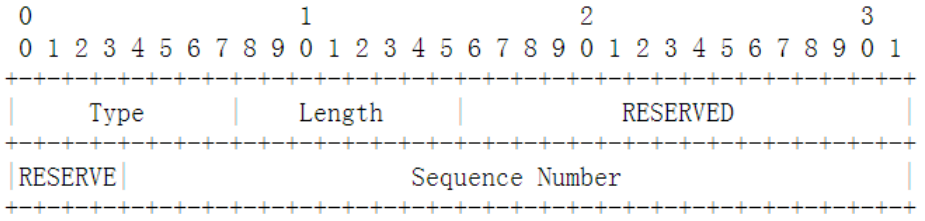


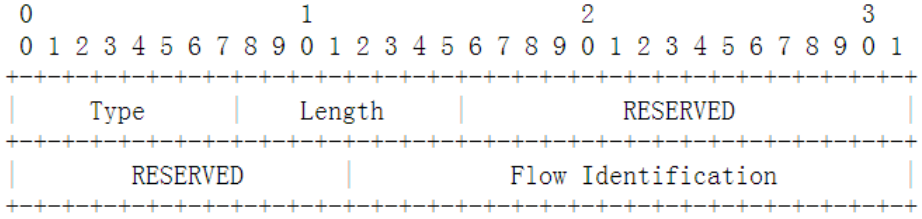
SRv6 Data Plane Solution Option1-Encapsulation

- Flow Identification(32bits) and Sequence Number(32bits) are carried as TLVs





- Type: 8bits, to be assigned by IANA.
- Length: 8.
- RESERVED: 28 bits, MUST be 0 on transmission and ignored on receipt.
- Flow Identification: 20 bits, which is used for identifying DetNet flow.



- Type: 8 bits, to be assigned by IANA.
- Length: 8.
- RESERVED: 20 bits. MUST be 0 on transmission and ignored on receipt.
- Sequence Number: 28 bits, which is used for indicating sequence number of a DetNet flow.

SRv6 Data Plane Solution Option1-Replication Function

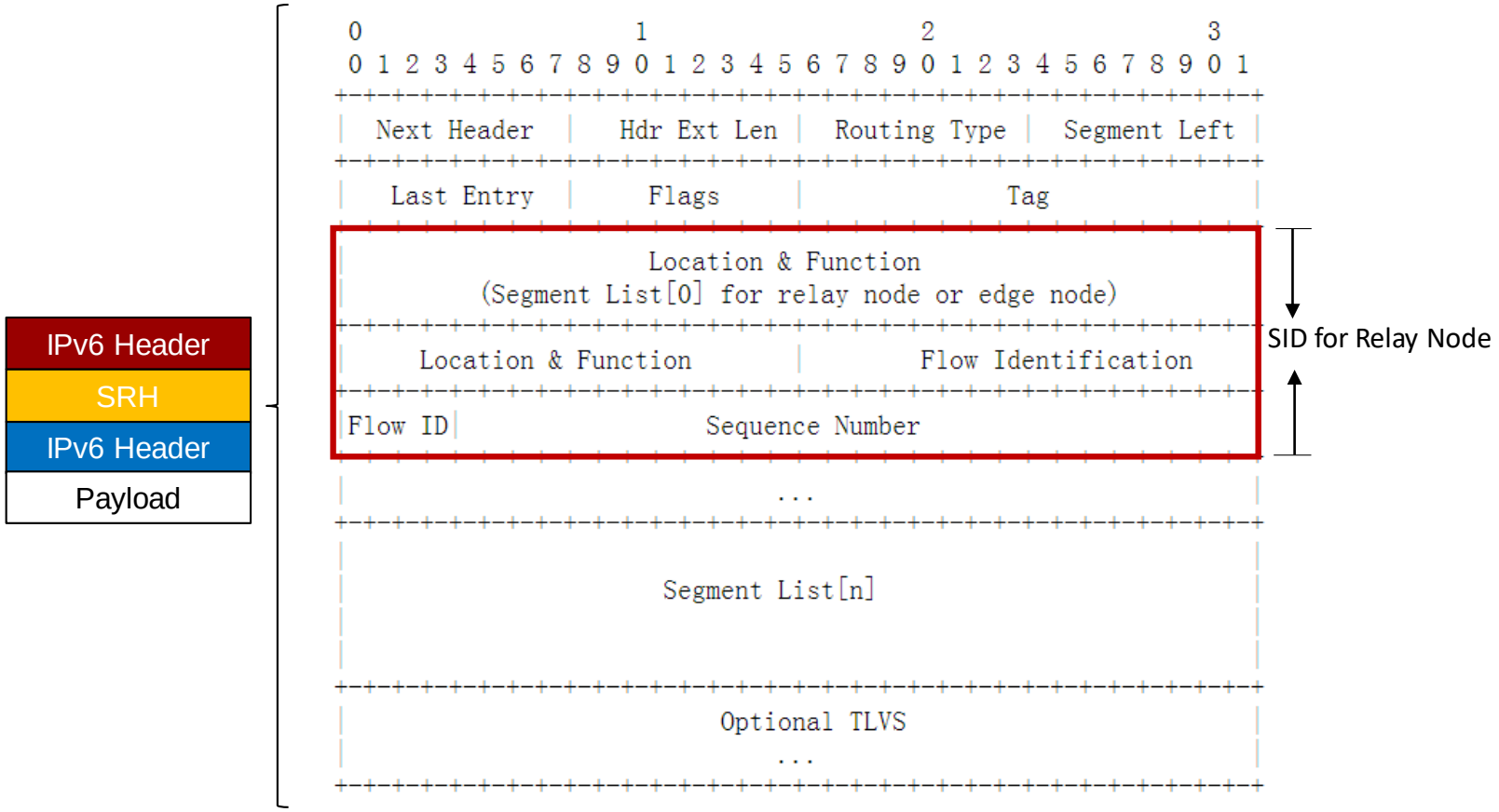
- End. B.Replication: Packet Replication Function
  1. IF NH=SRH & SL>0 THEN
  2. extract the DetNet TLV values from the SRH
  3. create two new outer IPv6+SRH headers: IPv6-SRH-1 and IPv6-SRH-2 Insert the policy-instructed segment lists in each newly created SRH (SRH-1 and SRH-2). Also, add the extracted DetNet TLVs into SRH-1 and SRH-2.
  4. remove the incoming outer IPv6+SRH header.
  5. create a duplication of the incoming packet.
  6. encapsulate the original packet into the first outer IPv6+SRH header: (IPv6-SRH-1) (original packet)
  7. encapsulate the duplicate packet into the second outer IPv6+SRH header: (IPv6-SRH-2) (duplicate packet)
  8. set the IPv6 SA as the local address of this node.
  9. set the IPv6 DA of IPv6-SRH-1 to the first segment of the SRv6 Policy in of SRH-1 segment list.
  10. set the IPv6 DA of IPv6-SRH-2 to the first segment of the SRv6 Policy in of SRH-2 segment list.
  11. ELSE
  12. drop the packet

SRv6 Data Plane Solution Option2-Elimination Function

- End. B. Elimination: Packet Elimination Function
    1. IF NH=SRH & SL>0 & "the packet is not a redundant packet" THEN
    2. do not decrement SL nor update the IPv6 DA with SRH[SL]
    3. extract the value of DetNet TLVs from the SRH
    4. create a new outer IPv6+SRH header
    5. insert the policy-instructed segment lists in the newly created SRH and add the retrieved DetNet TLVs in the newly created SRH
    6. remove the incoming outer IPv6+SRH header.
    7. set the IPv6 DA to the first segment of the SRv6 Policy in the newly created SRH
    8. ELSE
    9. drop the packet

SRv6 Data Plane Solution Option2-Encapsulation

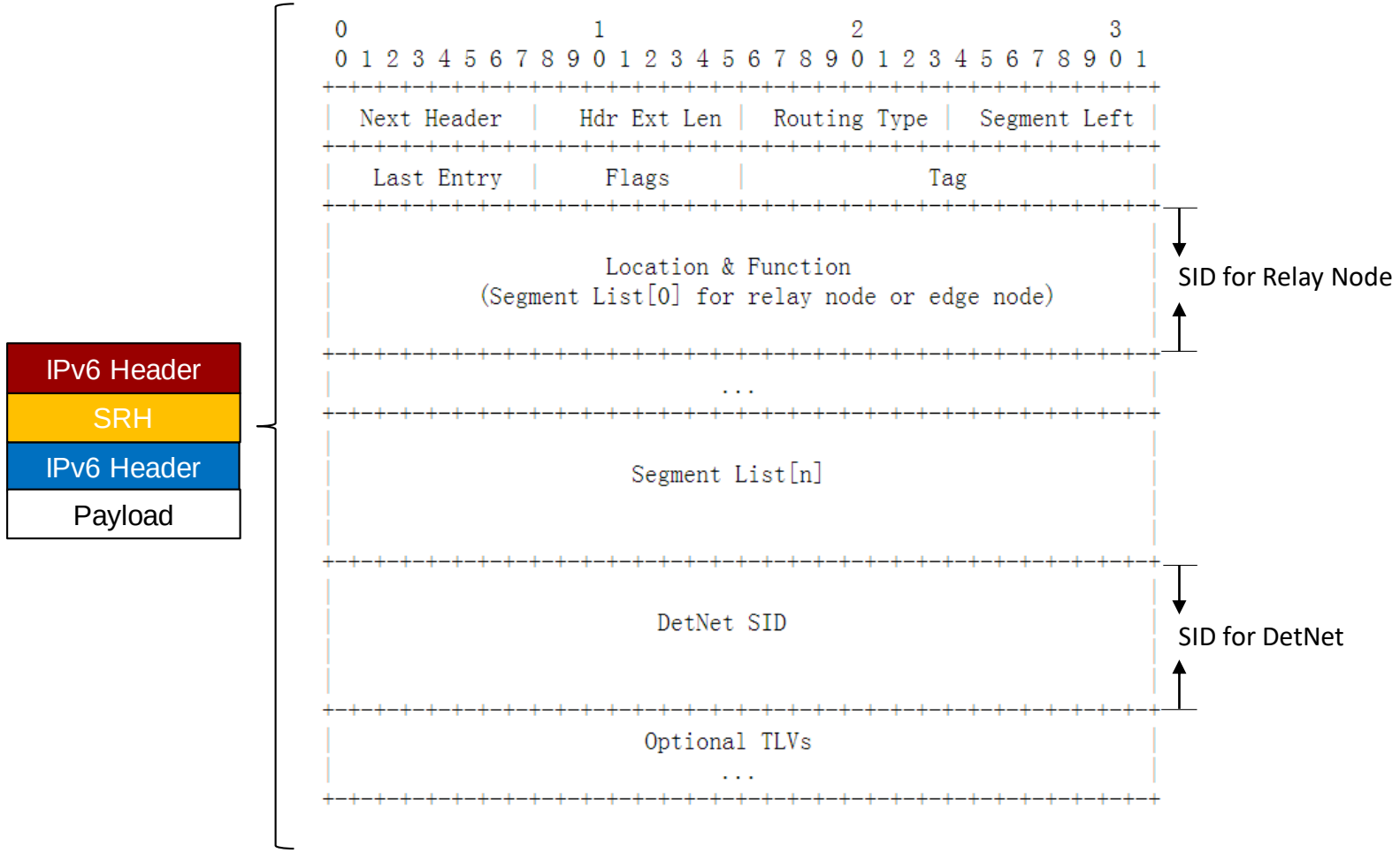
- Flow Identification(20bits) and Sequence Number(28bits) are carried as arguments in the SID for Relay Node



- Location & Function: the 80 most significant bits that are used for routing
- Flow Identification: 20 bits, which is used for DetNet flow identification in the DetNet relay node;
- Sequence Number: 28 bits, which are used for dis crime packets in the same DetNet flow;

SRv6 Data Plane Solution Option3-Encapsulation

- Flow Identification and Sequence Number are carried as in DetNet SID



DetNet SRv6 Data Plane Solution Example