SRv6 Unified SID Usecase & Solution

Unified SID usecase & SRH-Flags-Extension

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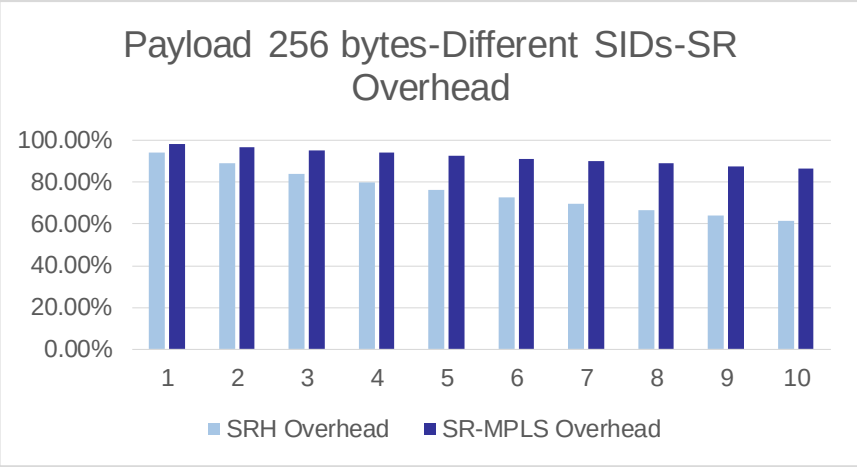
SRv6 use case discussion

- A new SRv6 network (greenfield)
  - SR-TE path requires more than 8 segments in SRH, SRH overhead is too heavy and not friendly to existing HW
  - SRv6 requires additional address planning and assignment
- Upgrade to SRv6 from SR-MPLS/MPLS (brownfield)
  - Reduce the impact on the existing SR-MPLS network, including compatibility with SR-MPLS service and the existing HW
  - End-to-end service can fully or partially re-use SR-MPLS labeled SIDs during the upgrade
  - Better supports interworking between SR-MPLS with SRv6

Problems and requirements of SRv6 SRH solution

- SRH Overhead
  - SRH overhead is too heavy (as shown on the figure) for SR-TE, if it has 10 SIDs, the SRH overhead is just up to 40%
  - SRH overhead also needs the chips to process 160 bytes-long SIDs list
- SRv6 SID Compatibility
  - It should keep the original SRH mechanism
  - SRv6 is required to consider the compatibility with the existing network, such as SR-MPLS
  - SRv6 is expected to reduce the need for IP address and SIDs management



Unified-SID Principle

Unified SID keeping compliant with standard SRH:

- Using reserved bits in the Flags field by simple extension, it is compatible with SRH.
- Two bits for SIDs format:
  - 0b00 – 128-bits SID, an IPv6 address
  - 0b01 - 32-bits SID, an IPv4 address
  - 0b10 - 32-bits SID, an MPLS label in leftmost 20-bits, rightmost 12-bits for context information used by the label forwarding entry. The context information could be U-SID function code.
  - 0b11 - reserved for future use

Unified SID operation keeping compliant with SRv6 Programming:

- 0b01: For further study
- 0b10: Building the relationship between label-based SIDs and IPv6 address, simply based on the existing ILM entry without modification

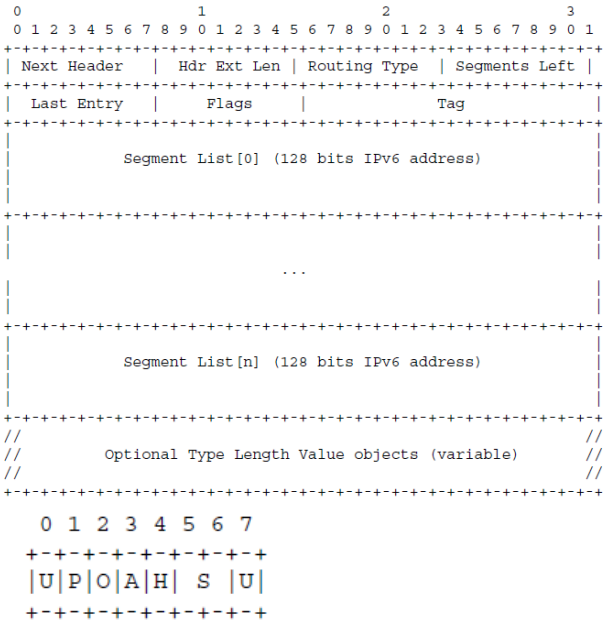
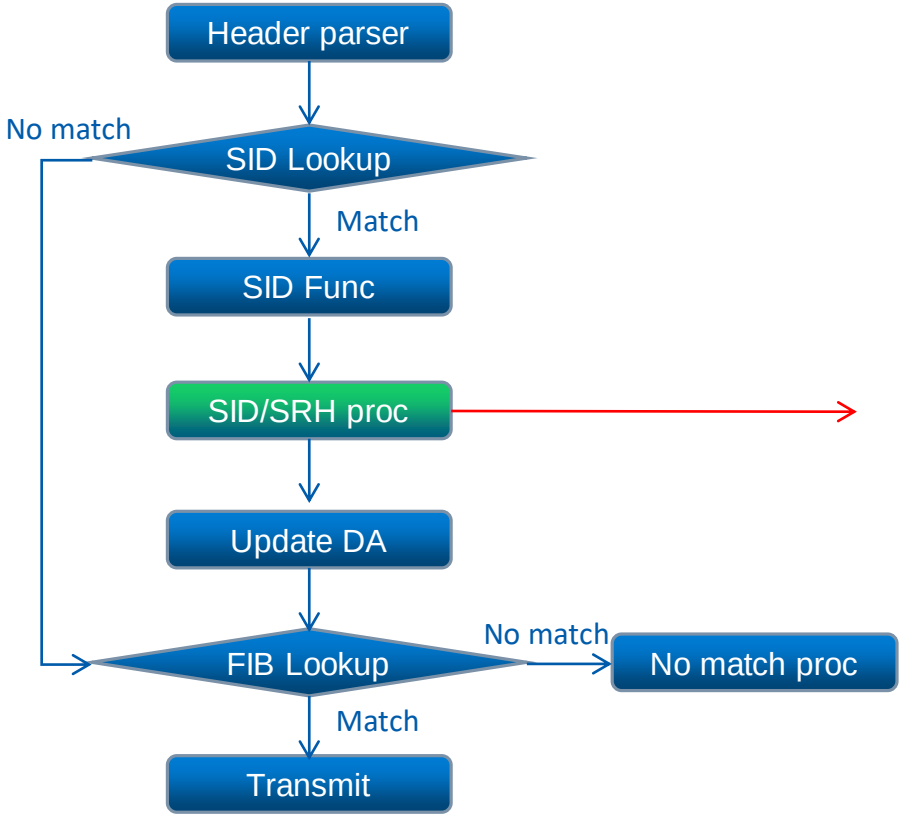


Figure 2: Flags field format

SRv6 Compressing Solutions Operation



Existing solutions

- SID Shifting
- SID Stitching
- SID Mapping
- ... ...

Mapping solution is easier to implement in chip even in existing ASIC chip

U-SID format cases

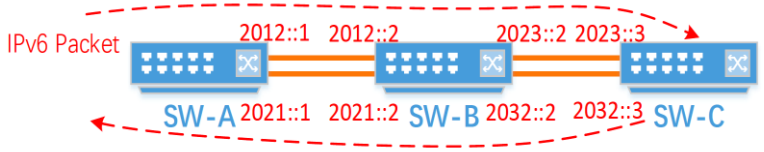
- Standard SRv6
  - It is the same with standard SRv6 when the SIDs format of flags is 0b00
- IPv4 address
  - Will be discussed in the future versions of the draft
- MPLS Label
  - See next page
- Reserved
  - For further study

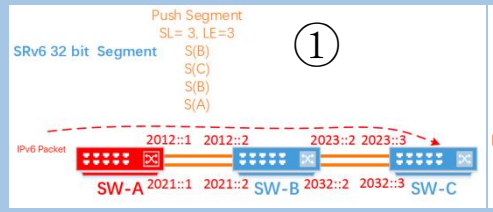
MPLS label U-SID format

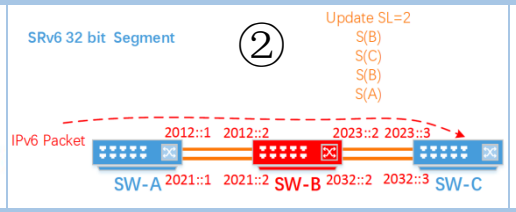
- MPLS label U-SID format
  - The U-SID format of Flags is 0x02, the U-SID length can be 32 bits for 8-bit alignment, and the locator length can be 20bit to be compatible with SR-MPLS.
  - It can reuse the existed SIDs assignment for SR-MPLS. It makes it easy to upgrade from SR-MPLS to SRv6.
  - It also can be used for the existing network that already has IPv6 addresses assigned, and it doesn't have enough new IPv6 address prefixes for SRv6 SIDs. It can use the 20bit-SID as locator label mapping to IPv6 address just like MPLS label.

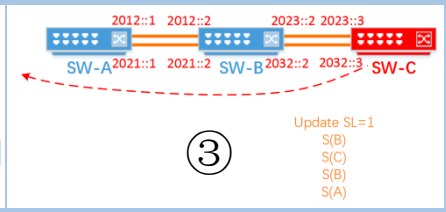
Unified SID Proof of Concept

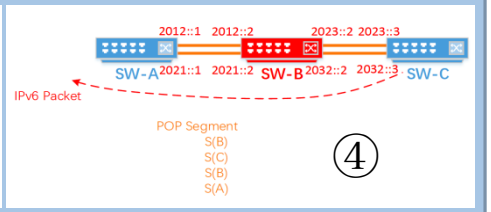
- PoC environment
  - Right figure (3 nodes: SW-A/B/C)
  - SRv6 Service: SW-A <--> SW-B <--> SW-C <--> SW-B <--> SW-A
- Unified SID PoC (**Broadcom Chips and Centec Chips**)
  - SW-A: Push Segment ①
  - SW-B/C: Process & Update Segment ② ③
  - SW-B': PSP Segment ④











Next steps

- Comments, suggestions, and questions are always welcome and greatly appreciated
- Where this work can be continued – SPRING WG or, for example, 6man?

Thank you!