Signaling Aggregate Header Size Limit via IGP

draft-liu-lsr-aggregate-header-limit

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Backgroud

Aggregate Header Limit (AHL)
- introduced in RFC8883
- the total header size that a router is able to process due to it's processing limit
- related with the device's buffer size (for devices designed with parsing buffer)
- packet may dropped or sent to slow path if the limit is exceeded

Total packet header chain size is increasing greatly in IPv6/SRv6

Headend nodes	Intermediate nodes
- IOAM: IOAM data fields in HBH/DOH	- BSID: a new SID list to the original packet
- Alternate-Marking: AltMark Option in HBH/DOH	- ti-Ifa: a repair SID list encap by PLR
- network slicing: NRP Option in HBH	
- SR service programming: Metadata in SRH TLV	

If the AHLs of the downstream nodes can be obtained in advance, the risk of packet dropping or inefficient processing due to limit exceeding can be reduced.

Motivation for IGP Signaling

Existing mechanism

➢ [RFC8883]: an ICMPv6 Destination Unreachable error with code for "Headers too long", when a node discards a packet due to aggregate header limit exceeding

➢ May not work well when

  – there're a large amount of paths: the burden of sending and receiving ICMP messages increases

  – the paths are dynamic: the segment lists may change over time, more difficult to collect the AHLs in advance

IGP Signaling

➢ The headend and intermediate nodes can easily get aggregate header limits of all the nodes in the domain, regardless of the amount or type of the paths

➢ There're already mechanisms like IGP-MSD to advertise certain size limit at per node and per link basis.

IGP Extensions

➢MSD and the IGP-MSD signaling mechanism is not SR-specific

➢a new "IGP MSD-Type value" code for aggregate header limit, its value field represents the the total header size that a router is able to process at full forwarding rate

➢defined mainly for protocol simplicity, whether a new dedicated sub-TLV is better can be discussed further

AHL Usecases

Mainly implementation specific, some possible usages:

➢For the intermediate node

–	When it needs to increase the size of the packet header by inserting/encapsulating, if the downstream limits are exceeded, the node MAY choose to not to use the related feature/function and log an error

➢For the headend node

–	When it needs to attach extra data along the existing paths, MAY choose to not to use the related feature/function and log an error if AHL is not sufficient

–	It MAY calculate the SRv6 paths with the awareness of the AHLs of all the nodes within the domain

➢For the controller

–	It can collect the AHLs advertised by IGP via BGP-LS for path computing and other management purpose, e.g, whether to enable certain function on the given path

Next Steps

➢Welcome feedback and comments !

Thank You !