Segment Routing for Enhanced DetNet

draft-geng-spring-sr-enhanced-detnet

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DetNet is Supposed to Support Bounded Latency

• The DetNet QoS can be expressed in terms of:
  • Minimum and maximum end-to-end latency from source to destination, timely delivery, and bounded jitter (packet delay variation) derived from these constraints.
  • Packet loss ratio under various assumptions as to the operational states of the nodes and links.
  • An upper bound on out-of-order packet delivery. It is worth noting that some DetNet applications are unable to tolerate any out-of-order delivery.

• Three techniques are used by DetNet to provide these qualities of service:
  • Resource allocation
  • Service protection
  • Explicit routes
SR MPLS/SRv6 Is Able to Provide Explicit Route

- SR MPLS/SRv6 could support:

  1. Source routing, which can steer the DetNet flows go through the network according to an explicit route with allocated resource by segment list in SRH;

  2. Network programming, which can give packet instructions in every node along the path to guarantee bounded latency.
SR MPLS/SRv6 Extensions Could Be Able to Provide Explicit Route & Bounded Latency

• SR MPLS/SRv6 extensions could support:

1. Source routing, which can steer the DetNet flows go through the network according to an explicit route with allocated resource by segment list in SRH;

2. Network programming, which can give packet instructions in every node along the path to guarantee bounded latency.
BLI (Bounded Latency Information) is Introduced for Bounded Latency

- As defined in [I-D.yzz-detnet-enhanced-data-plane], 8 or more Bounded Latency Information Types (BLI Type) are introduced to differentiate the types of BLIs, based on the required information of queuing/scheduling/shaping mechanisms to guarantee bounded latency.

- Bounded Latency Information Value (BLI Value) is a specified value of a specific type of BLI to provide guidance for packet processing with the meaning of a particular BLI type.

- The pair <BLI Type, BLI Value> information should be indicated by SRv6 data plane.
SRv6 Extension for Bounded Latency

- Bounded Latency Information (BLI) is used to guide forwarding in network device, which could be initiated in SRv6 data plane. With the characteristics of Segment Routing, the bounded latency information could be coupled with explicit path to provide latency guarantee in each node/ adjacency indicated by the segment list.

- Two new variations of End.X SID are defined for DetNet bounded latency, which are called End.X.BL and End.X.BLI:
  - End.X.BL SID has two meanings: 1) to identify an interface/link, just like the adjacency SID; 2) to identify the pair <BLI Type and BLI Value> information on the interface/link to guarantee bounded latency.
  - End.X.BLI SID has two meanings: 1) to identify an interface/link, just like the adjacency SID; 2) to identify the BLI Type to guarantee bounded latency.

  - The BLI Value corresponding to the End.X.BLI SID is carried explicitly in the SRv6 packet header
  - There are 3 possible options for carrying variable BLI Value associated with the End.X.BLI SID, including: Arguments in End.X.BLI SID, SRH TLV for BLI used together with End.X.BLI SID, New options in DoH before SRH together with End.X.BLI SID
Next Step

- Comments from SPRING & DetNet
- Cooperation with people who are interested
Thanks