IPv6 Hop-by-Hop Options for DetNet

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DetNet dataplane requirements for IPv6

Redundancy Information for service sublayer

- Þ Think sequence information but that's too limitative
- Þ No POF: Anything unique within the upper bound on out-of-order packet delivery
- Þ If POF: Anything strictly ordered for the duration of the path, e.g., time stamp
- Þ Network Coding: multiple fragments that can be delivered in any order

Path Information for both forwarding and service sublayer

- Þ Path Information provides a scope for redundancy information
- Þ DetNet places flows on paths (water and pipe analogy), and forwards along paths
- Þ Same path same DetNet treatment and fate share for all flows and OAM
- Þ A PREOF path is not a linear sequence of nodes (terminology issues in sight)

A native IPv6 signaling for DetNet dataplane

The draft places the DetNet info in the IPv6 Hop-By-Hop Extension Header

DetNet information available early in the packet and easy to grab

- Þ No need to dig down to transport header to find port info

Signals the path and PHB independently of the transported flows

- Þ Enables tunneling, OAM, and flow aggregation with common treatment

Fits IPv6 architecture to coexist with other IPv6 extensions e.g., SRv6

Fits DetNet architecture whereby edge nodes assign DetNet flows "to specific paths through a network“ [RFC 8655]

Can we use the IPv6 HbH Extension Header?

Using EH's has gained traction recently

- See success of SRH with SRv6
- RFC 8200 allows routers to ignore HbH options (removed a MUST)
- "IPv6 Hop-by-Hop Options Processing Procedures" to make it even simpler

Less Complexity in Dataplane

- 6-tuple is a complex key to read and use, and may be lost in tunneling / crypto
- EH comes naturally with tunneling at PE if end-systems not service-aware
- The HbH EH is always first after the IPv6 Header: simpler P4 / ASIC processing

Current version is 04

First personal submissions in quick sequence

Early comments on applicability and option details

- DetNet Redundancy Information Option
  - Þ Sequence but but not only (e.g., time, include Net coding)
  - Þ Could be placed in DO if/when SRH signals service sublayer
- DetNet Strict Path Option
  - Þ DetNet forwarding layer is strict
- DetNet Loose Path Option
  - Þ Relaxed to traverse non-service-aware
  - Þ Could/Should be fully replaced by SRH

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