IPv6 Hop-by-Hop Options for DetNet

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DetNet dataplane requirements for IPv6

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

Path Information for both forwarding and service sublayer
- Path Information provides a scope for redundancy information
- DetNet places flows on paths (water and pipe analogy), and forwards along paths
- Same path → same DetNet treatment and fate share for all flows and OAM
- 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

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

Signals the path and PHB independently of the transported flows

- 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**
  ß Sequence but but not only (e.g., time, include Net coding)
  ß Could be placed in DO if/when SRH signals service sublayer

• **DetNet Strict Path Option**
  ß DetNet forwarding layer is strict

• **DetNet Loose Path Option**
  ß Relaxed to traverse non-service-aware
  ß Could/Should be fully replaced by SRH