

IPv6 Options for DetNet

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DetNet dataplane requirements served

Do not mix Flow (the water) and Path (the pipe)

↳ Allow multiple flows and OAM with same treatment

Rich set of redundancy and path information

↳ DetNet state in each node vs. inline (SRH) => path info is processed
HbH

↳ Not just sequence cnt, value using timestamp or opaque from ULP or
LLP

↳ Loose path information for slice / VRF / topology information

Early in the packet for hardware consumption

DetNet detailed 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

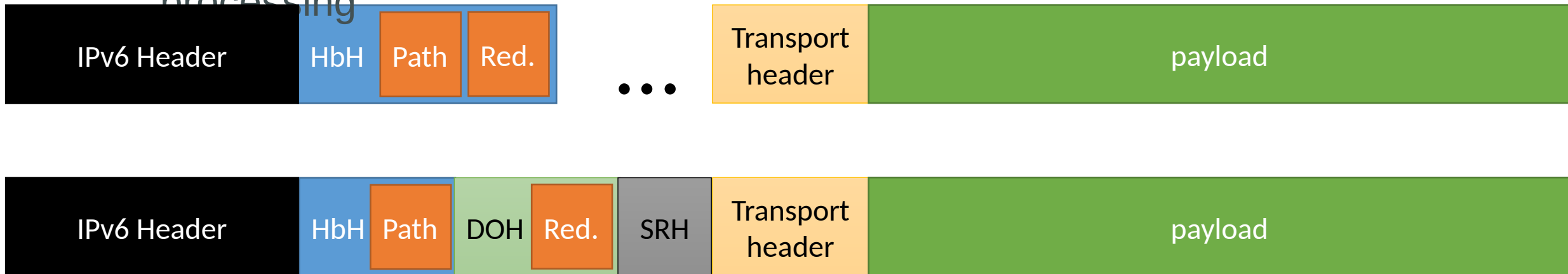
- Path Information provides a scope for redundancy information
- DetNet places flows on paths need to signal that path in IPv6 Headers
- Same path → same DetNet treatment and fate share for all flows and OAM
- PREOF requires multipathing, not a linear sequence of nodes (terminology

IPv6 HbH vs. Destination Option Header?

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

processing



e.g. Strict path, service sublayer relay nodes indicated in SRH

Current version is 06

New: combines HbH with DOH + SRH

New: Example headers combos

- DetNet Redundancy Information Option in HbH or DOH
 - ↳ Sequence but not only (e.g., time, include Net code)
 - ↳ Could be placed in DOH if/when SRH signals service support
- DetNet Strict Path Option in HbH only
 - ↳ DetNet forwarding layer is strict
- DetNet Loose Path Option in HbH or DOH
 - ↳ Clarified use, e.g., to signal Topology or slice

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Questions / Discussion

A native IPv6 signaling for DetNet dataplane

The draft places the DetNet info in the IPv6 Extension Headers as OH

DetNet information available early in the packet and easy to grab

- HbH always comes first after IPv6 Hdr, DOH is before SRH if present

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]

Current version is 04

First personal submissions in quick sequence

Early comments on applicability and option details

- DetNet Redundancy Information Option

- ↳ Sequence but but not only (e.g., time, include Net coding)

- ↳ Could be placed in DO if/when SRH signals service sublayer

- DetNet Strict Path Option

- ↳ DetNet forwarding layer is strict

- DetNet Loose Path Option

- ↳ Relaxed to traverse non-service-aware

- ↳ Could/Should be fully replaced by SRH

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