LOOPS (Local Optimizations on Path Segments) and its Geneve binding

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draft-bormann-loops-geneve-binding
draft-li-tsvwg-loops-problem-opportunities
draft-welzl-loops-gen-info
Recap: LOOPS aims to provide in-network loss recovery over specific segment to optimize packet delivery

Elements of LOOPS
- Information model for local **recovery**: in-network retransmission/FEC
  - Can be encapsulated in a variety of formats; define some of those
- Local **measurement**: e.g. segment forward delay/variation
  - To set recovery parameters
- Congestion **feedback**: drop-to-mark
  - ECN to inform end hosts about congestion loss
Recap: LOOPS is normally enabled over overlay tunnel

- Various scenarios:
  - Overlay path via cloud
  - SD-WAN based branch office interconnect
  - Improve multipath
  - Wireless subpath, e.g. satellite
How it relates to Geneve

• From IETF105 to IETF108:
  – IETF105: Non-WG-forming BoF. Explore the design space
  – IETF108: WG-forming BoF. Narrow down to MVP (Minimum Viable Protocol)
    • Some design space consensus (drop-to-mark, FEC default)
    • For encapsulation: focus on Geneve encapsulation first

• Solution sketch gives the whole picture of LOOPS function
  – Sequence space, Initial sequence number determination, ACK/NACK generation
  – Loss detection, Retransmission persistency, Local measurement
  – draft-welzl-loops-gen-info

• Geneve binding defines the format when embedding LOOPS to Geneve
  – Map the functions to Geneve, define data plane format, take care of Geneve specifics
  – draft-bormann-loops-geneve-binding-00

![Figure 2: Type Field Format in Geneve LOOPS Option](image1)

![Figure 3: Variable Option Data Format in Geneve LOOPS Option](image2)

![Figure 4: Flags in Variable Option Data in Geneve LOOPS Option](image3)
LOOPS BoF in IETF108

• BoF Info
  Friday, July 31, 2020 (UTC)
  11:00-12:40 (UTC) Session I
  Room 7
• Chairs: Spencer Dawkins, Andrew McGregor, Brian Trammell
• Description: LOOPS performs local optimizations within segments of an end-to-end path, in tunnels carrying aggregate flows. LOOPS recovers lost packets using retransmission and/or forward error correction (FEC), without requiring explicit cooperation from end hosts. After a non-WG-forming BOF at IETF 105 and further sharpening the charter proposal at https://github.com/loops-wg/ to a Minimum Viable Protocol, this is now a WG-forming BOF.