Packet Loss Signaling for Encrypted Protocols

draft-ferrieuxhamchaoui-tsvwg-lossbits

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Networks can look like dumb pipes, only if someone can find leaks and patch them quickly

• TCP: observe seq#, ack#, sacks

• Transport with encrypted headers: 😞
  (QUIC has a “latency Spin bit”, so you may get an RTT estimate but not loss)
Proposal: Two “Loss bits”

- **Q**: The “sQuare signal” bit is toggled every N outgoing packets (akin to color in RFC 8321)

- **L**: The “Loss event” bit is 1 when Unreported Loss counter (ULC) > 0
  - UCL is *incremented* for each packet deemed lost by the protocol
  - UCL is *decremented* for each packet sent with L=1
Loss Calculation

- **End-to-End loss** ($e$)
  \[ e = \text{fraction of packets with } L=1 \]

- **Upstream loss** ($u$)
  \[ u = 1 - \frac{\text{average # of observed packets in a block (same Q)}}{\text{size of the block}} \]

- **Downstream loss** ($d$)
  \[ (1 - u)(1 - d) = 1 - e \]
  \[ d = \frac{e - u}{1 - u} \]
Experimental Data

Akamai serving QUIC to some Orange users in an African country
Interested?

• Side Meeting
  Monday 8:30am in Sainte-Catherine

• WG Discussion
  tsvwg (Thursday) — focus on the bits
  maprg (Friday) — focus on the measurements

• Contact Authors
  draft-ferrieuxhamchaouiti-svwg-lossbits