

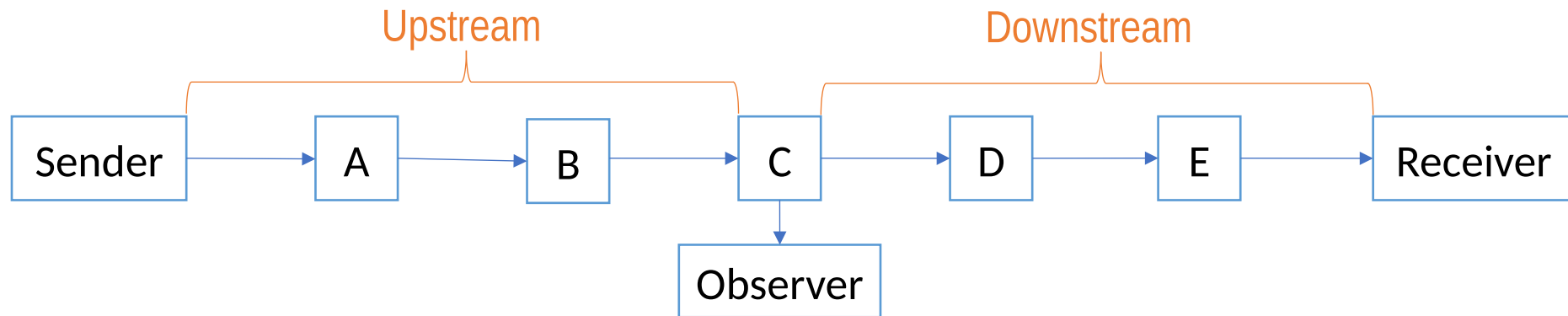
Troubleshooting QUIC Streaming

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Mops WG meeting, IETF106

Monitoring and Troubleshooting

Operators must monitor Delay and Loss and address problems quickly



- TCP: observe seq# (and ack#/sack#, if path is symmetric)
- QUIC encrypts protocol headers
 - Delay and Loss signaling must be explicit
- “*Just observe similar TCP flows*” is not a good answer

Packet Delay and Loss for Media Streaming

- Media streaming is the largest QUIC use case
- Streaming performance is sensitive to:
 - Change in round trip delay
 - Packet loss

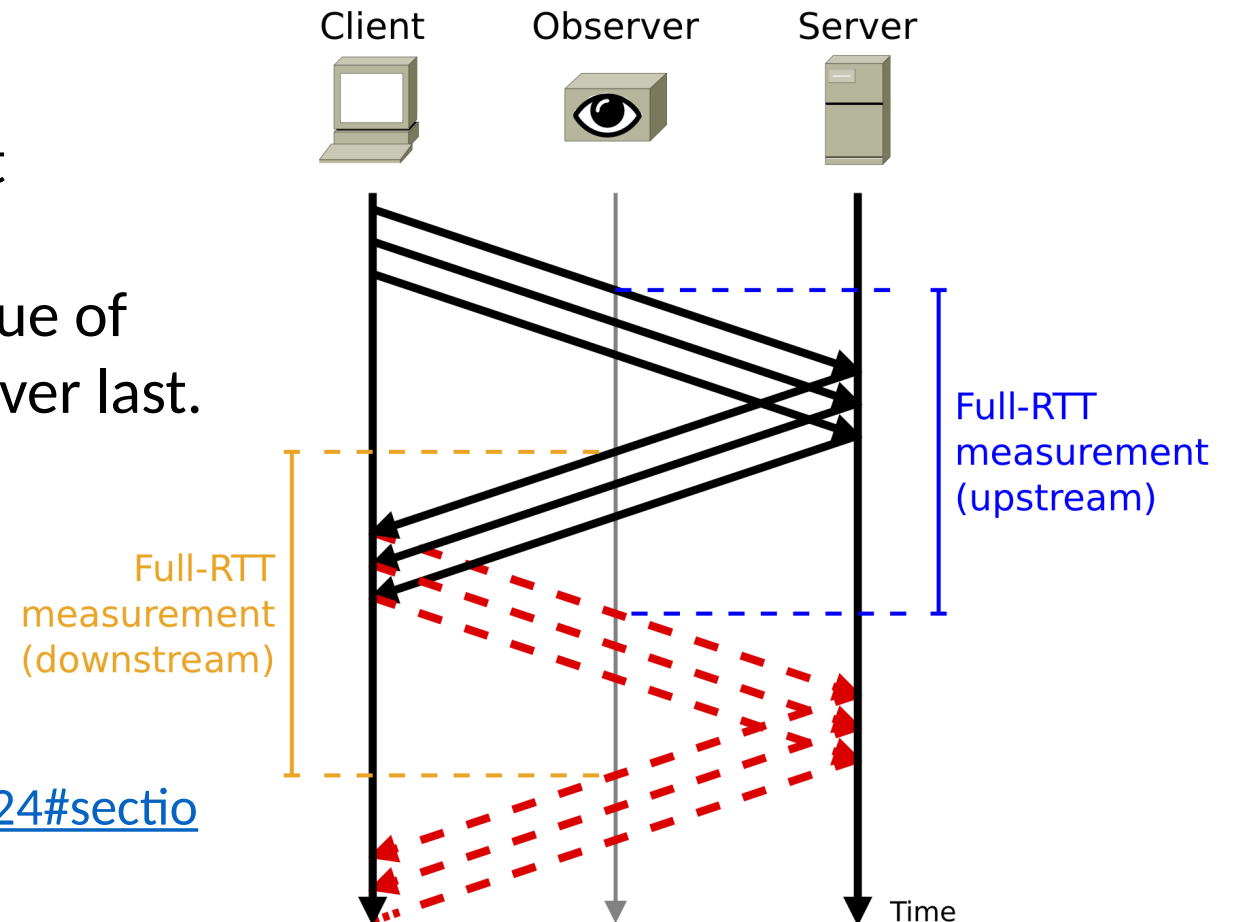
QUIC Delay Measurement - Spin Bit

Spin Bit is already in QUIC v1 spec

- Server echoes the last value of the Spin Bit received from the client.
- Client sends packets with the Opposite value of Spin Bit than what it received from the server last.
- QUIC Short Packet Header (1st byte)

0 1 S R R P P

- Spin Bit: Delay Measurements
- <https://tools.ietf.org/html/draft-ietf-quic-transport-24#section-17.3.1>



QUIC Loss Measurement – Experiments

No Loss signal in QUIC v1 spec

Expect QUIC Extension draft(s) for loss measurements by extending Spin Bit methodology to Loss Measurements

QUIC Short Packet Header (1st byte)

0 1 S R R P P

- **Reserved** Bits: There are proposals to use for Loss measurements:
 - draft-ferrieuxhamchaoui-quic-lossbits
 - draft-cfb-tsvwg-spinbit-new-measurements

Benefit of explicit signal (RFC 8558)

- Detecting the connections that are losing packets requires observing the headers of most of them!
- Explicit signal avoids exporting keys to the probe for decoding packet traces
- Key distribution does not work even within own domain:
 - Resilience: Key distribution lossy or slow under severe network conditions
 - Security: Insecure
 - Privacy: Exposes client and application data unnecessarily

Conclusion

Request

*If you believe explicit loss signaling is important,
speak up and watch for QUIC extension drafts for loss bits!*

Links

- QUIC transport protocol spin bit:
draft-ietf-quick-transport (17.3.1. Latency Spin Bit)
- Loss detection proposals:
draft-ferrieuxhamchaoui-tsvwg-lossbits
draft-cfb-tsvwg-spinbit-new-measurements

Links

<https://www.ietfjournal.org/enabling-internet-measurement-with-the-quic-spin-bit/>

<https://tools.ietf.org/html/draft-stephan-quic-interdomain-troubleshooting-03>

<https://tools.ietf.org/html/draft-ietf-quic-transport-24#section-17.3.1>

<https://datatracker.ietf.org/doc/draft-ferrieuxhamchaoui-tsvwg-lossbits/>

<https://tools.ietf.org/html/draft-cfb-tsvwg-spinbit-new-measurements-00>

<https://github.com/britram/draft-trammell-quic-spin/blob/master/draft-trammell-quic-spin-00.md>

<https://datatracker.ietf.org/meeting/105/materials/slides-105-tsvwg-sessb-32-loss-signaling-for-encrypted-protocols>