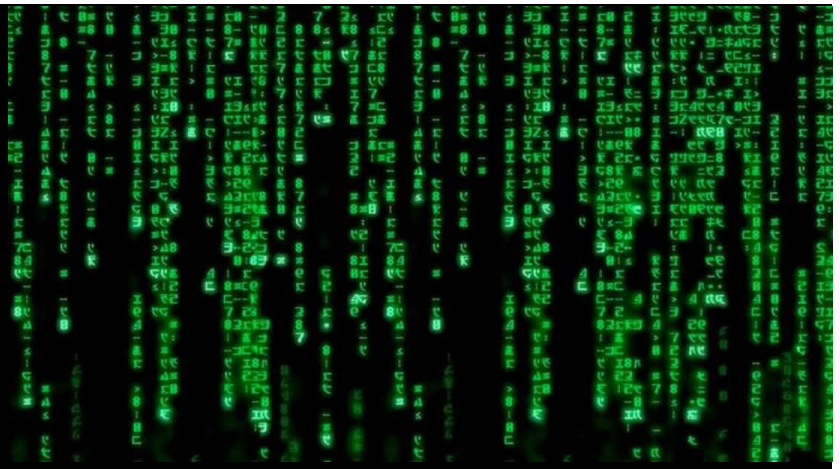
Networking with QUIC



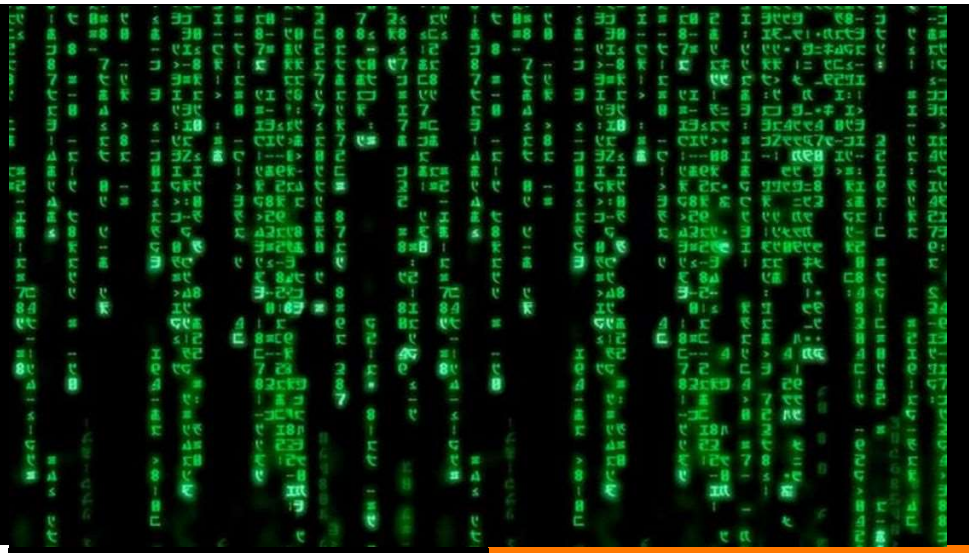
In search of lost metrics

Alexandre Ferrieux, Isabelle Hamchaoui
Orange Innovation

orange™

Orange Expert Programme

What is QUIC ?



Child of the NSA scandal : Enhanced privacy, no linkability!

Paranoid QUIC community at IETF against operators

A transport protocol similar to advanced

TCP

versions with deep encryption including packet numbers

30% of

Orange traffic

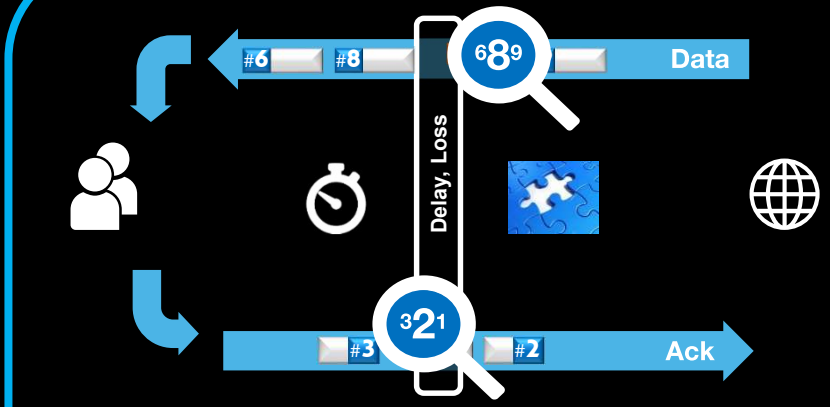
Start in 2014, IETF standard in 2021

HTTP/3

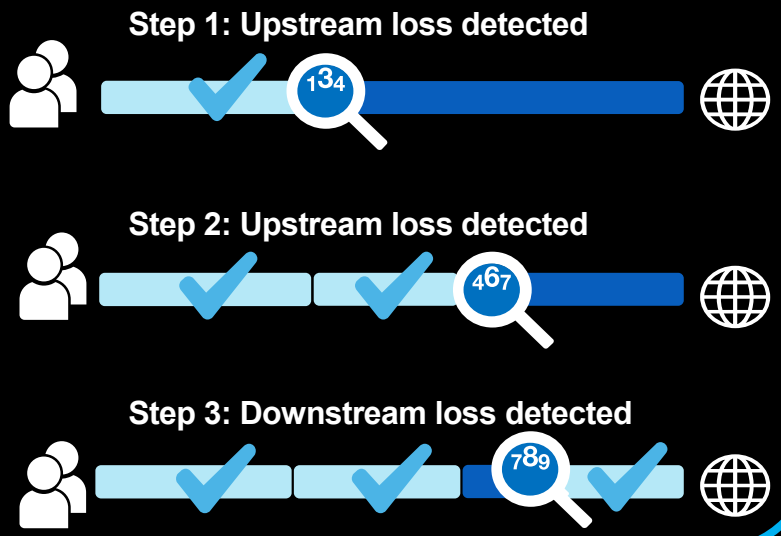
QUIC

Standard Transport Layer

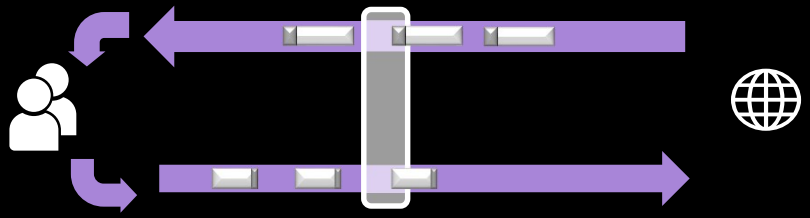
TCP versus QUIC Troubleshooting



Loss detection and location via nomadic probe



TCP

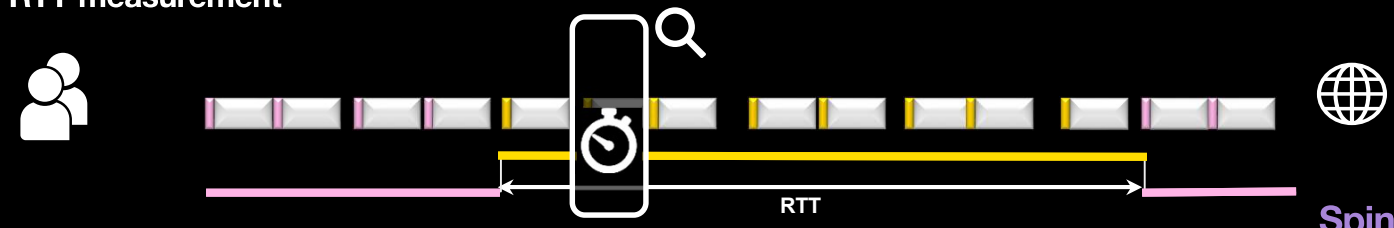


QUIC suspicious paths are not TCP ones

QUIC

Proposals for QUIC observability

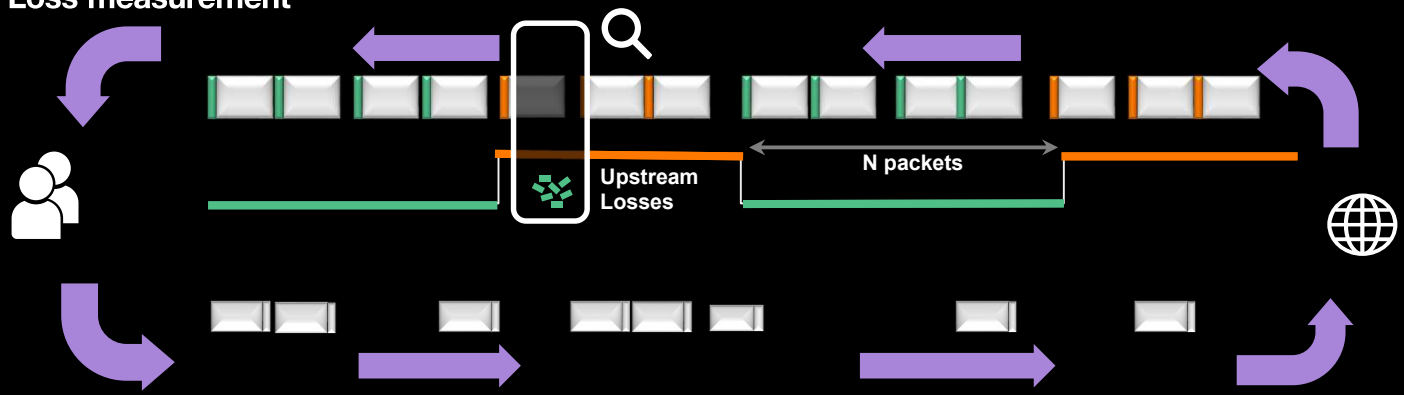
RTT measurement



The spin Bit toggles every round trip

Spin bit – standard option

Loss measurement



The sQuare bit delineates blocks of N emitted packets

Loss bits - proposal

Key Take-aways

Risks - Loss of key indications for Telcos

- Operators' blindness in case of customer experience degradation
- No easy way to distinguish between different actors' responsibility

Solutions for QUIC observability

- Only minor changes in QUIC stacks, but requires inclusion in RFC + feature enabled on both end-points
- The spin bit option shipped in QUIC v1 but never activated by GAFA
- No IETF consensus on the loss bits: interest expressed only by CDN providers and few operators (Orange, Akamai, Lightspeed, Satcom, TIM)

References

- First draft presented at IETF 104 (March 2019)
  https://datatracker.ietf.org/doc/draft-ferrieuxhamchaoui-quic-lossbits
- Orange-Akamai trial presented at IETF 105 (July 2019)
  https://datatracker.ietf.org/meeting/105/materials/slides-105-maprg-packet-loss-signaling-for-encrypted-protocols-01
- Akamai+lightspeed step-in at IETF 106 (November 2019)
  https://datatracker.ietf.org/doc/draft-ferrieuxhamchaoui-tsvwg-lossbits/
- Satcom trial presented at IETF 106 (November 2019)
  https://datatracker.ietf.org/meeting/106/materials/slides-106-maprg-losses-in-satcom-systems-identification-and-impact
- Joint draft with Telecom Italia and Akamai (mars 2020)
  https://datatracker.ietf.org/doc/draft-mdt-ippm-explicit-flow-measurements/
- Independent evaluation from Ike Kunze et al. (Aachen university)
- *L, Q, R, and T: which spin bit cousin is here to stay? (ANRW '21)*

Thank you