PERFORMANCE IMPLICATIONS OF INTEROPERABILITY

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2nd QUIC and Satellite Open Stakeholder Meeting

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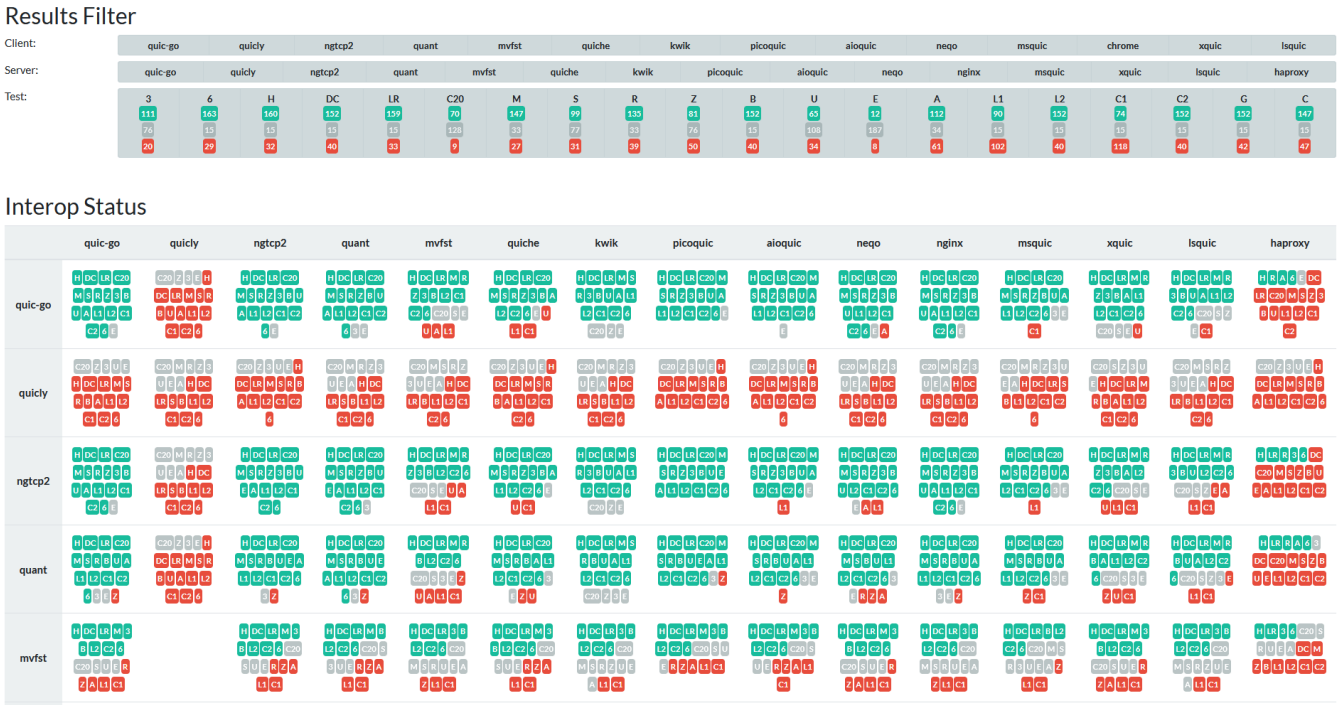
Introduction to interoperability

« Interop » matrix

- At the core of QUIC WG activity
- Help identify issues in the proposed drafts

➢ Interoperability is necessary for a quic client A to communicate with quic server B



https://interop.seemann.io/

When interoperability meets congestion controls

- **QUIC ‘core’**
  - May not specify much for the congestion control
  - Interoperability when it is needed for the life cycle of a connection (establishment, on going, ending)
- **QUIC extensions can provide interoperability for aspects of the congestion control**
  - DATAGRAM : unreliable congestion control
  - ACK Frequency : tune the ACK ratio and the delay between ACK
  - 0-RTT-BDP : efficient and careful connection resumption

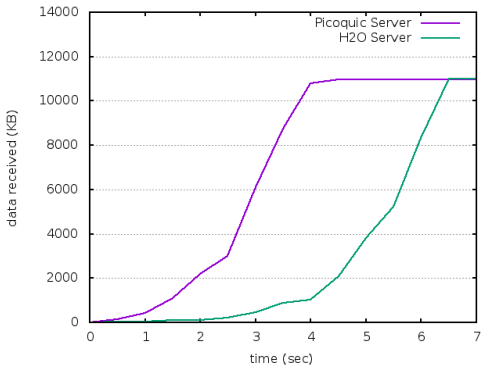
➢ **Interoperability can have an impact on the *performance***

➢ **Client and server *both contribute* to the performance of a connection**

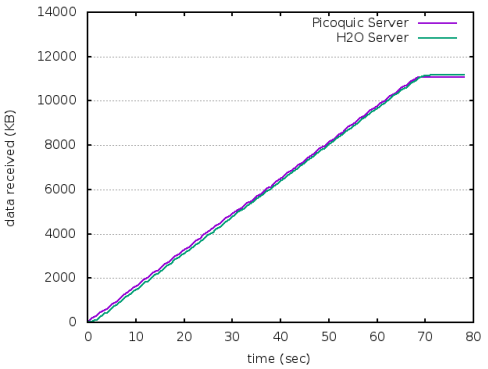
Transport Parameters and QUIC Implementations

- **Default values for congestion controls differ from one implementation to another**
- **The ACK Policy varies:**
  - PICOQUIC and QUICLY implement « ACK Frequency » (dynamic ACK policy during a connection)
  - NGTCP2 follows the RFC9000 (fixed ACK ratio)
- **ACK poilicy impacts performance**
  - 50 Mbps / 10 Mbps use-case

Transport parameters	picoquic	ngtcp2	quicly
Intitial_max_data	1Mo	1Mo	16Mo
Initial_max_stream_data_bid_local	2Mo	256Ko	1Mo
Initial_max_stream_data_bid_remote	64Ko	256Ko	1Mo
ICWND	10	10	10
Max_udp_payload_size	1252	1252	1252
Max_ack_delay	10ms	25ms	25ms
Congestion control	CUBIC, BBR	CUBIC, BBR	CUBIC



PICO-QUIC CLIENT



CURL CLIENT

Take aways

- **Interoperability may be integrated as extensions to QUIC**
  - These extensions can be negotiated, accepted or rejected
  - They may be of interest for a set of clients and servers
- **Interoperability with congestion control parameters contribute to the performance of a session**
  - Even if they affect the client!

- **Questions ?**