DLR
Computer Science 7
Computer Networks and
Communication Systems
FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG
TECHNISCHE FAKULTÄT

QUIC and Satellite Open Stakeholder Meeting

2020-11-04 (online)

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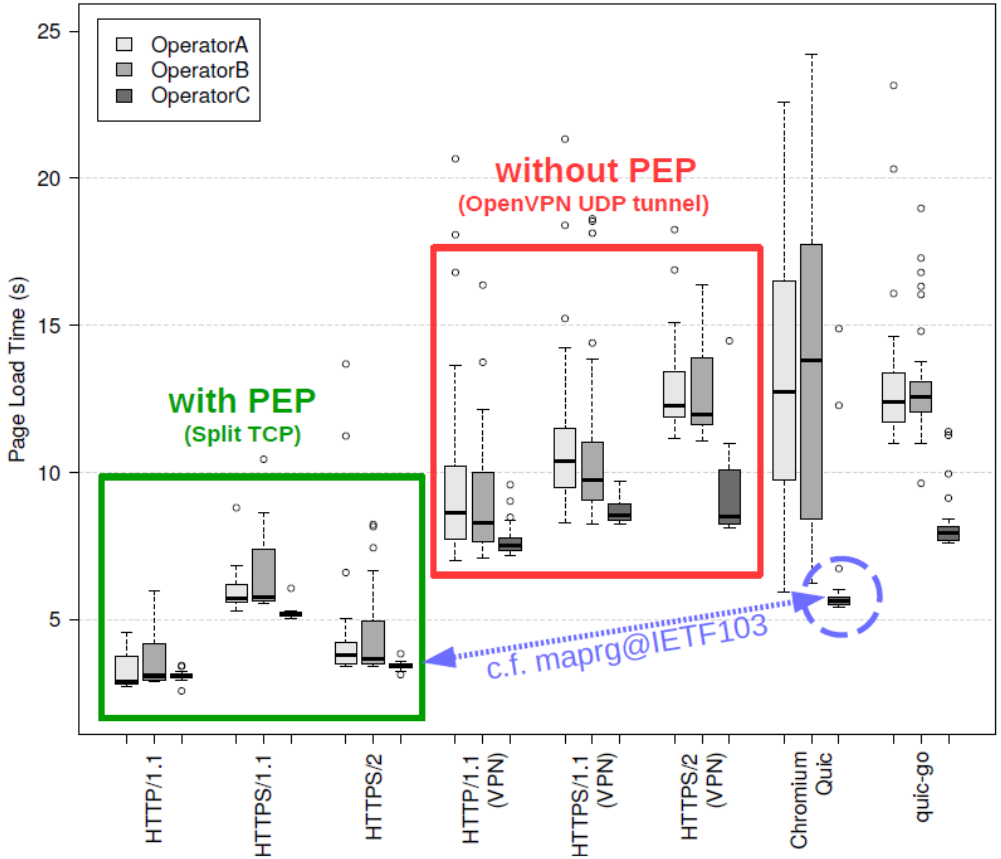
So far... QUIC performance measurements

Supported by:
Federal Ministry for Economic Affairs and Energy
on the basis of a decision by the German Bundestag

NetSys 2019

- Three different European satellite operators
- Outdated Google QUIC Q043 implementations, no 0-RTT
  - Chromium QUIC, `19eaae6`, 09/2018
  - quic-go, `ffdfa1f`, 08/2018
- Static website (34 objects, total size 1.4 Mbyte)
- Page Load Time increases with VPNs or QUIC
- QUIC performance depends on operator and implementation, but is able to perform better than HTTP over VPNs



Papers are available at
https://www7content.cs.fau.de/~deutschmann/TMC-IPv6

So far... QUIC performance measurements

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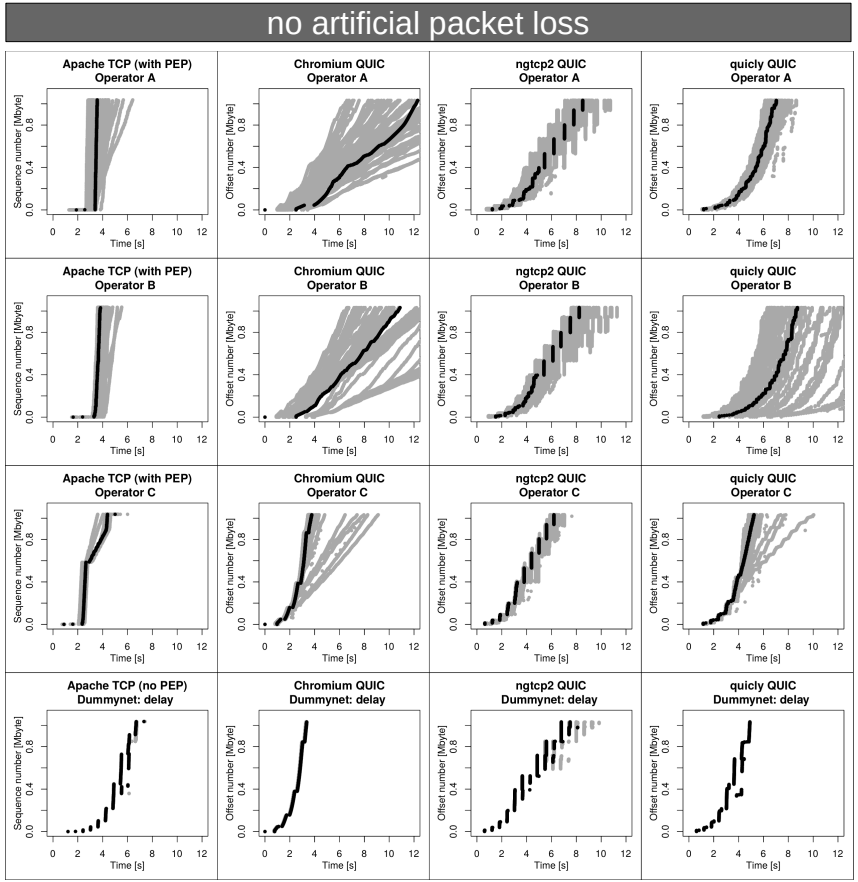
KaConf 2019

- Three different European satellite operators (+ DummyNet)
- Outdated QUIC implementations, no 0-RTT
  - Chromium QUIC Q046, `8179a83`, 08/2019
  - quicly draft-22, `56dcc95`, 07/2019
  - ngtcp draft-22, `d00bf08`, 08/2019
- 1 Mbyte object
- QUIC performance depends on operator and implementation



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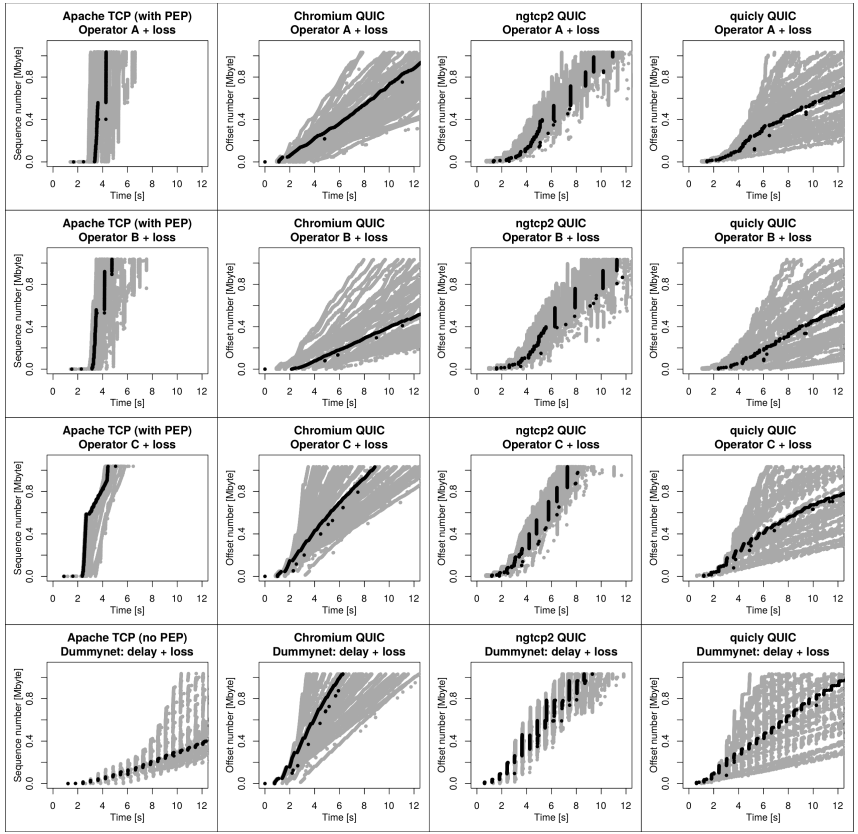
- 1 Mbyte object
- QUIC performance depends on operator and implementation
- Packet loss has very negative impact

1% artificial packet loss



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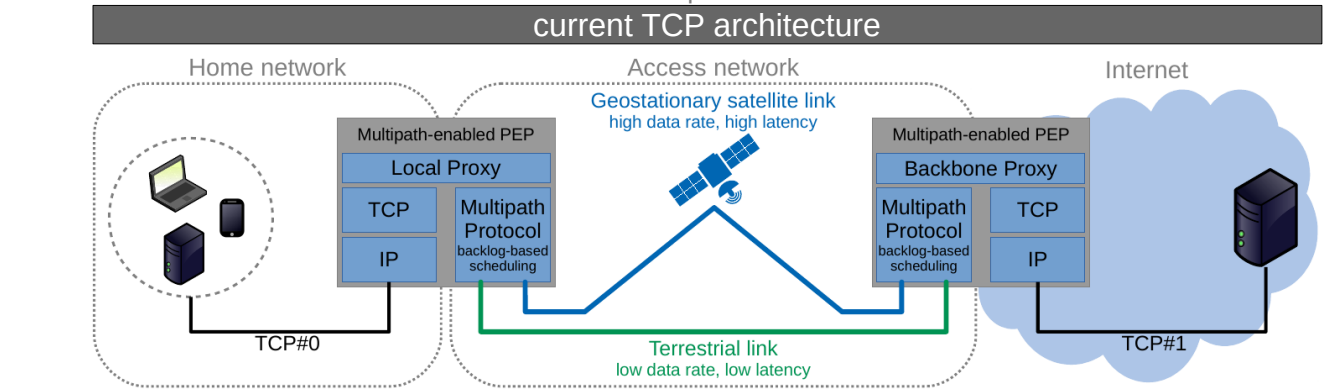
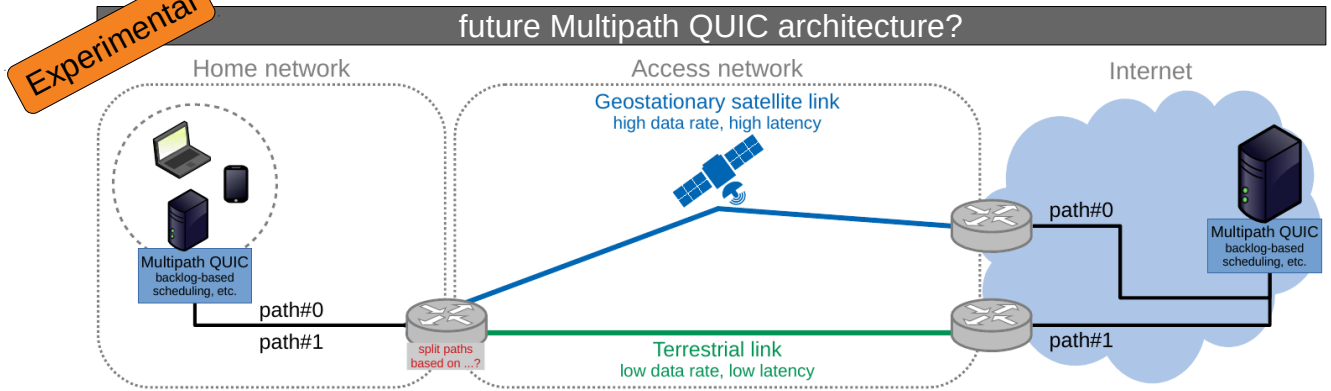
Future Research

More information https://www7content.cs.fau.de/~deutschmann/TMC-IPv6

Multipath communication with terrestrial and satellite links

- See also 5G ATSSS



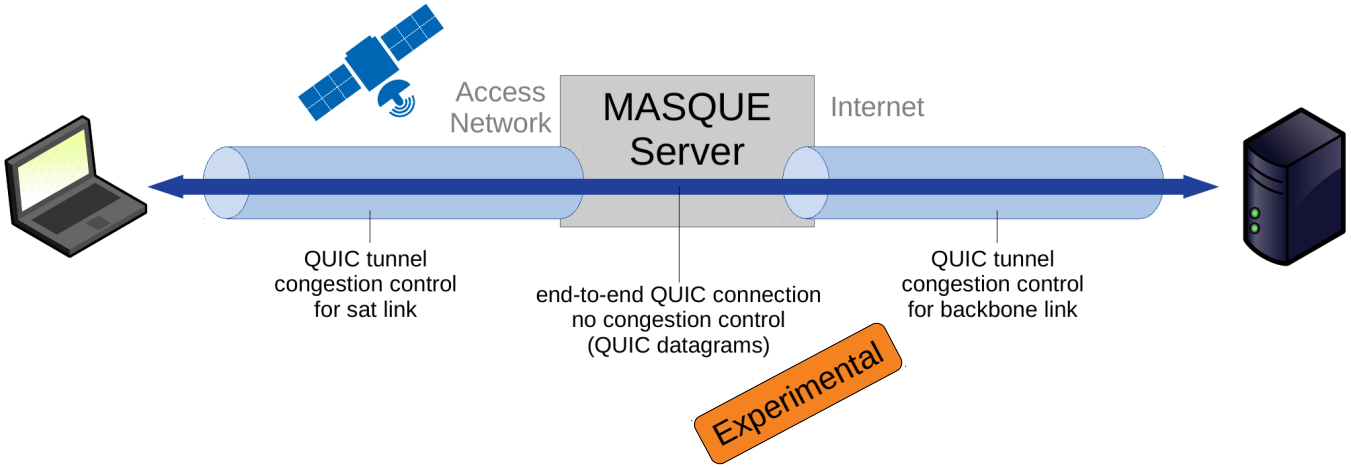


See IETF QUIC mailing list and/or 3GPP documents for discussion

Supported by ESA
5G METEORS MakerSpace

Explicit QUIC proxies (MASQUE)?

- See also 5G NTN



"But I do expect QUIC will eventually include support for explicit proxies to terminate some or all of the congestion control independently of the underlying content." Jan 23, 2015
https://groups.google.com/a/chromium.org/g/proto-quic/c/k_tPUf6JkkA/m/xueEGOJReHoJ

See IETF MASQUE mailing list for discussion

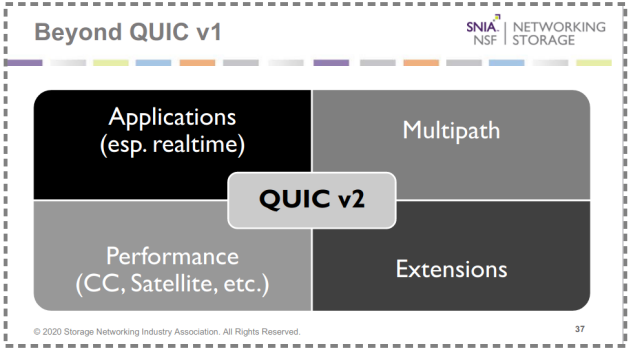
Conclusion

PEPs become inapplicable

- Problem: performance impacts
- Opportunity: architecture without middleboxes

Need for much more performance testing and IETF participation!

- Single path end-to-end QUIC over Sat (without multipath; without proxies)
- `draft-kuhn-quic-4-sat`



Source:
Lars Eggert (QUIC WG chair), *QUIC – Will it Replace TCP/IP?*
BrightTALK Webcast
https://www.brighttalk.com/webcast/663/382768/quic-will-it-replace-tcp-ip