Chair of Connected Mobility
School of Computation, Information and Technology
Technische Universität München

Pub/sub in space: DNS over MoQ

“From req/res to pub/sub: Exploring Media-over-QUIC for DNS”

Mathis Engelbart, Mike Kosek, Lars Eggert, Jörg Ott

6 November 2025

TIPTOP WG @ IETF 124

Chair of Connected Mobility
School of Computation, Information and Technology
Technische Universität München

One Motivation…

“3.1 Pre-walk all needed names”
“3.2 Pre-fetch all needed names
[…]
A method for syncing and updating all the updated records to the isolated network should be put in place, at the appropriate frequency. Typical DNS zone transfer mechanisms may not be suitable because TCP transport is likely not possible in deep space. In this case, other file transfer mechanisms may be used.”

[draft-many-tiptop-dns-01]

- Why not automate replication – of just those records that changed?
- Proactively upon change – avoiding sync lags and response delays
- Avoiding having to explicitly craft and maintain domain lists

Disclaimer

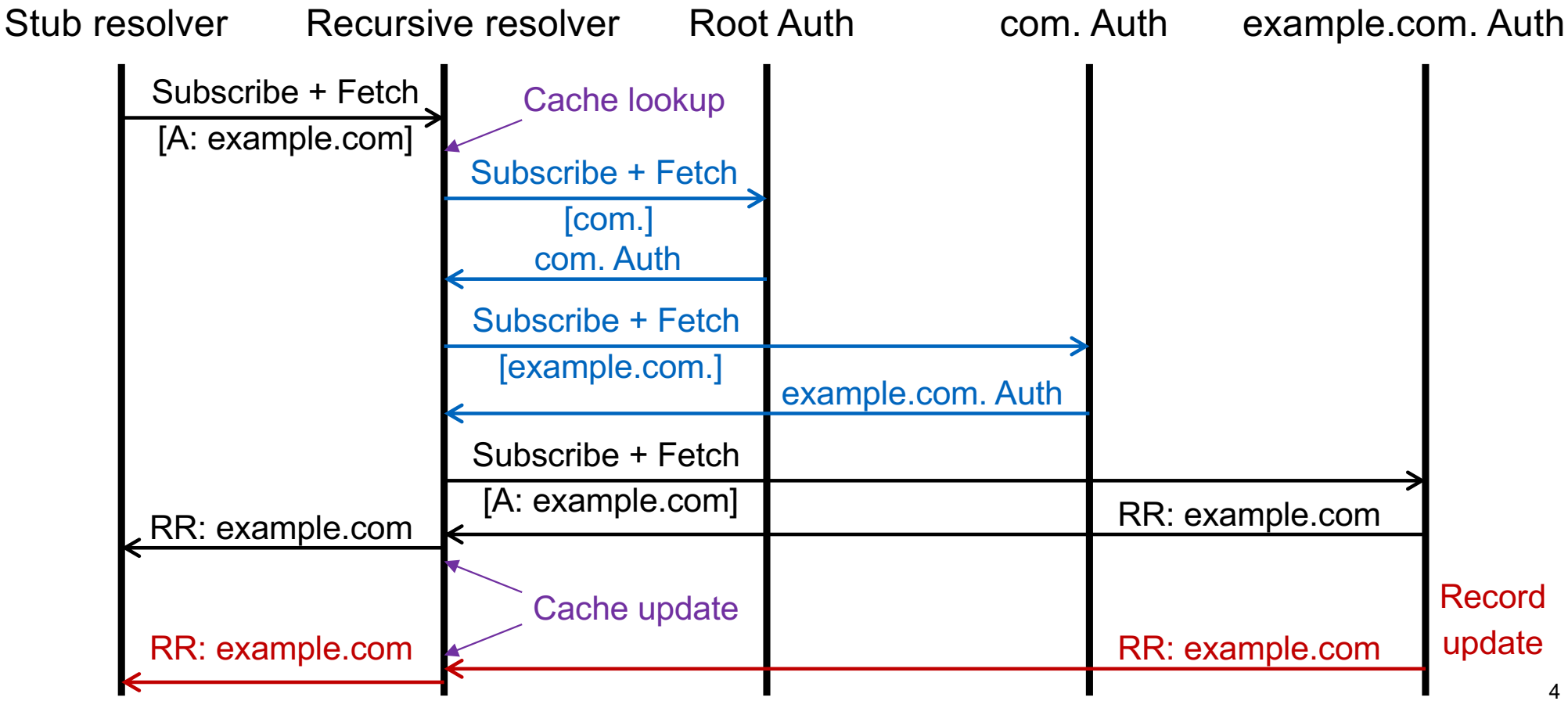
- Using Media-over-QUIC Transport (MoQT) as a Substrate for pub/sub
- Convenient, available, implemented

But:
- Could be another pub/sub mechanism
- Could be protocol extensions to DNS
- Could be yet something else

- This is more about the concept than the specific proof-of-concept

Chair of Connected Mobility
School of Computation, Information and Technology
Technische Universität München

Overview

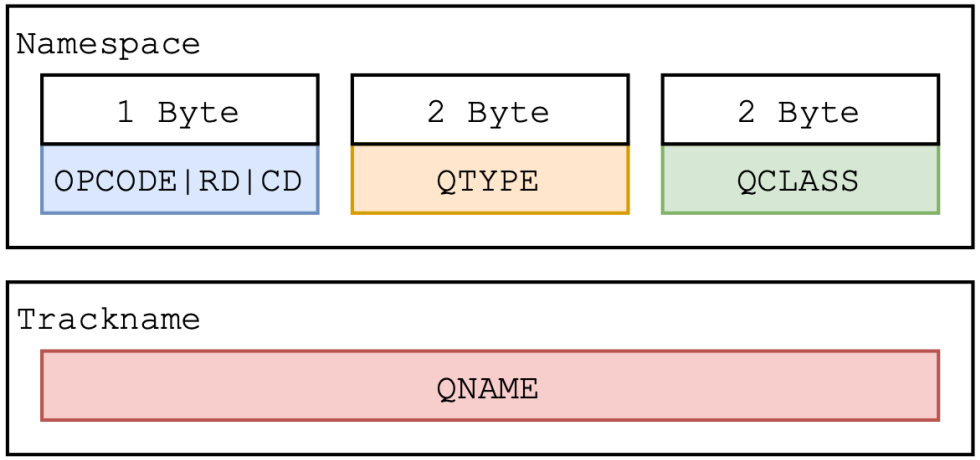


Chair of Connected Mobility
School of Computation, Information and Technology
Technische Universität München

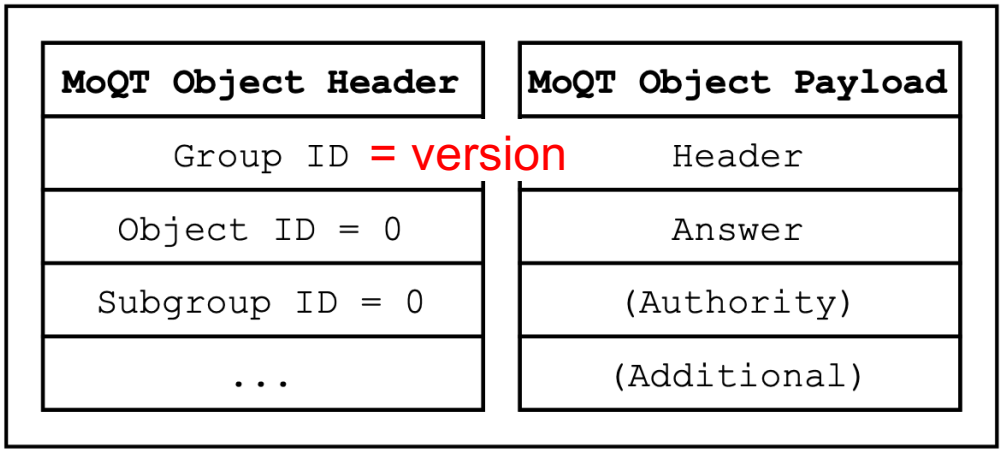
Minimal mapping

- Need to ensure that different DNS requests for the same record match

DNS Query



DNS Response



Incremental / partial deployment

- Recursive resolver may speak regular DNS to either side
- Accept regular DNS requests from the stub and translate into subscriptions
  - Respond with proactively received, cached records
- Actively query a regular authoritative DNS server for updates
- Local subscription management (cleanup) e.g. using heuristics
  - at stubs and recursive resolvers

Wrap-up

- Prototype implementation
  - mengelbart/moqtransport + quic-go/quic-go + miekg/dns

- Details here

  Mathis Engelbart, Mike Kosek, Lars Eggert, Jörg Ott: From req/res to pub/sub: Exploring Media over QUIC Transport for DNS. ACM HotNets, Nov. 2025.
  Pre-print: https://arxiv.org/abs/2510.26234