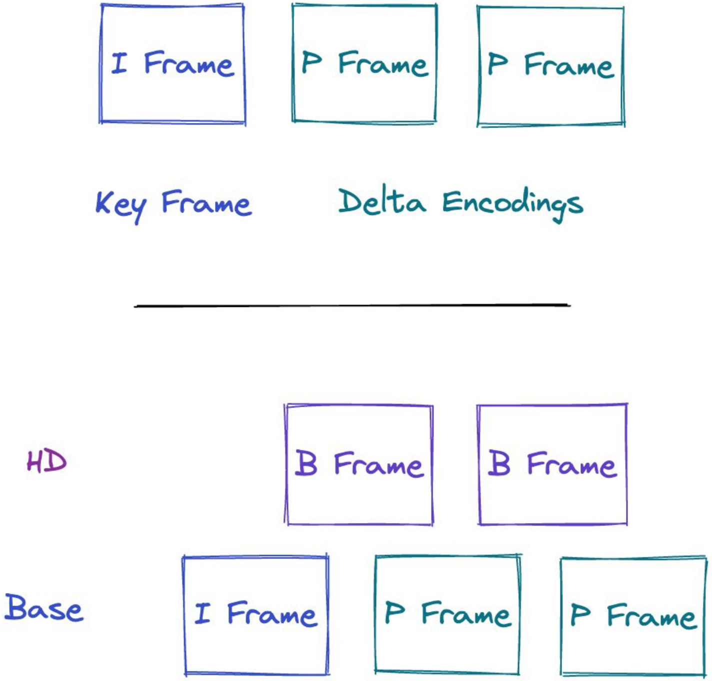
MoQ: What is it and why is it not just HTTP/3?

Alan Frindell

QUIC is a great fit for low-latency video

HTTP, not so much



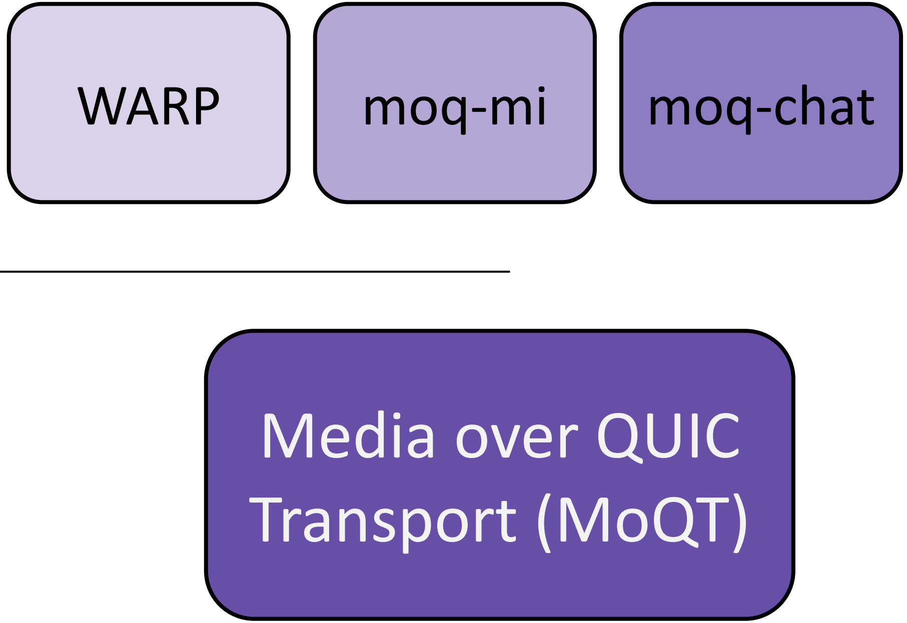
Not all data is equally important

Depending on which frames are lost, the viewer may get an acceptable experience

MoQ - Two new protocol layers

Media Specific - Implemented by publishers and subscribers

Media Agnostic - Implemented by proxies, relays and caches



WARP

moq-mi

moq-chat

Media over QUIC Transport (MoQT)

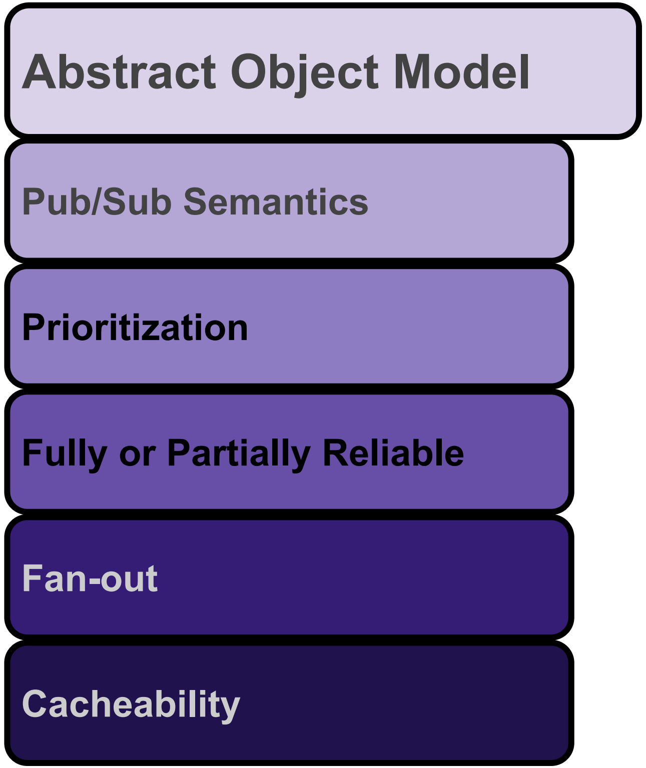
QUIC

On Naming

Media over QUIC Transport (MoQT)

All of those words are wrong

MoQT Features


Abstract Object Model

Pub/Sub Semantics

Prioritization

Fully or Partially Reliable

Fan-out

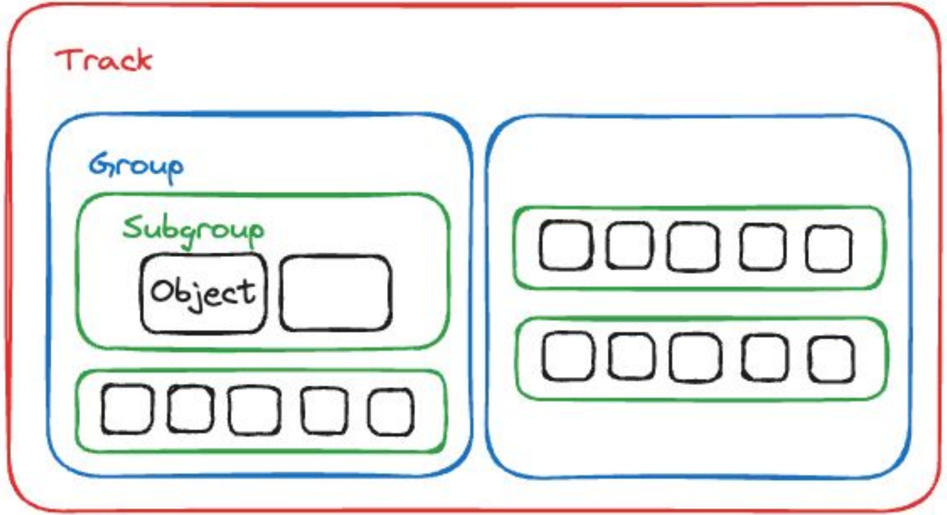
Cacheability

Track = Sequence of data

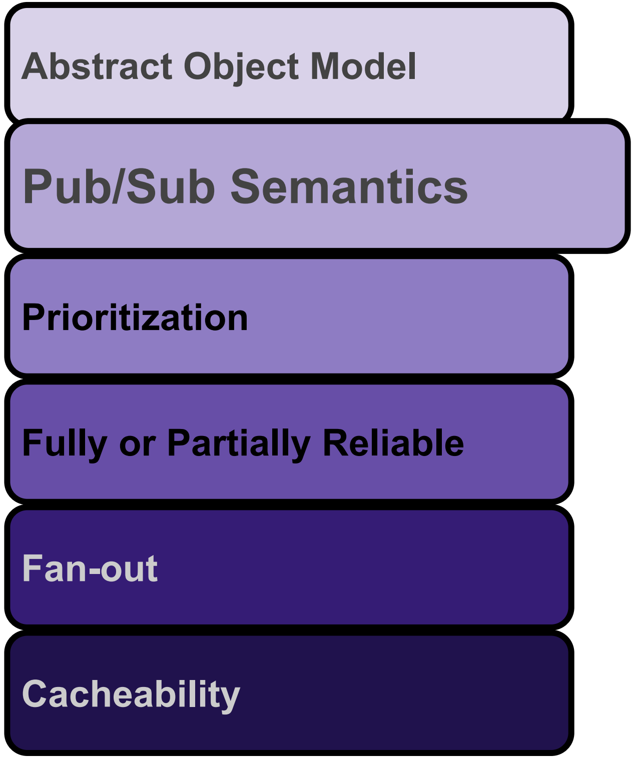
Groups = Join Points

Subgroups = Dependencies (**QUIC Streams**)

Objects = Addressable units with metadata



MoQT Features



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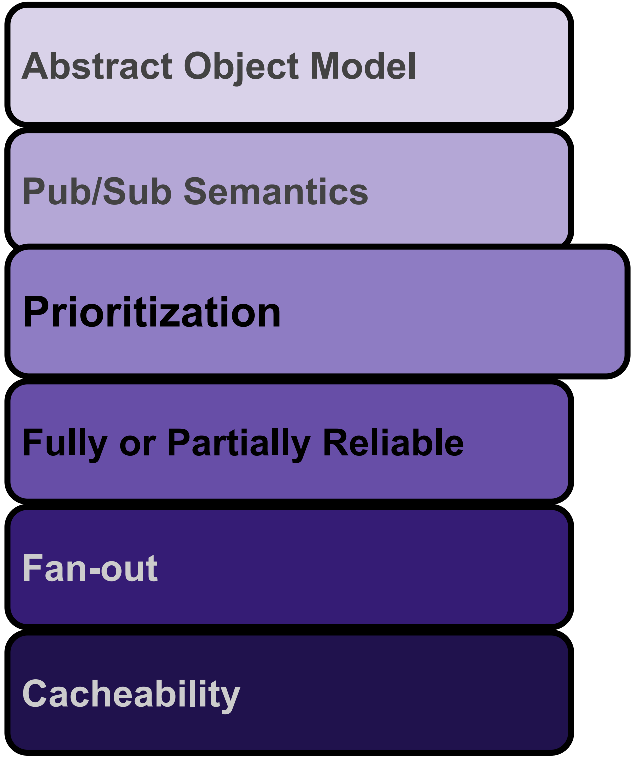
Natural paradigm for live and real-time data

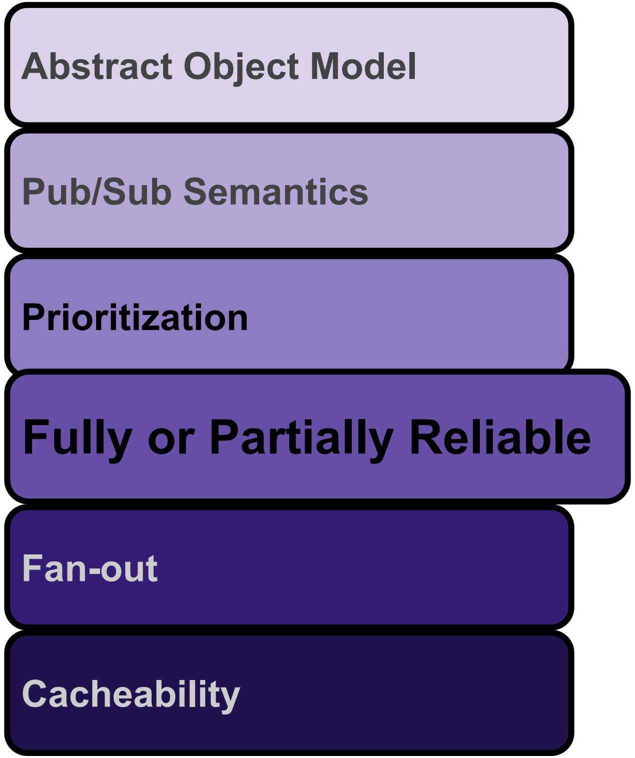
MoQT Features



Most important data is delivered first during congestion:

- Audio **>>** Video
- Low-res **>>** High-res
- Fresh **>>** Stale

MoQT Features



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Timeouts

Objects can be dropped if they are too old to be useful

Datagrams

No retransmission machinery

MoQT Features

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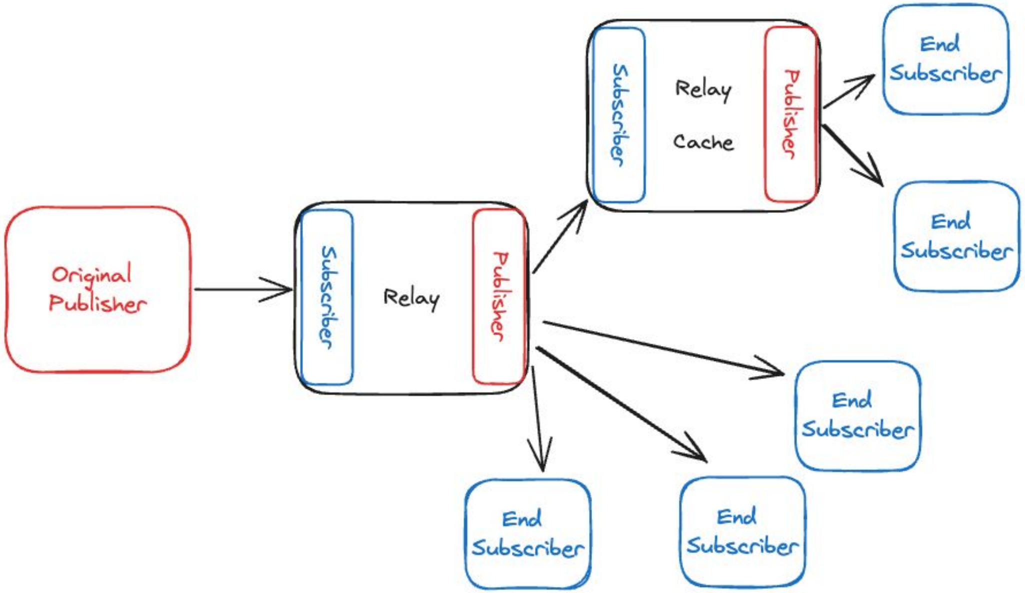
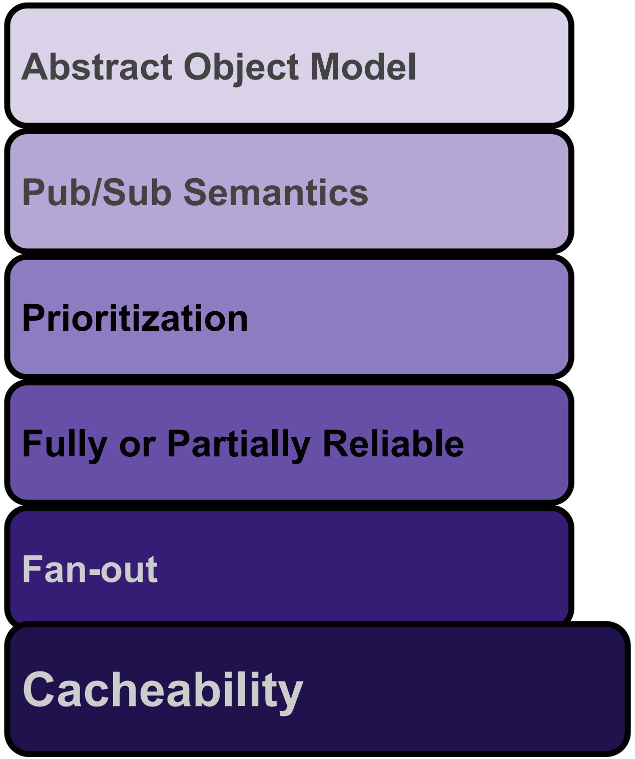
Relays are first-class citizens to achieve high scale



MoQT Features



Abstract Object Model

Pub/Sub Semantics

Prioritization

Fully or Partially Reliable

Fan-out

Cacheability

All objects are optionally cacheable

Trigger Warning

HTTP Server Push will be mentioned on the following slide

Why can’t MoQT be native HTTP/3?

- Multiple streams as part of the same response
        - Server Push is *close*, but PUSH_PROMISE and HEADERS are wasted overhead
    - Browsers never added the kind of APIs that would make push useful outside of cache fill
    - The community is done with Server Push

- Bidirectionality
    - No native client initiated unidirectional streams
    - Many clients do not support streaming POST or even streaming response delivery

Industry Interest

At least 7 Unique Implementations across C++, JS and Rust

ACM MILE HIGH VIDEO

DEMUXED

Discussion

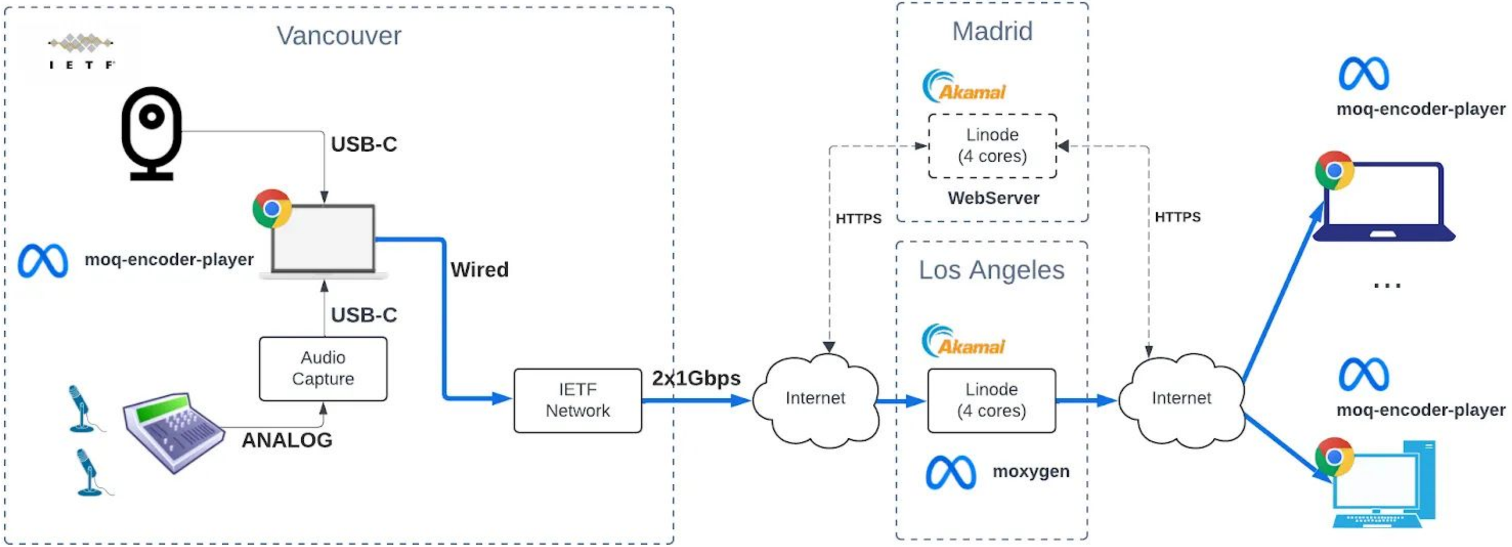
- Do you think this is headed in the right direction?
- Is WebTransport the last HTTP Extension?
- Is there value in MoQT beyond media (generic pub/sub/caching/fanout)?
- What other applications could benefit (eg: AI or AR/VR)?
- Recommendations for making MoQ successful?

Backup

MoQ is LIVE

First public live stream in July - 68~~000~~ concurrent viewers

Glass to glass latency over the internet as **low as 100ms**



Shout Out:
Jordi Cenzano