draft-navarre-quic-flexicast
Flexicast QUIC

IETF 123 - Madrid
MBONE

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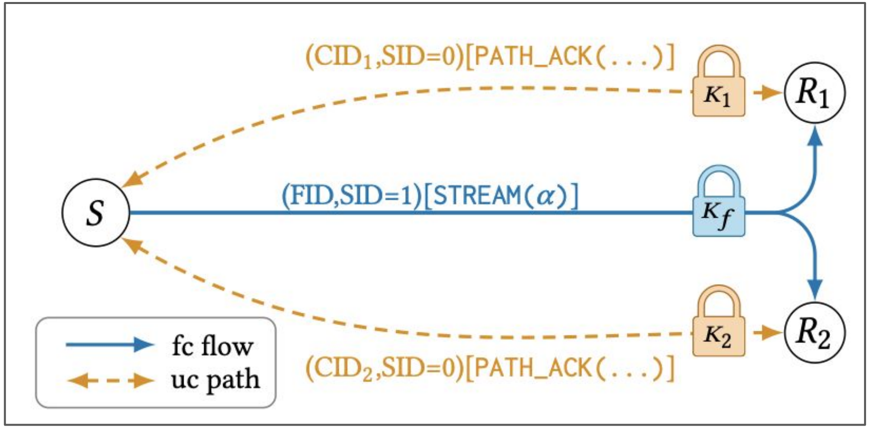
Flexicast QUIC: extend Multipath to provide seamless multicast when possible, unicast fallback

- Per-receiver, secured, bidirectional unicast path
  - Control data (ACK) and retransmissions
- Shared, unidirectional flexicast flow
  - Convey data to all receivers
  - IP Multicast destination address
- Extends Multipath QUIC
  - Viewed as a second path for the receivers
  - With a different decryption key



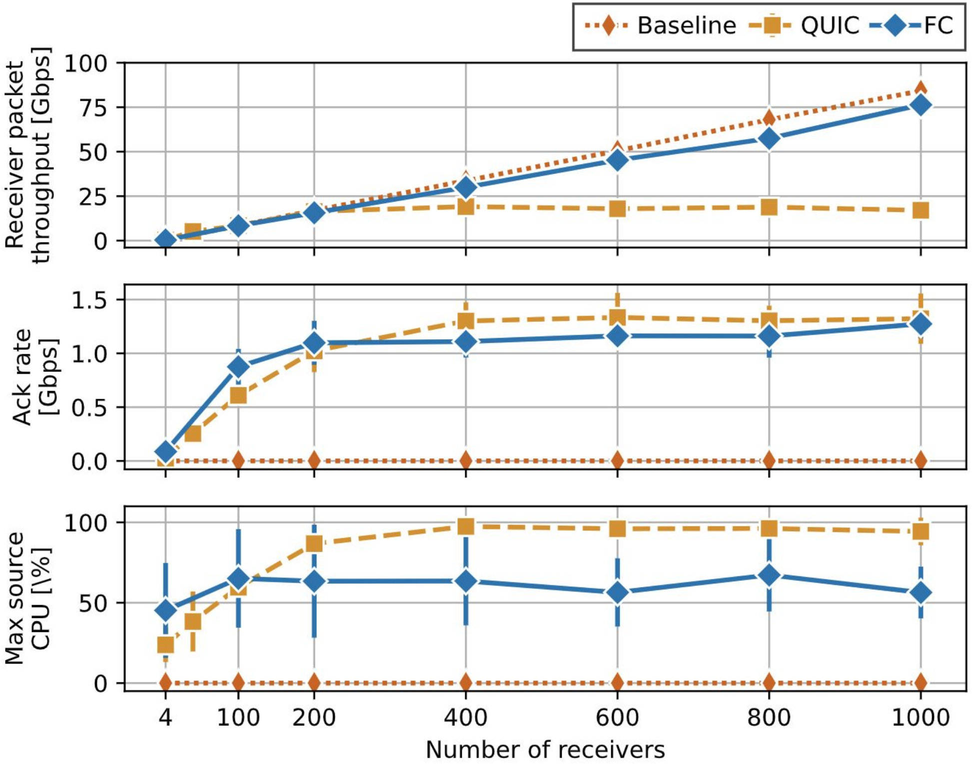
Since IETF 121: released implementation!

- IETF 121 (Dublin, November 2024)
  - Presentation of the extension
  - Discussion about possible use-cases (TreeDN) and AMT

- Working extension of Cloudflare quiche to support Flexicast QUIC!

The Flexicast QUIC source reaches up to ~80 Gbps of cumulated traffic for 1000 receivers

AMD EPYC 7452 processors, 32 CPU cores, 128 GB RAM, 100 Gbps links

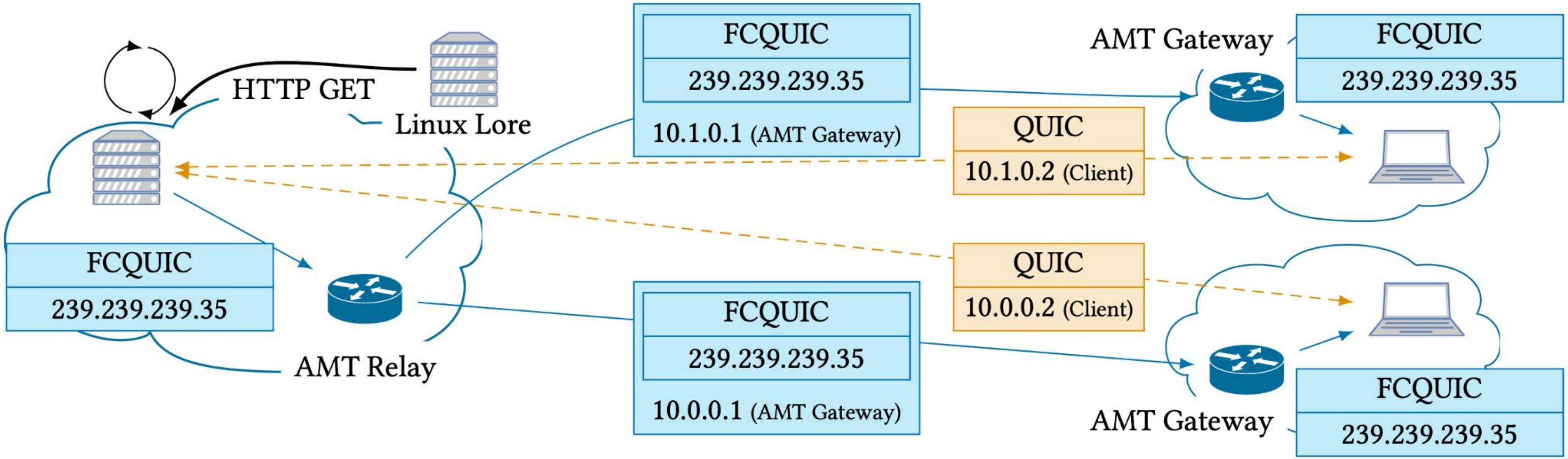


- Input traffic: ~80 Mbps
- Baseline = plain UDP above IP Multicast
- Difference with the baseline: limited by the experimental setup

Cumulated on all receivers after network replication

We host an FCQUIC source reachable on the Internet through Automatic Multicast Tunneling

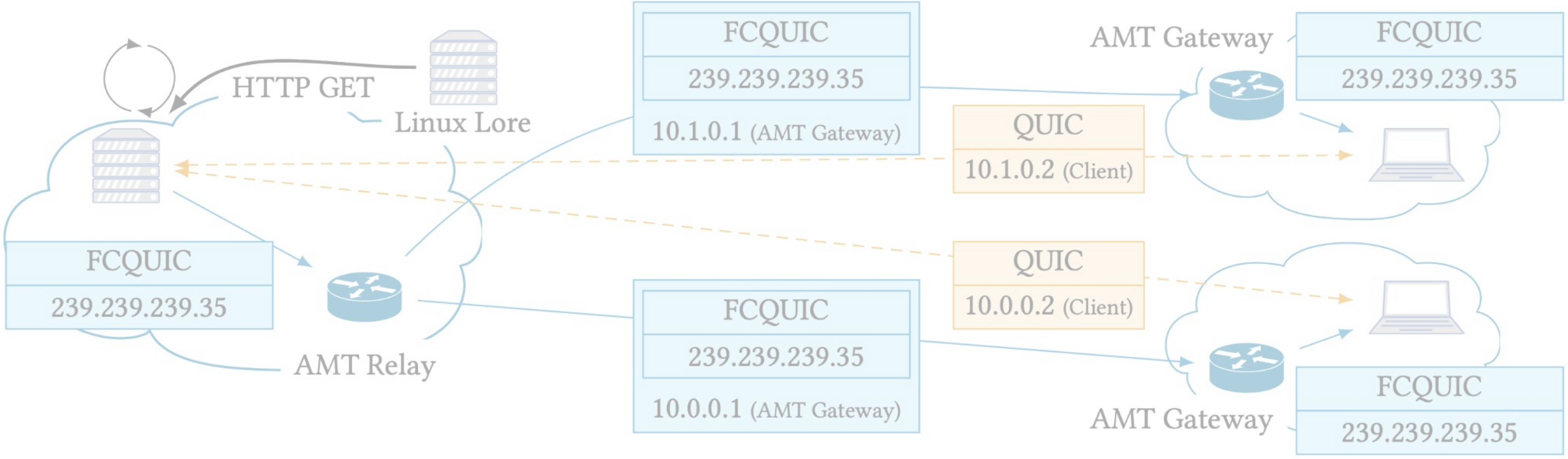
Automatic Multicast Tunneling (AMT) enables receivers to receive multicast packets through unicast-only networks (RFC 7450)



We host an FCQUIC source reachable on the Internet through AMT

Automatic Mul … ve multicast
packets throug …

Do not hesitate to connect to our FCQUIC source
The application: **push-based RSS** updates of the Linux Kernel Lore mailing list.



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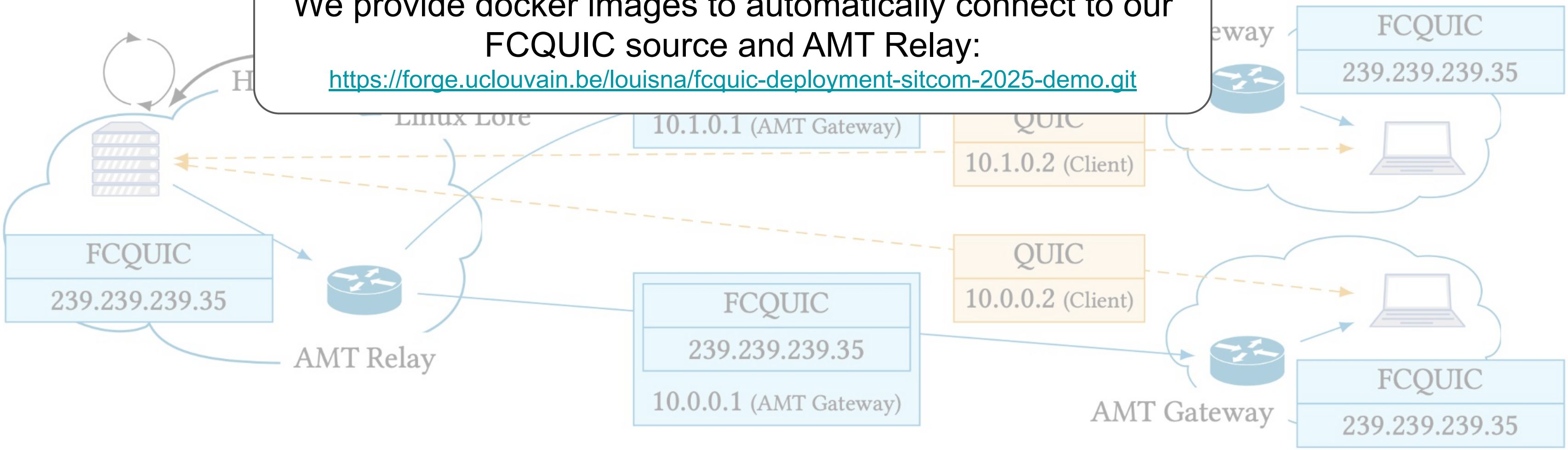
We provide docker images to automatically connect to our FCQUIC source and AMT Relay:
https://forge.uclouvain.be/louisna/fcquic-deployment-sitcom-2025-demo.git



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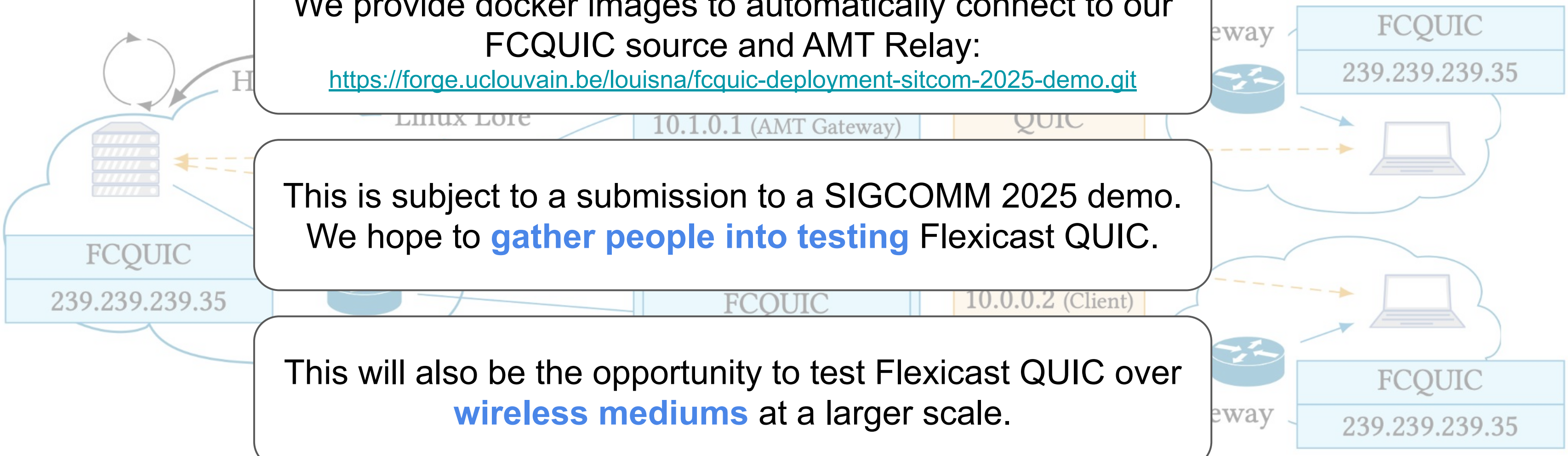
This is subject to a submission to a SIGCOMM 2025 demo.
We hope to **gather people into testing** Flexicast QUIC.

This will also be the opportunity to test Flexicast QUIC over **wireless mediums** at a larger scale.



Happy to get some feedback

- Extending Multipath QUIC to support flexible multicast
- Working implementation
- A scientific paper describing Flexicast QUIC has been published
- TreeDN + Flexicast QUIC
- Discussions with Max for merging with Jake's draft draft-jholland-quic-multicast
- Open for collaboration!
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  olivier.bonaventure@uclouvain.be

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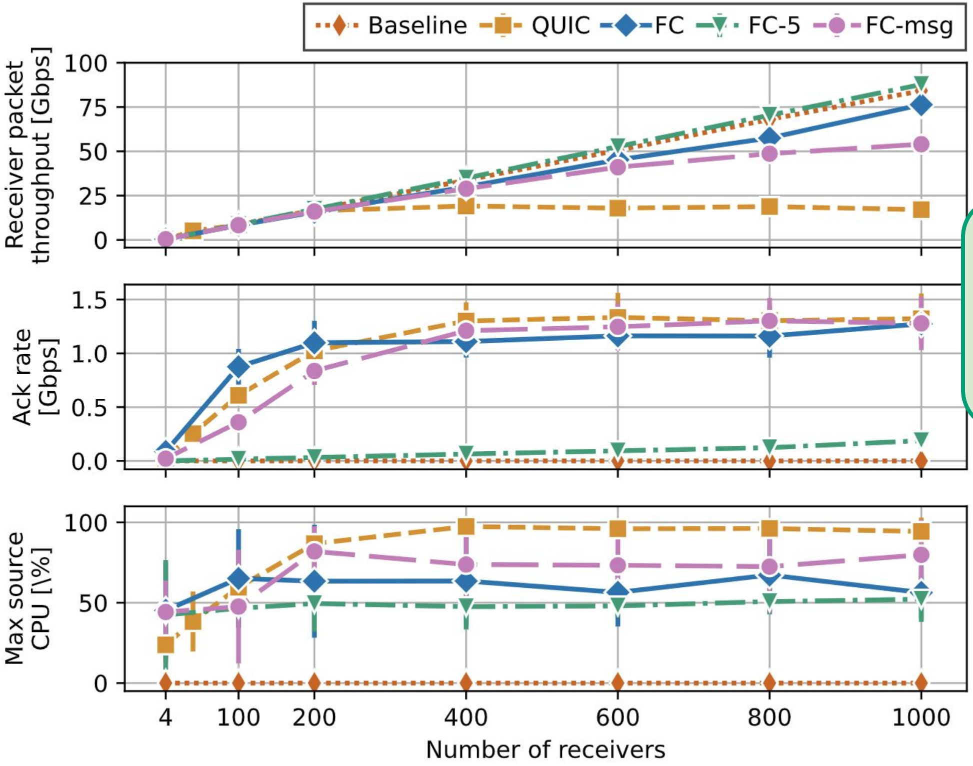

- Input traffic: ~80 Mbps
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- the baseline:
  xperimental
  msg) increases the throughput by >2x compared to unicast
- Adding an *ack delay* of 5ms to the flexicast receivers

The throughput with a 5ms ack delay reaches the baseline
The acknowledgment rate decreases due to the timer

We change Multipath QUIC to create Flexicast QUIC

- Remove the path probing **if** the destination address is a **multicast** address
- Different TLS key for each "path"
- The new "path" (let's call it **flexicast flow**) is unidirectional
  - E.g., receivers send PATH_ACK on its unicast path only
- The flexicast flow is "just" another path
  - Retransmissions can either be on the unicast path or flexicast flow
  - Bottleneck receivers can fall-back on unicast seamlessly