Requirement of SCONE in Real Time Communication

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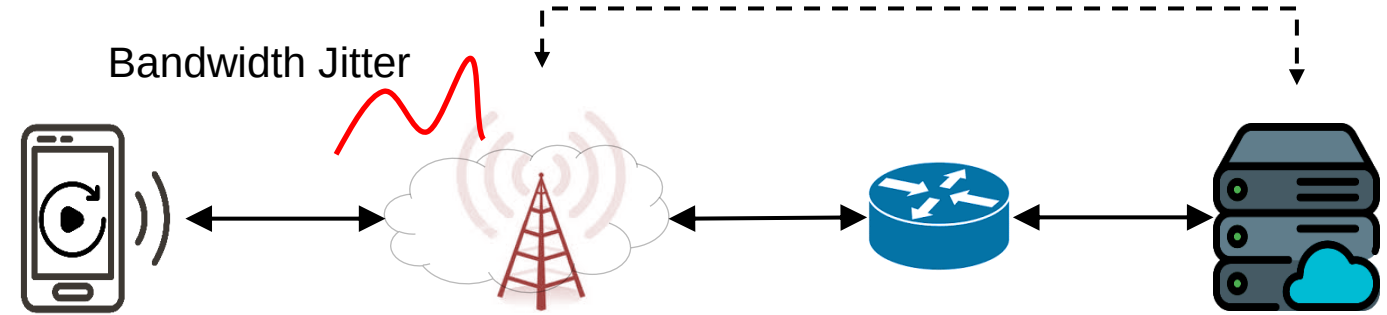
Latency of Real-time Communication



Long Latency

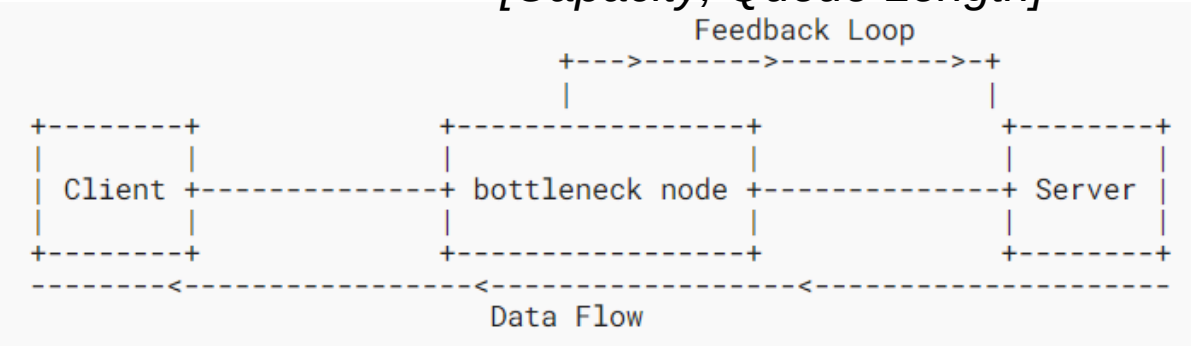
Bandwidth detection is too slow.

A feedback pathway is needed.

Reduce detection time and latency.

Feedback and Flow Control

[Capacity, Queue Length]



1. Bottleneck reports current Capacity and queue length back to sender(Piggybacked in ACK packet)
2. Sender calculate bitrate based on feedback
3. Adjust the encoder parameter

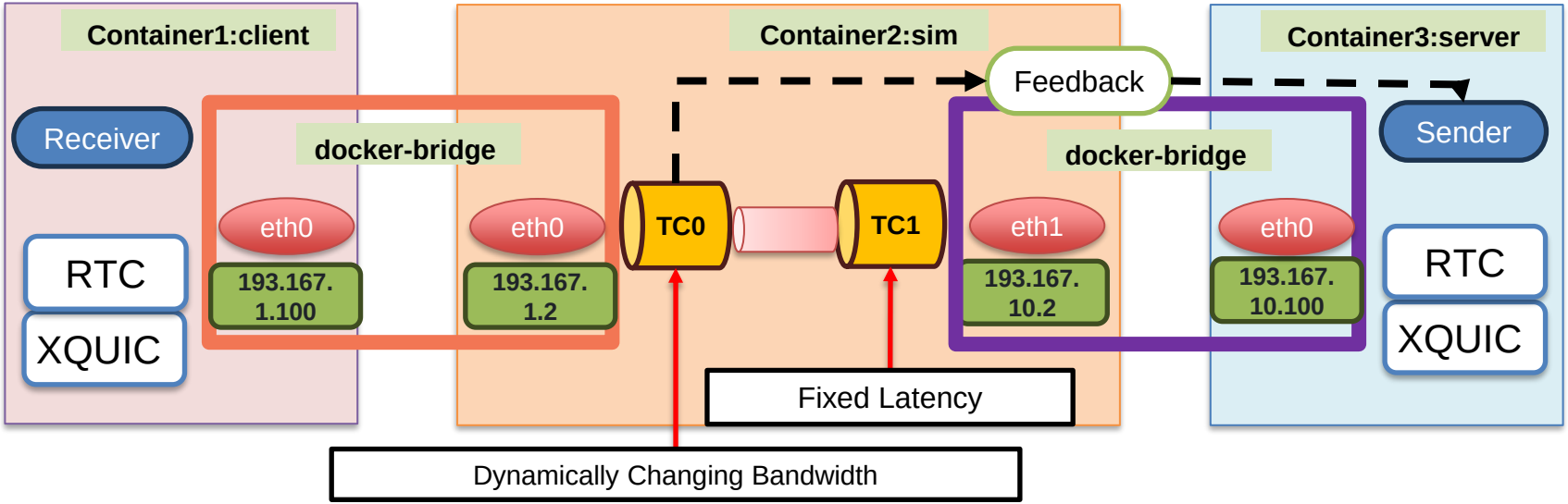
$$\text{BitRate} = \text{Capacity} - \frac{Queue(sender) + QLen}{T}$$

T: Target Queue Delay

Implementation and Test Setup

- When: The feedback is triggered when congested and sent periodically.
- How: Encapsulated in the reverse QUIC packet.
- Encapsulation: Private field between UDP and QUIC packet for now. Structured Connection ID (Metadata inside QUIC CID) for the future.

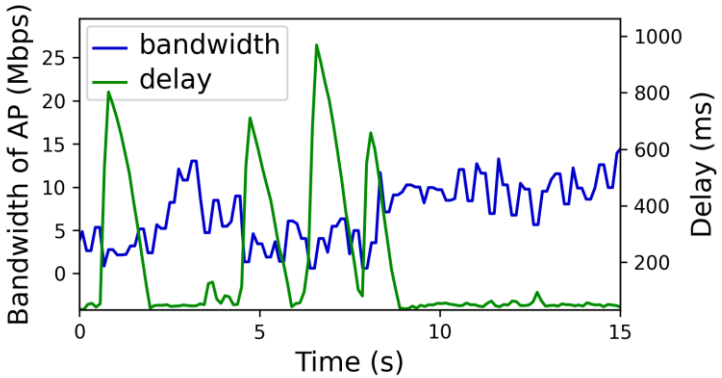
```
Structured Connection ID {
  Config Parameters (8),
  Metadata (40...152),
}
```



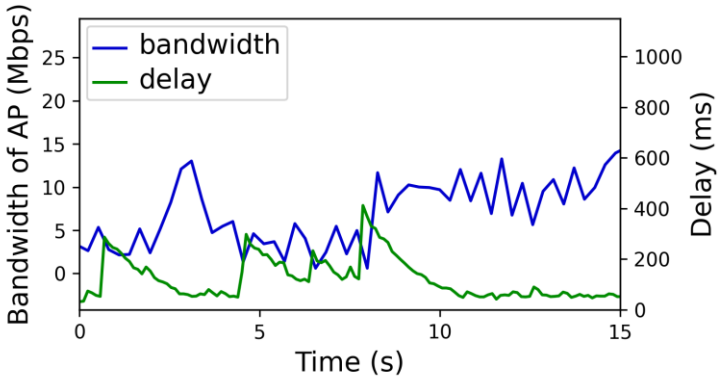
https://datatracker.ietf.org/doc/draft-shi-quic-structured-connection-id/

Results

Latency-aware Flow Control(COPA)



RTC with SCONE



Frame Latency	mean/ms	P90/ms	P99/ms
COPA	131.6	402.0	815.0
RTC with SCONE	72.4	120.5	248.0

Comments and Suggestions?