

Using QUIC to traverse NATs

IETF 117

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draft-seemann-quick-nat-traversal

QUIC v1 (RFC 9000)

- Assumes that the server is always publicly reachable
- The client might be behind a NAT
- Defines how to handle NAT rebindings
- Defines how a client can actively migrate to a different path

ICE (RFC 8445)

1. Gather candidates
2. Exchanges candidates between peers
 - a. Match candidate pairs
3. Connectivity Checks
4. Nominate candidate pair
5. Keeping paths alive

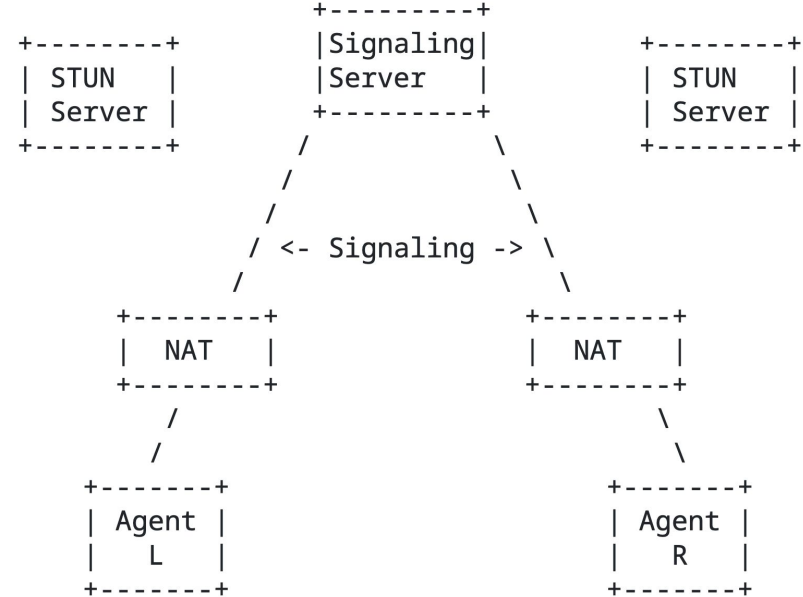


Figure 1: ICE Deployment Scenario

Purpose of this Draft

- Make it possible to use QUIC in a p2p setting
- Possible use cases:
 - Building block for WebRTC over QUIC
 - ... lots of other p2p protocols

Mode 1: Use External Signaling Channel

- Run ICE to completion first
 - Then run a QUIC handshake on the nominated address candidate pair
-
- ⊕ No need to change any ICE / QUIC stacks
 - ⊖ Requires running a (non-QUIC) signaling server
 - ⊖ Lots of round trips

Mode 2

1. Gather candidates
2. **Exchanges candidates between peers**
 - a. Match candidate pairs
3. Connectivity Checks
4. Nominate candidate pair
5. Keeping paths alive

Mode 2: Use a Proxied QUIC Connection

- Use a proxied QUIC connection for signaling (e.g. CONNECT-UDP)
- Signal using a new QUIC frame type: ICE frame

```
ICE Frame {  
    Type (i) = 0x1ce,  
    Length (i),  
    Data (...),  
}
```

- QUIC then migrates the connection to the nominated candidate pair
- ⊕ No (non-QUIC) signaling server needed
- ⊖ What if ICE Connectivity Check and QUIC Path Probe disagree?

Mode 3

1. Gather candidates
2. **Exchanges candidates between peers**
 - a. Match candidate pairs
3. **Connectivity Checks**
4. **Nominate candidate pair**
5. **Keeping paths alive**

Mode 3: Use Connection Migration to Probe Paths

- Use a proxied QUIC connection for signaling
- Use QUIC connection migration to probe paths
 - Requires the server to send a probe packet to create NAT binding
- QUIC then migrates the connection to the nominated candidate pair

Does this require QUIC Multipath?

Probably not necessary. But potentially beneficial.

	QUIC v1	QUIC Multipath
Client can probe (multiple) paths	✓	✓
Server can probe paths	✗	✗
Concurrent data transfer on multiple paths	✗	✓

What's next?

- Interest in the WG?
- This is a -00 version
- Lots of work necessary