Shared Connection for TURN TCP

draft-petithuguenin-turn-tcp-variant-01

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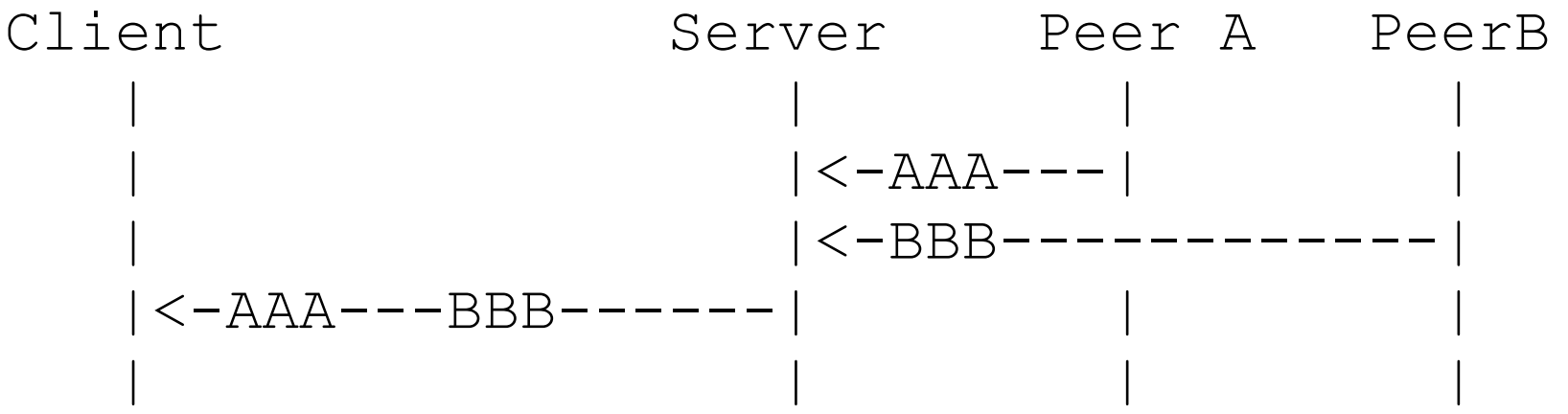
03/25/2009

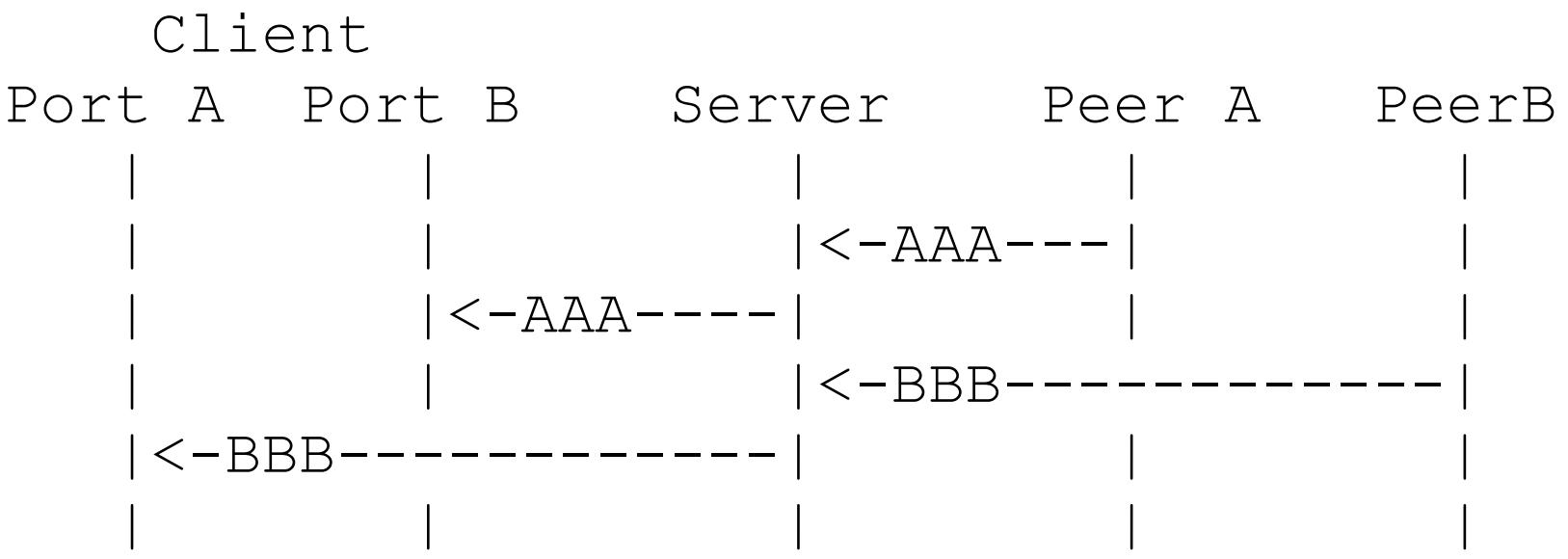
TURN UDP Allocation

- Data exchanged with peers on an UDP allocation are multiplexed over one TCP or UDP connection between the client and the server.



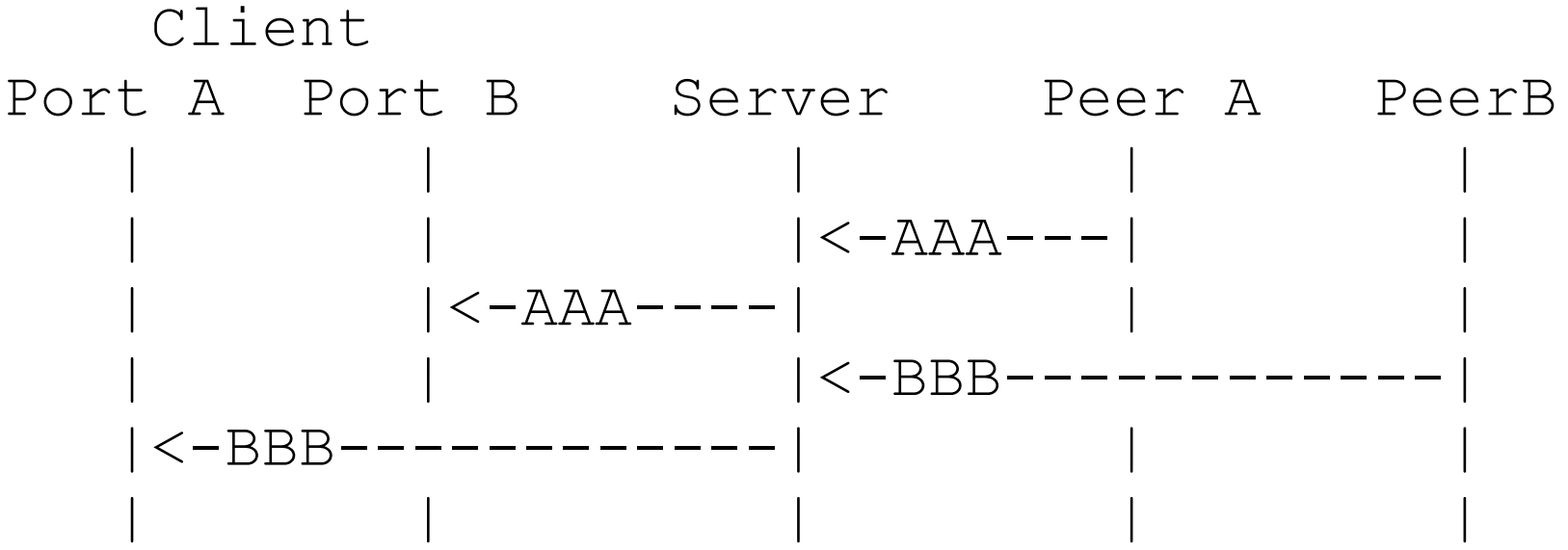
TURN TCP Allocation

- Data exchanged with peers on a TCP allocation use multiple TCP connections between the client and the server.



Why Two Mechanisms?

- If using multiple connections between the client and server is a such good idea for TCP allocation, why do not do the same for UDP allocations?

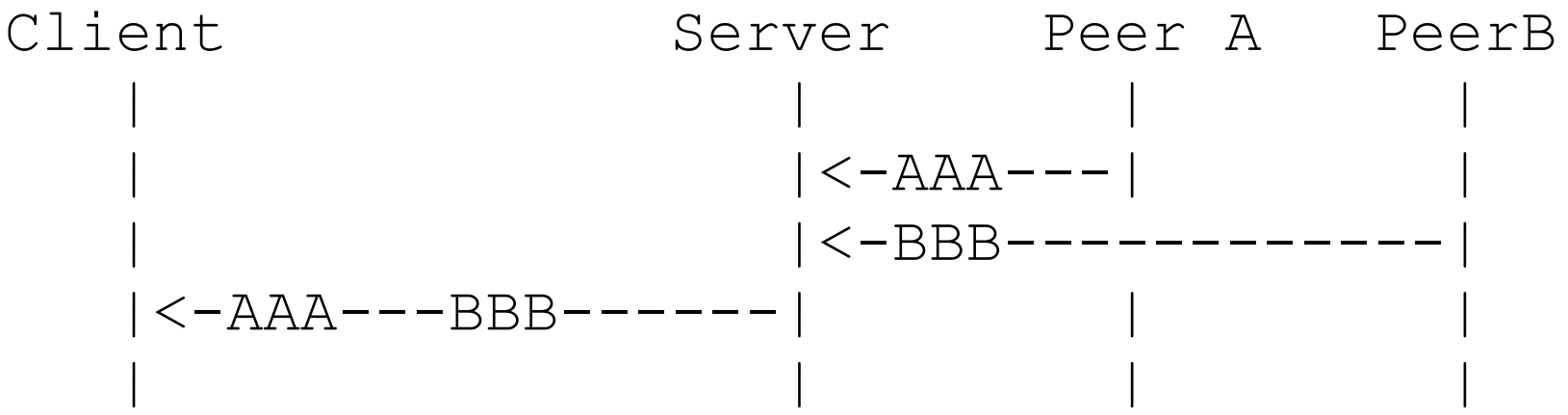


Let's rewrite TURN UDP!

- TURN UDP much simpler as the client source port would identify the peer.
- Channels and Send/Data Indications can be removed.
- No fragmentation for UDP packets already close to the Path MTU.
- (Just kidding)

Reuse TURN UDP mechanism

- The multiplexing mechanism exists already for UDP allocations, so let's reuse it:



Modifications for TCP Allocations (1)

- Inspired by OpenSSH multiplexing
- Two new attributes used when a peer is connected with a TCP allocation:
  - WINDOW-SIZE: initial size of he window
  - MAX-SIZE: size of the buffer
- An independent window size is associated to the peer both on the client and on the server.

Modifications for TCP Allocations (2)

- A new AdjustWindow Indication:
  - XOR-PEER-ADDRESS or CHANNEL-NUMBER: Identifies the peer connection.
  - ADD-SIZE: Value to add to the current window size.
- The current window size decreases when data is sent.

Pros (1)

- Unified mechanism
- One TCP connection through the NAT per TCP allocation (see iab-ip-model-evolution).
- Faster than establishing multiple connections (same than persistent connections in HTTP 1.1 or OpenSSH multiplexing).

Pros (2)

- ICE TCP opens multiple TCP connections for connectivity check, then close all but one – this fits well with the multiplexing mechanism.

- Multiple TCP connections between the same endpoints do not share congestion state.

Cons

- Head Of Line Blocking.
- Some optimizations not possible.
- Additional complexity added by the windowing mechanism.