ICE

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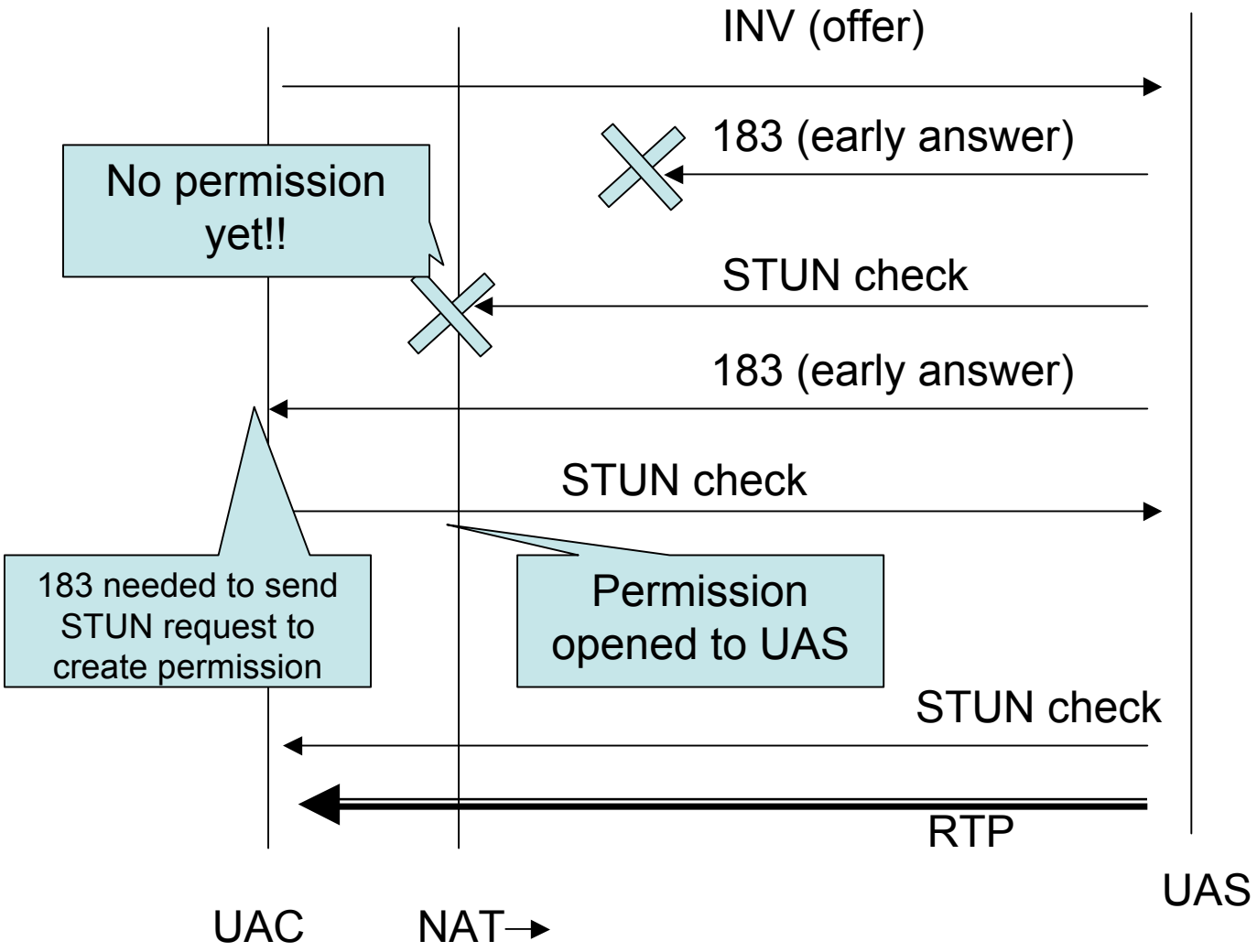
Changes since -08

- Connectivity preconditions to informative reference
- Removed remnants of ICE meta-protocol from intro – its about offer/answer protocols
- New terminology – server reflexive and relayed replace STUN-derived and TURN-derived
- Username randomness reduced to 24 bit minimum – not for security, for conflicts
- Password in separate a=ice-pwd attribute, shared for all candidates of all sessions
  - Reduces message entropy and size – more sigcomp friendly

Changes since -08

- Changed references to rfc3489bis from RFC3489
- Using behave terminology, not ‘symmetric’, ‘full-cone’, etc.
- Added diagram for explaining justification for a=remote-candidate
- Answerer can now use a candidate once validated, in anticipation of upcoming offer
  - Must revert to actual one in m/c line if timer fires after next expected offer
  - Only answerer can send – not offerer
- Still need to reliably deliver 183 w/ SDP – retransmit until STUN trick described

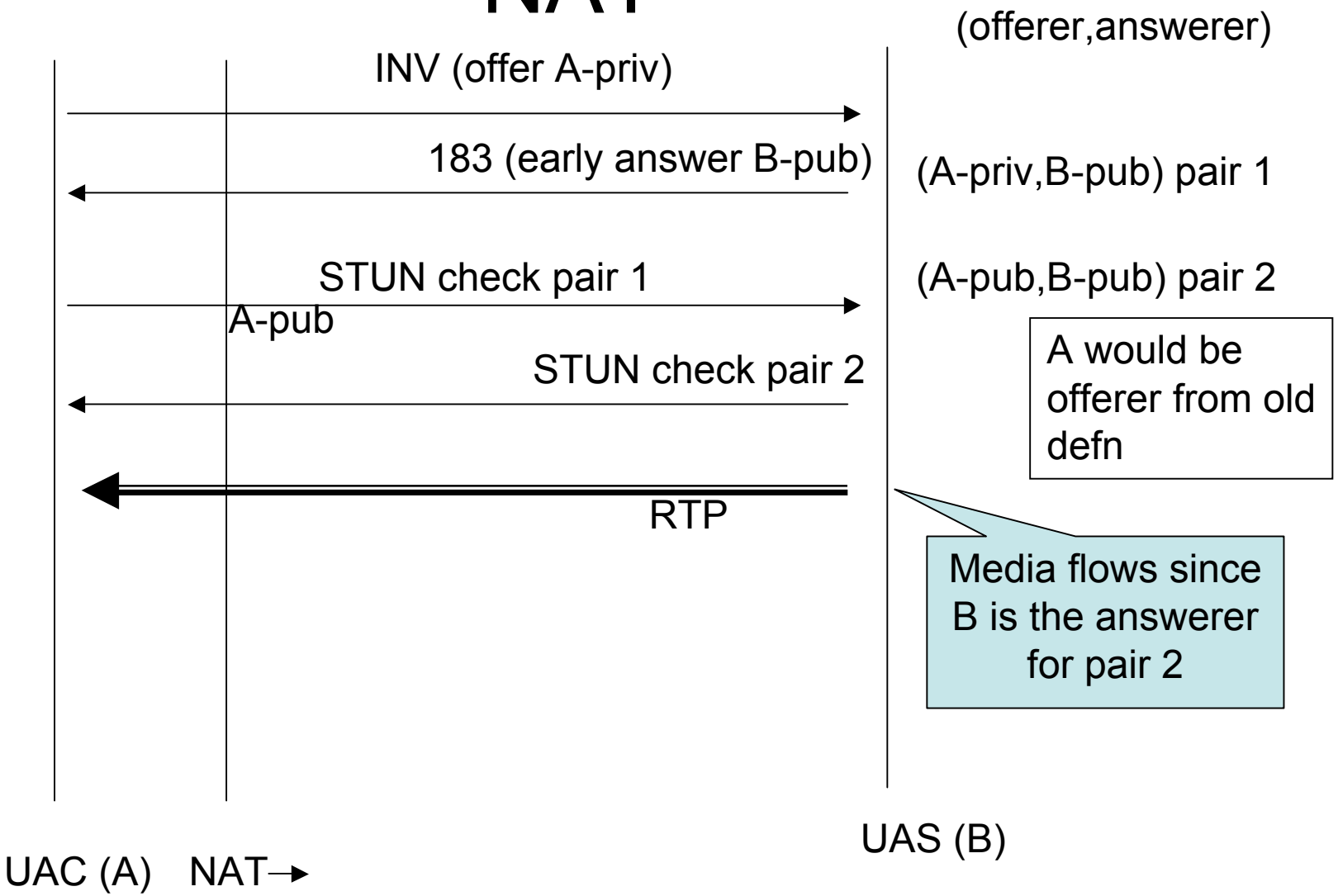
Why 183 needs to be reliable



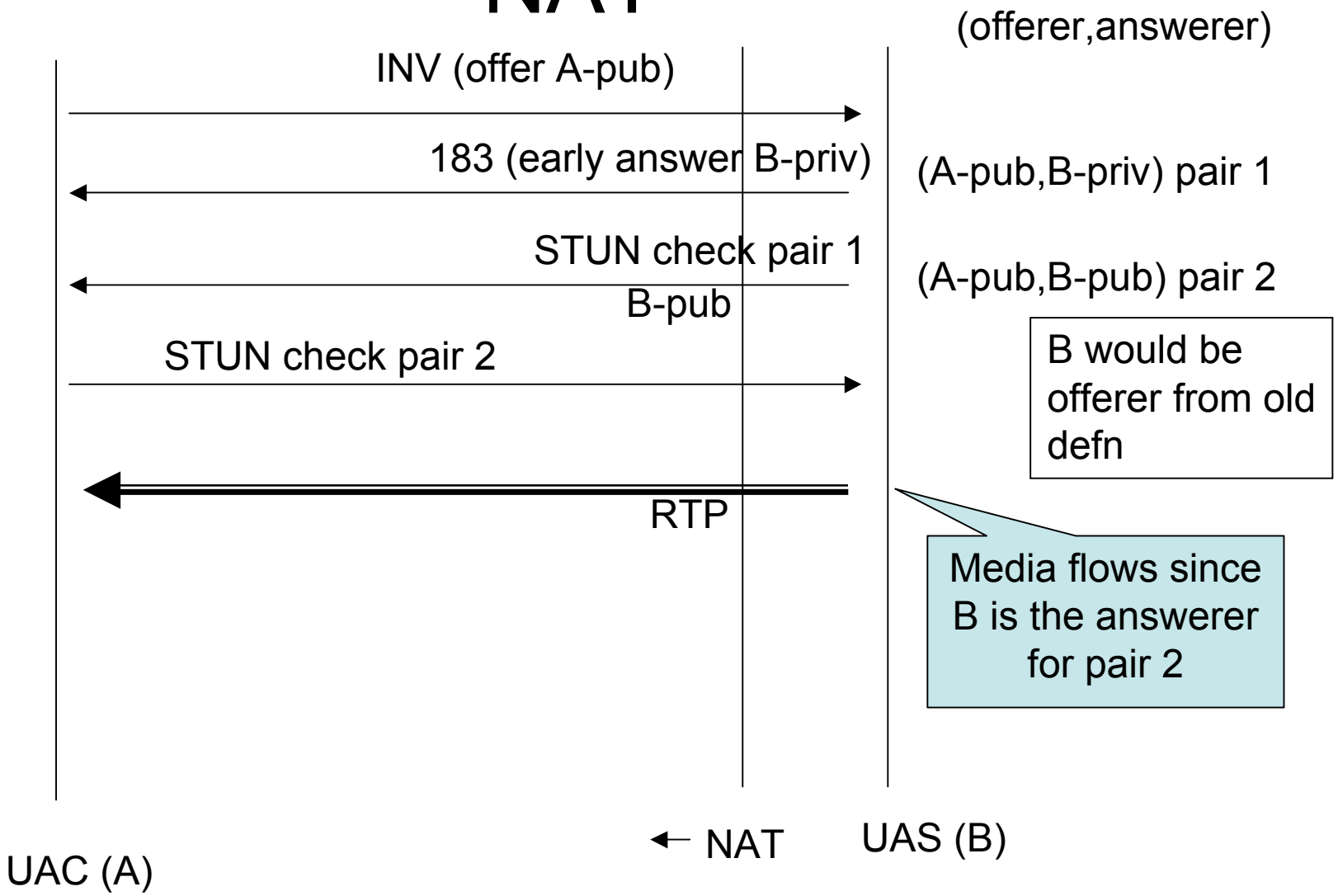
Changes in -06

- Role of offerer vs. answer for derived candidates now inherited from generating candidate
  - Role dictates who sends updated offer (offerer)
  - Role dictates who can send early media (answerer)
- Previously, role was defined as
  - Agent sending STUN request that lead to discovery of new peer-derived candidate was offerer
  - Agent sending STUN response was answerer
- Why – see next slide

Case 1: UAC Behind APD Binding NAT



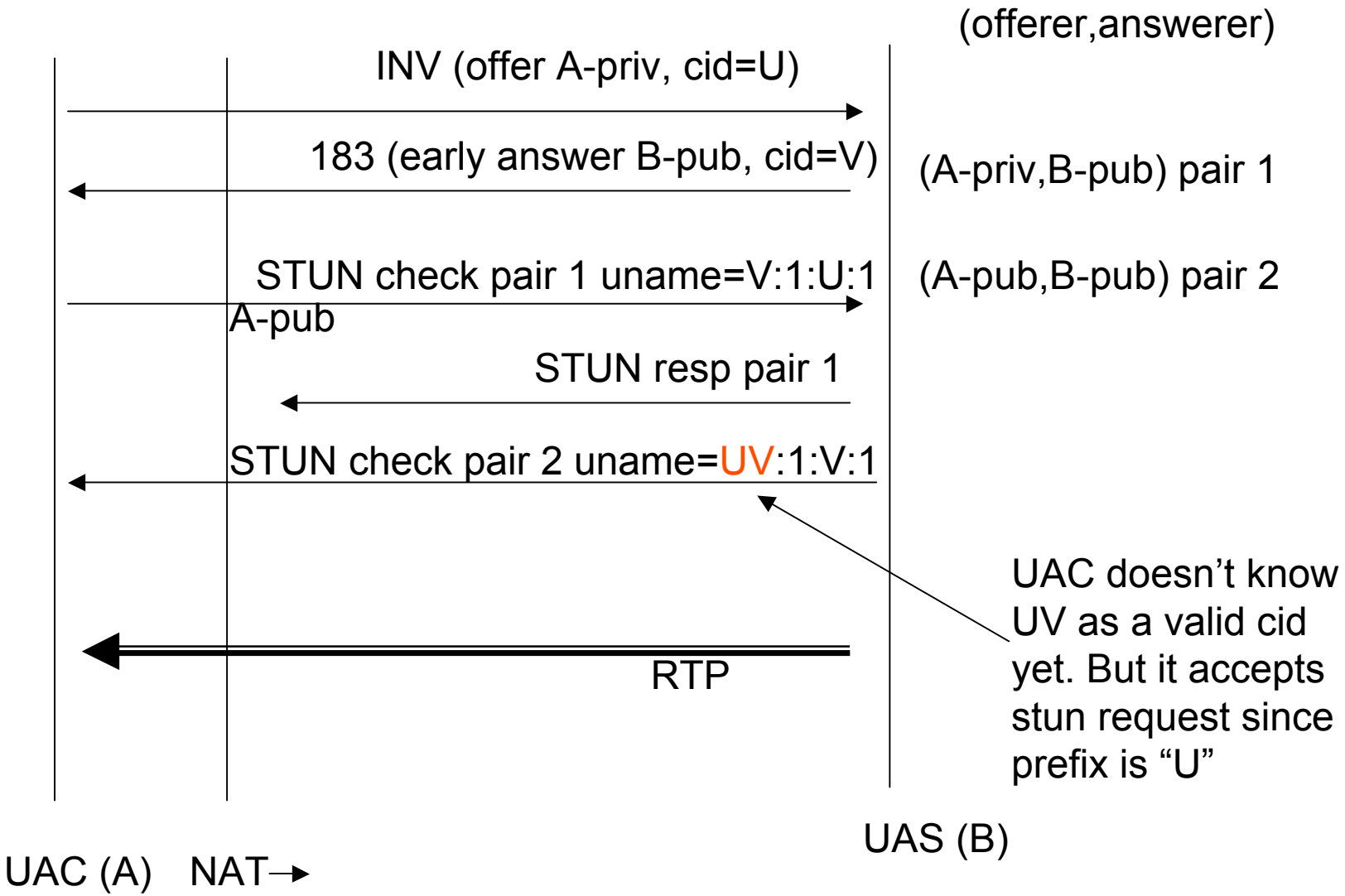
Case 2: UAS Behind APD Binding NAT



Changes since -08

- Agent must be prepared to receive RTP and STUN on each candidate
  - Not just one in m/c-line
  - Consequence of early promotion – no way to signal that STUN only can be received
- Incoming STUN request processed if prefix matches existing username
  - Deals with race condition – next slide

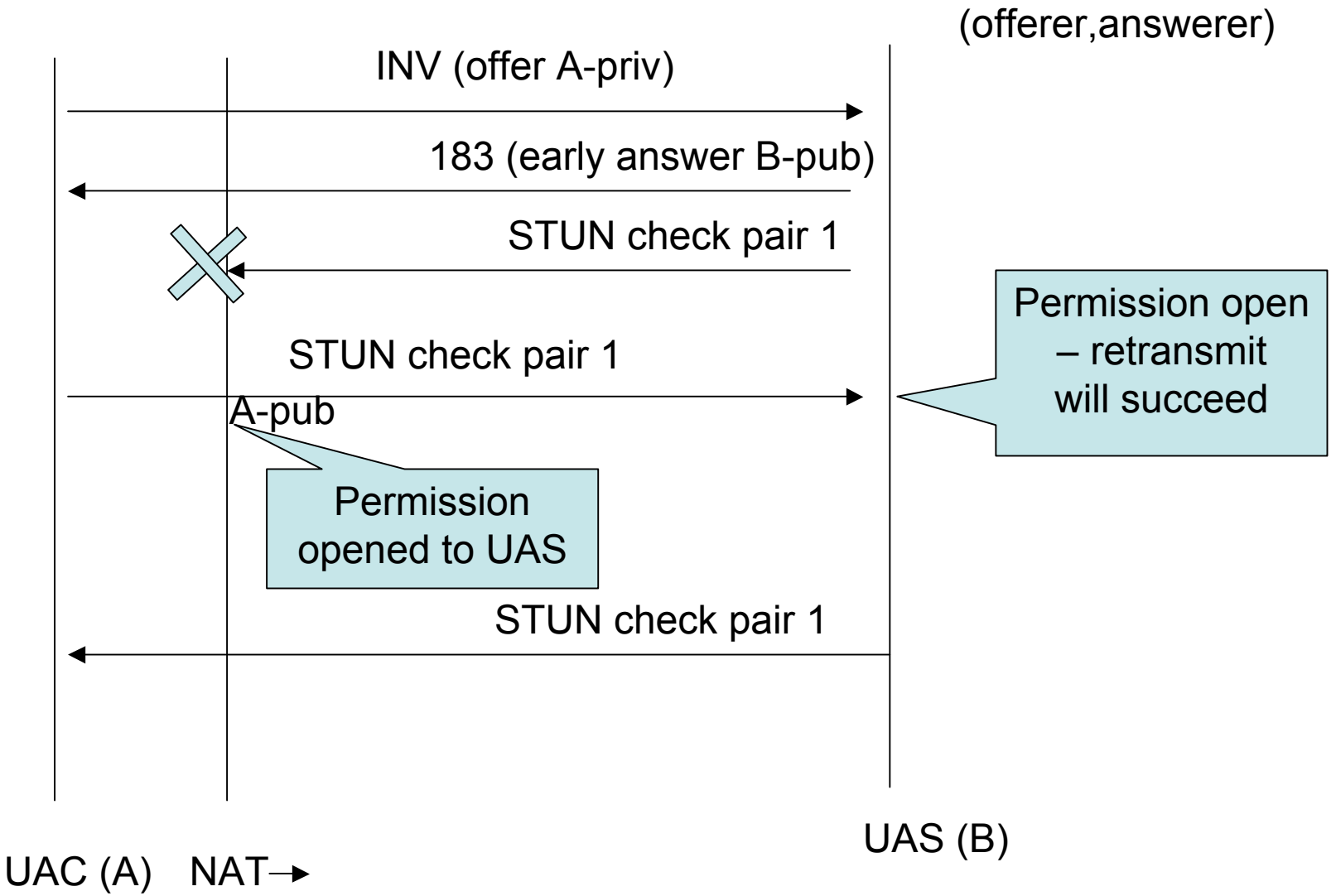
Username Race Condition



Changes since -08

- Added simpler example and updated larger example to use just TURN
- Jitter buffer adaptation triggered on receipt of marker bit or change in source IP
- Retransmit your STUN request when you get a STUN request
  - Speeds up convergence – see call flow next slide

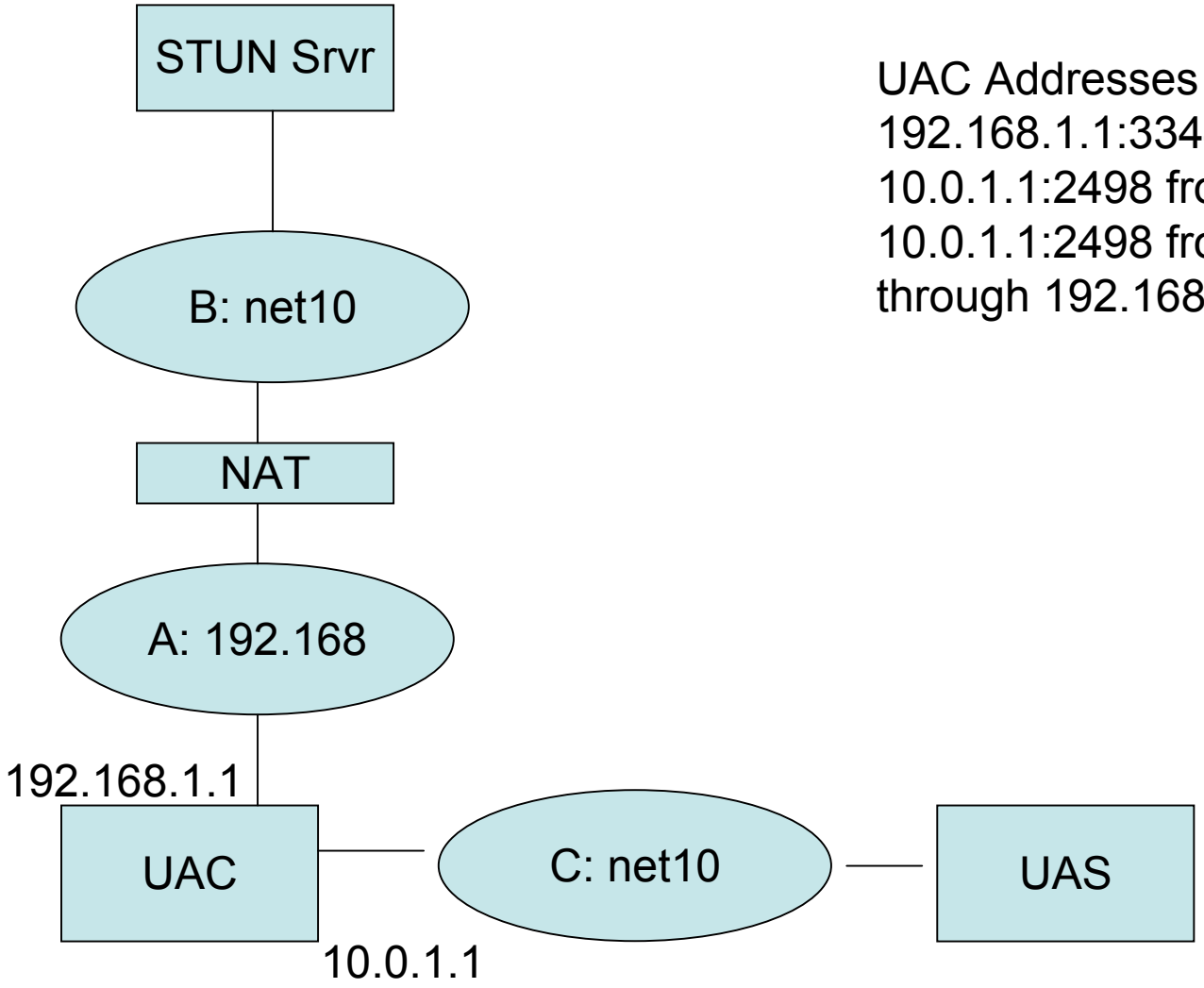
Retransmit condition



Changes since -08

- If address gathering yields same derived address from different local address, then keep it
  - Complicated corner case, but it's a real case
  - Impacts where you send STUN checks from – will send from both
- Next slide

Redundant Address Elimination



UAC Addresses
192.168.1.1:3344 from local i/f
10.0.1.1:2498 from other local i/f
10.0.1.1:2498 from stun server through 192.168.1.1

Open Issues

- None I am aware of
- Document ready for WGLC!

ICE-tcp Changes

- Defined three types of tcp candidates – active, passive, actpass
- Type of candidate is signaled in a=candidate line
- Local interfaces produce actpass and active
- STUN produces passive
  - Yes – for TCP!
- Relayed both active and actpass
  - With TURN – you obtain one candidate for actpass, separate one for active
- Pairings go as one would expect
  - Active with passive or actpass
  - Passive with active or actpass
  - Actpass with anything
- Why have actpass and active from local interface?
  - Simultaneous open can fail miserably
- With active candidates, port 9 and local interface are signaled
  - Discovered by p2p stun checks

ICE-tcp Changes

- TURN can provide both relayed and server reflexive TCP address
- Actpass candidates preferred over active and passive
- m/c-line contains native IP/port of candidate
  - Ephemeral IP/port for peer derived
- FSM for pairing states driven by STUN, not connection attempts
- For pairs where one side is active, actual pair goes into invalid and peer derived pair goes to active
- STUN-based keepalives used for TCP
- Generic demux algorithm defined

ICE-tcp Status

- No known issues – needs review
- Ready for WGLC?
  - Should ideally go jointly with ICE to make sure its all in sync