Trickle ICE

Incremental Provisioning of Candidates for the Interactive Connectivity Establishment (ICE) Protocol

draft-ivov-mmusic-trickle-ice

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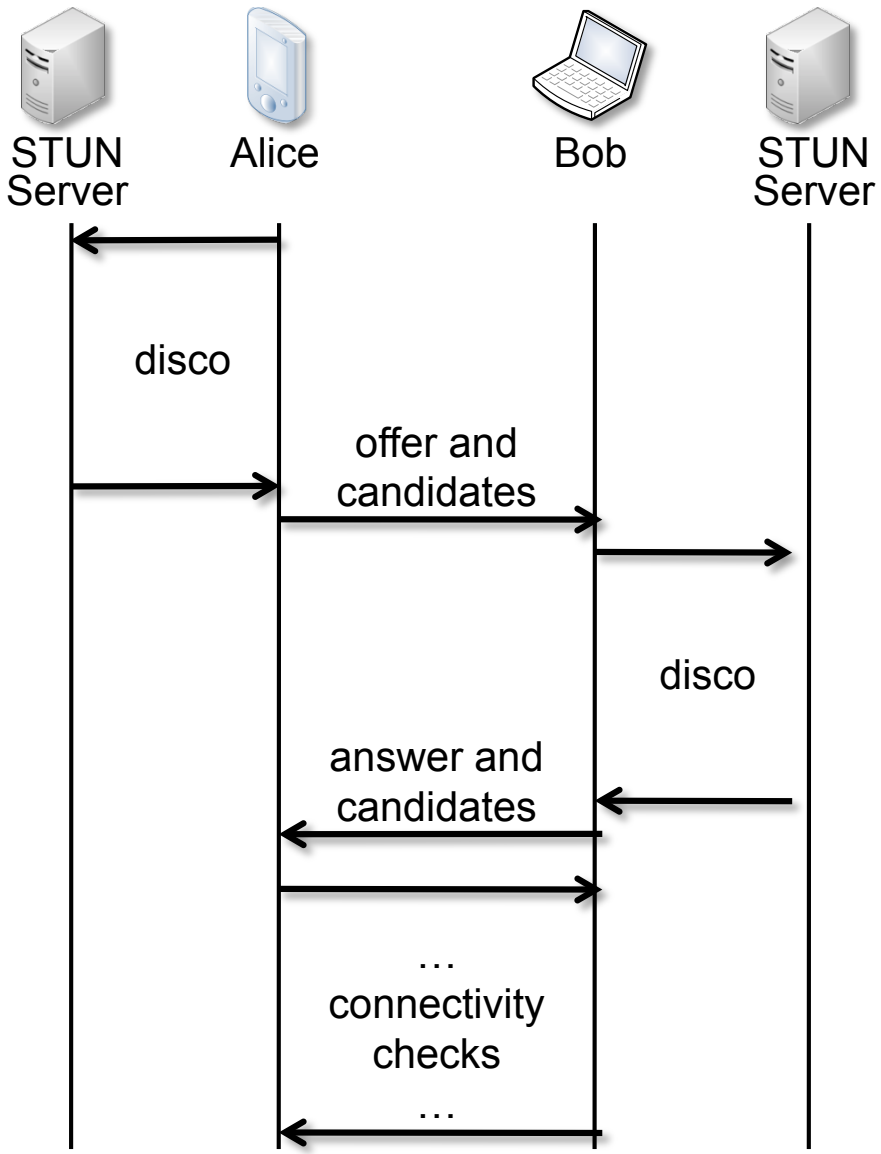
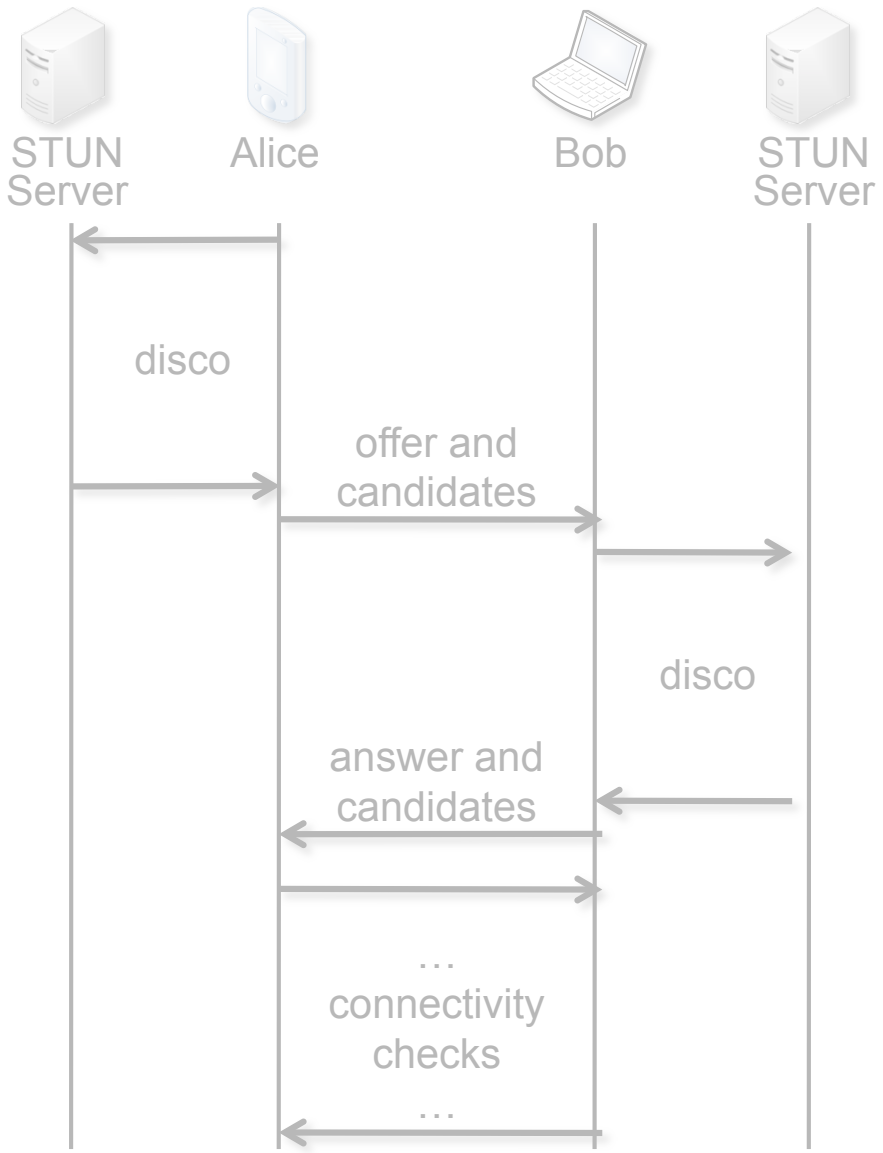
Reminder: Vanilla ICE

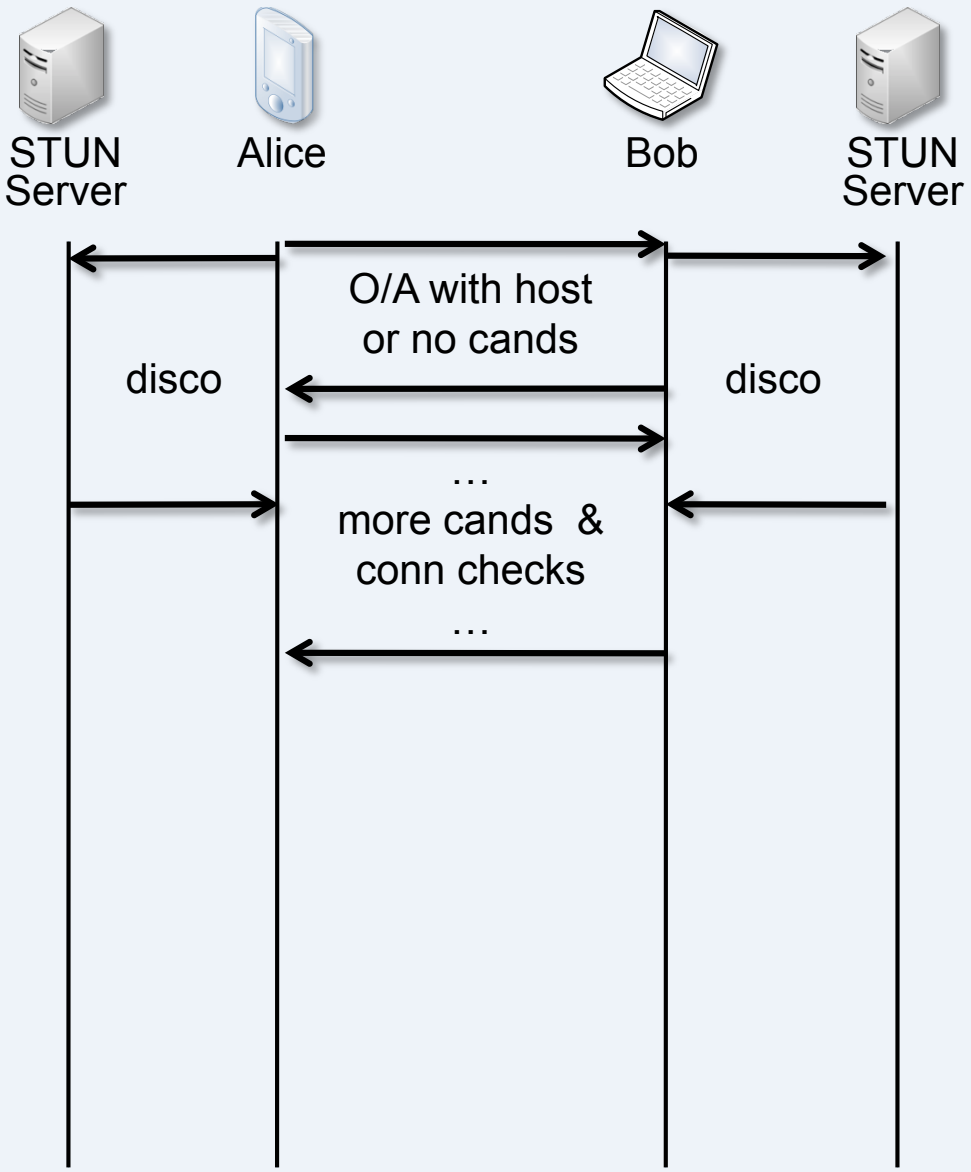


Vanilla ICE as per RFC 5245

Reminder: Vanilla ICE vs Trickle ICE



Vanilla ICE as per RFC 5245



Trickle ICE

Reminder: Starting Checks

- Maintains Active/Frozen checklist state
  (rather than deducing it)
- Start checks as soon as we have one non-empty list
- Unfreeze the other check lists once the first one completes
  - (Inherited from 5245 but might be worth updating to: “unfreeze as soon as non-empty”)

Reminder: Ending Checks

- Vanilla ICE: Every time a conn check completes thou shalt update states and fail a check list if:
  - all of its pairs are either in the Failed or Succeeded state;
  - at least one of the components of the media stream has no pairs in its valid list.

- Trickle ICE adds the following conditions:
  - all candidate harvesters have completed and the agent is not expecting to learn any new candidates;
  - the remote agent has sent an end-of-candidates indication for that check list

TODOs from Last Time

- Clarify relationship with Offer/Answer
- Define SDP for Offers and Answers
- Define SDP for trickled candidates
- Expand on half-trickle
- Provide a SIP usage
- What about ICE Lite …

Changes to the SDP

- Advertising support for trickle ICE:

```
a=ice-options:trickle
```

- Offers and answers with no candidates:

```
c=IN IP4 0.0.0.0
m=audio 1 RTP/AVP 0 96
```

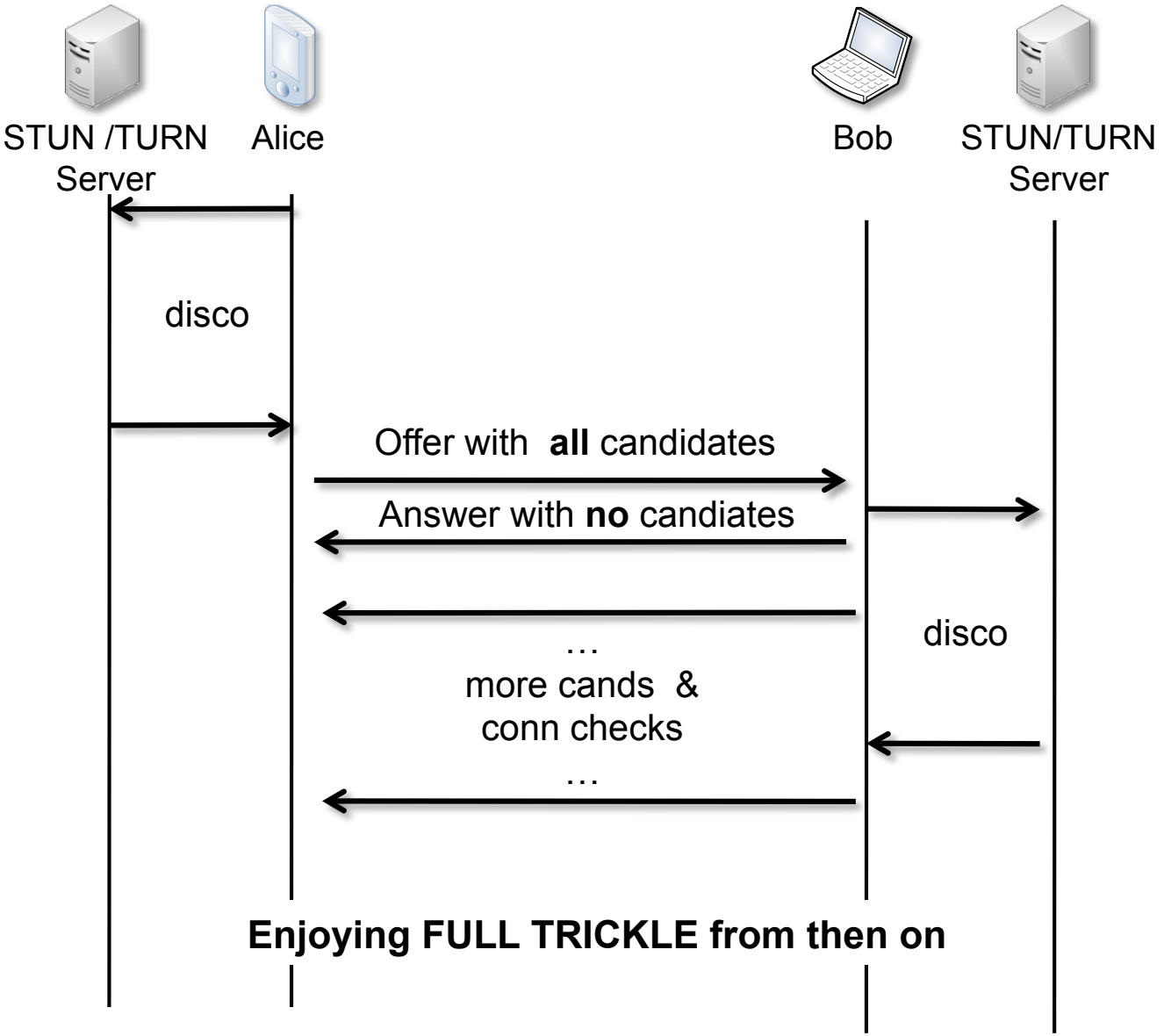
- New candidates and end of candidates

```
…
a=candidate:1 1 UDP 1234 1.2.1.4 5000 typ host
a=candidate:2 1 UDP 5678 6.1.2.3 5000 typ srflx
a=end-of-candidates
```

Support and Discovery

- Removed requirements for pre-verifying support
- Draft now mandates use of *half trickle* when pre-verifying is impossible (important for SIP):
  - Offerer starts as with vanilla 5245 ICE
  - Answerer sees `a=ice-options:trickle` and trickles
  - All subsequent Offers/Answers can use trickle

Half Trickle



Open Issues
MID vs Stream Index

- Do we really need the stream index option?

- Possible application syntax (do we want to spec this)?

For example:

```
a=mid:1
a=candidate:1 1 UDP 16582 12.18.10.3 5000 typ host
a=candidate:2 1 UDP 16584 96.1.2.3 5000 typ srflx
a=end-of-candidates
a=mid:2
a=candidate:2 1 UDP 16915 96.1.2.3 5002 typ srflx
```

Open Issues

Session or media level end-of-candidates

```
c=IN IP4 12.18.10.3
a=end-of-candidates
m=audio 5000 RTP/AVP 0 96
a=candidate:1 1 UDP 16582 12.18.10.3 5000 typ host
m=video 5000 RTP/AVP 0 96
a=candidate:2 1 UDP 16915 96.1.2.3 5002 typ srflx
```

VS

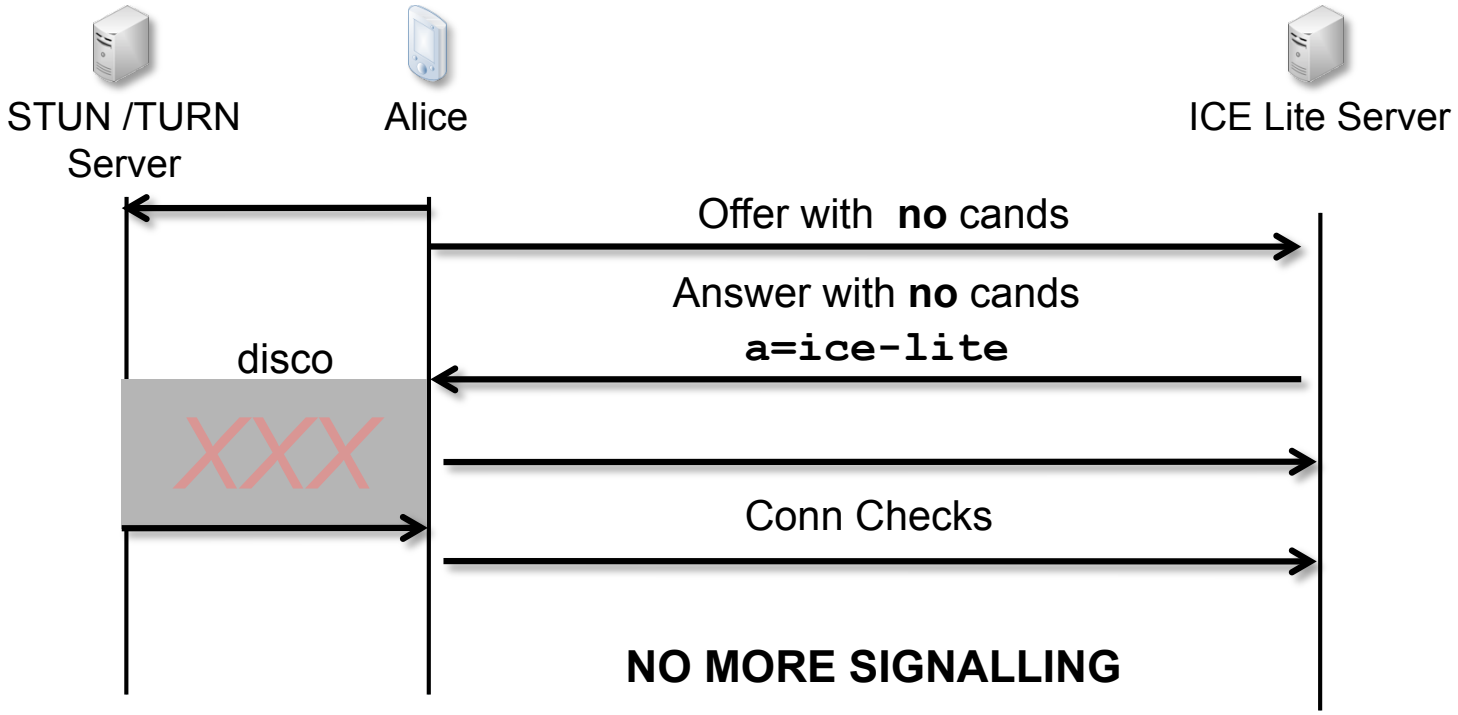
(our preference)

```
c=IN IP4 12.18.10.3
m=audio 5000 RTP/AVP 0 96
a=candidate:1 1 UDP 16582 12.18.10.3 5000 typ host
a=end-of-candidates
m=video 5000 RTP/AVP 0 96
a=candidate:2 1 UDP 16915 96.1.2.3 5002 typ srflx
a=end-of-candidates
```

Open Issues

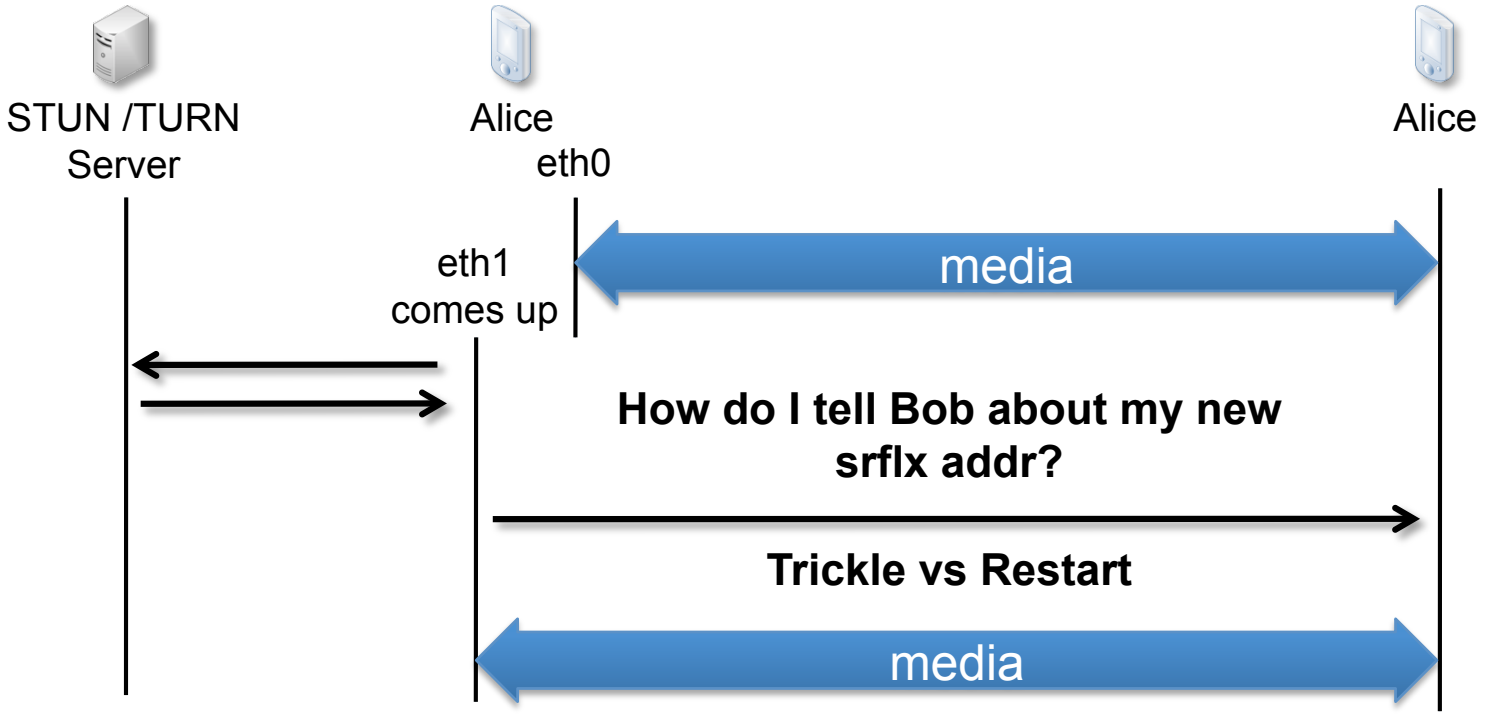
ICE Lite and Candidate Signalling (Christer)

- Trickle ICE Lite agents can learn all their peers' addresses as *peer reflexive*.
- Should we have the option of not sending them through signalling as well



Open Issues

New Candidates after ICE Completion? (Mobility)



- Option 1: Require ICE Restart (harmless really)
- Option 2: Process (How? Why?)

Appendix:

A SIP Usage for Trickle ICE (1/3)

- SIP Applications would always do half trickle unless explicitly configured otherwise

- Trickling will happen with in-dialog SIP INFO requests as per RFC 6086

- The INFO Package token name for this package is "trickle-ice”
  - Does not mandate GRUU support

- Does not remove the requirement for doing a re-INVITE upon completion of ICE processing.

Appendix:
A SIP Usage for Trickle ICE (2/3)

```
INFO sip:alice@example.com SIP/2.0
...
Info-Package: trickle-ice
Content-type: ?application/sdp? <- … ahem
Content-Disposition: Info-Package
Content-length: ...

a=mid:1
a=candidate:1 1 UDP 1658497328 192.168.100.33 5000 typ host
a=candidate:2 1 UDP 1658497328 96.1.2.3 5000 typ srflx
a=mid:2
a=candidate:2 1 UDP 1658497328 96.1.2.3 5002 typ srflx
a=end-of-candidates
```

Appendix:

A SIP Usage for Trickle ICE (3/3)