MMUSIC

Happy Eyeballs Extension for ICE

draft-reddy-mmusic-ice-happy-eyeballs-00

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IPv6 Broken: Problem 1

Offer/Answer Exchange

- ICE Connectivity Check - IPv6 Address I
- ICE Connectivity Check - IPv6 Address II
- ICE Connectivity Check - IPv6 Address III
- ICE Connectivity Check - IPv6 Address IV

ICE Connectivity Check - IPv4 address

Media
Problem 1

- Several seconds to learn IPv6 is broken!

- Hosts with Multiple Interfaces (Wifi, 3G, VPN) could have multiple IPv6 addresses
- Host with 10 IPv6 addresses trying to reach remote peer with 10 IPv6 addresses, with $T_a = 50ms$
- Time before IPv4 addresses are tested would be $50ms \times 10 \times 10 = 5000ms$

- Dual stack hosts behave worse than IPv4-only hosts!
Problem 2: IPv4/IPv6 host, server-reflexive Blocked

ICE Connectivity Check - IPv6 Address I
ICE Connectivity Check - IPv6 Address II
ICE Connectivity Check - IPv6 Address III
ICE Connectivity Check - IPv6 Address IV
ICE Connectivity Check - IPv4 Address
ICE Connectivity Check - IPv6/IPv4 relayed address
Media

Offer/Answer Exchange

Firewall
Problem 2 – Multihoming with Firewalls

- Several seconds to fall back to TURN server
  - Hosts with Multiple IPv6 host addresses, IPv4 server-reflexive addresses
  - Host with 8 IPv6 host addresses, 4 server-reflexive addresses trying to reach remote peer with 12 IPv6/IPv4 host/server-reflexive addresses with Ta = 100ms
  - Time before IPv4/IPv6 relayed addresses are tested would be 50ms*(8 + 4)*12 = 14.4 seconds

- Hosts with many IP addresses suffer!
PROPOSED SOLUTIONS
The Happy Eyeballs ICE Solution

Alice

Start Timer

Timer Fires

Bob

Offer/Answer Exchange

Bind Request using IPv6 Address I

Bind Request using IPv6 Address II

Bind Request using IPv6 Address III

Bind Request using IPv4 Address

Bind Response using IPv4 address

Media

Try IPv6/IPv4 in Parallel

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The Happy Eyeballs ICE Solution

- Problem 1 avoided (Dual Stack Hosts, IPv6 broken)
  - Faster response even if IPv6 path is down, host has global IPv6 address but is disconnected from the IPv6 Internet.

- Problem 2 avoided (Multi-homing Firewall blocks P2P)
  - Faster response even if IPv4/IPv6 connectivity checks using host and server-reflexive candidate pairs is not successful