IPv6/IPv4 transition technology Interop

NATs are good!

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"Fanboy" series - IPv6 and NATs
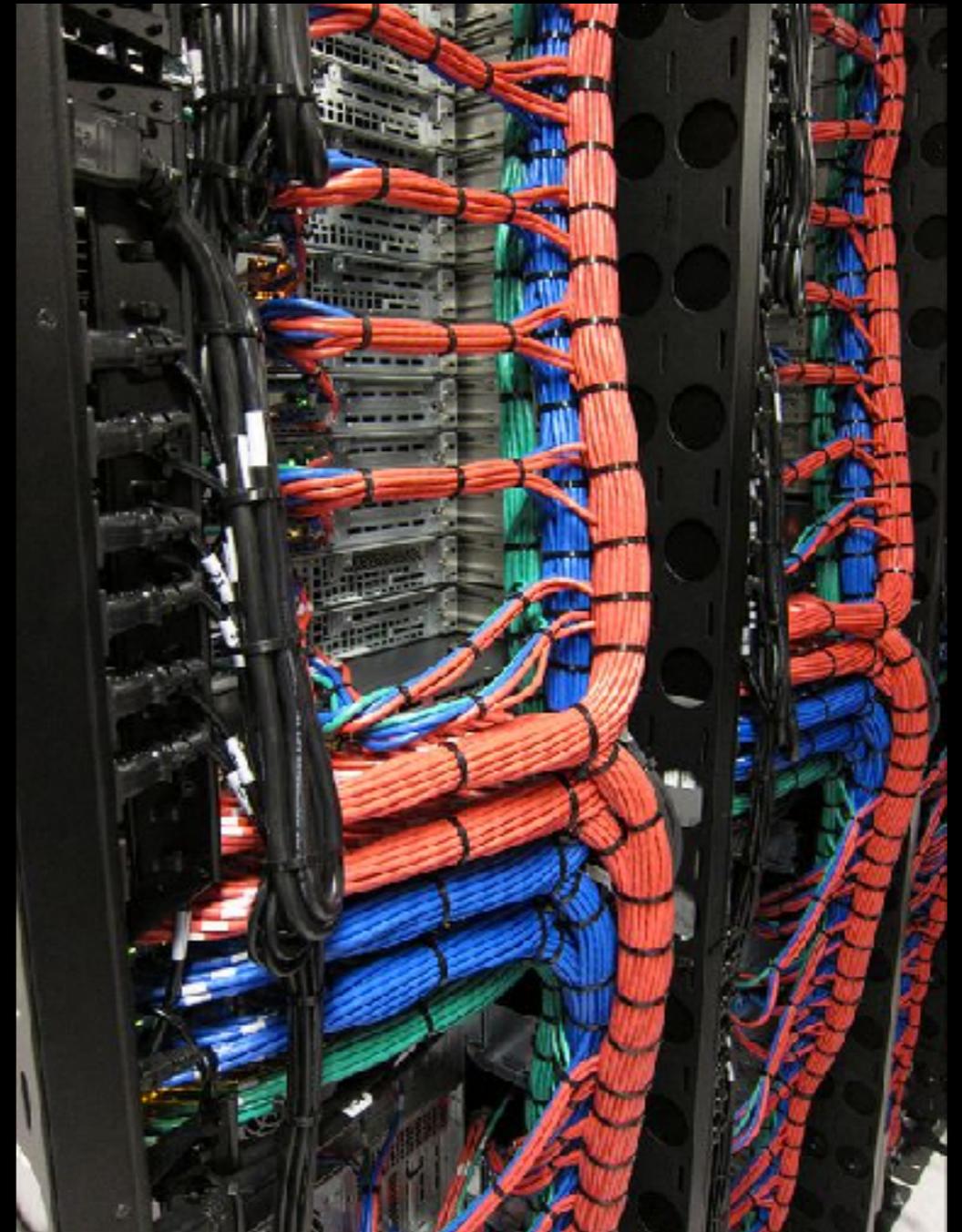
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Goal:

1. Test if the "new" Internet works:

   - IPv6 only plus NAT64

2. Test if we can make the old Internet work forever:

   - IPv4 address sharing mechanisms (464XLAT, DS-lite, MAP-E, MAP-T, CGN, LW46)

   - Interop testing of DS-lite, 464XLAT, LW46
     (VPP, LEDE, Allied Telesys)

How we did it:

What we did:

- First time: Interop test between VPP DS-lite (AFTR) and Allied Telesis (DS-lite B4)

- VPP NAT64, LEDE 464XLAT, VPP LW46, LEDE LW46

- Implemented:

  - VPP DHCPv6 PD client

  - Stun library DNS64 NAT64 discovery / IPv4 literal synthesiser

  - Fixed bugs!

- Tested applications behind DS-lite, 464XLAT, NAT64

IPv6 only + NAT64:

- iPhone => everything works! (almost)

- Laptop => most stuff works

- ssh 64:ff9b::a.b.c.d works! ;)

- Spotify doesn't on OSX

- Cisco Spark doesn't anywhere

- Apple iPhone beta profile download

- Works: Meetecho, Skype, Jabber, Etherpad, appear.in, Whatsap, Telegram, Dropbox, Outlook, Airdisplay, Slack, OpenVPN, Cisco Anyconnect, RDP

Learnt

- Building networks is really hard!

- IPv6 addresses are too long to type correctly

- Synthesising IPv6 addresses from (general) RFC6052 (NAT64 prefix) prefix sucks. Revise RFC6052?
  But at least we got to fix a buffer overflow

- NAT644444 (global IPv6 -> global IPv4 -> private IPv4 -> global IPv4)

- Media point to point still works through multiple NATs

- All the IPv4 sharing mechanisms are "just" more IPv4…

(New)Requirement for IPv6 only hosts

- Must be able to do NAT64 prefix discovery (RFC6052)

- Synthesise IPv6 address from an IPv4 literal (RFC7050)

- Should do local DNS64 to support DNSSEC (RFC6147) (if you do validation).

Remaining work

- IPv4 forever?
  Can we run the Internet on a single port?
  QUIC guys? :-)

Credits:

- Pål-Erik Martinsen

- Pierre Pfister (4 time hackathon winner!)

- Lee Howard (Newcomer)

- Matus Fabian (Newcomer and first IETF)

- Jordi Palet

- Hermin Anggawijaya (Newcomer)

- Ole Trøan