IPv6/IPv4 transition technology Interop

NATs are good!
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"Fanboy" series - IPv6 and NATs

32,584 views
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, Whatsapp, 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