IPv6 Deployment Challenges

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Inspired by Kurt-Erik Lindqvist

IPv6 and IPv4

- IPv6 and IPv4 are two different protocols
  - Resources available over IPv6 are not reachable from an IPv4 node and vice versa
- Luckily the layers in the Internet Architecture are independent of each other
  - Same transmission, IPv4 and IPv6 can be run in parallel, on the same network
  - Several protocols we have used during the years have died, new have arrived

No customer demand?

- If customers do not ask for IPv6, there is no ability for providers to charge (extra) for IPv6
  - This imply they do not get the extra money needed for investments in new hard- and software
  - Not having any customer demand is not a problem because deployment of IPv6 happens anyway
- Customers ask for content and services (Google, Spotify, Skype) and do not care what protocol is used
  - IPv6 does not enable new services

What do providers do?

- Upgrade of hard- and software happens all the time in a continuous upgrade cycle
  - Remember, no customer demand, no extra revenue, no ability to invest specifically for IPv6
- At least in the short term building a special IPv6 business case just does not make any sense

Developing and developed world?

- The developing world, with no deployed IPv4 hardware at customers sites, might be in advantage as they can deploy IPv6 capable hardware directly
- The deployed cable-tv-modems, residential gateways, DSL equipment, firewalls etc will take a long time to replace

Core network

- Core network can already handle IPv6
- Operational experience is missing
- “Debugging” soft- and hardware is needed
- Management systems are IPv4 only
- “We are with IPv6 where we where with IPv4 1995”
- Vendors have charged extra for IPv6

IPv6 coexisting with IPv4?

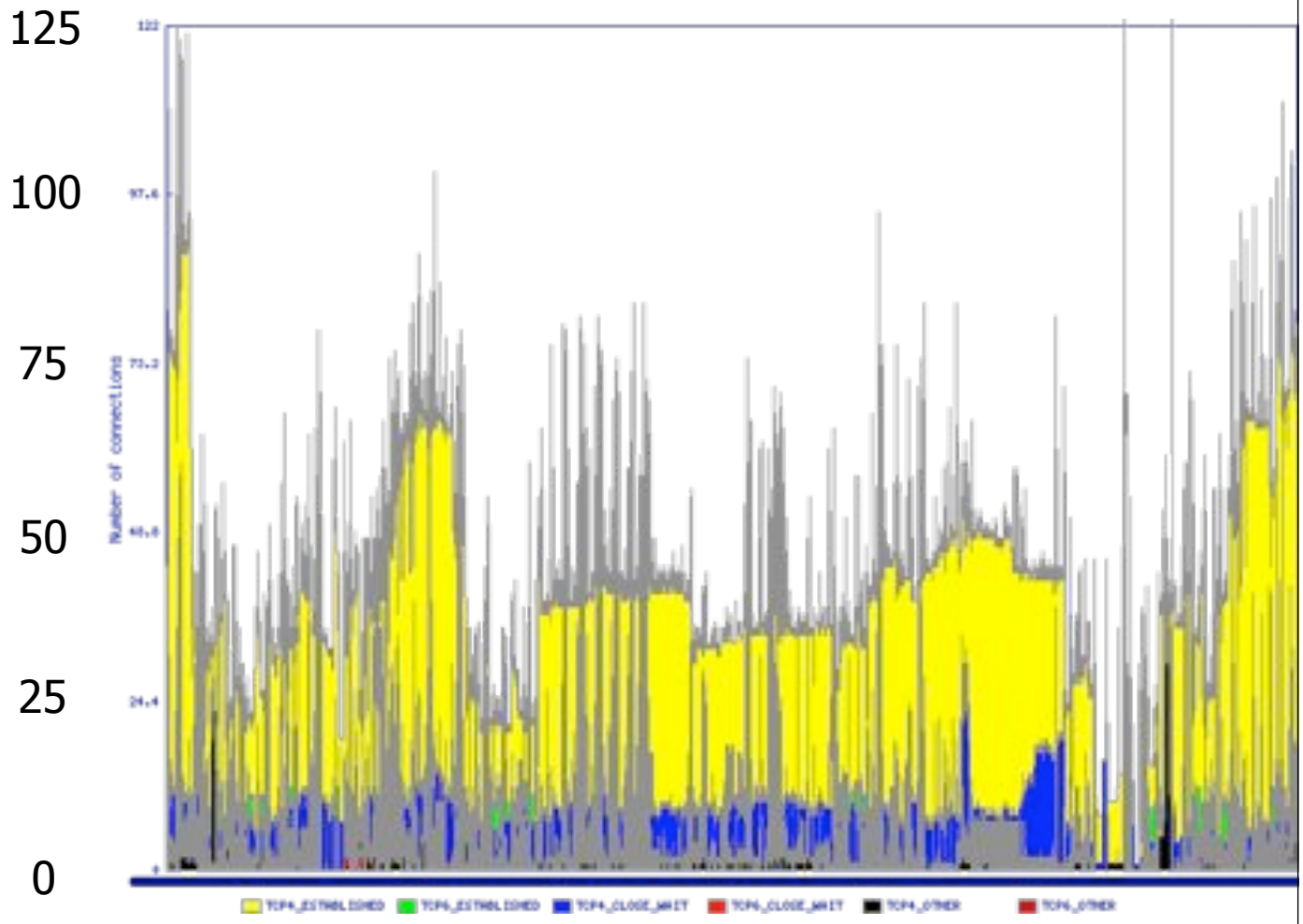
- IPv6 in core, but IPv4 only to customers require various gateways
  - IETF is working on solutions
- Often IPv6 works at home, and in core, but not over the connecting link
- Bridging IPv4 to/from IPv6 will be needed for a long time
  - Dual stack services extremely important

Most pressing need today

- “Small gateways” for private homes do not support IPv6
- No large deployment possible
- No interest from enterprises to get IPv6 as their customers and employees can not use IPv6
- Some vendors **now** start including IPv6, and same for backend systems

Some NAT solutions might be problematic

Number of ports open over time from one computer



What is the cost?

- Because IPv6 deployment happens as part of the normal upgrade cycle, it is impossible to separate the costs of IPv6 from upgrade costs
- For homes, the upgrade cycle is slower than the core, in some cases hardware is never changed
  - Translation technologies will be needed

Do we have deployment?

- FreeTelecom in France
  - 3 million subscribers
  - Have their own CPE with IPv6
- IPv6 available for their triple-play users
  - 250k users have asked for it
  - Might look small, but is significant

Measurement in Sweden

- 0.5% users used IPv6 for content available over both IPv6 and IPv4
- 6% users managed to fetch content only available over IPv6
  - 89% over 6to4
  - 9% Toredo
  - 2% “other” IPv6 space

Thanks to Mikael Abrahamsson, Telez

Things are clearly happening!

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