IPv6 at Home

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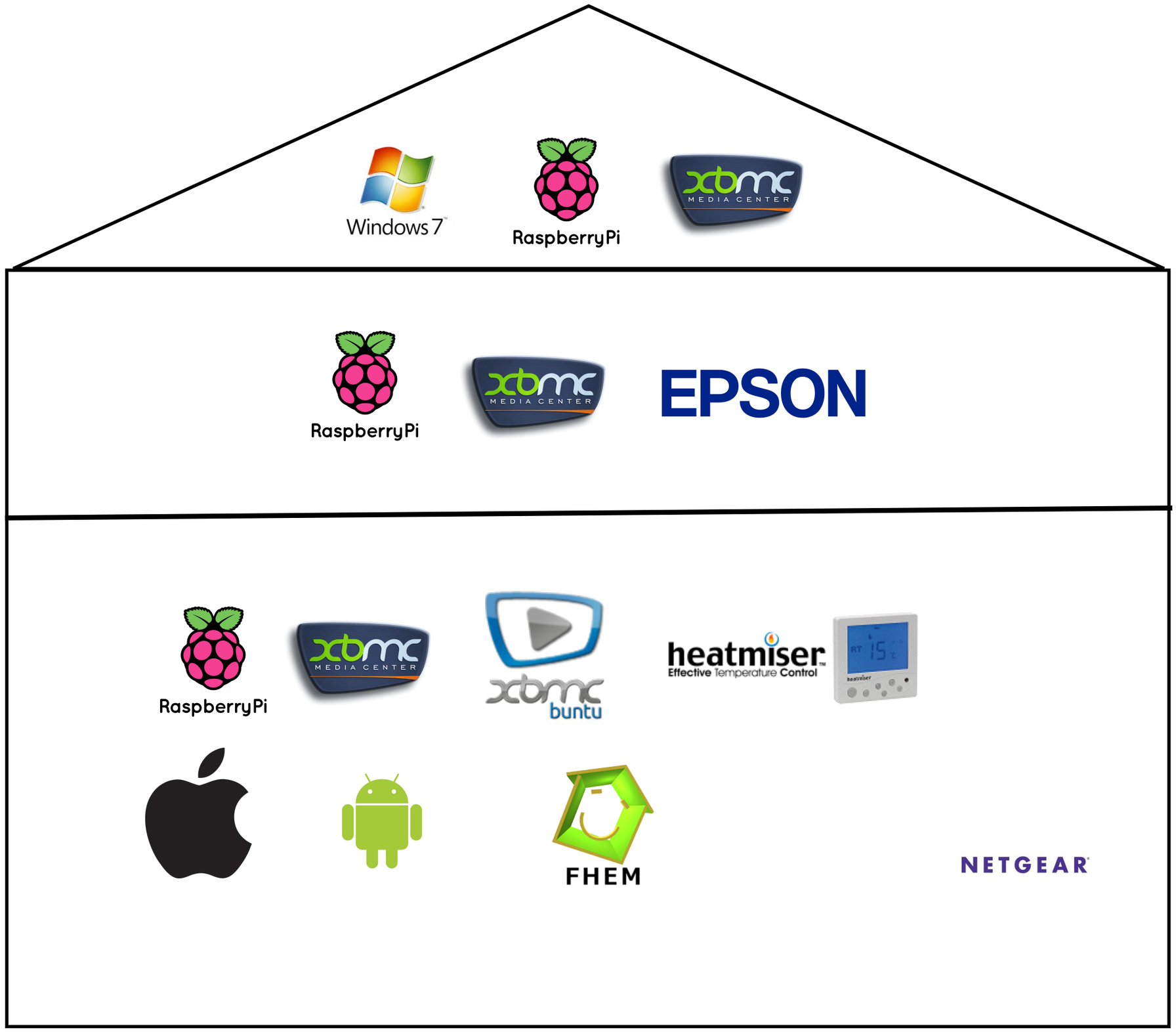
Netnod Autumn Meeting 2014

How it started

- Being an IPv6 trainer since 2009
- Benjamins hobby is domotics
- Time to put our money where our mouth is
  - But how much money?
  - Can we do with v6 what we do with v4?

How it was


Windows 7
RaspberryPi
xbmc MEDIA CENTER
RaspberryPi
xbmc MEDIA CENTER
EPSON
RaspberryPi
xbmc MEDIA CENTER
xbmc buntu
heatmiser Effective Temperature Control
FHEM
NETGEAR
D-Link Building Networks for People
upc

Some specs

- UPC 20 Mbit/s*
- Netgear WNR3500U/L wifi AP (standard firmware)*
- Switch Sitecom 8 ports
- 1 vlan to XBMC Media Center with antenna for “klik aan klik uit” RFXtrx433 USB tranceiver
- Media Center ASRock ION 330 running XBMCbuntu
- Netgear ReadyNAS RND4000 4 disks each 1.5T*
- Webcam D-Link*
- Printer Epson Stylus SX515W*

First challenges

- UPC Cable 20 Mbit/s gives only IPv4 over DHCP
  - But we need the speed
- XS4ALL ADSL 8 Mbit/s IPv4/IPv6 dual stack (PPPoA)
  - only 8 Mbit/s because of distance to the DSLAM
- The default XS4ALL Fritz!box 7360 could not Multi-WAN
  - Lots of suggestions from Eric van Uden from AVM!
  - Supposedly works with Freetz (freetz.org) but seemed hassle ;)

..So then what?

The next idea was to use the ASRock ION 330 as a firewall/ router with PFSense.

IPv6 support on PFSense is still in Beta and when we tried it, it was broken.

We contacted the developer, offered a testbed, but without result.

First challenge solved

- OpenWrt Barrier Breaker on the Netgear WNR3500U
  - Supports Multi-WAN
  - Bridge
  - Firewalls
  - DHCPv6-PD works
  - IPv4 traffic is load balanced

/64

/64

IPv6

/48

XS4ALL

Guest WiFi

Home WiFi

IPv4

upc

IPv4

OpenWrt

Wireless Freedom

Update 2014

- UPC got upgraded to 50 Mbit/s
- We subscribed for the “friendly customers IPv6-trial”
- DS-Lite (public IPv6/private IPv4)
- Separate modem - no firewall

- Not received the modem yet…..

SLAAC vs DHCPv6

- We tried DHCPv6 but found our main devices didn’t have (decent) support
  - Mac OSX 10.6.8
  - Android 4.2.2
  - Windows7
- So we sticked to SLAAC (for now)

Easy step: Media

- We have a Raspberry Pi in every room
  - serving as a media center
  - running Raspbmc
- Raspberry Pi and Raspbmc support IPv6
  - Raspbmc was not stable enough
  - Moved to OpenELEC

The NAS

- Netgear ReadyNAS RND4000
  - No IPv6 support ever
  - Time for an upgrade anyway ;)
- Homebuilt PC, ASRock Motherboard
- Ubuntu with ZFS
- Costs: 550 Euro Hardware and 200 Euro disks

Mission Thermostat

- 2 Years ago, we bought a new thermostat
- Decided to buy Heatmiser PRT-WS WiFi
- 164 Euro
- Nice apps
- But no IPv6?!
- So, we contacted the support desk
  - No IPv6 support on the roadmap

Tado works

- Difficult to find an IPv6 capable thermostat
- German company Tado has one
- Doesn’t ship to NL yet
- Uses Thingsquare Mist (open source software for IoT)
- 99 Euro Per Year (wait....what?)

Tado 2014

- In April Tado started shipping to NL
- New option to buy Tado: 250 Euro
- So….we bought it
- Supposedly runs 6LoWPAN between gateway and thermostat
- But no IPv6 from gateway to Tado servers
  - wait…..what?!

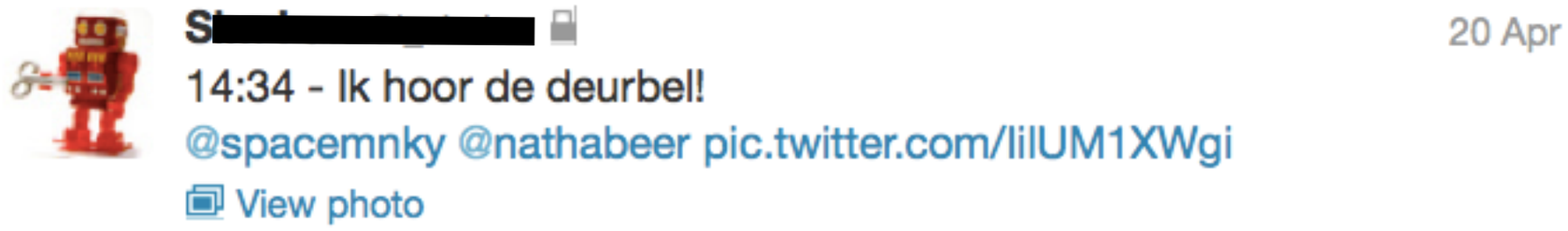
Tado 2014

- No manual control, app only
- Needs internet connectivity for heating
- But no IPv6 on the roadmap?!

- We sent back the thermostat….
- Back to Heatmiser, next up is Nest

I Spy: the Front Door

- D-Link IP webcam at front door (no IPv6)
  - sends pictures to e-mail
  - if door bel is pressed, a picture is taken and sent to private Twitter account with message: “the doorbel rang”



IPv6 at the door

- Logitech USB webcam (cheap, no IP)
- Raspberry Pi
  - running Raspbian
- Twitter and Twitter API don't do IPv6!
- Tweets are still sent over IPv4
- Looking at relay to unlock door over IPv6
  - Possibly with NFC key

Webcam works over IPv6

(We don’t have street visibility anymore!)

IPv6 lights!

Our energy supplier offers IPv6 capable lights

So, we bought them:
2 bulbs and a “gateway” for 129 Euro

Plus an “e-manager” for 2,95 Euro per month!

Light specs

Theory:

Practice: We didn’t get it to work over IPv6

(sent an e-mail to GreenWaveReality)

From their website

The IPv6-Addressable Light Bulb Goes On Sale

GreenWave Reality and NXP launch 6LowPAN mesh-networked LED bulbs and home energy control platform.

Jeff St. John
October 22, 2012

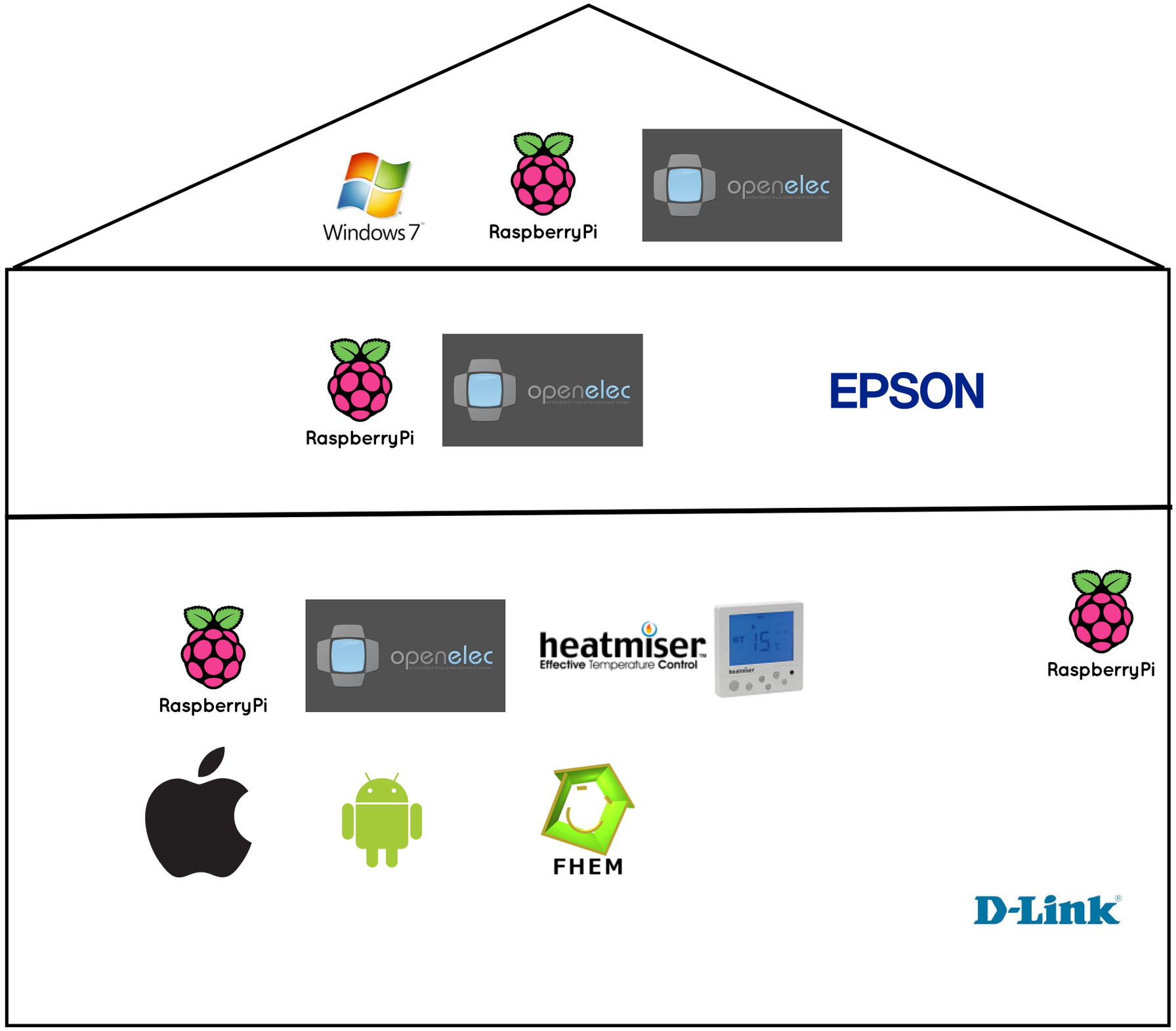
What can you do with an LED light bulb that has its own internet address? And how much would you pay for it?

IPv6 Lights

- Same story as Tado really..
- So (supposedly) 6LoWPAN between the device and the gateway, but no IPv6 from the gateway to the Greenwave servers.
- Greenwave does not give support to end-users
- Energy supplier doesn’t know about IPv6

Why do these IoT devices only work in the cloud?!

How it is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D-Link
Logitech
upc
XS4ALL

To do

- Boblight over IPv6
- Buy a new printer
- Much more.....

Lessons learned

- IPv6 in your house is not cheap
- There is a lot of manual labour involved
- Thank Goodness for Open Source!
- Vendors of commercial “home” products are not even aware of IPv6
- Not everything with IPv4 can be done with IPv6

Thank you!

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