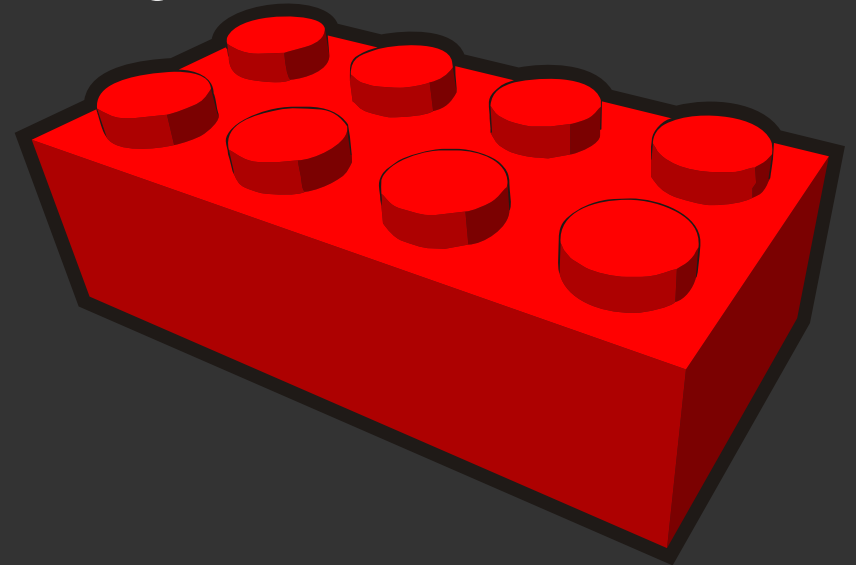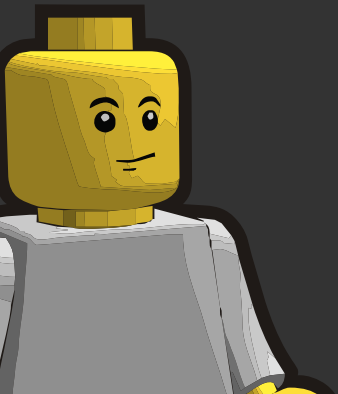# Going v6-only at home

v6-WG   RIPE72
May 26 2016 Copenhagen

Luuk Hendriks

IKNOWBESTEFFORT

Can I do this myself?
Can I get a v6-only WLAN up and running at home?

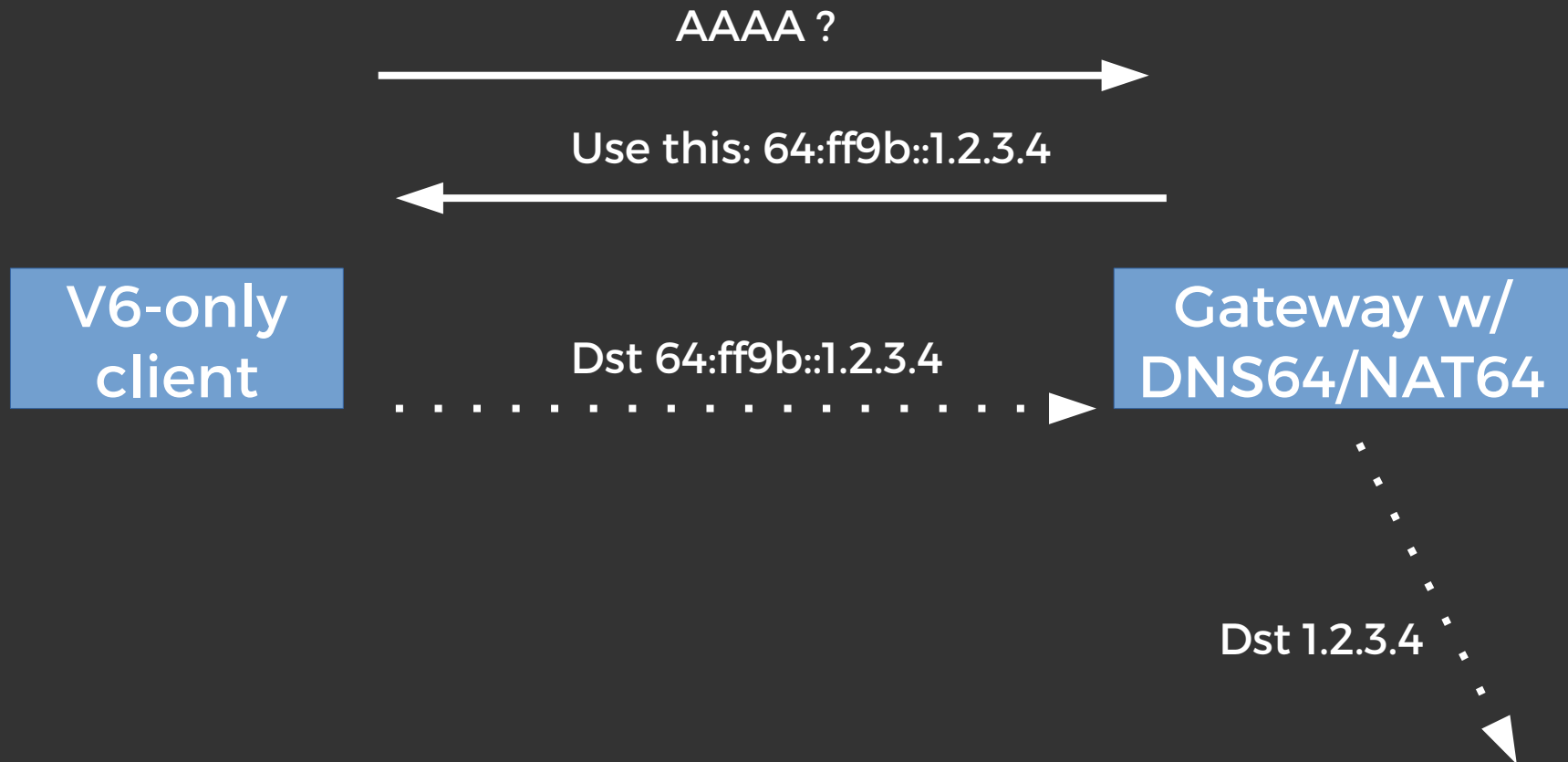In what situations does it work, and when does it fall short?

Requirements

Don't want to buy
special networking hardware

Not too many dirty hacks
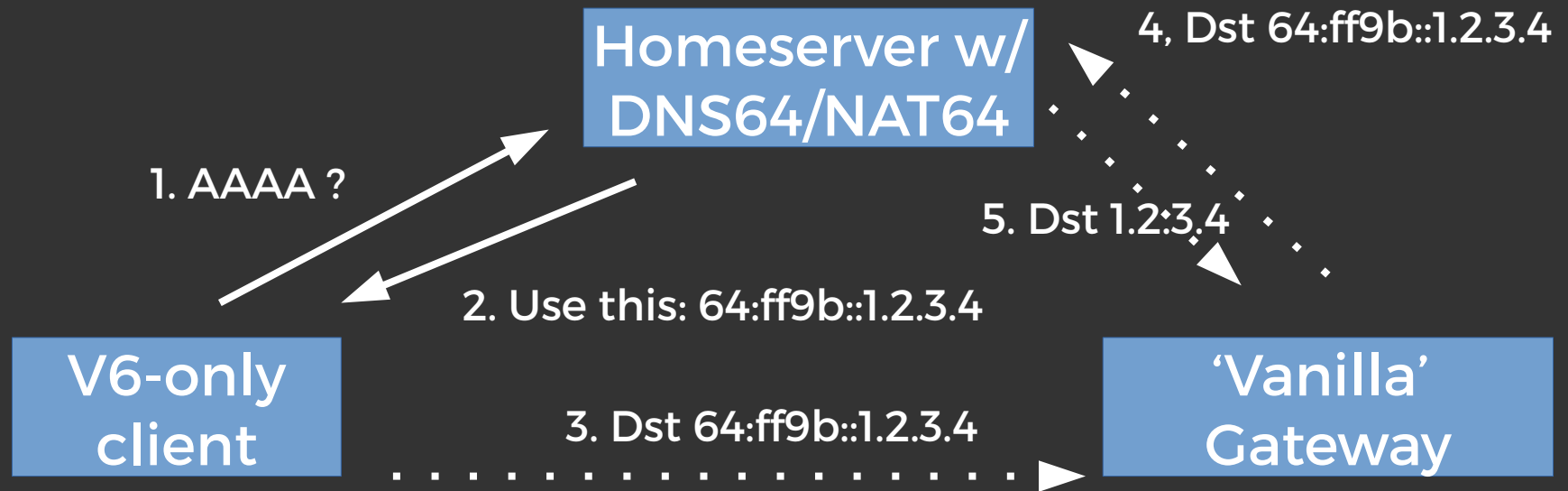
Keep CPE/gateway as vanilla as possible

→ a solution that is generally
applicable/deployable

Functional overview

AAAA ?

Use this: 64:ff9b::1.2.3.4

V6-only client		Gateway w/ DNS64/NAT64

Dst 64:ff9b::1.2.3.4

Dst 1.2.3.4

!hardware = software

We need something to do ...
... DNS64: PowerDNS + Lua
... NAT64: Tayga

Configuration

```
function nodata ( remoteip, domain, qtype, records )
        if qtype ~= pdns.AAAA then return pdns.PASS, {} end
        setvariable()
        return "getFakeAAAARecords", domain, "2a02:58:5:2464::"
End


tun-device nat64
ipv4-addr 10.64.0.1
prefix 2a02:58:5:2464::/96
dynamic-pool 10.64.0.0/24
data-dir /var/spool/tayga
```

TL;DR literally 10 lines of config

Few necessary necessities

On the server doing NAT64:

```
# iptables -t nat -A POSTROUTING -o eth0 \
                --source 10.64.0.0/24   --to-source 192.168.10.10 -j SNAT
# echo 1 >  /proc/sys/net/ipv4/conf/all/forwarding
# echo 1 >  /proc/sys/net/ipv6/conf/all/forwarding
```

On the gateway:
Static route for $nat64_prefix → $nat64_server

Done!

Nope.

```
cat /etc/resolv.conf


      Nameserver 192.168.10.1
      Search                 ?
      Domain                 ?
```

DHCP6 (dhcpd)

```
subnet6 2001:db8:0:1::/64 {
(...)
        option dhcp6.name-servers 2001:db8:0:1::53;
        option dhcp6.domain-search "local";
(...)
}
```

Or via your RAs (radvd):

```
RDNSS 2001:db8:0:1::53 2001:db8:0:1::5353 { (…) }
DNSSL local { (…) }
```

Doooone!

Nϕϕϕϕϕϕϕϕϕpe.

ping corley

Ping: corley: Name or service not known

"How the h did this even work before? !!?"

```
kickstand AAAA 2a02:58:5:2401::1

corley    AAAA 2a02:58:5:2401::10
```

Evaluation time

1. 'Measure' performance

2. Conduct survey wrt Quality of Experience

iperf

```
luuk@corley:~$ iperf -V -c 2a02:58:5:2464::8259:ddf -t 60 -P10
------------------------------------------------------------
Client connecting to 2a02:58:5:2464::8259:ddf, TCP port 5001
TCP window size: 85.0 KByte (default)
------------------------------------------------------------
[ 12] local 2a02:58:5:2401::10 port 49758 connected with 2a02:58:5:2464
[  3] local 2a02:58:5:2401::10 port 49748 connected with 2a02:58:5:2464
[  5] local 2a02:58:5:2401::10 port 49750 connected with 2a02:58:5:2464
[  4] local 2a02:58:5:2401::10 port 49751 connected with 2a02:58:5:2464
[  6] local 2a02:58:5:2401::10 port 49752 connected with 2a02:58:5:2464
```

iperf + htop

```
luuk@corley:~$ iperf -V -c 2a02:58:5:2464::8259:ddf -t 60 -P10
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[  6] local 2a02:58:5:2401::10 port 49752 connected with 2a02:58:5:2464
```

```
  1  [|||||                                        7.0%]   Tasks: 131, 439 thr; 2 running
  2  [|||||||||                                   15.1%]   Load average: 0.74 0.30 0.19
  3  [|||||||||||||||||||||||||||||||||||||||||||94.3%]   Uptime: 42 days, 19:17:01
  4  [||||||||||                                  15.7%]
Mem[|||||||||||||||||||||||||||||||||||||||3012/8815MB]
Swp[|                                         100/9535MB]

  PID USER      PRI  NI  VIRT   RES   SHR S CPU% MEM%  TIME+  Command
 4696 root       20   0  4956  2188  1372 R 99.3  0.0  0:38.00 /usr/sbin/tayga --pidfile /var/
```

iperf + htop

```
luuk@corley:~$ iperf -V -c 2a02:58:5:2464::8259:ddf -t 60 -P10
------------------------------------------------------------
Client connecting to 2a02:58:5:2464::8259:ddf, TCP port 5001
TCP window[ 10] local 2a02:58:5:2401::10 port 49756 connected with 2a02:58:5:2464::
----------[ 11] local 2a02:58:5:2401::10 port 49757 connected with 2a02:58:5:2464::
[ 12] loca[ ID] Interval        Transfer      Bandwidth
[  3] loca[  3]  0.0-60.0 sec   544 MBytes   76.0 Mbits/sec
[  5] loca[  8]  0.0-60.0 sec   565 MBytes   78.9 Mbits/sec
[  4] loca[ 10]  0.0-60.0 sec   516 MBytes   72.0 Mbits/sec
[  6] loca[  9]  0.0-60.1 sec   534 MBytes   74.6 Mbits/sec
          [ 12]  0.0-60.1 sec   598 MBytes   83.4 Mbits/sec
          [  7]  0.0-60.1 sec   536 MBytes   74.8 Mbits/sec
  1  [||||[  5]  0.0-60.1 sec   670 MBytes   93.5 Mbits/sec
  2  [|||||[ 4]  0.0-60.1 sec   656 MBytes   91.5 Mbits/sec
  3  [||||[ 11]  0.0-60.1 sec   672 MBytes   93.7 Mbits/sec
  4  [||||[  6]  0.0-60.1 sec   609 MBytes   85.0 Mbits/sec
Mem[||||[SUM]  0.0-60.1 sec   5.76 GBytes   823 Mbits/sec
Swp[     luuk@corley:~$ []

   PID USER      PRI  NI  VIRT   RES   SHR S CPU% MEM%   TIME+  Command
  4696 root       20   0  4956  2188  1372 R 99.3  0.0  0:38.00 /usr/sbin/tayga --pidfile /var/r
```

Visual representation of demographics with regards to 100% of user pool of the network

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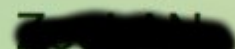
Result #1:

All problems are caused by applications

(not unlike we've seen at RIPE meetings)

Wi-Fi: ingeschakeld

Schakel Wi-Fi uit

✓ horace 🔒 📶

horace-5ghz 🔒 📶

horace-guest 🔒 📶

horace-nat64-5ghz 🔒 📶

HZN248393623 🔒 📶

HZN505236024 🔒 📶

TP-LINK_5GHz_338916 🔒 📶

Whooptiedoo 🔒 📶

Ziggo 🔒 📶

Ziggo2E90D 🔒 📶

Ziggo308C1 🔒 📶

Ziggo30E1D 🔒 📶

Ziggo30F79 🔒 📶

Verbind met ander netwerk...

Maak netwerk aan...

Open netwerkvoorkeuren...

Result #2:

The name of the SSID does matter.

(not unlike we've seen at RIPE meetings)

Lessons learned
& things to keep in mind

I can do this → you can do this.

No AAAA? No real v6.
(are we just hiding the real problem now?)

Breaking DNSSEC validation?
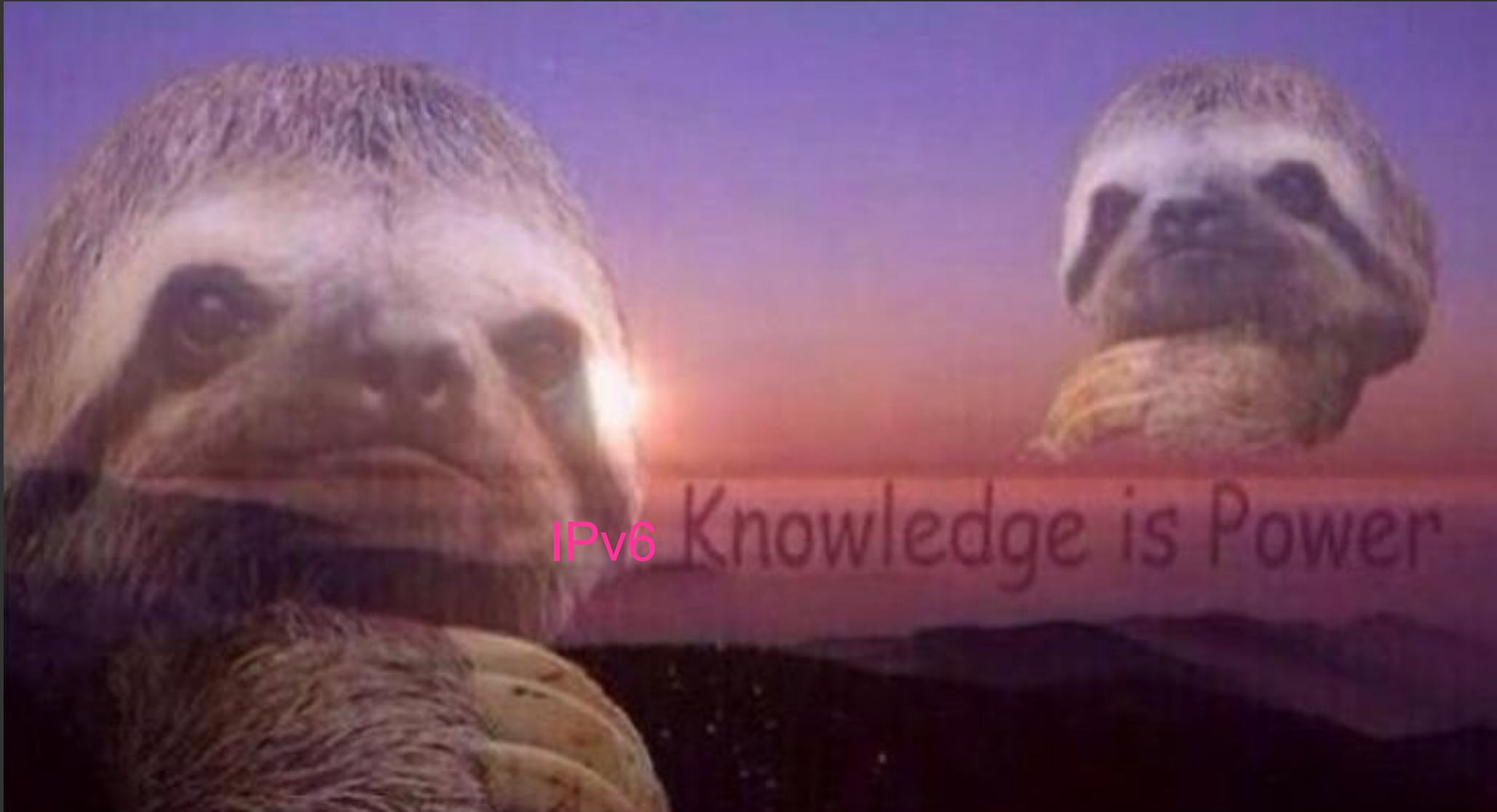
Perfect way to **force yourself
to think in v6**

YMMV

DNS64: Unbound, BIND, ..

NAT64: Ecdysis, Jool, WrapSix, ...
CPE/Gateway: ...?

But **DO** try this at your home!

Going v6-only at home

As presented at
v6-WG   RIPE72
May 26 2016 Copenhagen

Luuk Hendriks
**mail@luukhendriks.eu / luuk.hendriks@utwente.nl /
dRk/DriKE/dr<tab><tab><tab> @ IRC**