Going v6-only at home

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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

V6-only client

Gateway w/ DNS64/NAT64

Use this: 64:ff9b::1.2.3.4

AAAA?

Dst 64:ff9b::1.2.3.4

Dst 1.2.3.4
My Network Overview

1. AAAA ?
2. Use this: 64:ff9b::1.2.3.4
3. Dst 64:ff9b::1.2.3.4
4. Dst 64:ff9b::1.2.3.4
5. Dst 1.2:3.4

V6-only client

Homeserver w/ DNS64/NAT64

‘Vanilla’ Gateway

<please_pass_the_drain_cleaner.jpg>
!hardware = software

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

```bash
# 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!

Nøøøøøøøøøøøøøøpe.
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
-------------------------------
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

1 [            ]   7.0% Tasks: 131, 439 thr; 2 running
2 [            ]  15.1% Load average: 0.74 0.38 0.19
3 [            ]  94.3% Uptime: 42 days, 19:17:01
4 [            ]  15.7%
Mem[---------------] 3012/8815MB
Swp[ ] 100/9535MB

<table>
<thead>
<tr>
<th>PID</th>
<th>USER</th>
<th>PRI</th>
<th>NI</th>
<th>VIRT</th>
<th>RES</th>
<th>SHR</th>
<th>S</th>
<th>CPU%</th>
<th>MEM%</th>
<th>TIME+</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>4696</td>
<td>root</td>
<td>20</td>
<td>0</td>
<td>4956</td>
<td>2188</td>
<td>1372</td>
<td>R</td>
<td>99.3</td>
<td>0.0</td>
<td>0:38.00</td>
<td>/usr/sbin/tayga --pidfile /var/...</td>
</tr>
</tbody>
</table>
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] local[ ID] Interval      Transfer       Bandwidth
[   3] local[  3] 0.0-60.0 sec 544 MBytes 76.0 Mbits/sec
[   5] local[  8] 0.0-60.0 sec 565 MBytes 78.9 Mbits/sec
[   4] local[10] 0.0-60.0 sec 516 MBytes 72.0 Mbits/sec
[   6] local[  9] 0.0-60.0 sec 534 MBytes 74.6 Mbits/sec

[   7] local[10] 0.0-60.0 sec 598 MBytes 83.4 Mbits/sec
[   8] local[  9] 0.0-60.0 sec 536 MBytes 74.8 Mbits/sec
[   2] local[  4] 0.0-60.0 sec 670 MBytes 93.5 Mbits/sec
[   3] local[11] 0.0-60.0 sec 672 MBytes 93.7 Mbits/sec
[   4] local[  6] 0.0-60.0 sec 609 MBytes 85.0 Mbits/sec
Mem[ 11][SUM] 0.0-60.0 sec 5.76 GBytes 823 Mbits/sec
Swp[]

luuk@corley:~$
Visual representation of demographics with regards to 100% of user pool of the network
Visual representation of demographics with regards to 100% of user pool of the network
Result #1:
All problems are caused by applications
(not unlike we’ve seen at RIPE meetings)
Wi-Fi: ingeschakeld

Schakel Wi-Fi uit

☑ horace
☑ Dsavea
cs
☑ 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!
IPv6
Knowledge is Power
Going v6-only at home

As presented at
v6-WG  RIPE72
May 26 2016  Copenhagen

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