

6to4 at Home

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the problem

- our ISP in Uruguay has an IPv6 “enabled” network but not IPv6 services for residential customers.
- our servers run v6 natively with that same ISP as upstream provider.
- we wanted to experience v6 at home.

two solutions:

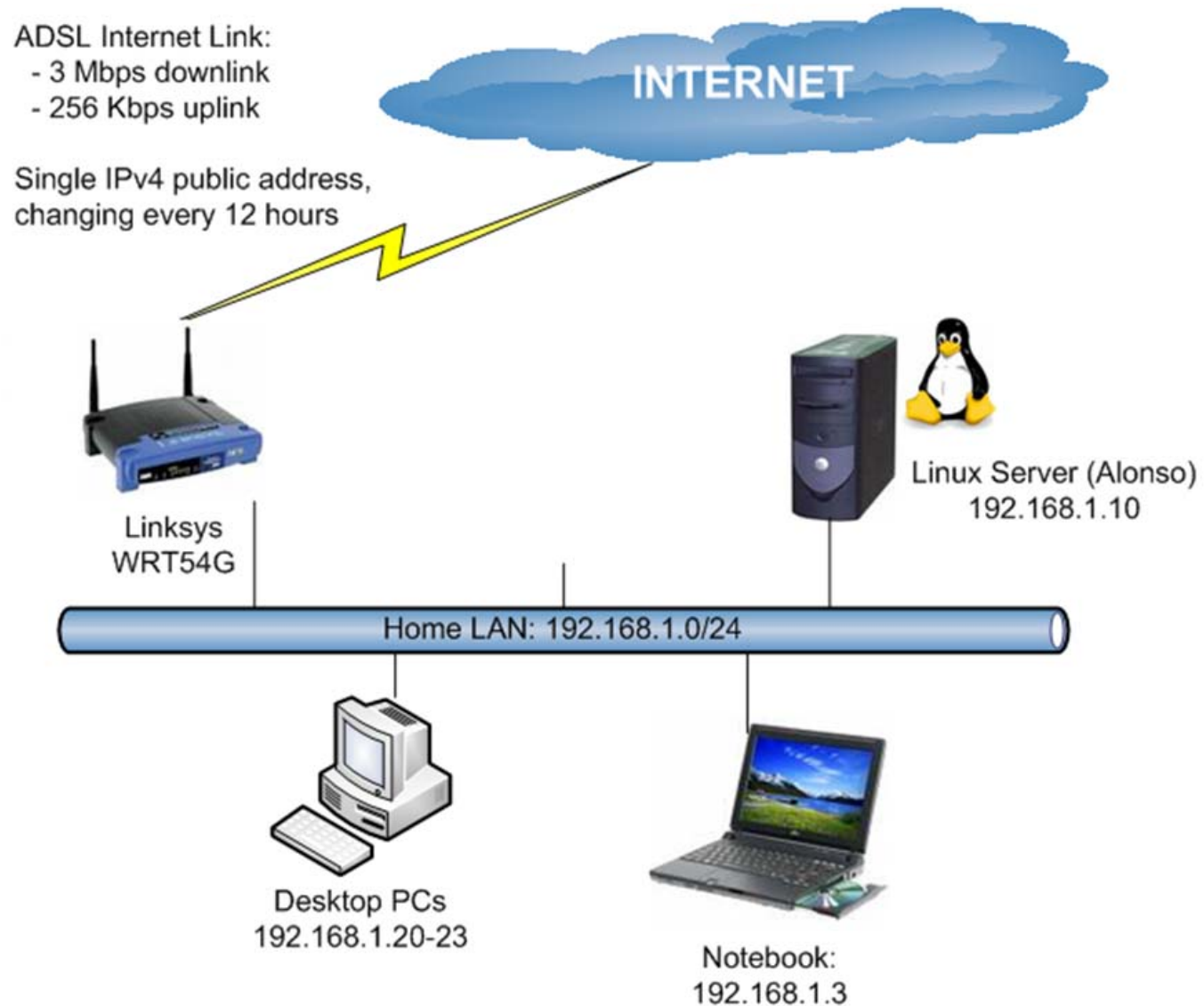
- I decided to run IPv6 at a linux box behind the NAT box.
- Roque decided to run IPv6 at the home network gateway itself running DD-WRT.

6to4 at Home: Linux gateway behind the NAT box:

- Scenario:
- Small home office, 3-4 people working simultaneously, plus 1-2 working remotely during the day
- Workstations and Linux server behind a Linksys WRT54G v2.2 and ADSL Internet link
- Good availability expected during long business hours
- Bricking the Linksys thus not an option! 😊

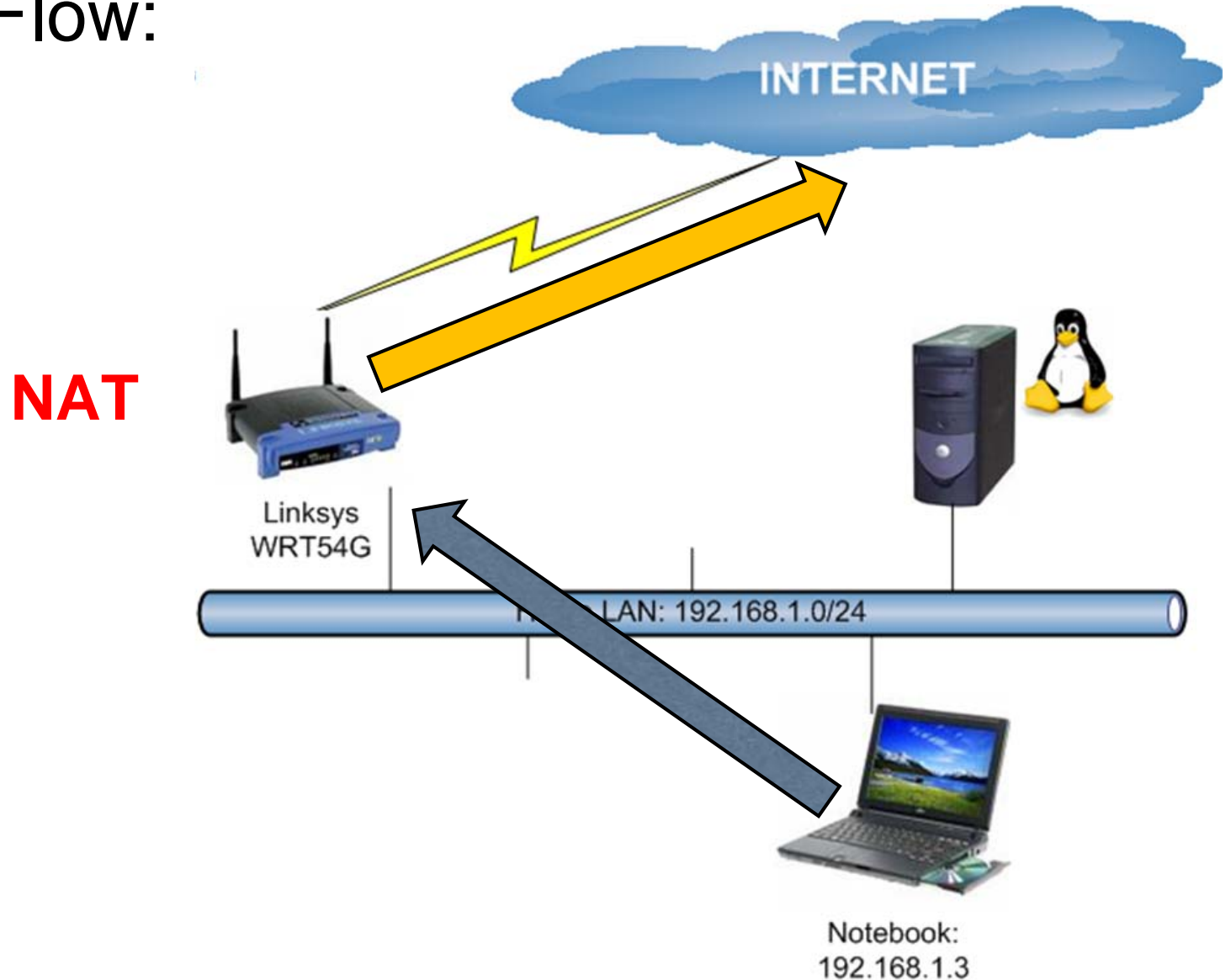
6to4 behind the NAT box (I):

- Network diagram:



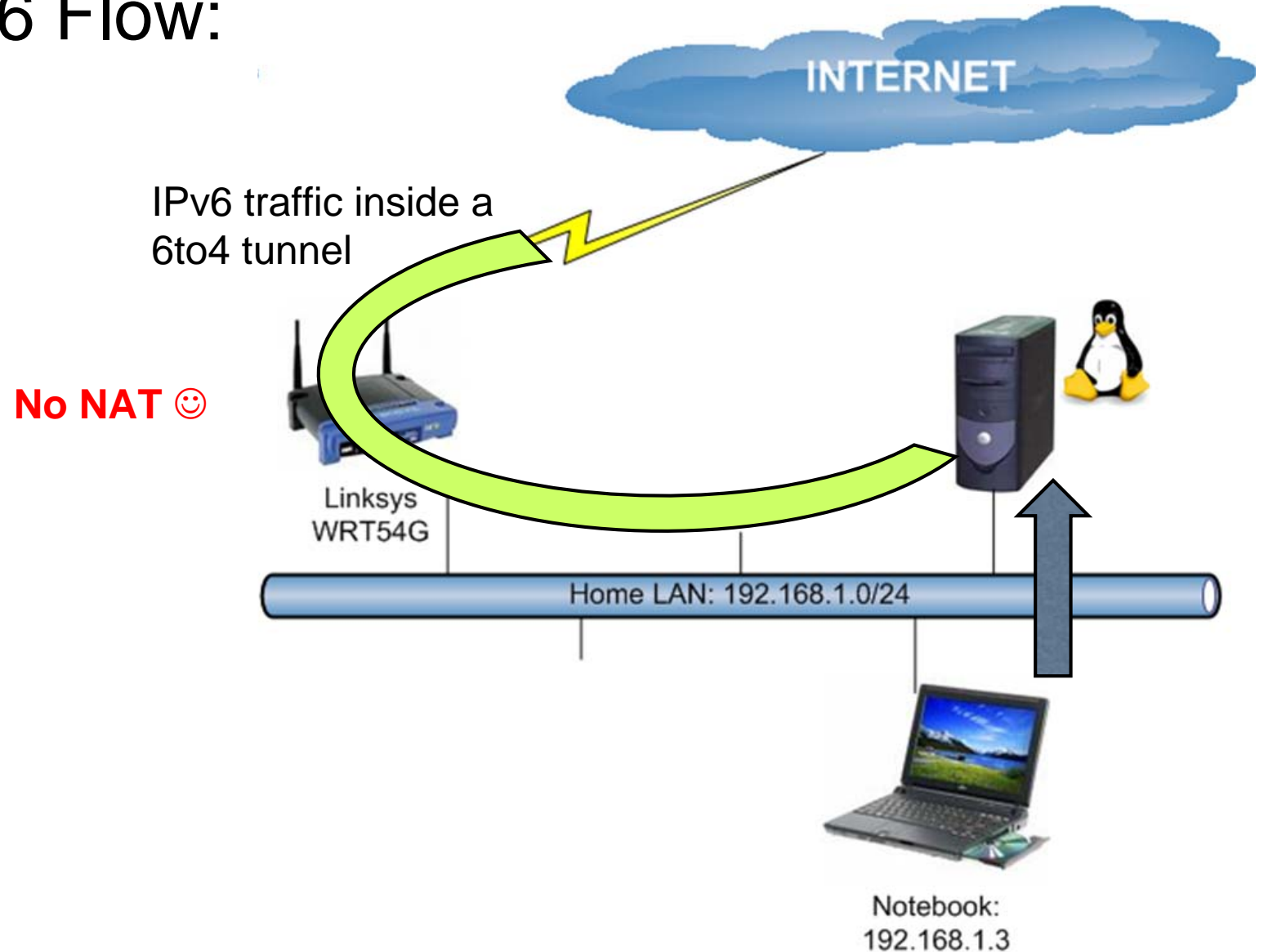
6to4 behind the NAT box (II):

- IPv4 Flow:



6to4 behind the NAT box (II):

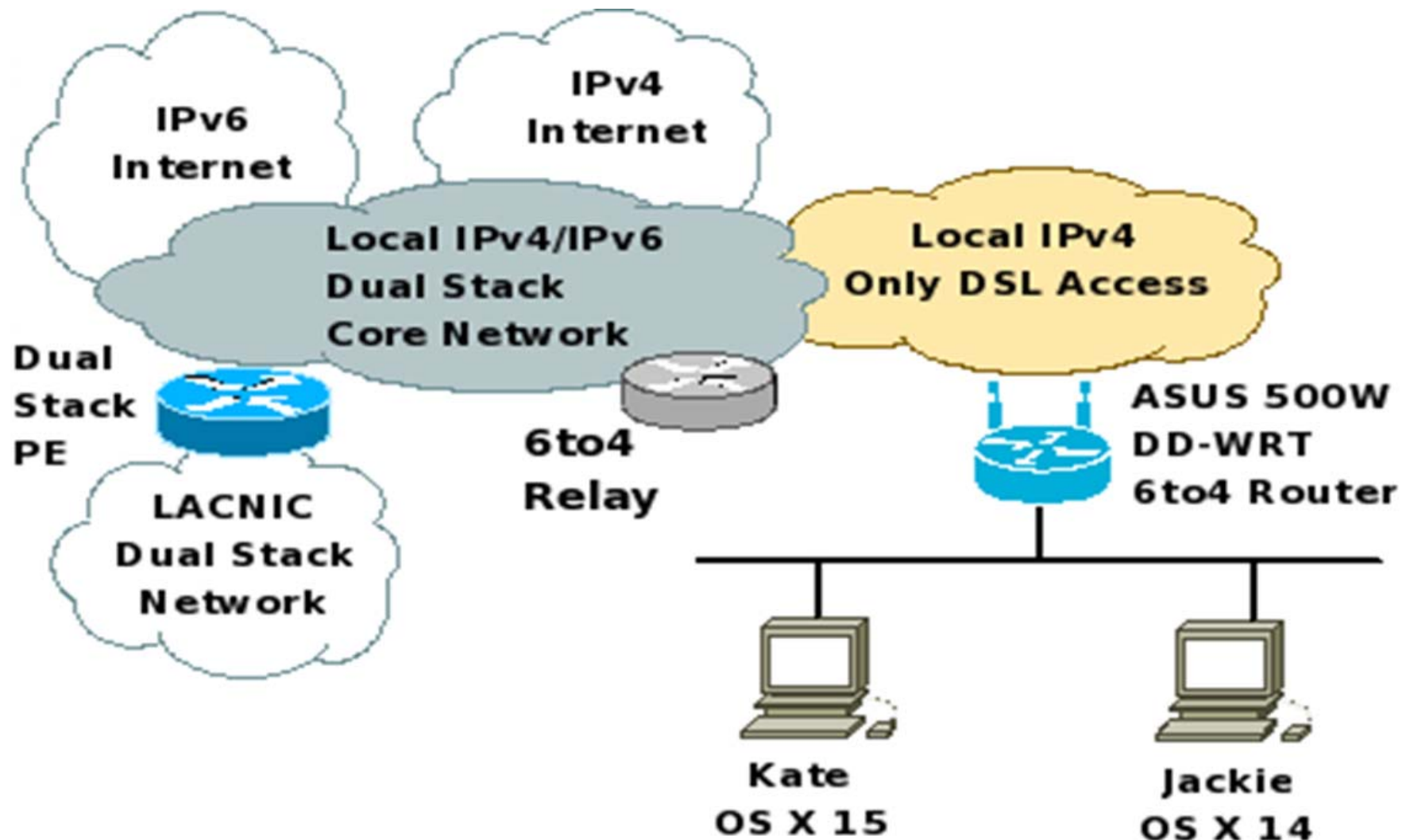
- IPv6 Flow:



6to4 behind the NAT box (III):

- Linux server:
 - start-up script configured for automatic configuration of the 6to4 interface
 - same script in “cron” for checking address changes.
 - 6to4 restarted whenever a public IPv4 address change is detected
 - Stateless autoconfiguration daemon (radvd) assigning IPv6 addresses to the other hosts in the LAN
- Public IPv4 address got using <http://whatismyip.com>

6to4 and DD-WRT



6to4 and DD-WRT

- IPv6 (and particularly 6to4) supported since v22 (voip or standard built).
- However v24 removed IPv6 support...lack of space for new wireless driver was the reason.
- Custom builds can be used, but not official support:
<http://www.crushedhat.com/downloads/DD-WRT/>

6to4 in DD-WRT take 1: Linksys WRT350N



6to4 and DD-WRT take II: ASUS WL-500W

- Steps following howto:
 1. Enable IPv6 ---> trivial.
 2. Enable Radvd ---> trivial.
 3. Configure Radvd ---> medium complex.
 4. Configure Initial Script ---> medium complex.
- However, my ISP changes my public address every 12 hours ---> custom

Dynamic External interface problem.

- the external public IPv4 address change every 12 hours.
- even if I change the Route Adv. message for the new address, the old prefix is still “alive” in the clients --> no connectivity.
- two options:
 1. send also a Route Adv. for old prefix with AdvValidLifetime = 0 when change detected.
 2. re-configure interface radvd with low

6to4 experience (II)

- Results of a *Totally Unscientific Experiment*:
 - Near-native speed for some sites
 - All IPv6 sites hosted by our ISP
 - (Yeah, all 10 of them, or so 😊)
 - Sixxs, ipv6.google.com
 - Others plainly unreachable
 - V6-enabled Microsoft sites
- Do we have a problem with URPF for 192.88.99.1? One relay did gave local access

what is the problem with 6to4?

- While 6to4 with a local relay solves the forward path, the return path is unknown ---> ISPs cannot build a business plan based on this.
- 6to4 is auto-configured in many applications even without access to any relay. Please check: draft-nward-6to4-qualification-01.txt

what is the problem with 6to4? (II)

- *When it works, it works great*, but for many sites, it just doesn't
- Users would quickly get frustrated because some sites would appear unreachable
- Is it a viable migration path in this situation?

6rd: IPv6 Rapid deployment.

- It is 6to4 using providers global unicast addresses. Same idea than 6to4 but without using 2002::/16.
- If I have 1x/32 ---> each IPv4 address gets 1x /64. Even when using NAT!.
- I can secure access to relay and solve the return path. I only need to change the CPE software.

ISP global unicast prefix: /32

Customer's IPv4 Address (32 bit)

- Free.fr implemented 6rd in 4million users in 4 months. $2001:DB8:XXXX:XXXX::/64$ → Each Customer gets a /64.

Conclusions.

- 6to4 works, sometimes and that is the issue.
- There is 6to4 traffic! ISPs installing relays are giving a better service to their users.
- 6rd uses 6to4 principles and allows a rapid deployment of IPv6 in some scenarios with control over both forward and return path.

thank you!

scripts available at:

<http://www.uy6tf.org.uy>

http://cagnazzo.name/drupal/sites/default/files/6to4-linux-dynip-0.3.tar_0.gz