RIPE81: Bringing IPv6 Everywhere

✚ ungleich

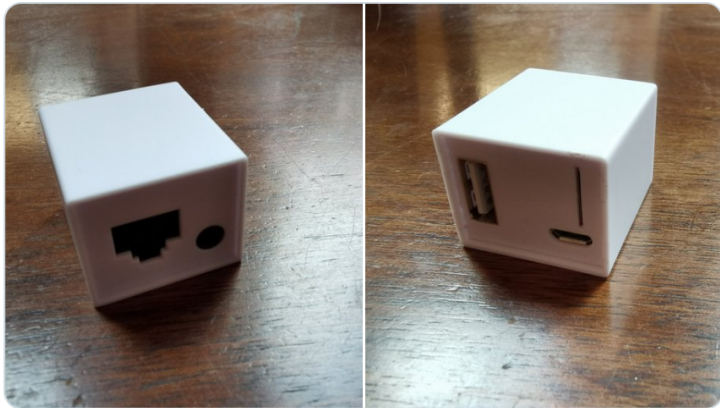Nico Schottelius, ungleich.ch

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You can get IPv6 anywhere.

Post RIPE79 talks

- ▶ "HE.net does not work behind NAT"
- ▶ "IPv6VPN.ch needs wireguard configuration"
- ▶ "I want something that just works"
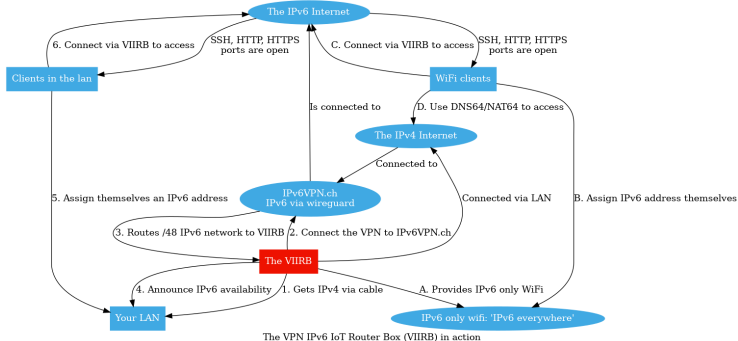- ▶ "Needs to be Plug and Play"

Introducing the VIIRB

The world's smallest IPv6 Router.

How to use the VIIRB

- Plugin the Ethernet cable
- Plugin power via MicroUSB
- That's it - everything else happens automatically.

How the VIIRB works

The VPN IPv6 IoT Router Box (VIIRB) in action

How the VIIRB works

- VIIRB acquires an IPv4 address on the Ethernet interface
- Establishes a VPN connection to DataCenterLight.ch
- Has a full /48 IPv6 network routed
- The :cafe:: subnetwork is configured for clients in the LAN
- VIIRB sends router advertisements
- All IPv6 capabale clients automatically assign themself an IPv6 address

Under the hood

- Hardware
  - About 3cmx3cmx3cm in size
  - MT7628
  - 550 Mhz
  - USB 2.0 port
- Software
  - OpenWRT 19.07.4 (latest by default)
  - Wireguard
  - dnsmasq

Bootstrapping a VIIRB

- ▶ Install/upgrade OpenWRT
- ▶ Remove some OpenWRT defaults (f.i. ULA assignments)
- ▶ Setup Wireguard with unique key pair
- ▶ Register public key at DataCenterLight VPN servers
- ▶ Generate and set a random root password
  - ▶ The VIIRB is world-wide reachable
  - ▶ Default passwords are not a secure approach
- ▶ Ship it

Findings

- The VIIRB supplies a static /48 network
  - Improves situation for some ISPs
  - Allows real IoT setups / remote access
- Successful claim:
  - You can have IPv6 anywhere.

The Present & Future

- VIIRB has been shipped to 15 different countries
- VIIRB project is +/- zero sum
  - Trying to keep the price and cost down
  - To enable anyone anywhere with IPv6
- Planning to anycast VPN endpoints in the future
- Looking for partners / organisations in the world
  - Increasing IPv6 Connectivity
  - Spreading IPv6 Availability
  - Aiding IPv6 education

Future IPv6 projects

- New hardware platforms
  - WIWIB: Similar to VIIRB + WiFi
  - VIMPI: High Speed Version, MT7621 based
  - VIGIR: 4G router with 802.11ac, MT7621 based
  - IPv6-Eye: world wide reachable IPv6 camera
    (https://1000ey.es)
- All devices come with wireguard pre-configured
  - Zero Configuration IPv6 for any situation

More of this

- ▶ The VIIRB
  - ▶ https://viirb.ungleich.ch
- ▶ VIIRB in the media
  - ▶ https://blog.apnic.net/2020/09/30/
    connect-to-ipv6-everywhere-with-viirb/
  - ▶ https://packetpushers.net/podcast/
    ipv6-buzz-058-tackling-ipv6-access-challenges/

Let's bring IPv6 everywhere.

▶ `https://IPv6.chat` (Matrix chat #ipv6:ungleich.ch)
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