

RIPE81: Bringing IPv6 Everywhere

 ungleich

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RIPE 79 claim

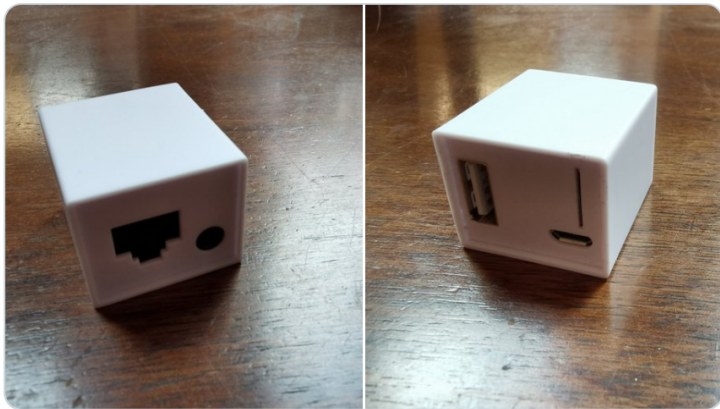


You can get IPv6 anywhere.

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

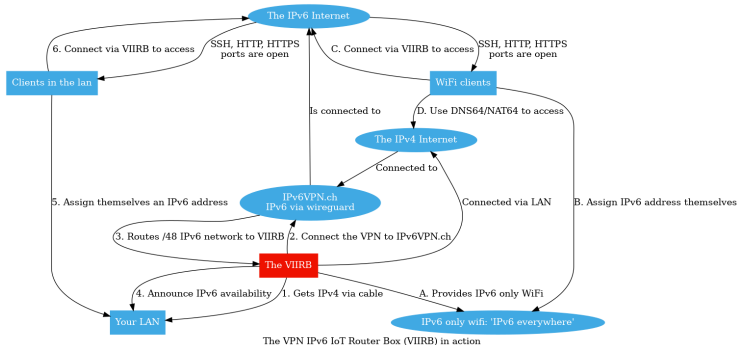


The world's smallest IPv6 Router.

How to use the VIIRB

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

How the VIIRB works



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 capable clients automatically assign themselves 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/>

IPv6 everywhere



Let's bring IPv6 everywhere.

- ▶ <https://IPv6.chat> (Matrix chat #ipv6:ungleich.ch)
- ▶ nico@ungleich.ch