The Need to Transition to IPv6

Yet another motivational talk

Ondřej Caletka | 12 April 2022 | SEE 10

Aren't we there yet?

- World IPv6 launch in 2012

- IPv6 stats are steadily growing

- Every major operating system **supports IPv6**

- But majority **still uses IPv4**

- IPv6 is a *second-class* citizen

IPv6 Adoption

We are continuously measuring the availability of IPv6 connectivity among Google users. The graph shows the percentage of users that access Google over IPv6.
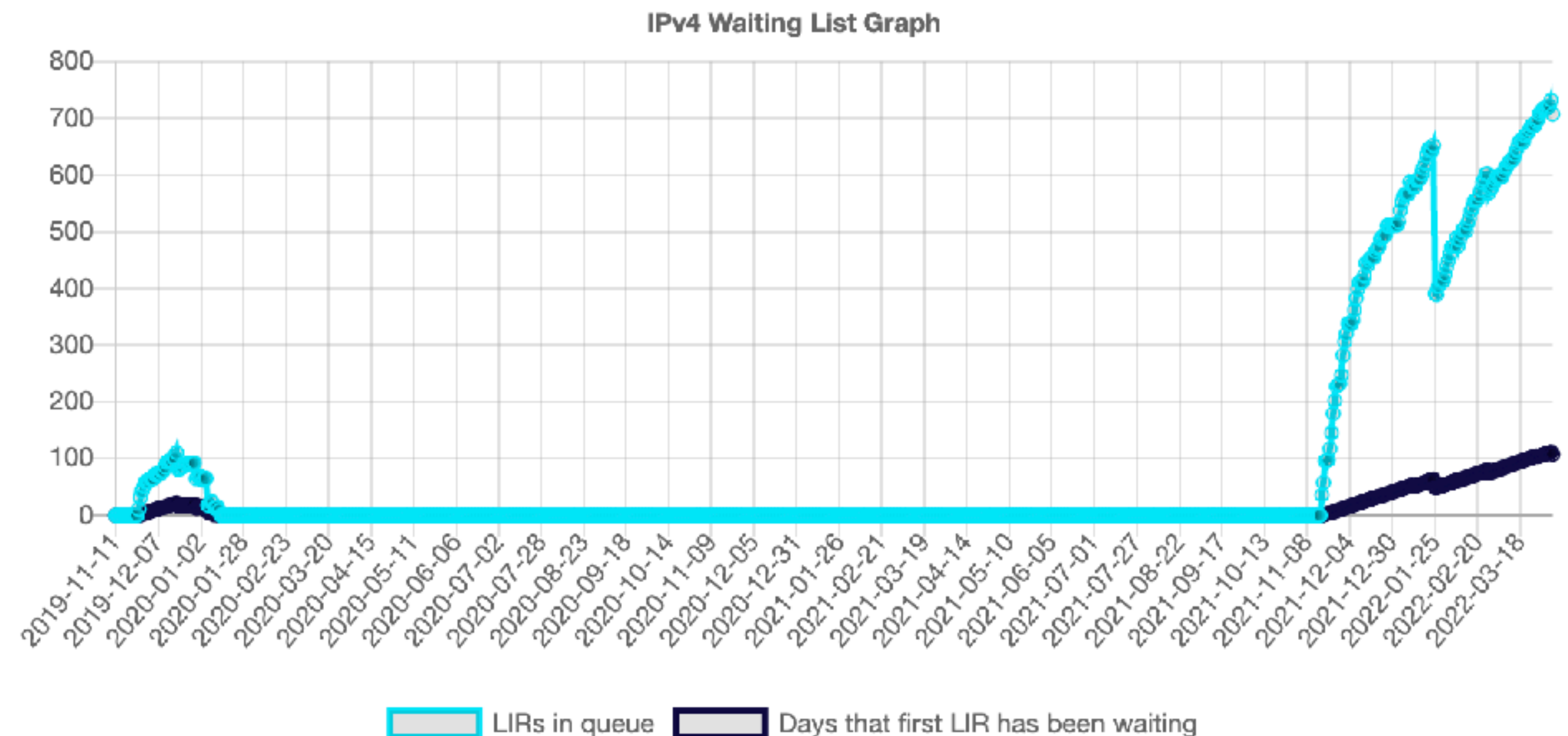
Native: 30.85% 6to4/Teredo: 0.00% Total IPv6: 30.85% | Apr 13, 2021
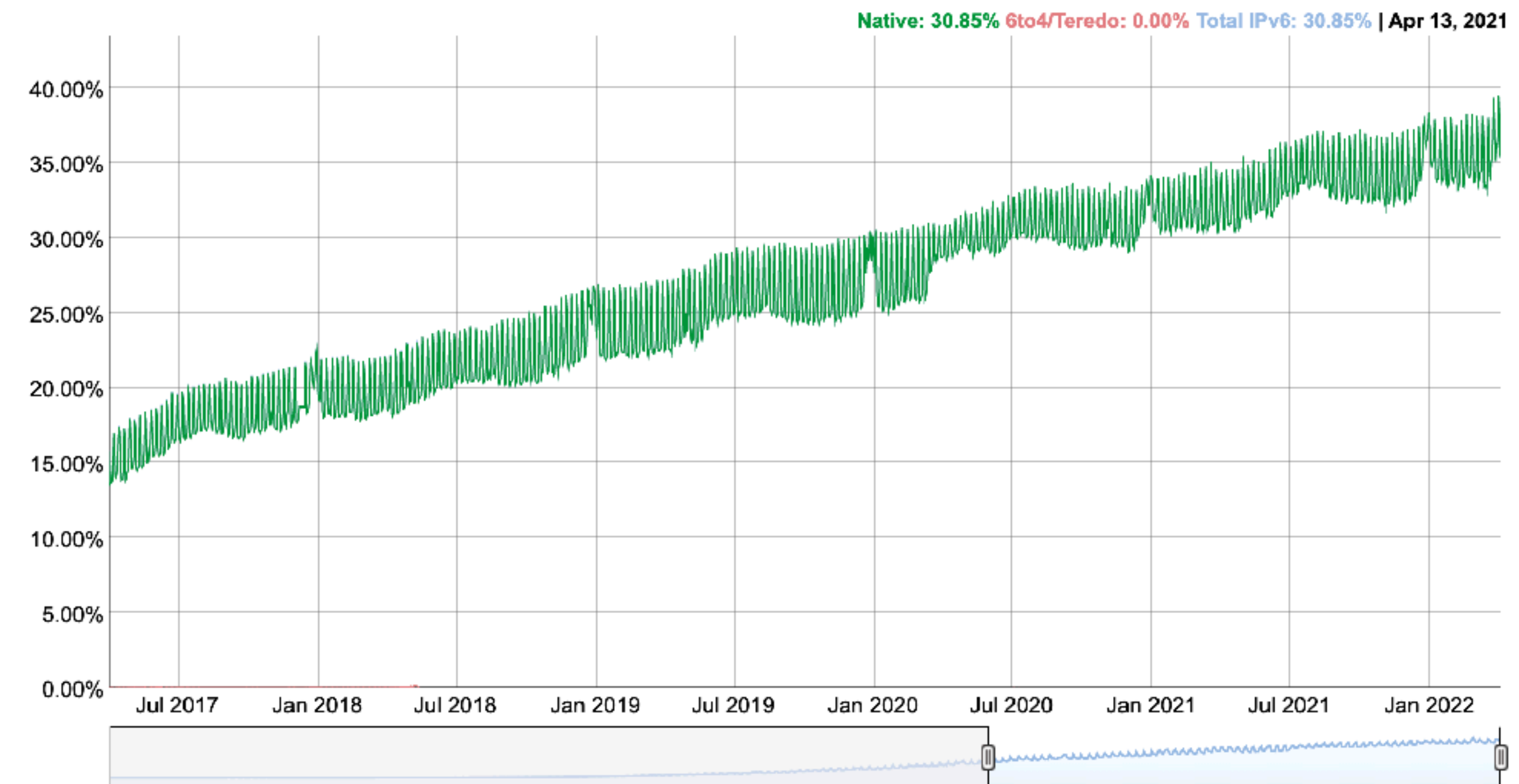
source: Google IPv6 stats

The future of IPv4

- Depletion phase since 2012

- Depleted in 2019

- Waiting list for /24 allocations

- IPv4 transfer market

- Prices are **steadily growing**

- Big players are **buying large blocks** of IPv4 resources

IPv4 Waiting List Graph

LIRs in queue   Days that first LIR has been waiting

Do you need a unique IPv4 address?

- If you are a home user, **probably not**

  - Carrier Grade NATs are getting better and better

- If you are an enterprise user, **probably yes**

- If you are a colocation provider, each of your customers needs **several IPv4 addresses**

- This will **not get better** until IPv6 is deployed universally

  - But you can spare some IPv4 addresses by running the most of your infrastructure IPv6-only

Advantages of deploying IPv6

- Unrestricted **growth of services**

- **Less strain** on CGN equipment

  - Many popular services available over dual stack

- Fewer problems related to **IP address sharing**

  - Like **geolocation**, **blocklisting** or **rate limiting**

- Simpler **data retention**

  - Addressing can be static; no need to store per-flow NAT mappings

- No problems with **colliding private address ranges**

  - Especially after *mergers and acquisitions*

Deploy IPv6 in a future-proof way

- Make a proper **addressing plan** from scratch

  - Reserve enough space for future growth

  - Group prefixes systematically by functions, locations and/or security policies

  - Avoid deploying large subnets *(prevent Layer-2 vulnerabilities)*

  - A proper plan makes IPv6 addresses *easier* to remember

- Deploy **native** IPv6

  - IPv4 will be turned off in the future, don't let IPv6 rely on it

- Use a *transition mechanism* for IPv4

  - So that it can be gradually phased out in the future

  - Save money on extra costs of IPv4 resources that might be useless in the future

Why not just extend IPv4?

- Even a *minimal* extension of IPv4 **means incompatibility**

- IPv6 provides solutions even to problems **not solved by IPv4**

  - For instance, addressing home networks with public IP addresses

2001:db8:1234:0::/64
192.0.2.0/24

::1

::2

2001:db8:1234::/48
192.168.0.1/24

The Internet
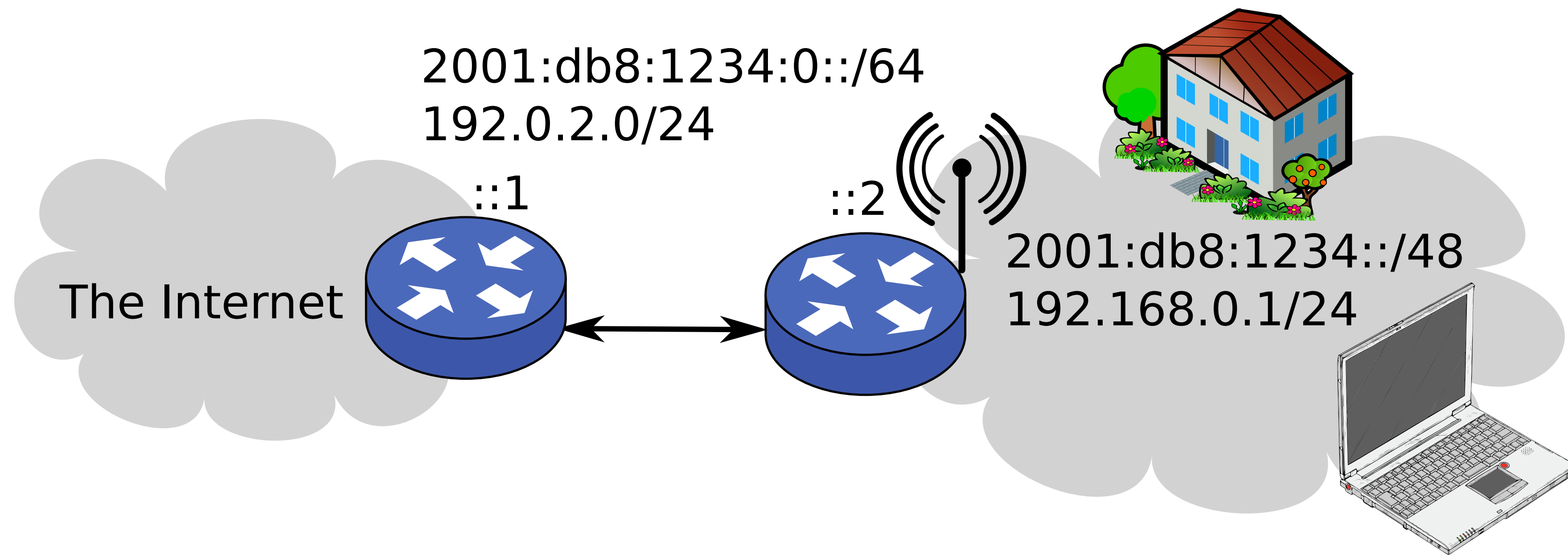
Security aspects of IPv6

- Neither *more* nor *less* secure than IPv4

- Global addressing **does not imply** global reachability

- Some supporting protocols are *different* and have their own vulnerabilities

- **Knowledge** is the best security feature

Did you know that there is a **brand new free e-learning course** on IPv6 Security?

https://academy.ripe.net

The future is IPv6-only

- Deploying IPv6 is the **first step**

- The final step is to **turn off IPv4**

  - So the scarce resources are finally released

  - Dual stack IPv4+IPv6 masks issues with IPv6

- Start with your **private management network**

  - If accessible only over VPN, there's no need for IPv4

- Continue with **your (home) office network**

  - Deploy NAT64/DNS64

  - Fix or replace hardware or software that fails to work on such network

Still not convinced?

Source: https://auctions.ipv4.global/prior-sales
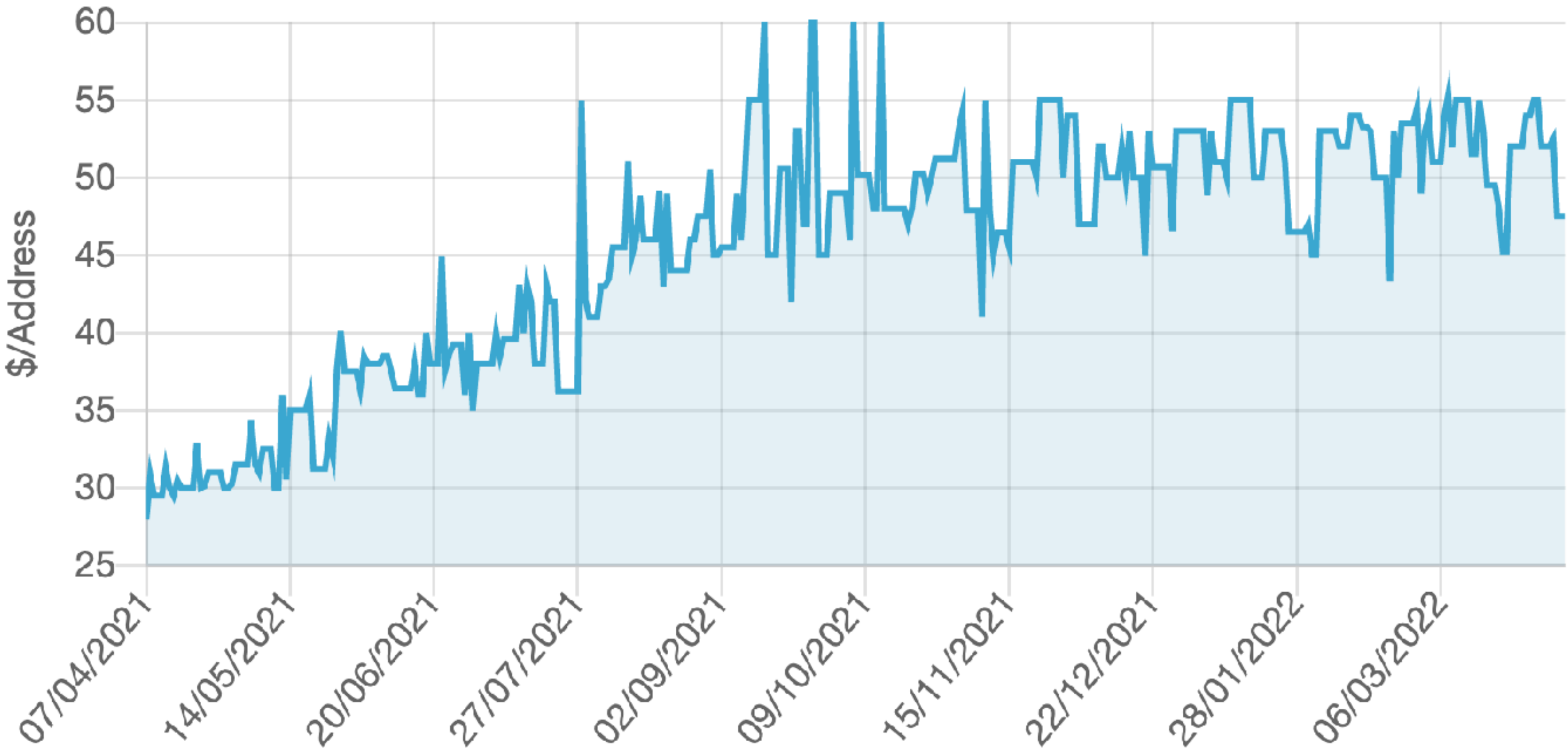
There is no Plan C

- IPv6 is the **only known solution** for the continuous growth of the Internet

- It is already **deployed in a large scale**

- There are **big IPv6-only plans**

- There are **first IPv6-only projects**

Questions

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