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# The Need to Transition to IPv6

Yet another motivational talk

Ondřej Caletka | 17 November 2021 | LUNOG4

# Aren't we there yet?

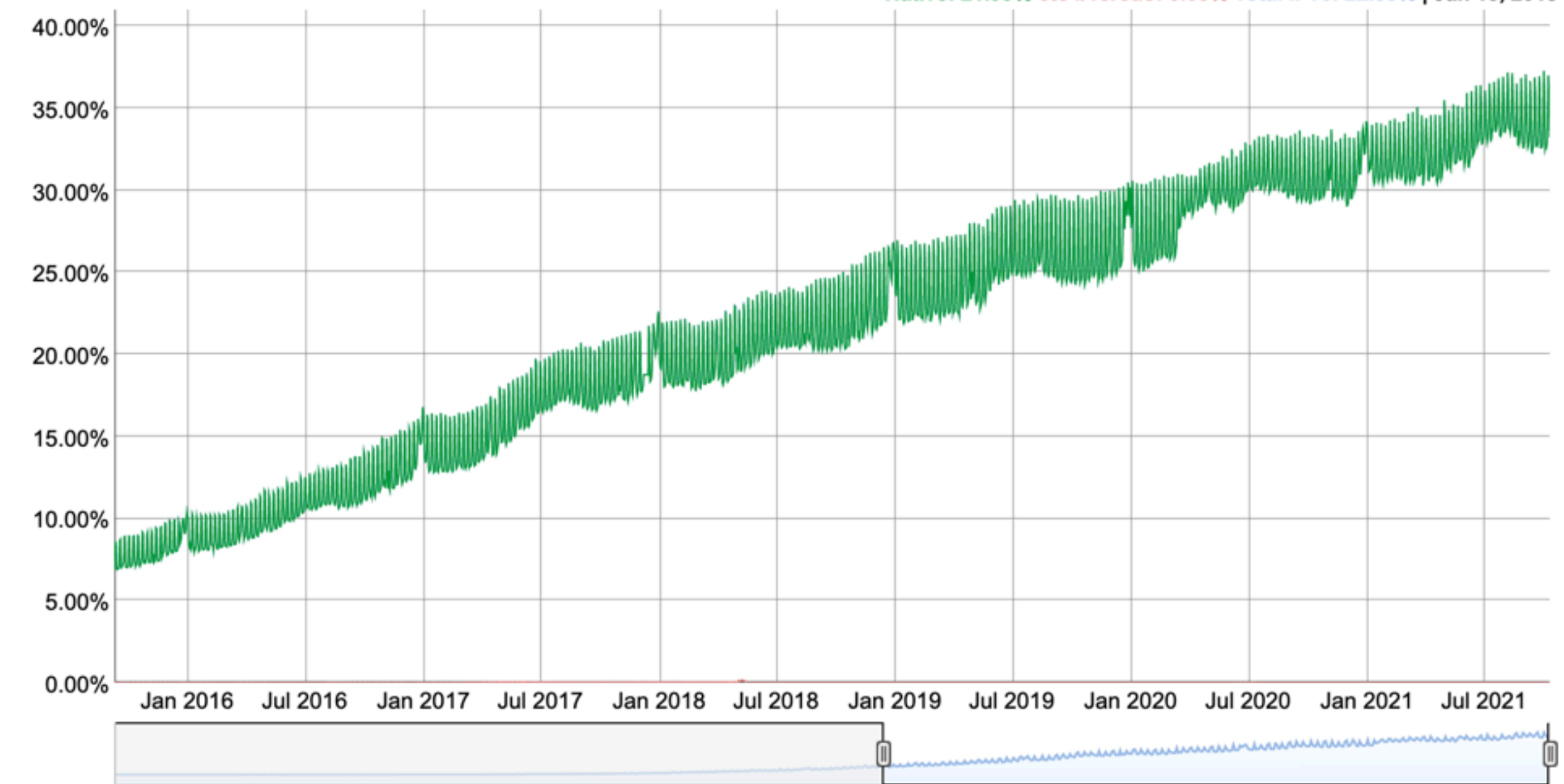


- World IPv6 launch in 2012
- IPv6 stats are steadily growing
- Every major operating system **supports IPv6**
- But majority **still uses IPv4**
- IPv6 is a *second-class* citizen

## 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: 21.99% 6to4/Teredo: 0.03% Total IPv6: 22.03% | Jan 13, 2018

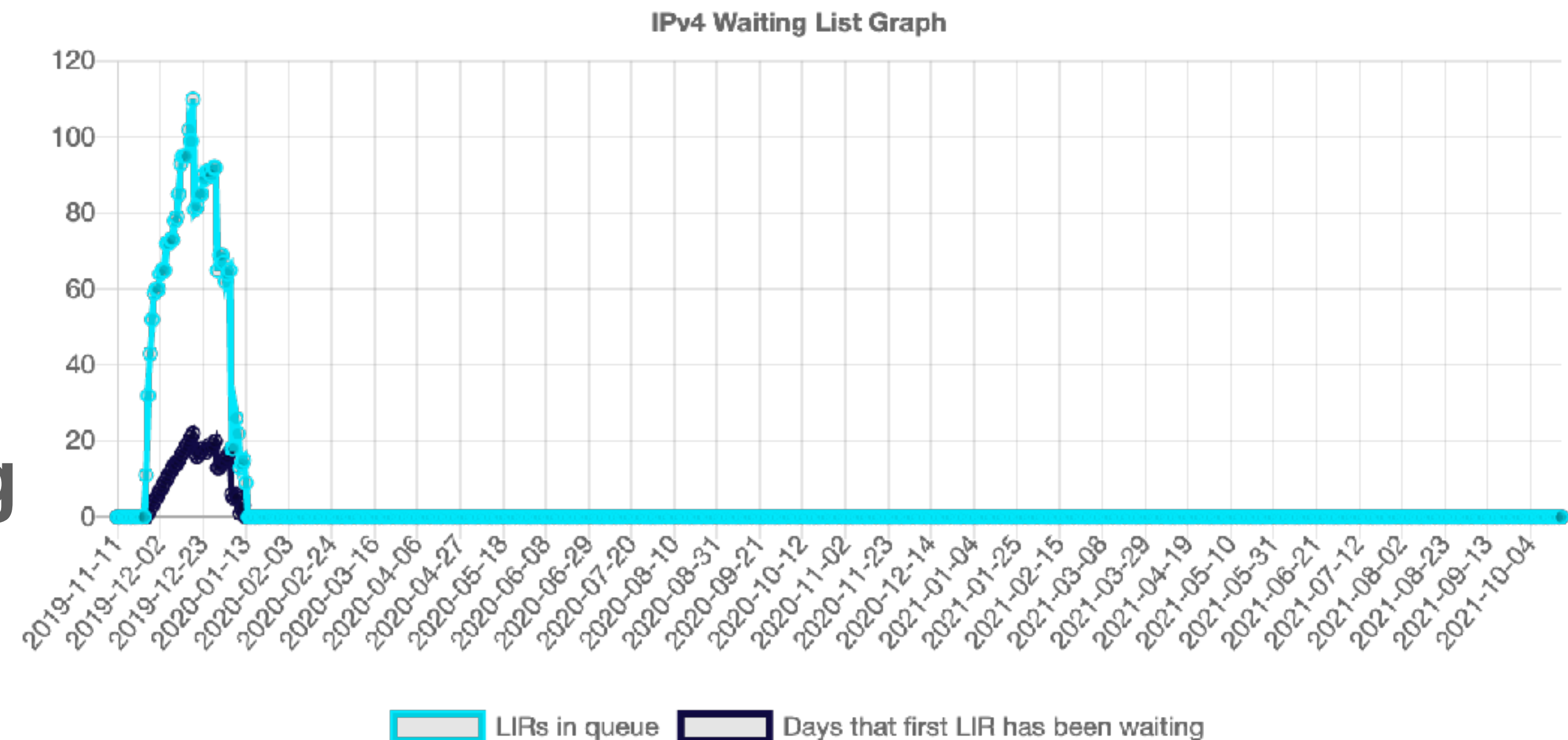


source: Google IPv6 stats

# The future of IPv4



- Depletion phase since 2012
- Depleted in 2019
- (*Empty*) waiting list for /24 allocations
- IPv4 transfer market
- Prices are **steadily growing**
- Big players are **buying large blocks of IPv4 resources**



# Do you need a unique IPv4 address?



- If you are a home user, **probably not**
  - Carrier Grade NATs are better and better
- If you are an enterprise, **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 the 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

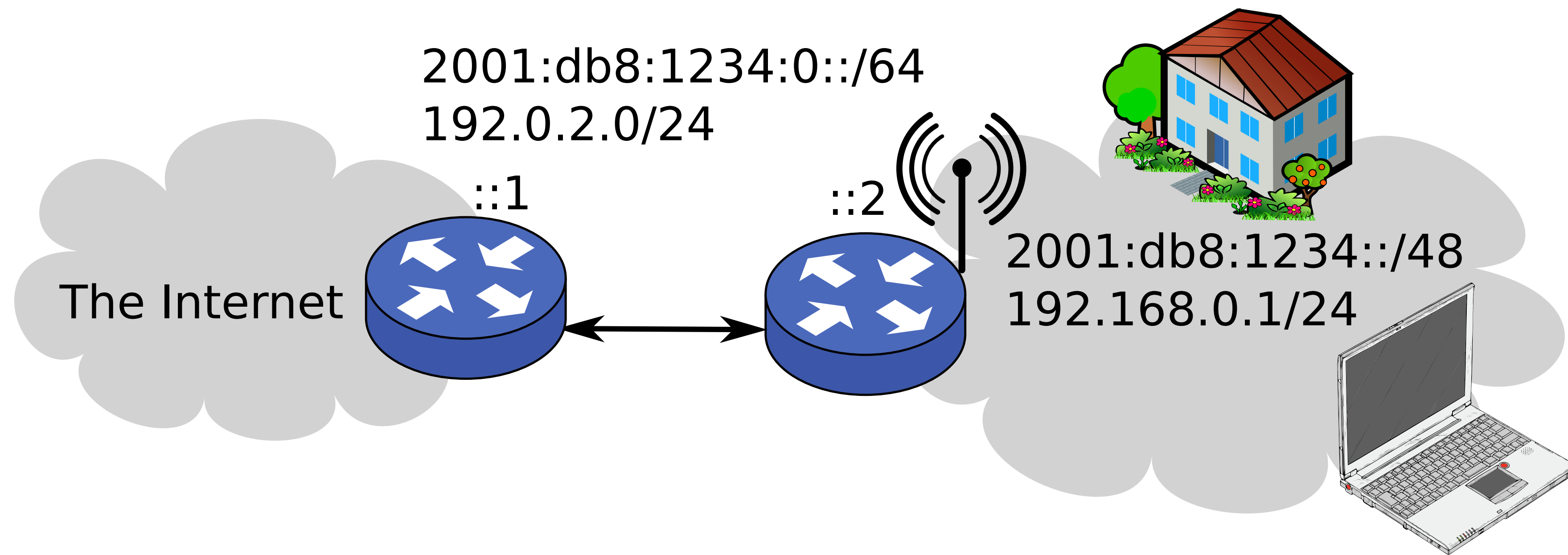


- Make a proper **addressing plan** from scratch
  - Reserve enough space for future growth
  - Group prefixes systematically by functions, locations and/or security policies
  - Avoid deploying large subnets (*prevent Layer-2 vulnerabilities*)
  - A proper plan makes IPv6 addresses *easier* to remember
- 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



# 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>



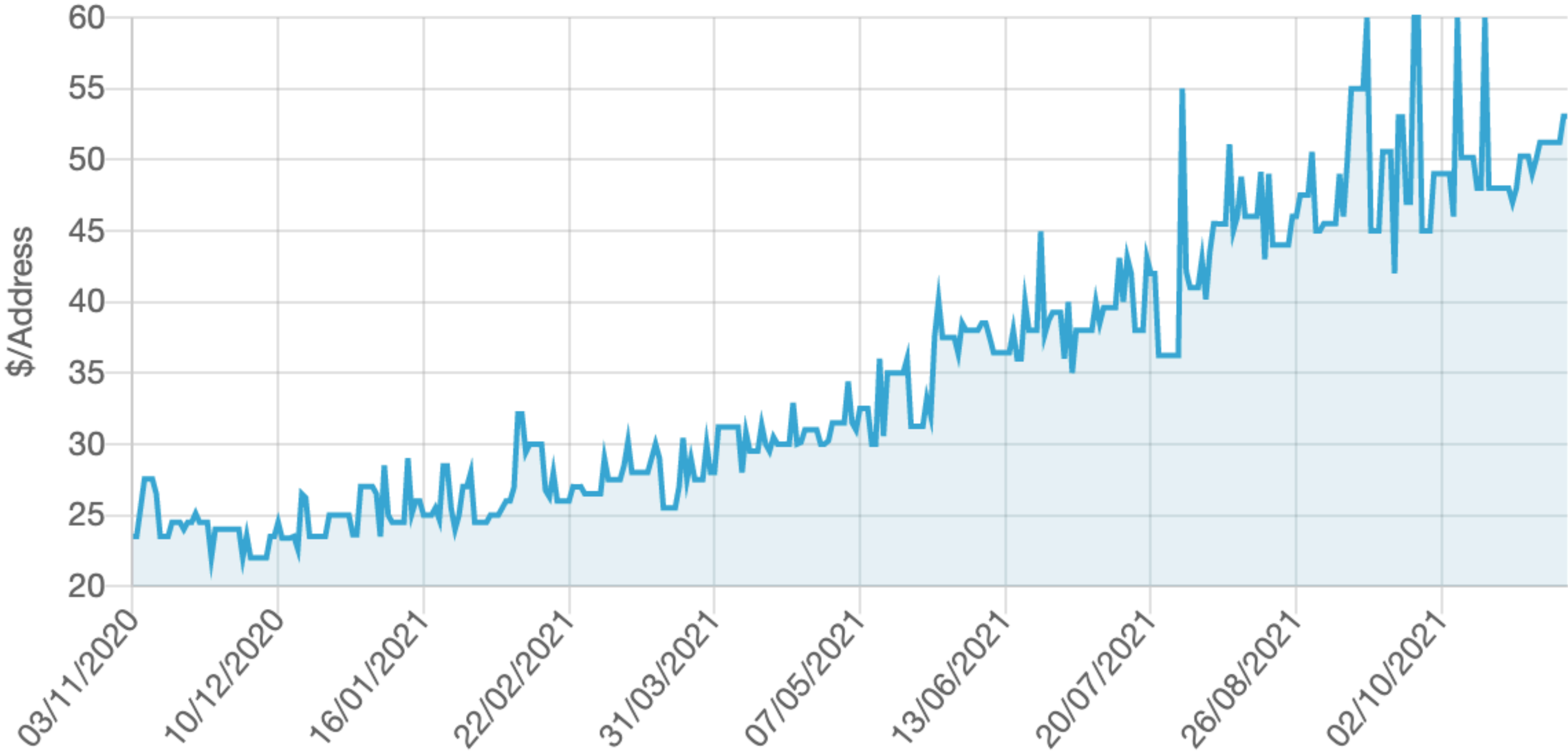


# The future is IPv6-only



- 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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