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IPv6 only hosting

at datacenterlight

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2019-12-12

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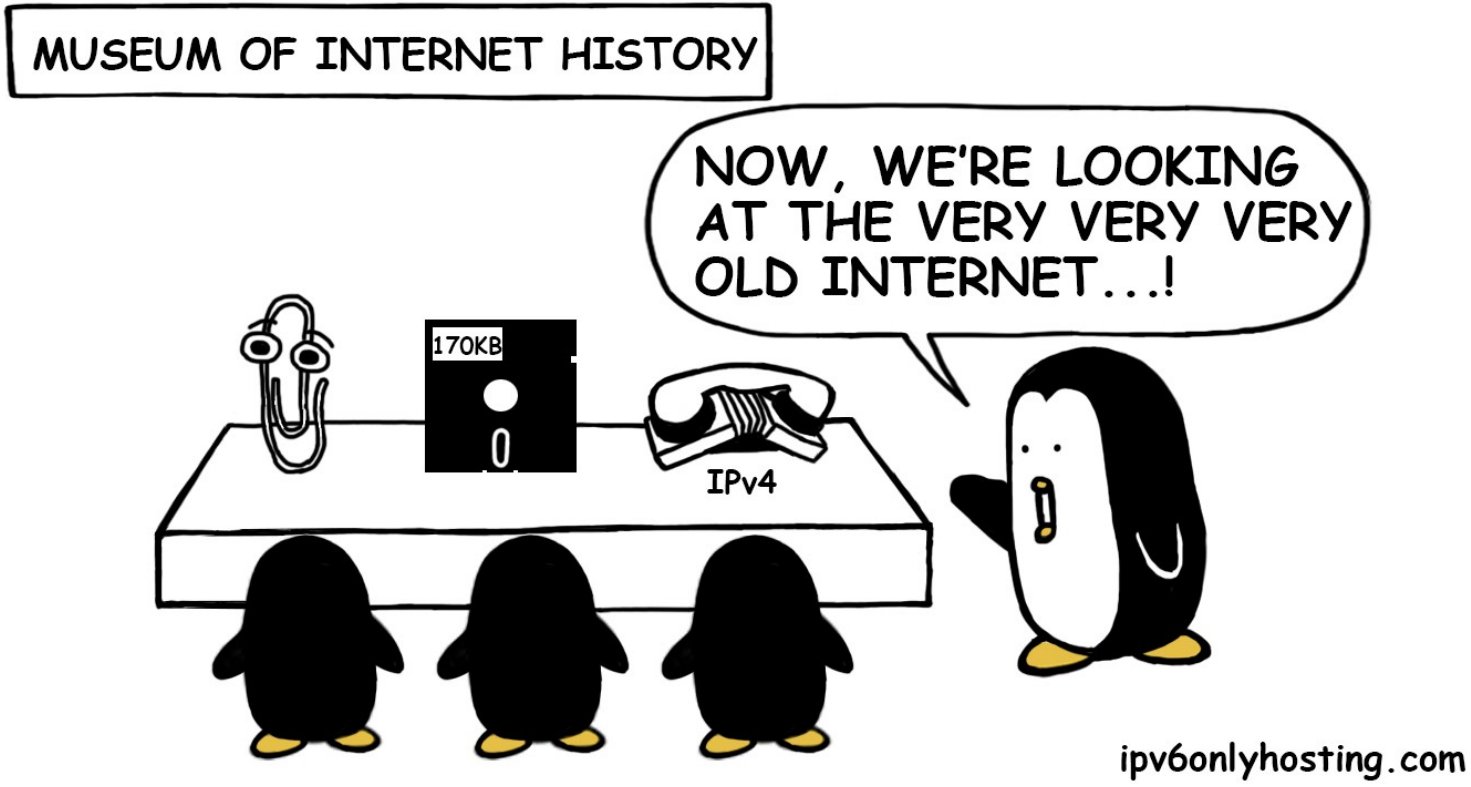
MUSEUM OF INTERNET HISTORY
NOW, WE'RE LOOKING AT THE VERY VERY VERY OLD INTERNET...!
170KB
IPv4
ipv6onlyhosting.com

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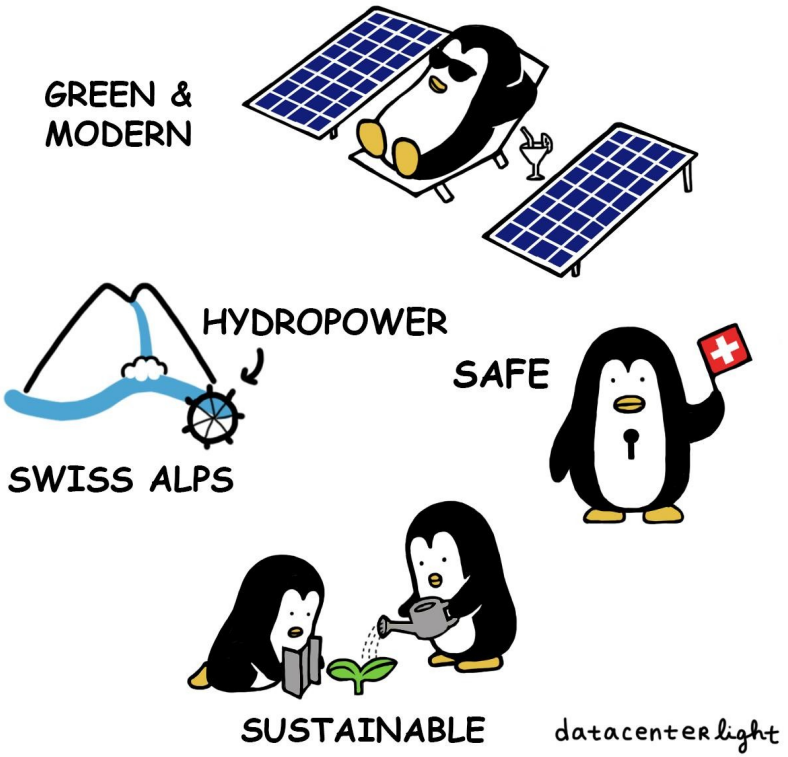
Data Center Light: sustainable hosting

- 100% Open Source
- 100% IPv6
- 100% Renewable energy
  - From the **on site hydro power plant**
- Reuse of old factory halls
  - Don’t build new, don’t tear down
- Passively cooled
  - Low density: 4m² per server
- Main product: VM Hosting



Starting in 2017: IPv4, IPv6 or Dual stack?

- Objective: Run thousands of VMs
- Status:
  - /22 IPv4 network (1024 addresses)
  - /29 IPv6 network (“countable infinite”)
- Options:
  - Focus on IPv6
  - Buy more IPv4 on the market

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Building a data center on IPv4
is like building a diesel car.
It works, it sells,
but it really is not sexy.

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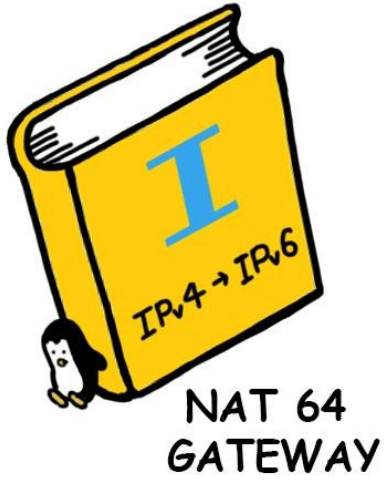
Stage 1: the nice & naïve approach (2017)

- IPv6 only everywhere
- IPv4 only via NAT64 on border routers
- Use NAT64 in both directions
  - outgoing: mapping to our prefix
  - incoming: mapping to servers/VMs



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Stage 1 challenges

- Some services binding only to 0.0.0.0 failed
- Some services had hard coded IPv4 addresses
- Minor (outdated) software problems
- Would have been too good to be true…!

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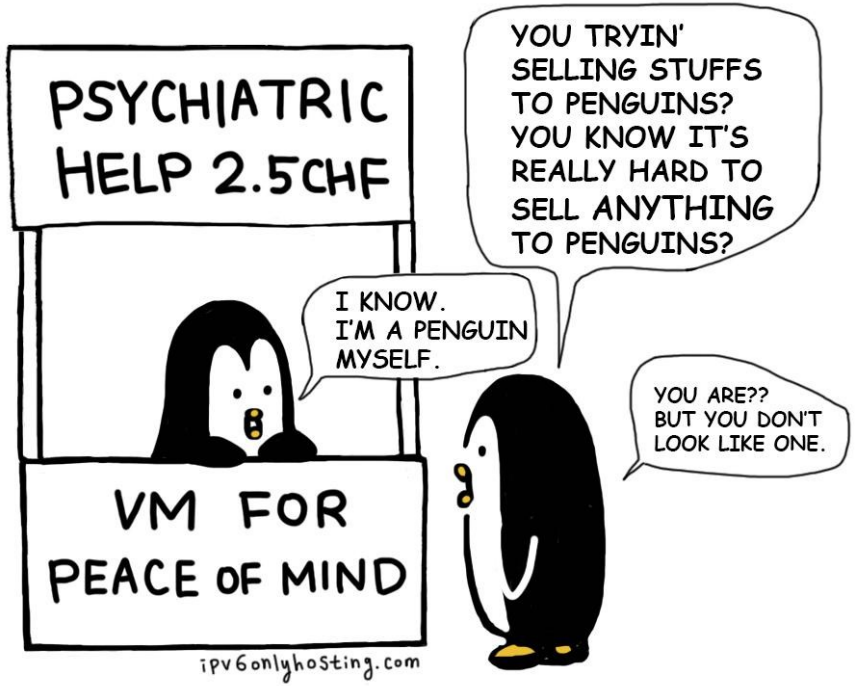
Stage 2: Make life easy for customers (2018)

- Most customers liked our stage 1 approach
- However: some customers did not understand it at all
- Switches, servers, storage still IPv6 only
- Changed VMs to dual stack



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THIS CHEESE
SMELLS SO BAD...!

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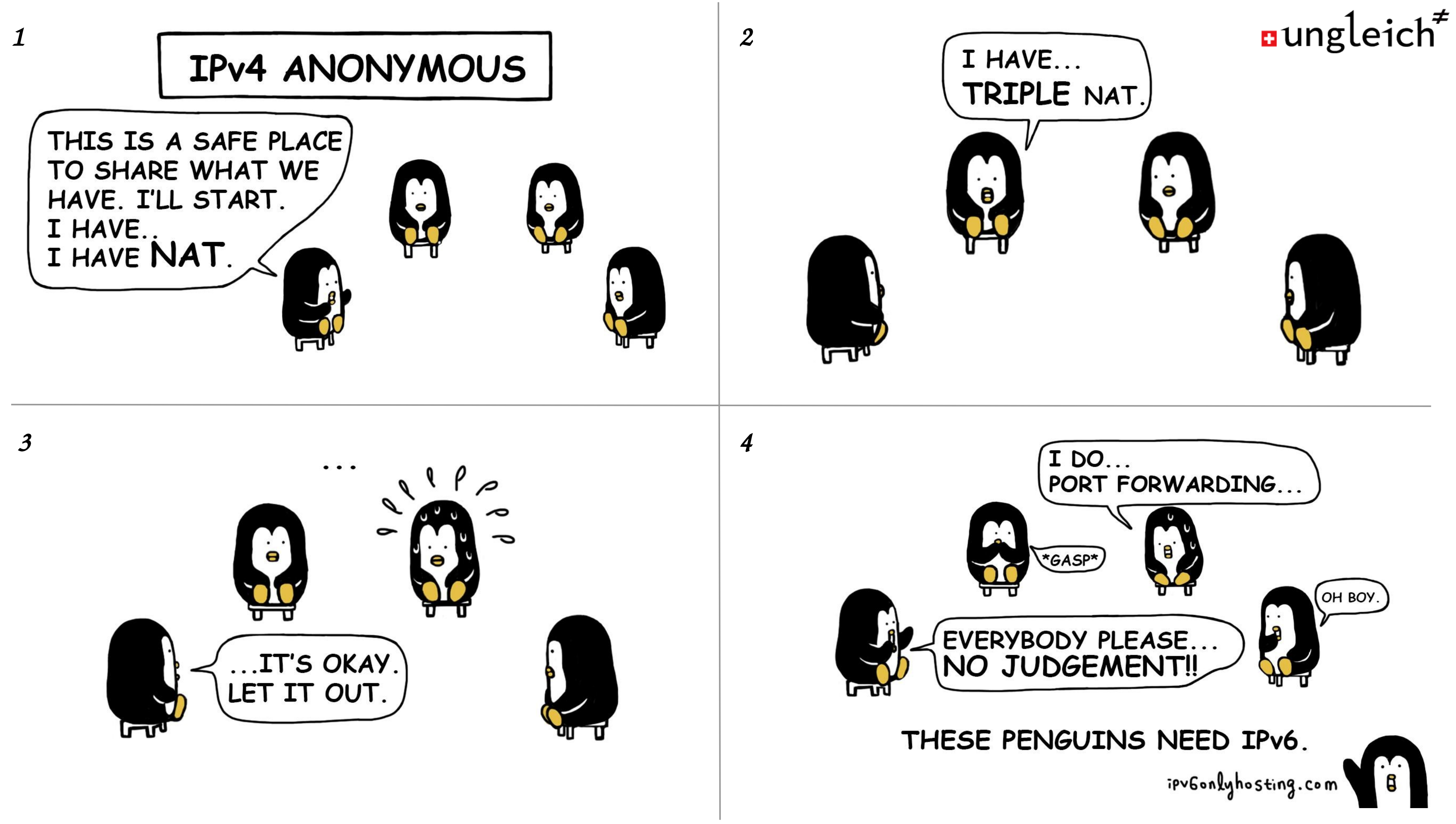
Stage 2 challenges

- Dualstack VMs: IPv4 scarcity bites us
  - Strong tension between sales & infrastructure operators
  - We cannot allocate one IPv4 address per VM
- Dual stack = dual complexity
- How to continue?



1
IPv4 ANONYMOUS
THIS IS A SAFE PLACE TO SHARE WHAT WE HAVE. I'LL START. I HAVE.. I HAVE NAT.
2
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I HAVE... TRIPLE NAT.
3
...
...IT'S OKAY. LET IT OUT.
4
I DO... PORT FORWARDING...
GASP
OH BOY.
EVERYBODY PLEASE... NO JUDGEMENT!!
THESE PENGUINS NEED IPv6.
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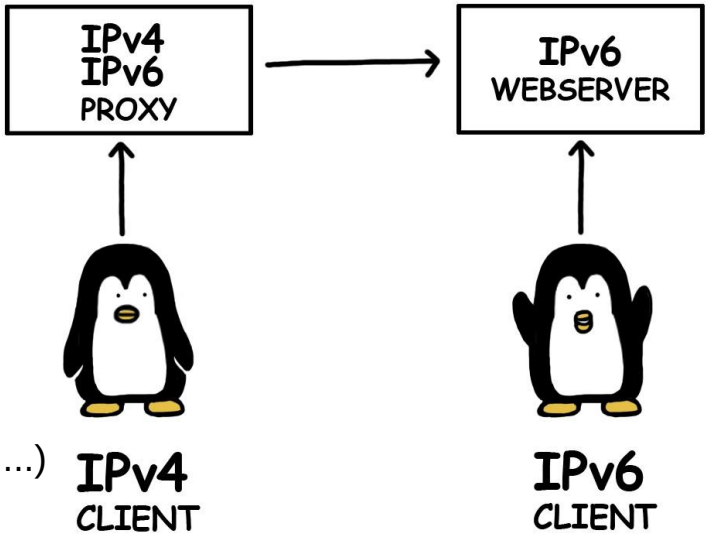
Stage 3: IPv6 only experience (2018)

- Launched https://ipv6onlyhosting.com
  - No incoming NAT64
  - Only reachable by IPv6
- IPv6 networking
  - 1 IPv6 address by default
  - 1 /64 per VM on request
- IPv6VPN.ch
  - Tunnel based IPv6 – works with CGNAT!
  - /48 per connection
  - Used world wide (CH, US, KR, CN, KZ, DE, ...)



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IPv6 Fun: IPv6 VPNs

- ping6 **nico.plays.ipv6.games**
- Same IPv6 address anywhere in the world
- ungleich version of **mobile IPv6**
- Carrying a /48 on the notebook
- IPv6 enabler for networks (advertise IPv6 in your WiFi network)

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Stage 4: IPv6 only for production (2019)

- Objective: Make IPv6 only VMs better than dual stack
- Using proxies to enable HTTP, HTTPS, IMAPS
- SMTP via forwarder, DNS via delegation
- Allow customers to build their **own networks** on their VM!
- Simplify **containers**: run them IPv6 natively

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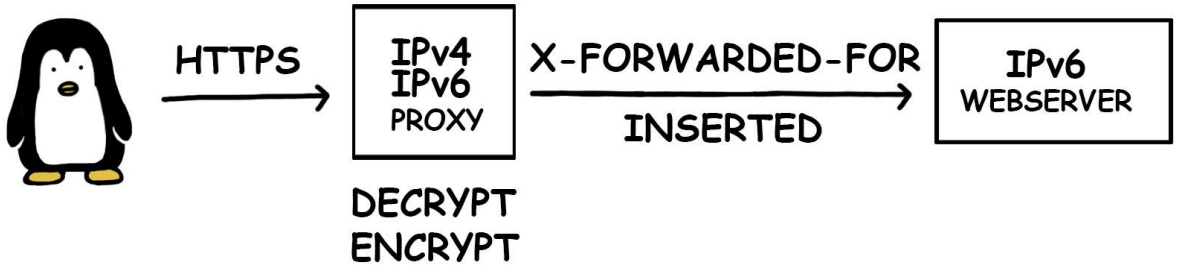
HTTPS (V1:OPENNING UP)



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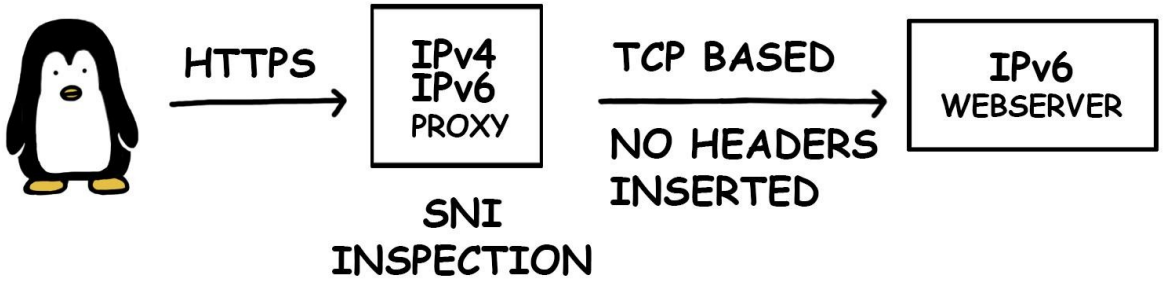
HTTPS (V2:TCP)



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Stage 4: Challenges?

- IPv6 not a challenge anymore
  - IPv6 has become an enabler
- Even hard core IPv4 supporters are switching to IPv6
  - IPv6 is more convenient than IPv4
- RIPE IPv4 run out supports customer mind change
  - Customers understand they need IPv6
  - Customers prefer single stack over dual stack (complexity)

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Stage 5: IPv6 first cloud management (2020)

- Objective:
  - Create an IPv6 first virtualisation stack
  - No compromises on the IPv6 side
  - Enabling all features one would expect from IPv6
- Status:
  - Beta running @ungleich

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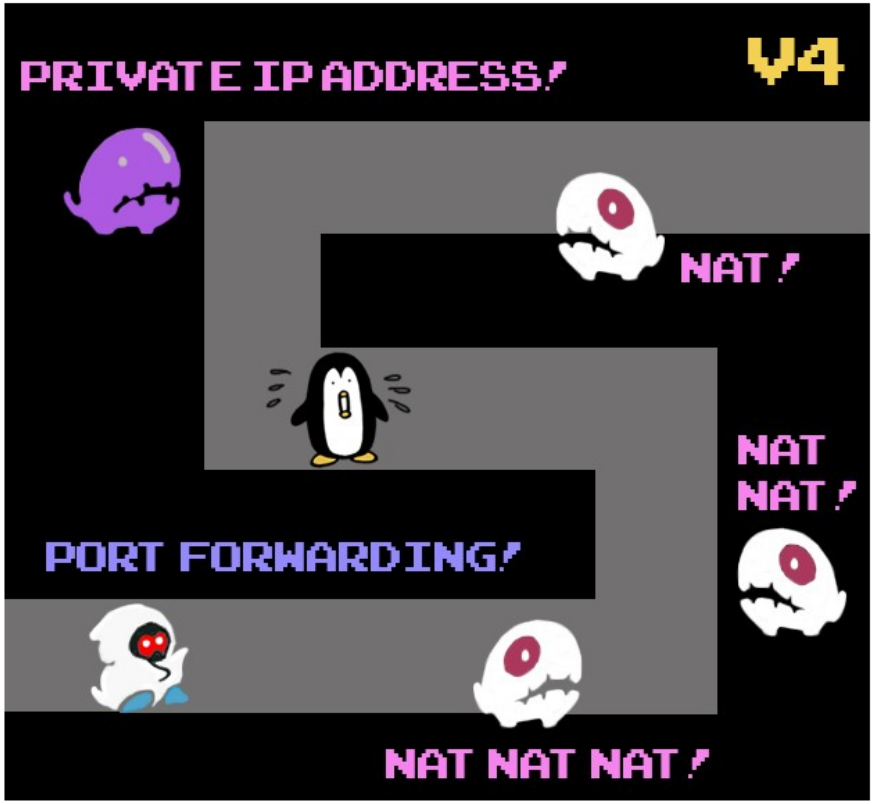
IPv6++

- Real time chat via IPv6 about IPv6 at https://IPv6.chat
- Hack4Glarus: A Hackathon with IPv6 in focus: https://hack4glarus.ch
  - 2020-06-05 .. 2020-06-07 in Glarus, Switzerland
- Write about IPv6 on https://IPv6.blog
- Work IPv6 only at https://IPv6.work
- Soon: play https://IPv6.games

THE PENGUIN GAME



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