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# IPv6 First

# at datacenterlight

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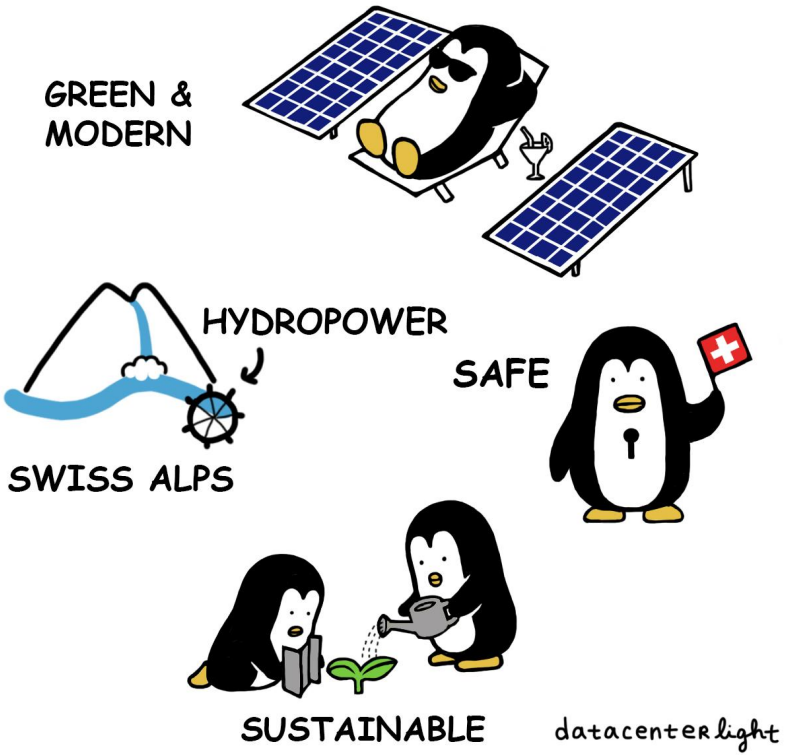
# Data Center Light (www.datacenterlight.ch)

- Reuse of old factory halls
  - Don’t build new, don’t tear down
- Passively cooled
  - Low density
  - Supported by **thick** walls
- Powered by hydropower
  - From the **on site power plant**
- 100% Open Source
- 100% IPv6
- Main product: (managed) VM Hosting



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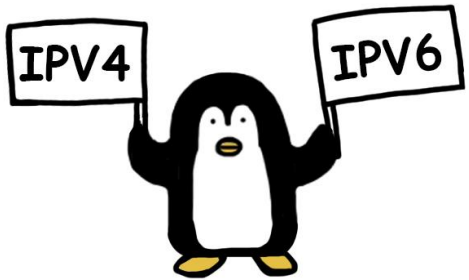
# Starting in 2017: IPv4, IPv6 or Dual stack?

- Starting position
  - RIPE LIR with a /22 (1024 IPv4 addresses) for starting
- Objective
  - Grow towards thousands of VMs
- 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 will get sold,
but it really is not sexy.

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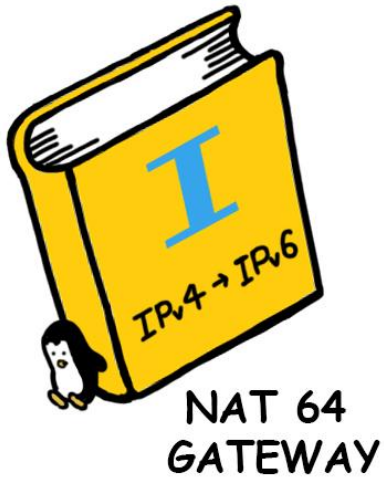
# Stage 1 setup: the nice & naïve approach

- IPv6 only
- Add IPv4 via NAT64 on border routers
- Use DNS64 in both directions
  - outgoing: mapping to our prefix
  - incoming: mapping to servers/VMs



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# Stage 1 challenges

- Services binding only to 0.0.0.0 fail
  - Most can be changed
  - Some can’t
    - Binding to 0.0.0.0 works, IF you have a loopback interface…!
    - Using proxies like nginx/haproxy to work around this
- Some services have hard coded (!!!) IPv4 addresses
  - DNS64 is never used
  - Completely breaks all assumptions
- Minor (outdated) software problems
- Would have been too nice to be true

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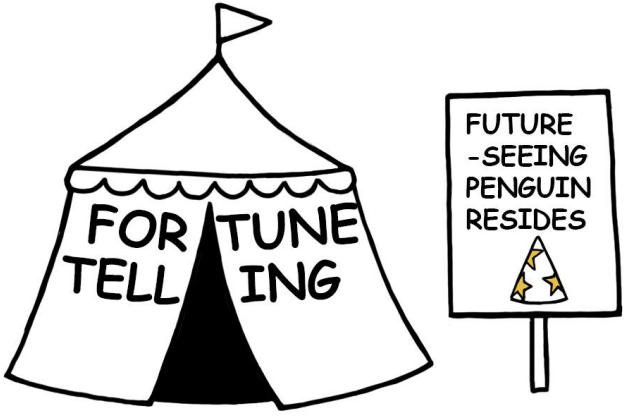


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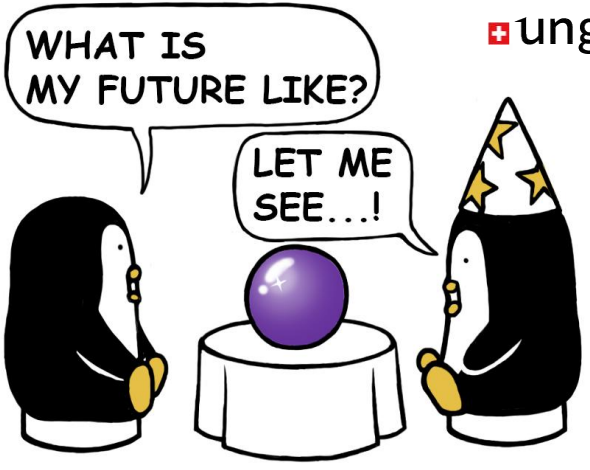


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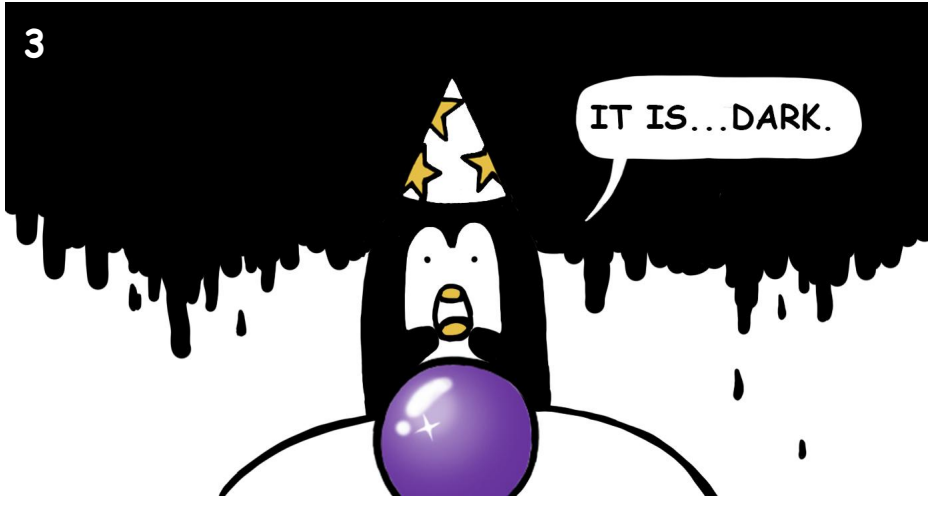


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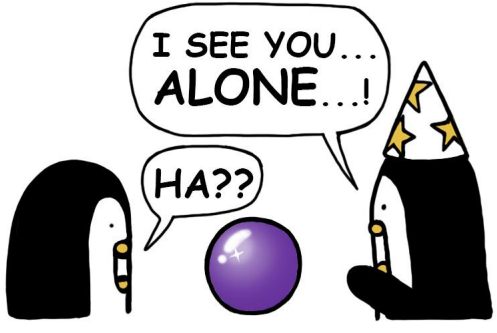


WHAT WILL HAPPEN TO IPv4 PENGUIN?!

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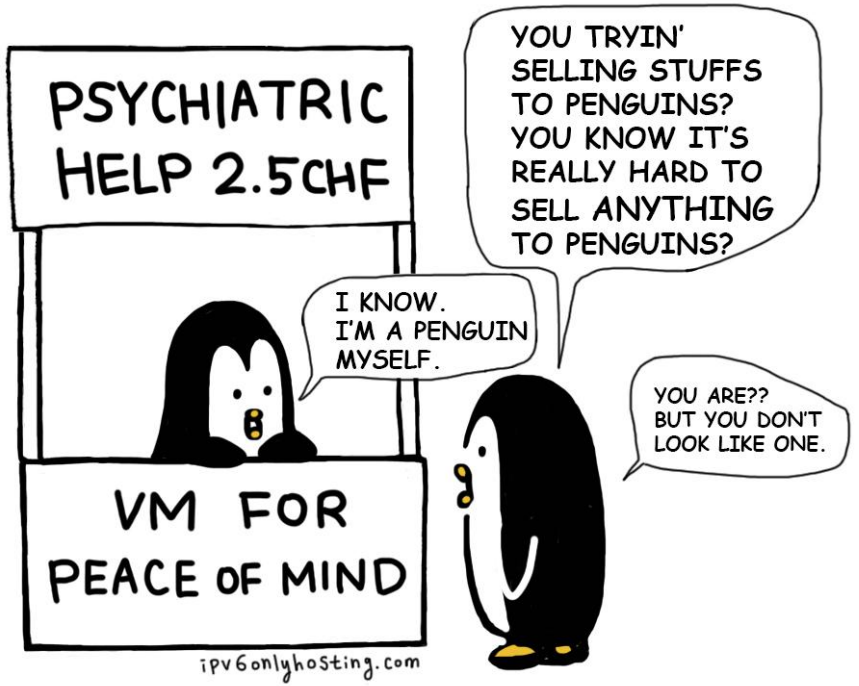
# Stage 2: Make life easy for customers

- Most customers liked our stage 1 approach
- However: some customers did not understand it at all
- Changing VMs: all dual stack
- Only hardware with IPv4: routers
- Switches, servers, storage: IPv6 only



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# Stage 2 challenges

- Changing to PXE/Netboot
  - Some firmware does not support DHCPv6
  - Introduce separate boot network
  - After booting up, the operating system only acquires IPv6
- Dualstack VMs: IPv4 scarcity bites us
  - Strong tension between sales & infrastructure operators
- How to continue?

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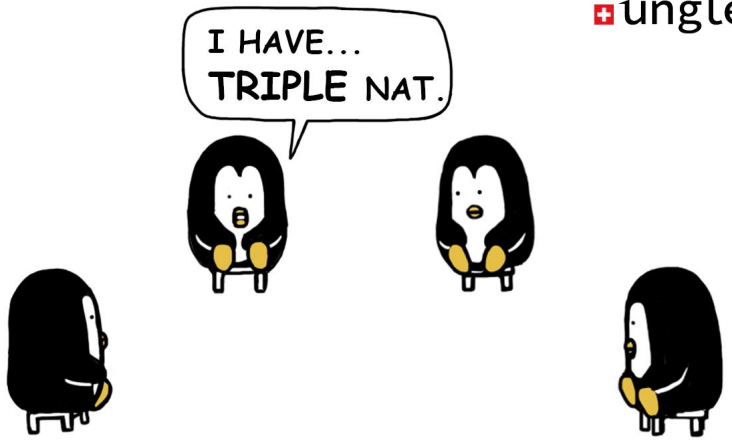


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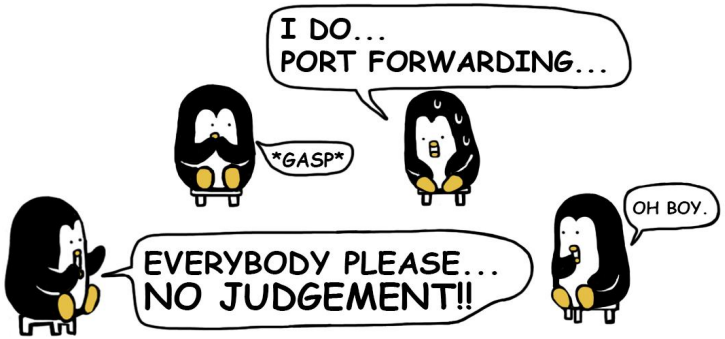


THESE PENGUINS NEED IPv6.

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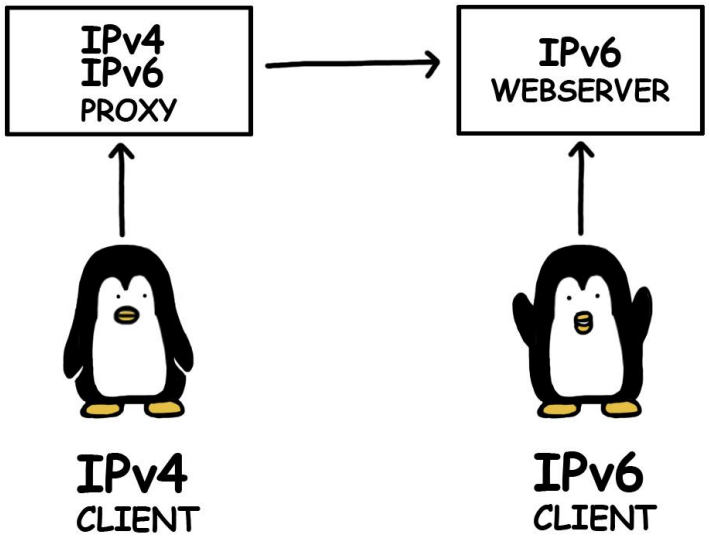
# Stage 3: IPv6 on steroids

- Launched https://ipv6onlyhosting.com
  - No incoming NAT64
  - Only reachable by IPv6
- How can this be useful?
  - Development: yes
  - Testing/experiments: yes
  - production: ???



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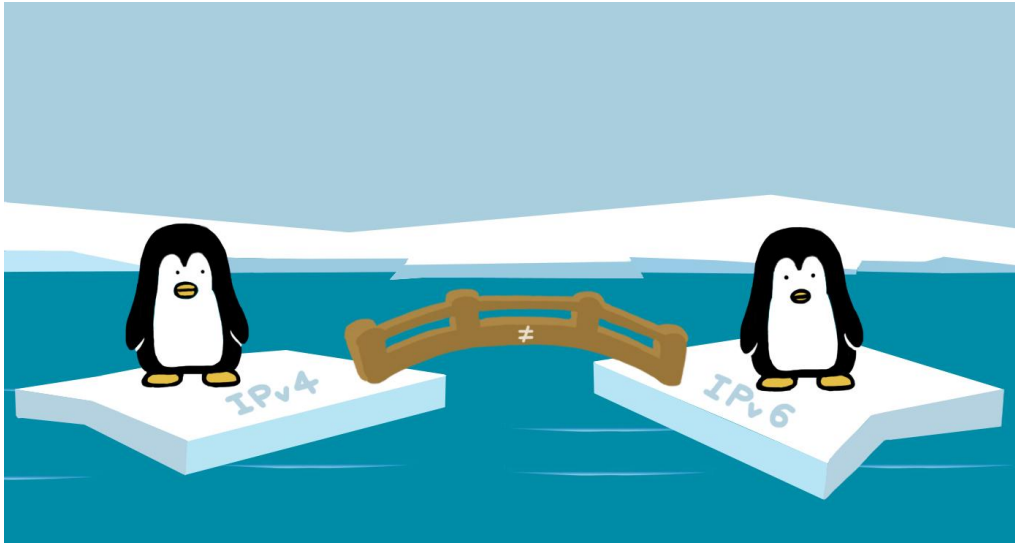
# Stage 3: Smart NAT64

- Static 1:1 mappings are not helpful
- Need to have 1:n mappings
- Introducing: proxy based IPv4
  - http proxy: ok
  - https (!) proxy: ok
  - smtp “proxy”: ok
  - dns “proxy”: ok
  - Smart layer7 - Layer 3 http(s) proxy



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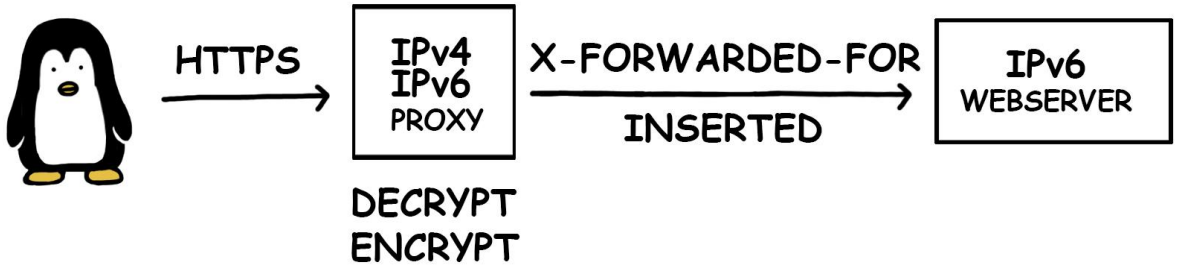
## HTTPS (V1:OPENNING UP)

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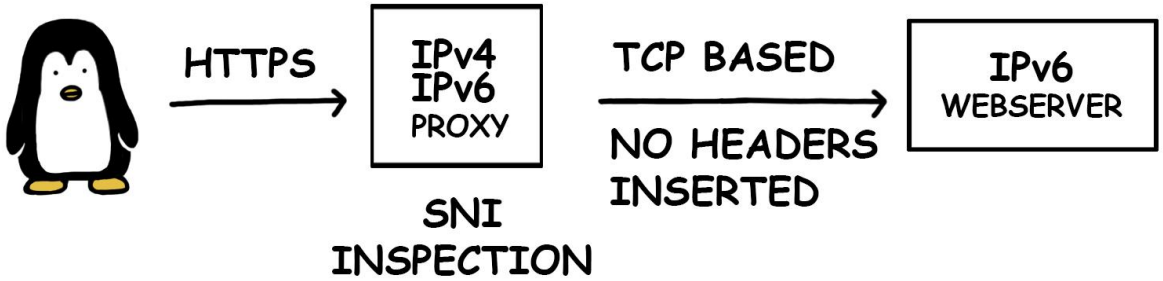
## HTTPS (V2:TCP)

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# More of this?

- Drop us a line at ipv6@ungleich.ch
- Chat with us on https://chat.ungleich.ch/ungleich/channels/ipv6
- Hack with us on IPv6 @ Hack4Glarus: https://www.hack4glarus.ch/
  - 30th of November to 2nd of December
- … soon: will launch IPv6.blog
  - vendor neutral IPv6 updates
- … soon: IPv6.work
  - IPv6 only freelancer platform