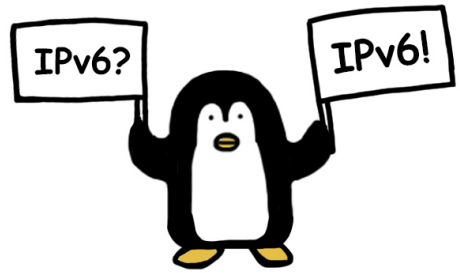
RIPE85: Open Source NAT64 Implementations

ungleich



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Background

- NAT64 is getting more common
  - As well as MAP-T and friends
- Support in various vendor specific devices
- So what is the status of Open Source NAT64 in 2022?

Tayga

- User space NAT64
- Static mapping only
  - Dynamic (stateful) mapping via NAT64-NAT44 (in kernel)
- Slow, core bound
- Maxed out at about 3 Gbit/s
- `http://www.litech.org/tayga/`

Jool

- Linux Kernel Module
- Outside of the main tree
- Fast, tested with 8.2 Gbit/s
- `https://www.jool.mx/en/`

P4-NAT64

- Open Source NAT64 usable on P4 switches
- Works with state tracking
- Very fast, tested with 9.3 Gbit/s
  - Due to P4 constraints potentially always able to run at line rate
- Master thesis work, no known production use
- `https://code.ungleich.ch/nico/master-thesis`

Cilium

- A Kubernetes CNI
- Supposedly supports NAT64
- Cilium does not work on IPv6 only hosts
  - `https://github.com/cilium/cilium/issues/21538`
- Open Github Issue
  - `https://github.com/cilium/cilium/issues/17878`
- Untested due to the above bug

OpenBSD PF

- Untested
- Very generic - NAT64 treated like NAT
  - Very clean approach

```
pass in log on re0 inet6 from any to 64:ff9b::/96
af-to inet from 192.168.1.153
```

- https://www.openbsd.org/faq/pf/nat.html
- https://blog.obtusenet.com/dns64-nat64-on-openbsd/

Summary

Tayga	Working, slow, no updates since 2011	~3 Gbit/s
Jool	Working, fast, unmaintained	~8 Gbit/s
P4-NAT64	More POC, limited to P4	~10 Gbit/s
Cilium	Unclear status, limited to kubernetes	?
OpenBSD	Generic, untested	?

Open Source NAT64

- Are there other feasible/potential implementations?
- Who is interested in an Open Source NAT64 solution?
  - Is anyone interested in joining an Open Source NAT64 project?
- IPv6 Focused Matrix Chat: `https://IPv6.chat` (#ipv6:ungleich.ch)