ratools
Field Test 2014

Dan Lüdtke

danrl/ratools.git danrlde

Dan Lüdtke

- Network Engineer
- Open Source Developer
- Author of German book *IPv6-Workshop*
- AS57821 (hobby)

danrl/ratools.git danrlde

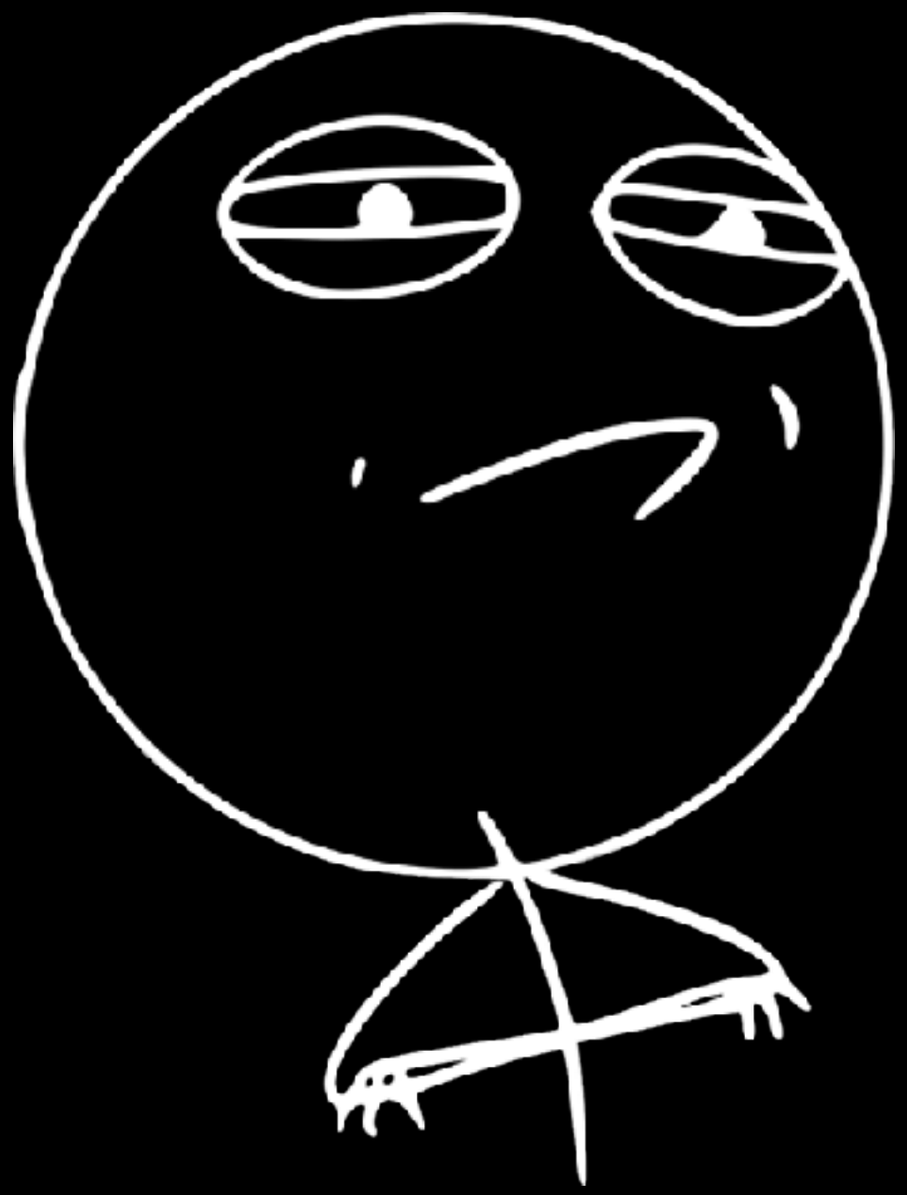
ratools

- An IPv6 router advertisement daemon
- A command line control utility
- Corresponding systemd unit files and bash completion scripts
- An implementation as close as possible to the RFCs

Why ratools?

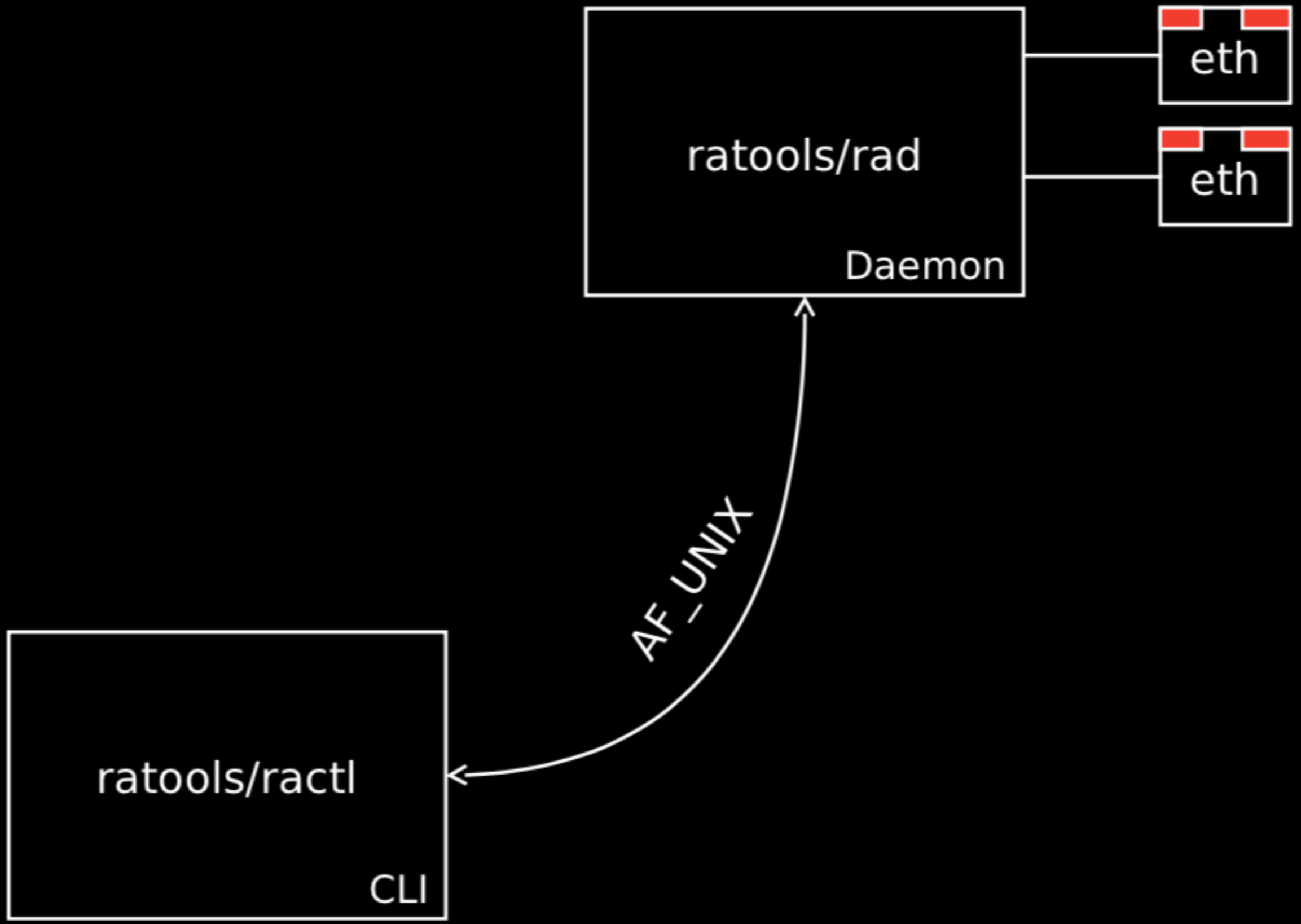
Evaluating RA daemons for Linux I was bothered by

- the inability to advertise admin-defined source link-layer addresses
- the lack of support for ICMPv6 RDNSS option
- implementations that do not keep state
- the RFC ignorance when it comes to de-advertising

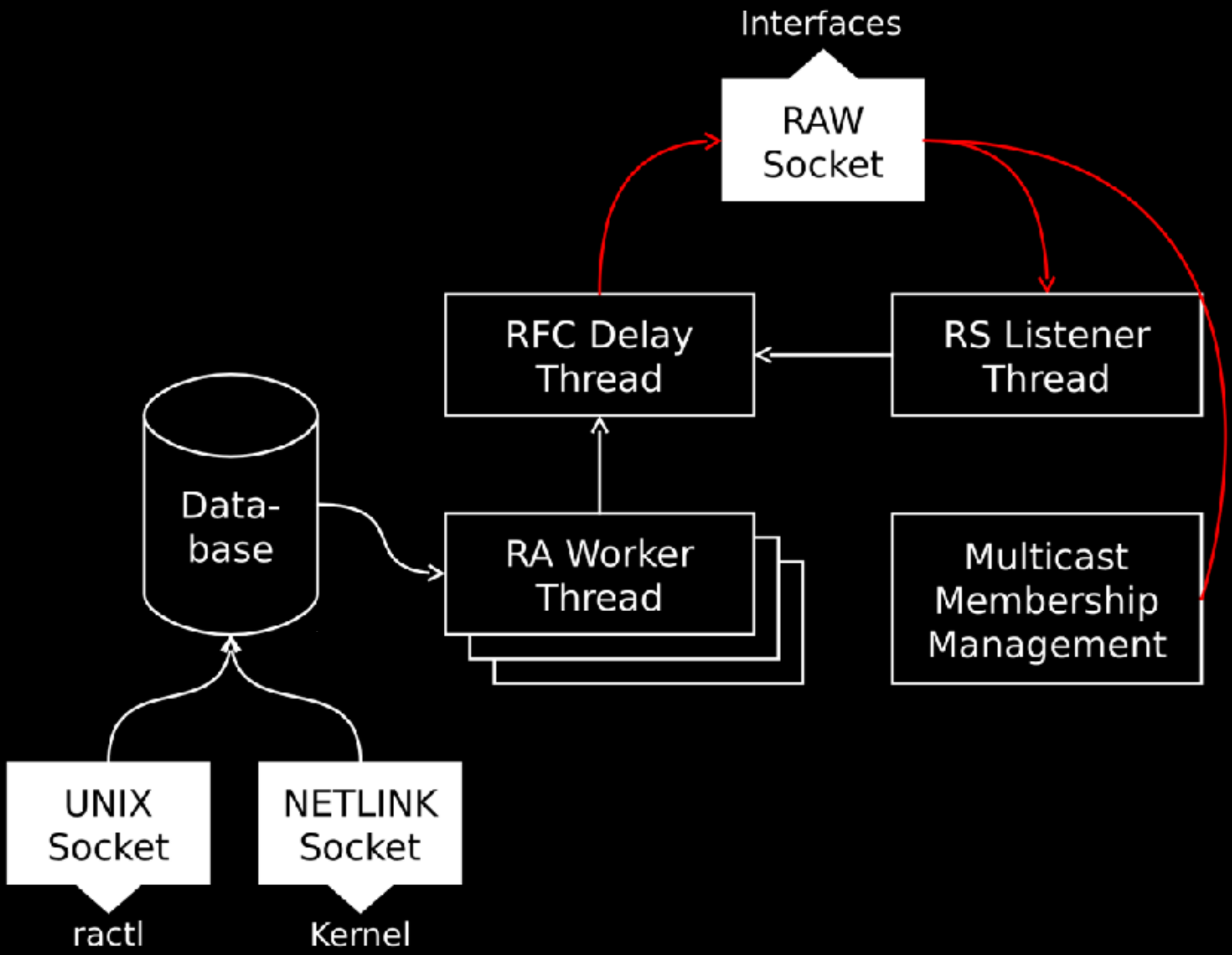


danrl/ratools.git danrlde

```
$ ip addr show
    2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP>
    mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 00:0c:29:20:fd:4c
    brd ff:ff:ff:ff:ff:ff
    inet6 fe80::20c:29ff:fe20:fd4c/64 scope link
    valid_lft forever preferred_lft forever
```



danrl/ratools.git danrlde



danrl/ratools.git danrlde

very Link-MTU

such auto-detection

many Source Link-layer Address

such auto-detection

such Prefix Information

so Recursive DNS Servers

much RAW

```
# ractl ra@eth2.3000 dump

ra@eth2.3000 create
ra@eth2.3000 set maximum-interval 0h5m0s
ra@eth2.3000 set minimum-interval 0h1m0s

ra@eth2.3000 enable
```

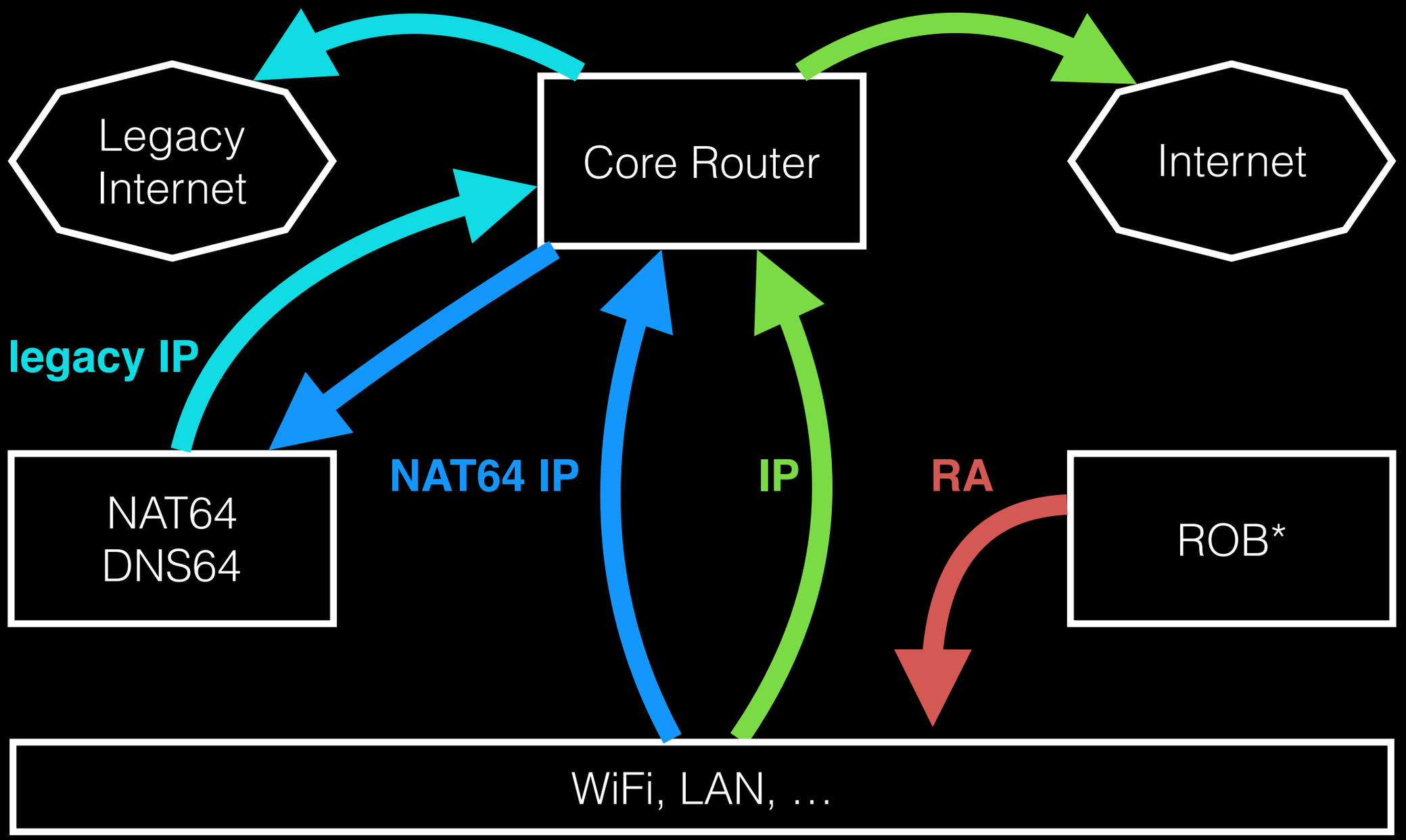
```
# ractl ra@eth2.3000 show
Router Advertisement `ra@eth2.3000':
  State:                    Enabled
  Created:                  2014-12-28 01:00:59
  Updated:                  2014-12-28 01:01:30
  Version:                  26/26
  Interface ID:             6               (eth2.3000)
  Interface State:          1               (Up)
  Interface MTU:            1500
  Hardware Address:         90:e2:ba:62:a7:0c
  Link-local Address:       ::
  Maximum Interval:         300             (0d 0h 5m 0s)
  Minimum Interval:         60              (0d 0h 1m 0s)
  Solicited/Unsolicited:    184/0
  Unicast/Multicast:        0/184
  Total RAs:                184             (20608 Bytes)
  Next RA scheduled:        2014-12-28 10:12:34
  Current Hop Limit:        64
  Managed Flag:             0               (No Managed Address Configuration)
  Other Managed Flag:       0               (No Other Managed Configuration)
  Home Agent Flag:          0               (No Mobile IPv6 Home Agent)
  Router Preference:        00              (Medium)
  NDP Proxy Flag:           0               (No NDP Proxy)
  Lifetime:                 1800            (0h 30m 0s)
  Reachable Time:           0               (0h 0m 0s 0ms)
  Retransmission Timer:     0               (0h 0m 0s 0ms)
```

- Annual 4-day international hacker conference
- Chaos Computer Club
- 2014: 12k visitors
- Hackers love Internet

c3noc

- Let’s build a medium-sized ISP network around xmas!
- Access
  - LAN
  - WiFi
    - ~20k unique devices
    - ~8k devices peak
- 40-100G uplink
- EUR 3mn worth of equipment

NAT64 Setup

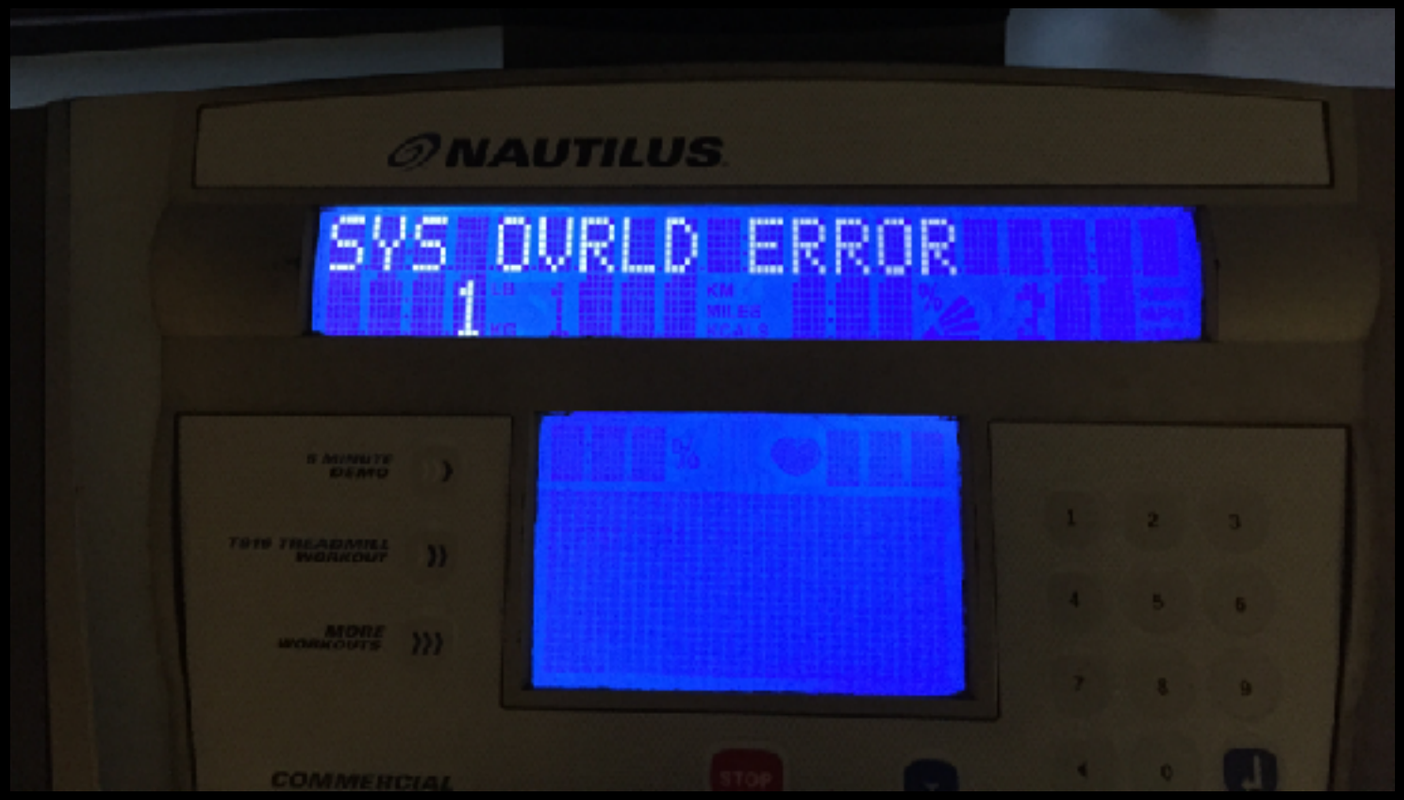


*Ridiculously Oversized Box

danrl/ratools.git danrlde

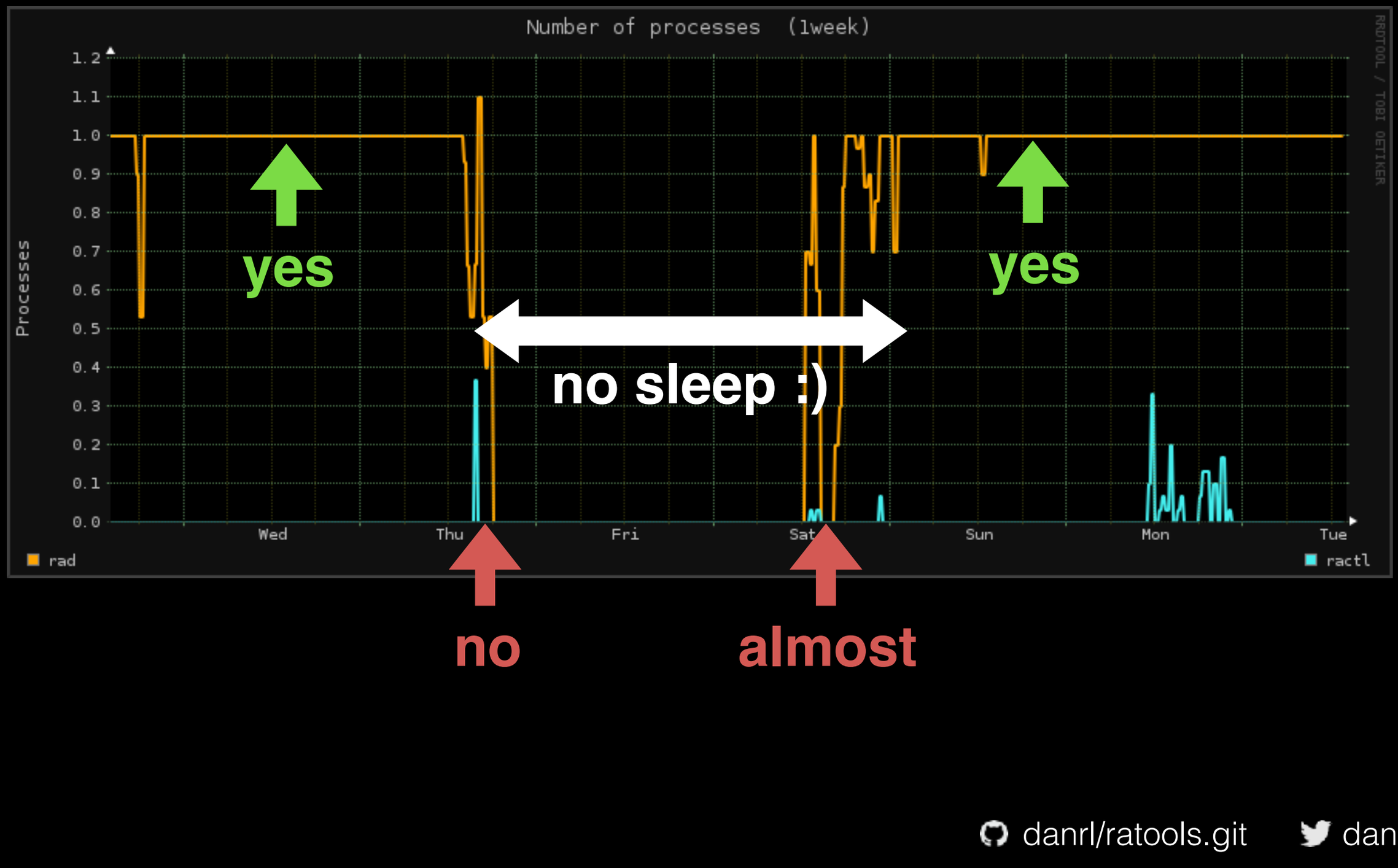
ratools Field Test

- Does it work?
- Does it scale?
- Finding bugs!



danrl/ratools.git danrlde

Does it work?

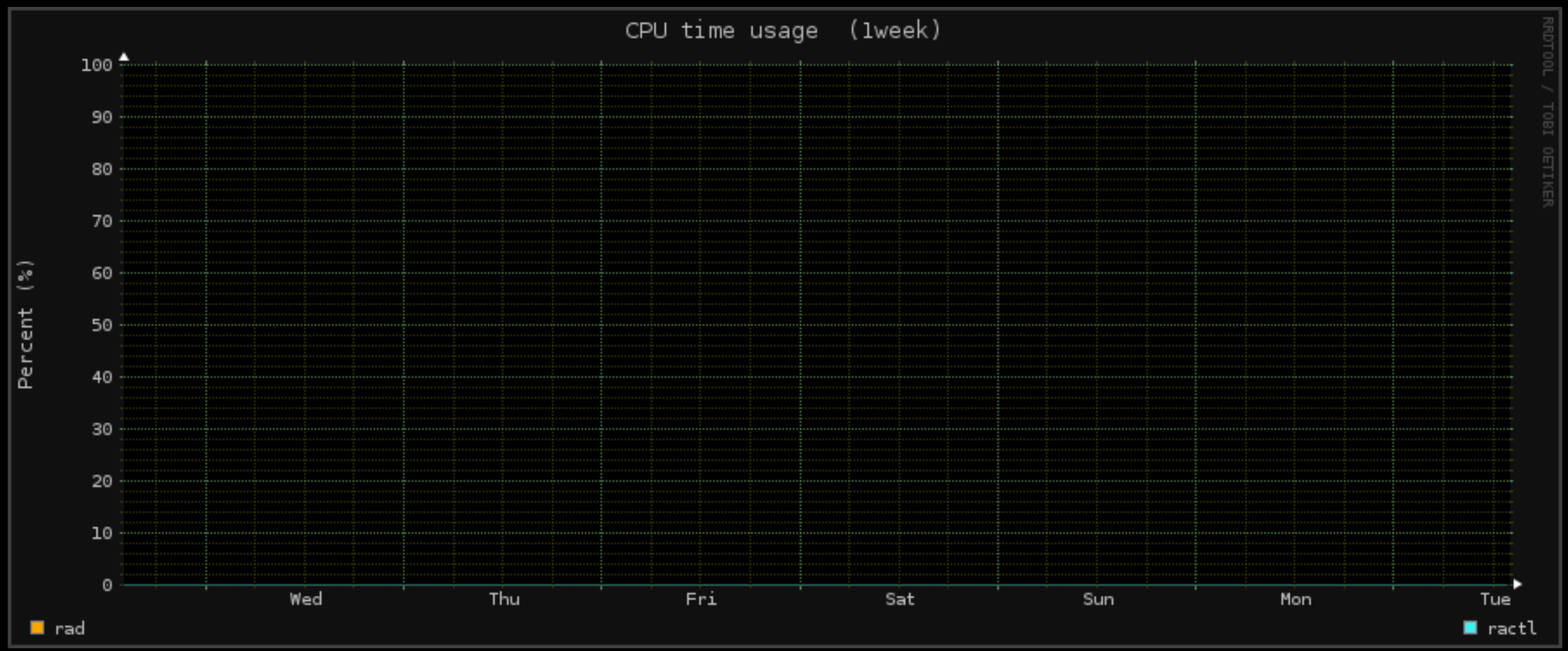


danrl/ratools.git danrlde

Why did it crash?

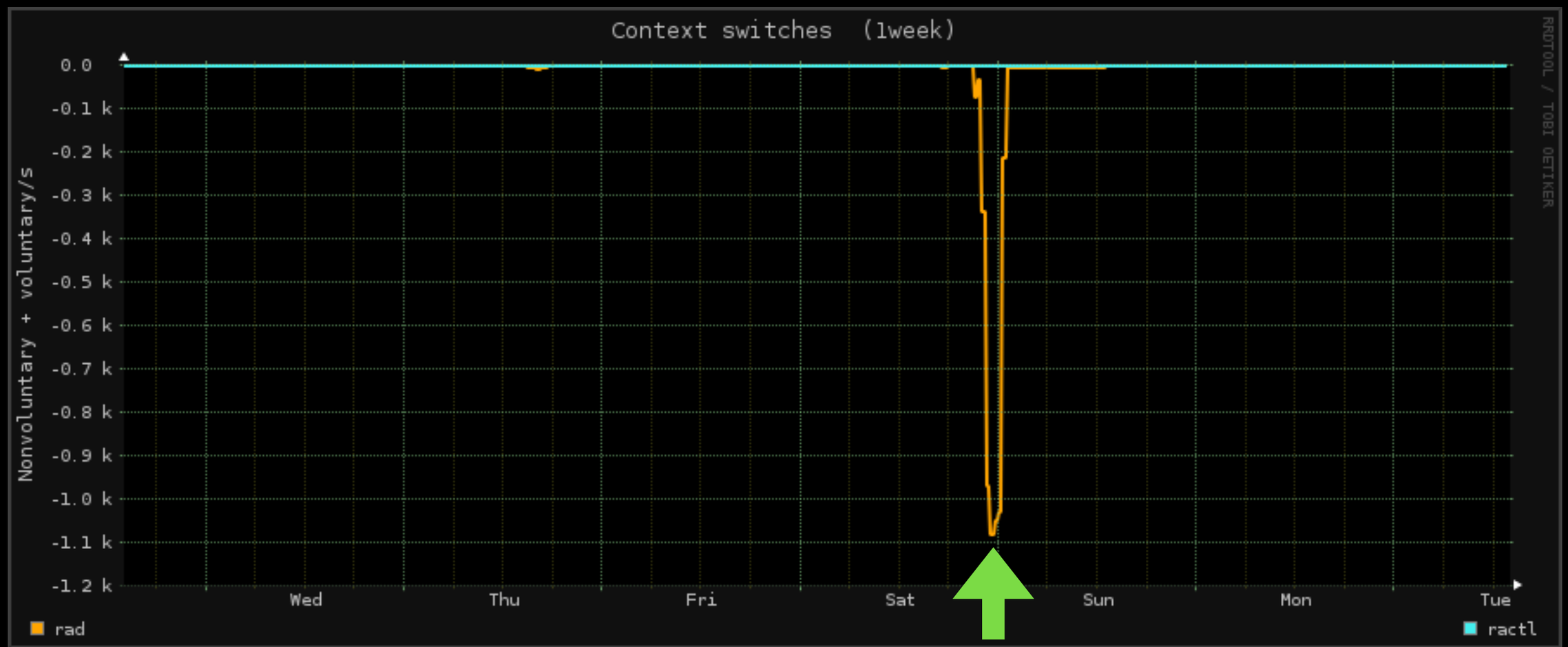
- More users joined the NAT64 network
- Database dead-locked
  - pthread_rwlock_wrlock() and friends…
- Rewrote the database code!

Does it scale?



danrl/ratools.git danrlde

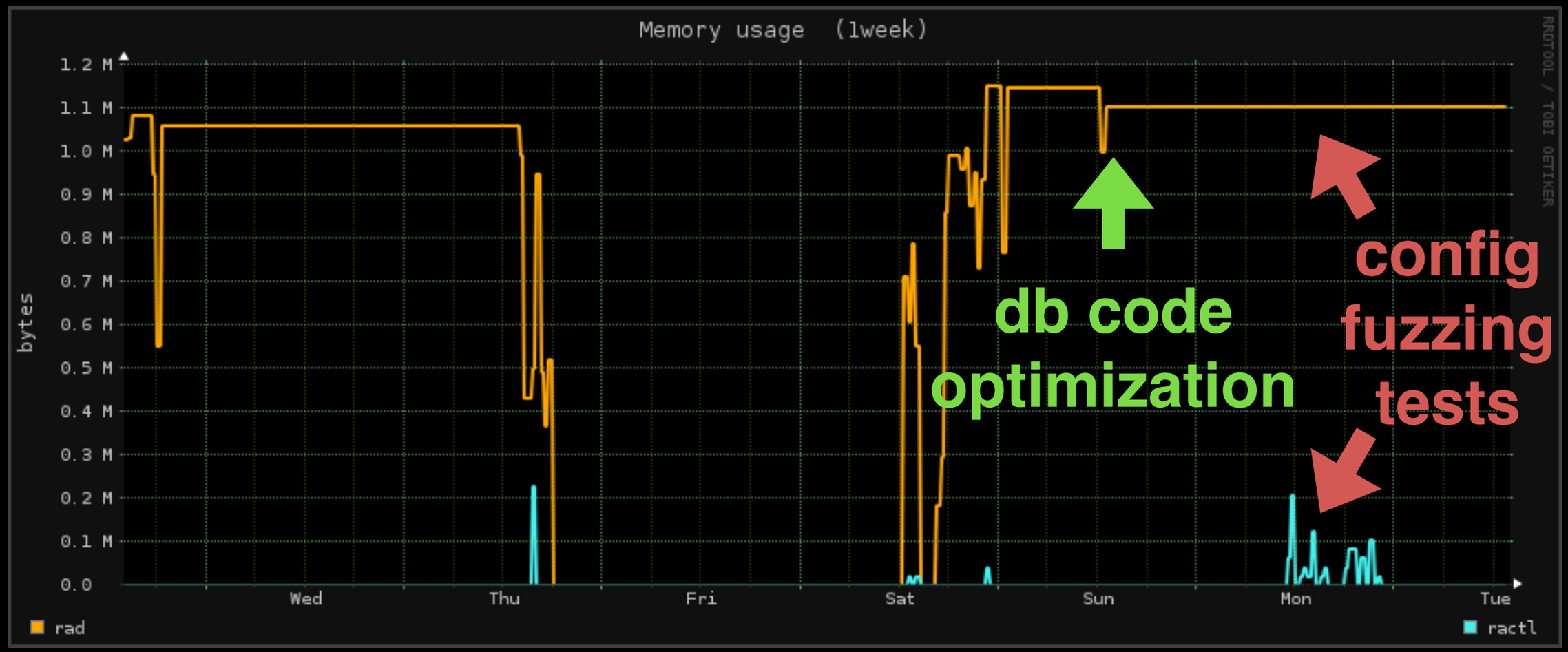
Does it scale?



control socket error

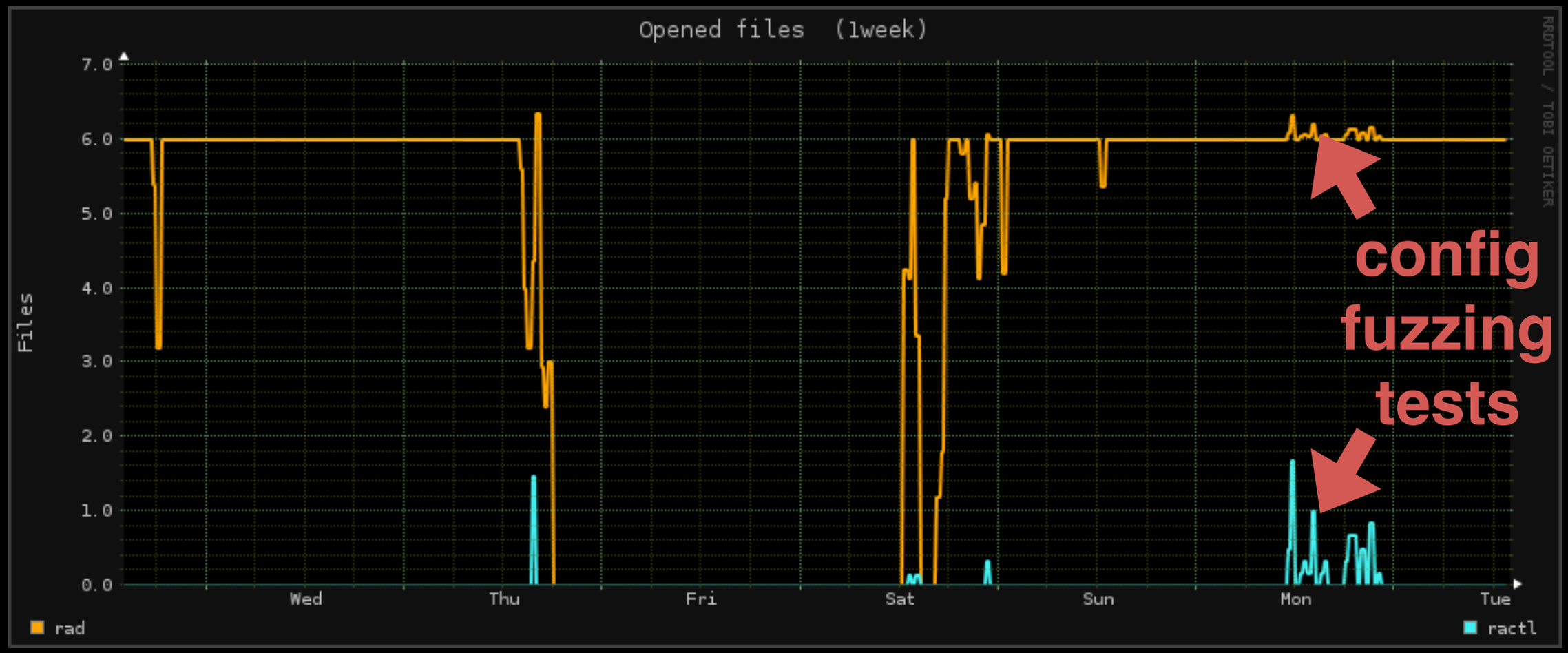
danrl/ratools.git danrlde

Does it scale?



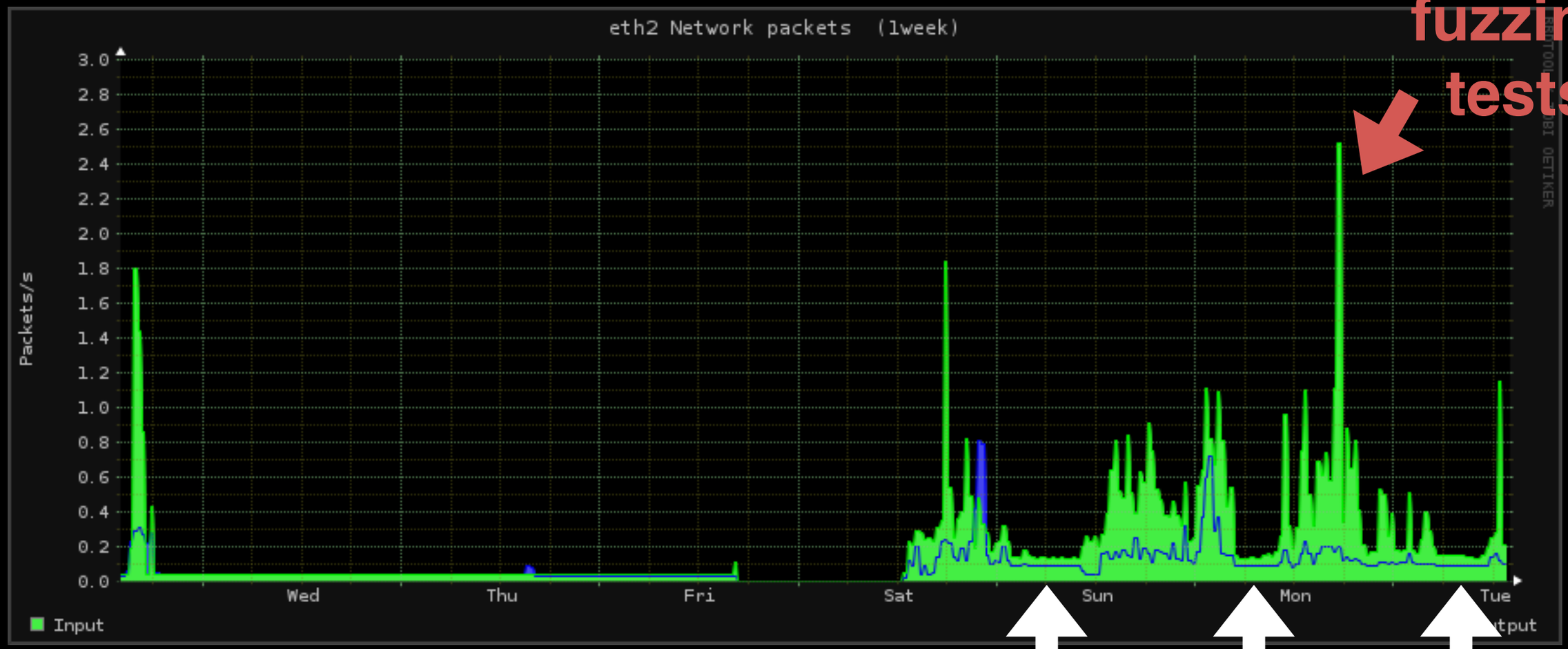
danrl/ratools.git danrlde

Does it scale?



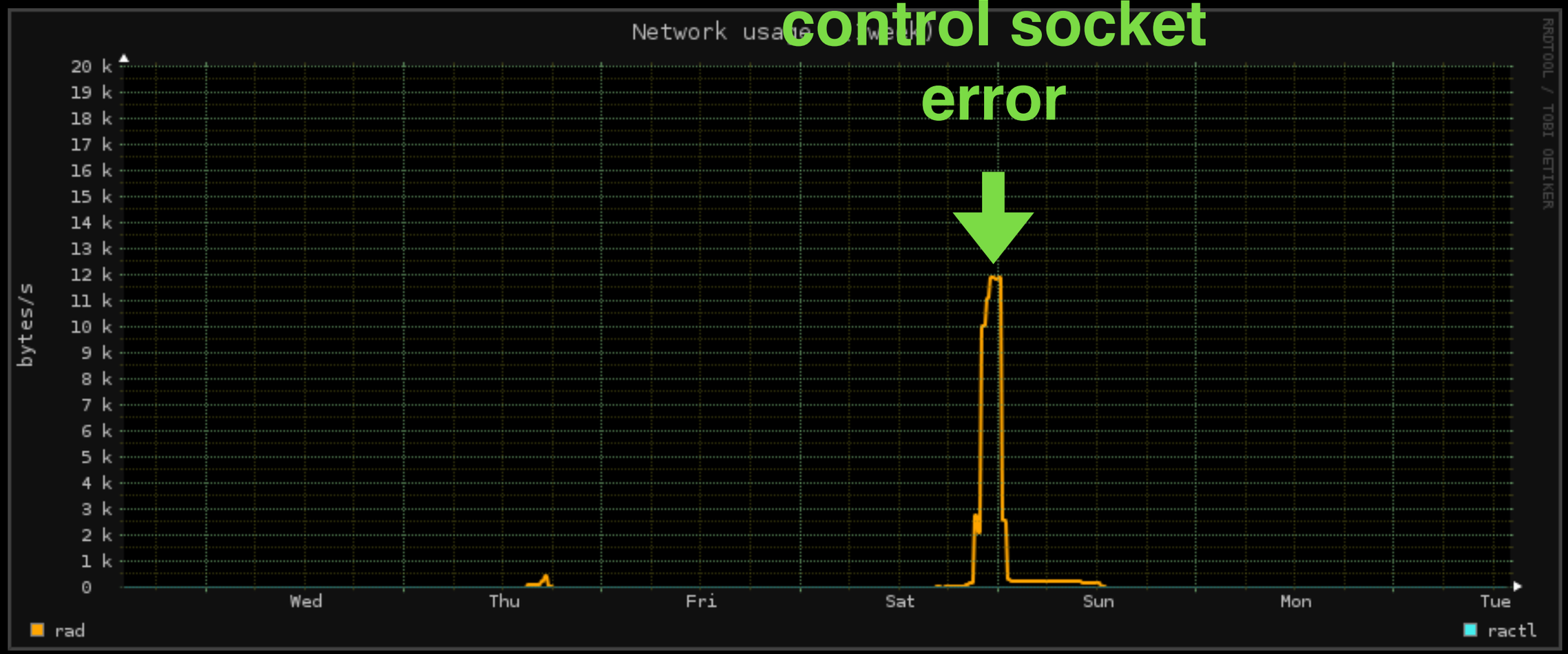
danrl/ratools.git danrlde

Does it scale?



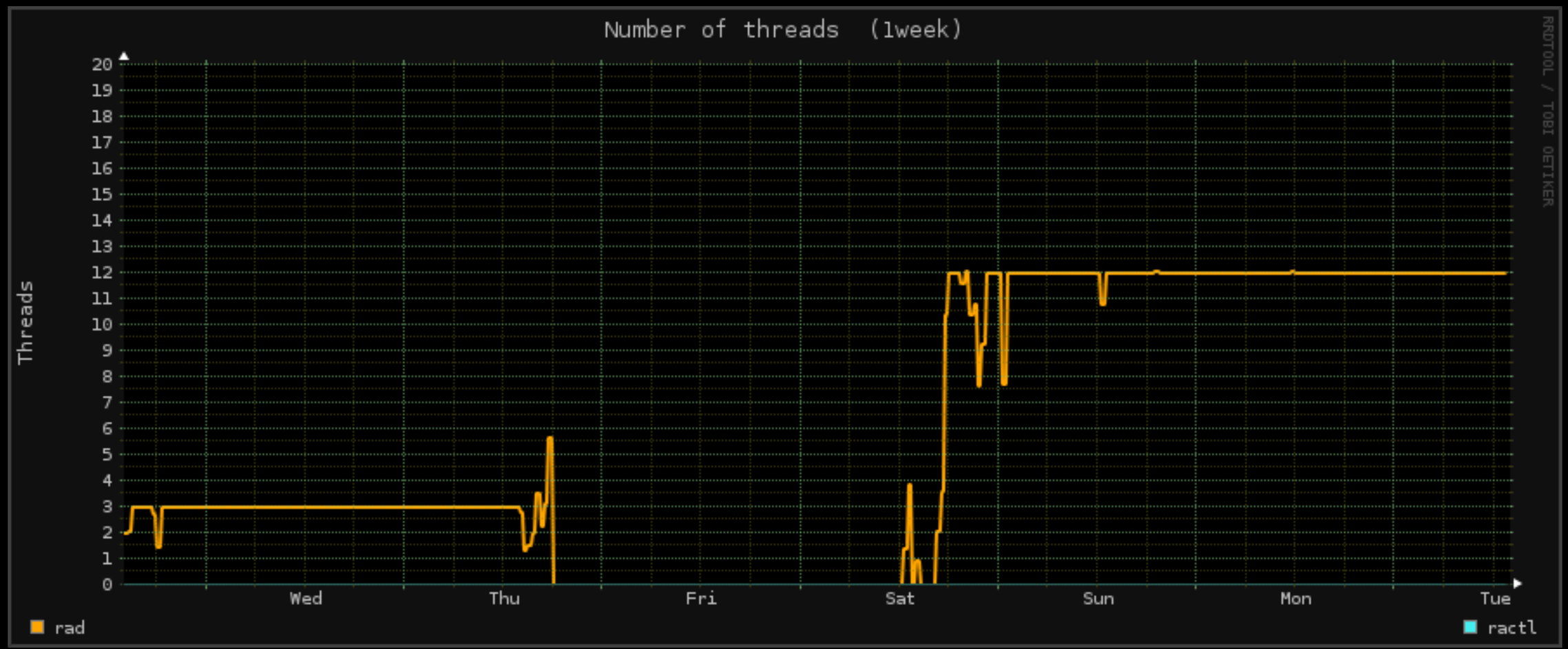
danrl/ratools.git danrlde

Does it scale?



danrl/ratools.git danrlde

Does it scale?



danrl/ratools.git danrlde

danrl
@danrlde

Hooray! My IPv6 Router Advertisement Daemon is serving the #31c3 NAT64 network! github.com/danrl/ratools /cc @wrf42 @c3noc #futurenow

danrl/ratools.git danrlde


danrl
BROADCOM
IPV6

mail@danrl.de
danrl@4.f.6.2.c.7.6.0.1.0.0.2.ip6.arpa

danrl/ratools.git

@danrlde