It's Knot DNS!

CZ.NIC, z.s.p.o.
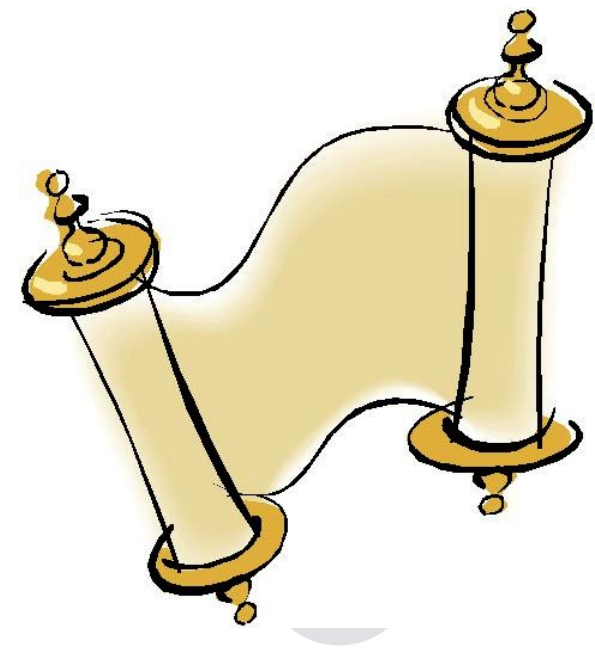
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Nov 3, 2011

cz nic
cz domain registry

Project history

- Started in 2009
  - Very small development team

- Development boosted in 2010
  - Two more people

- September 2011
  - Friends & Family Release
  - Small scale deployment

- November 2011
  - Public release

Project goals

- Open-source DNS server

  - Alternative to Bind/NSD

- Fast(est), feature-rich & on-the-fly reconfiguration

- Usable for TLDs

- Portable, modular

- Support all current (useful) standards

Features

- Portable – Linux, *BSDs, Mac OS X

- DNS standards implemented

  - Authoritative only

  - AXFR/IXFR (both master and slave)

    - ACLs

  - EDNS0

  - DNSSEC + NSEC3

- More to come

  - TSIG (almost done in a branch)

  - Dynamic updates

Features

- Simple C-like configuration file

  - Interfaces (IPv4 or IPv6)

  - Remotes (masters or slaves)

  - Zones

  - Logging (syslog or file-based)

- Runtime reconfiguration

  - Add and remove interfaces

  - Add and remove zones

- Zone compilation

- Simple control interface (knotc)
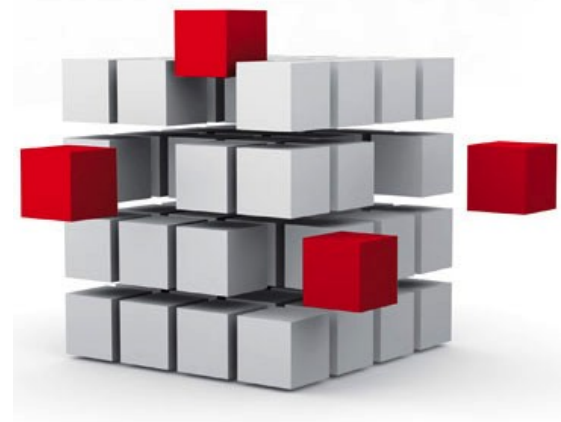
Design

- Object-oriented code

- Modular design
  - Structure + API

- Mostly lock-free architecture
  - RCU data-synchronization (liburcu)

- Inspired by BIRD Internet Routing Daemon
  - Other CZ.NIC Labs product

Design
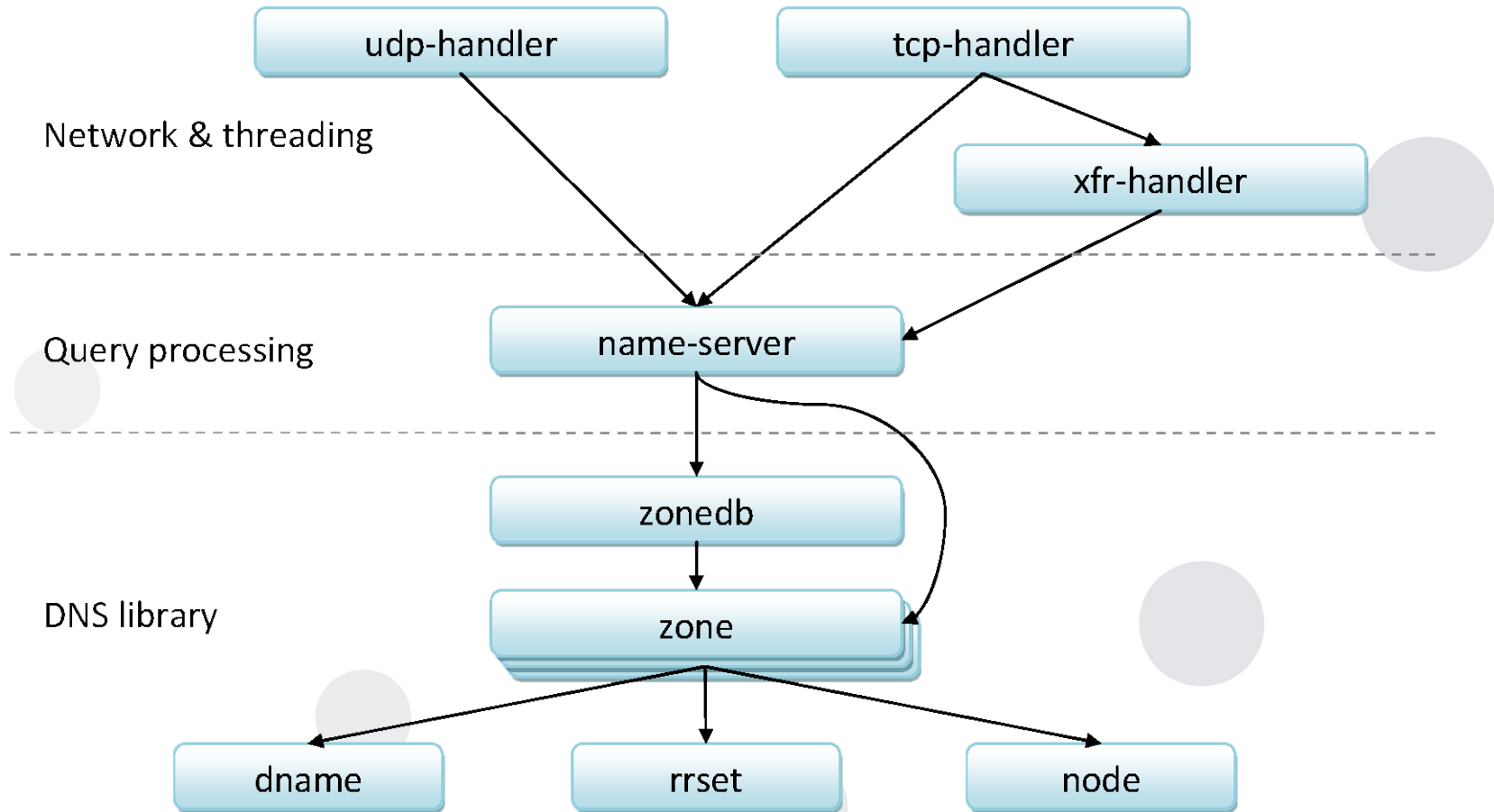
Achieving our goals

- Minimize amount of lookups for one query

    - Optimized zone structures

- Minimize lookup time

    - Hash table with worst-case O(1) lookup time

    - Lock-free architecture

- Non-stop operation, run-time updates

    - Read-Copy-Update (always consistent data)

    - Copy-on-Write (shallow copies)

Configuration example

```
system {
  storage "/var/lib/knot";
}

interfaces {
  my-iface { address ::1@53; }
}

zones {
  example.com {
    file "/etc/knot/example.com.zone";
  }
}

log {
  syslog { any info, warning, error; }
}
```

Benchmarks

- Setup

  - 4-core Intel Xeon X3430, 2.40 GHz, 2 GB RAM

  - Linux 2.6.38-11, x86_64
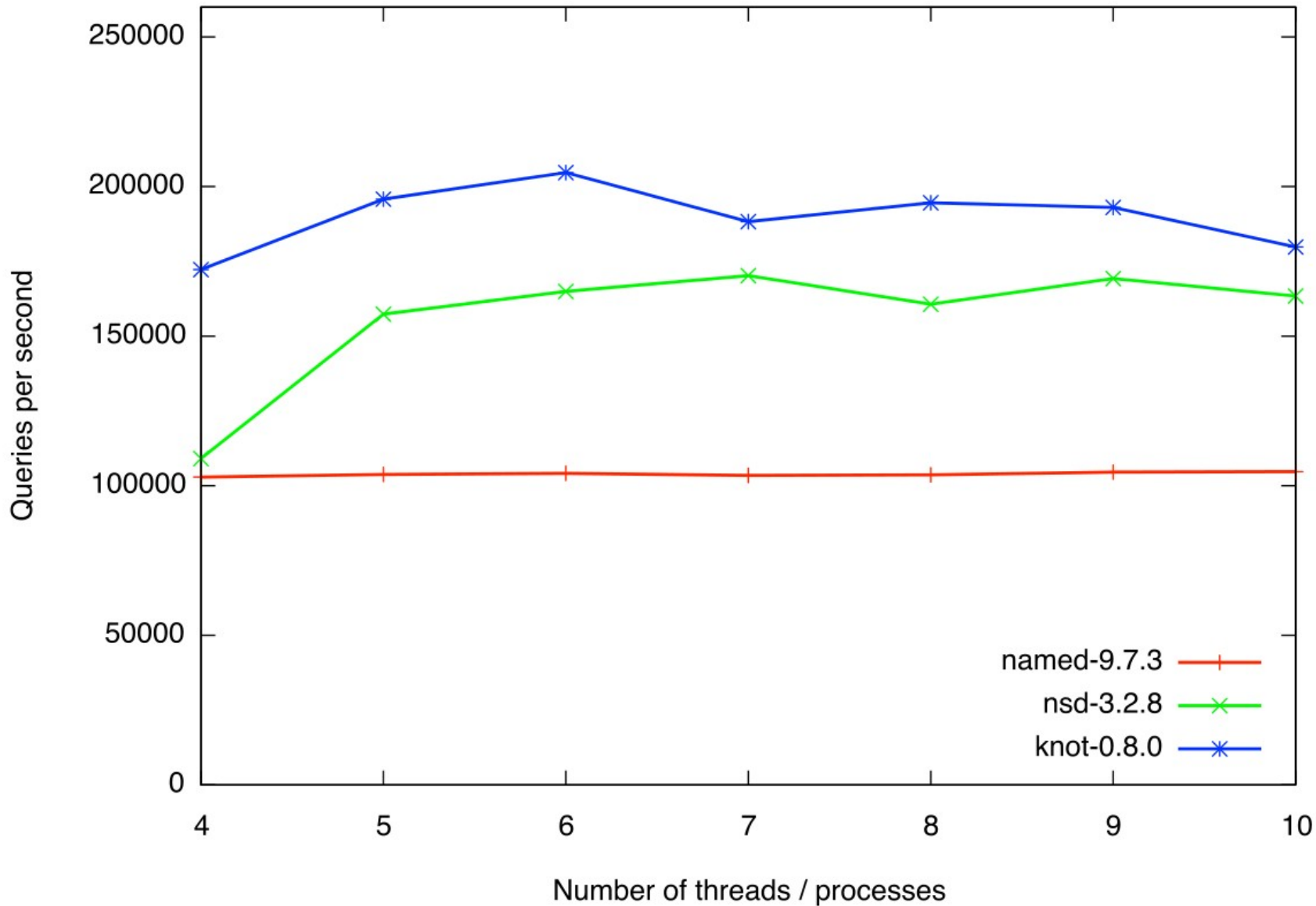
  - FreeBSD 8.2, x86_64

- Tools
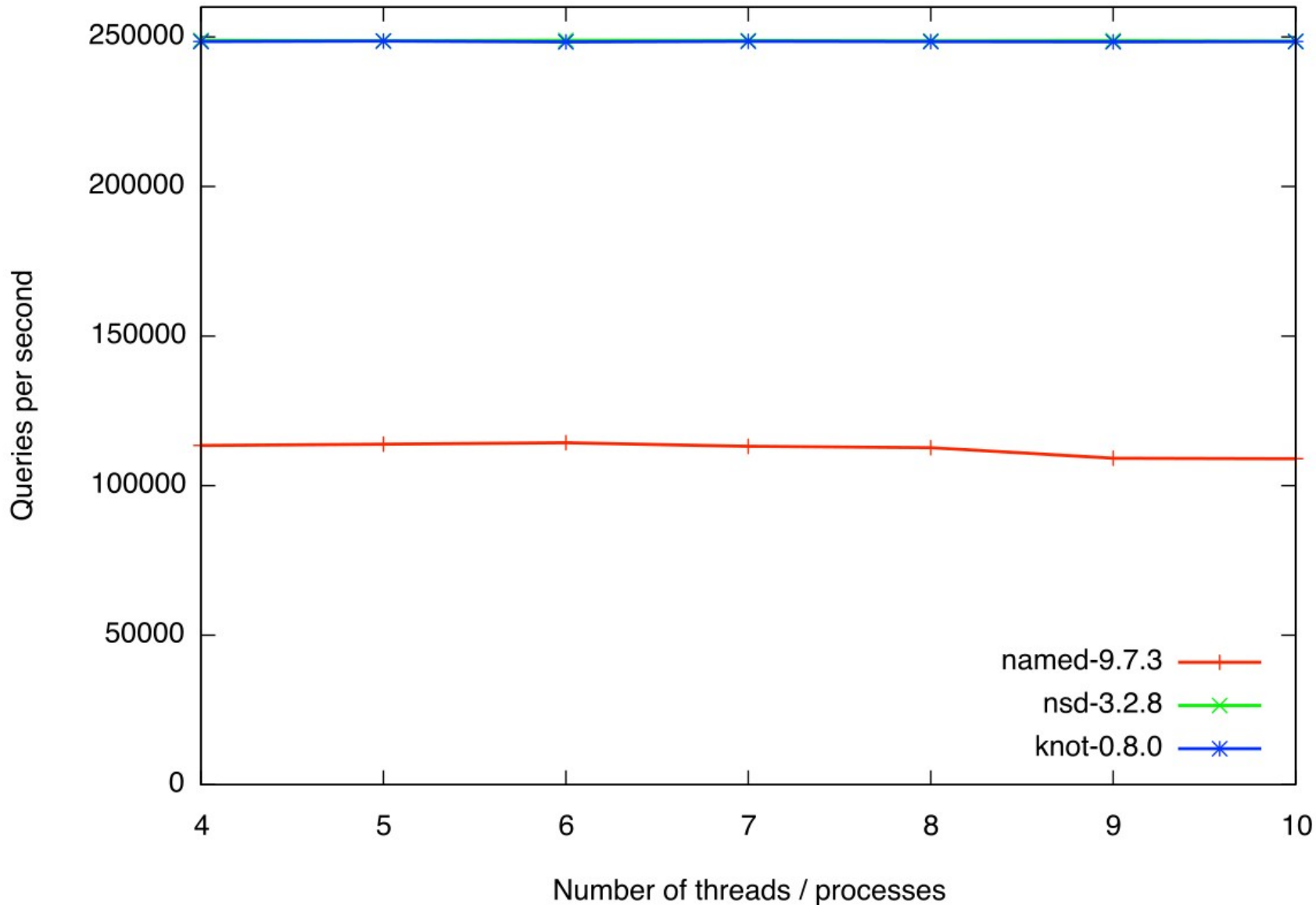
  - dnsperf (by Nominum)

- Data

  - Whole CZ zone with NSEC3

Response rate - Linux

Response rate – FreeBSD

Knot DNS at CZ.NIC

- Deployed at some less-important SLDs
  - e.g. knot-dns.cz

- Deployment plan for .CZ
  - Before end of 2011
  - Only selected anycast nodes

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(Near) Future Plans

- Feature-freeze

  - TSIG

  - Dynamic updates

  - NSID

  - Root zone support

- Testing, debugging, fixing bugs, testing, …

Future Plans

- Even better performance

- Reduce memory footprint

  - Without reducing performance

- Richer CLI

Summary

PROS

- Performance
- Runtime reconfiguration
- Developed in the DNS (TLD) operator community
- Active development

CONS

- Not-yet feature complete
- Higher memory footprint
- Possible bugs (beta)

Conclusion

- New high-performance authoritative server

- Beta-version

    - Not for production use yet

- Tarball or packages

    - deb (Debian and Ubuntu)

    - rpm (Fedora)

- Feedback and testing welcome

More resources

- Knot DNS

    http://www.knot-dns.cz/

- Development site (issue tracking)

    https://git.nic.cz/redmine/projects/knot-dns

- Git repository

    git://git.nic.cz/knot-dns

- Mailing list

    knot-dns-users@lists.nic.cz

Questions?

http://www.knot-dns.cz/

knot-dns-users@lists.nic.cz

správce domény cz

HOW TO WRITE GOOD CODE:

START PROJECT.

DO THINGS RIGHT OR DO THEM FAST?

FAST → CODE FAST

RIGHT → CODE WELL

DOES IT WORK YET? → NO

ARE YOU DONE YET? → NO

ALMOST, BUT IT'S BECOME A MASS OF KLUDGES AND SPAGHETTI CODE.

NO, AND THE REQUIREMENTS HAVE CHANGED.

THROW IT ALL OUT AND START OVER.

?

GOOD CODE