A flexible DNSSEC-validating Resolver

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Who are those CZ.NIC people?

- .CZ
  - https://omnia.turris.cz/
- KNOT DNS
  - https://www.knot-dns.cz/
- BIRD
  - http://bird.network.cz/
- TURRIS OMNIA
  - https://omnia.turris.cz/
What is Knot DNS Resolver?

- Platform for building recursive DNS service
- Open-source DNS Resolver (GPLv3+)
- Full DNSSEC support:
  - RFC 6650 – ECDSA support
  - RFC 5011 – Automated Trust Anchor Management
  - RFC 7646 – Negative Trust Anchors
What is Knot DNS Resolver?

- Written in C and LuaJIT
- Scriptable daemon with dynamic configuration in Lua
- Simple core extensible with modules in C, Lua & Go
- “Happy Eyeballs” IPv6 (20ms headstart)
- No internal threading, scales by self-replication
Who is it for? Everybody!

- Large recursive DNS farms
- Small recursors in private networks
- Personal resolvers
- Geeks, tinkerers, and your granma :)
Large recursive DNS farms

- Scales, the really fast scriptable engine allows you to change resolution
- Flexible cache backends (lmdb, memcached, redis)
- Great statistics, metrics, and plotting with Graphite backend
- RF7646 Negative Trust Anchors
- Cluster-aware – etcd module for self-configuration
- Views and ACL support
- Prefetching
Plotting in Grafana
Small recursors in private networks

- QNAME minimisation for DNS privacy
- DNSSEC and RFC5011 key management
- Low memory consumption (cache can be paged out)
- Query policy based resolution
  - Match: pattern, suffix, RPZ
  - Action: PASS, DENY, DROP, FORWARD, TC
- DNS64 support to complement NAT64
Personal resolvers

- Simple config-less operation
  - Just give it a writeable file for DNSSEC root trust anchor and you are good to go
- Persistent caching (survives reloads/reboots)
- Tinyweb module for monitoring your queries
  - Live Demo: https://kitsune.labs.nic.cz/
- Future:
  - DNS over HTTP and dealing with “hotel wifis”
  - DNS over TLS (as the standards mature)
Tinyweb output

kresd @ kitsune

Queried servers
• kresd is scriptable without binding go port 53

• scripts/kresd-host.lua
  • dig/host like utility
    $ ./scripts/kresd-host.lua -c IN -t AAAA www.fosdem.org
    www.fosdem.org has IPv6 address 2001:67c:1808::5

• scripts/kresd-query.lua
  • Prints DNS response QNAME
    kresd-query.lua -t SOA cz "print(pkt:qname())"
  • Prints RCODE from the DNS response
    kresd-query.lua -t SOA nan. "print(pkt:rcode())"
    3 # ← NXDOMAIN

• API specification in the documentation
Current status

- A beta phase of the project
- Comes with extensive documentation
  - http://knot-resolver.rtfd.org
- Give it a try!
  - Shiny new website: https://www.knot-resolver.cz/
  - Debian and Ubuntu packages (see the website)
  - Sources: https://gitlab.labs.nic.cz/knot/resolver
  - Docker # docker run cznic/knot-resolver
- Throw a normal and a weird DNS stuff on it
- Report back any oddities or success stories
Thank You

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