



Cascade: A DNSSEC signer you can trust

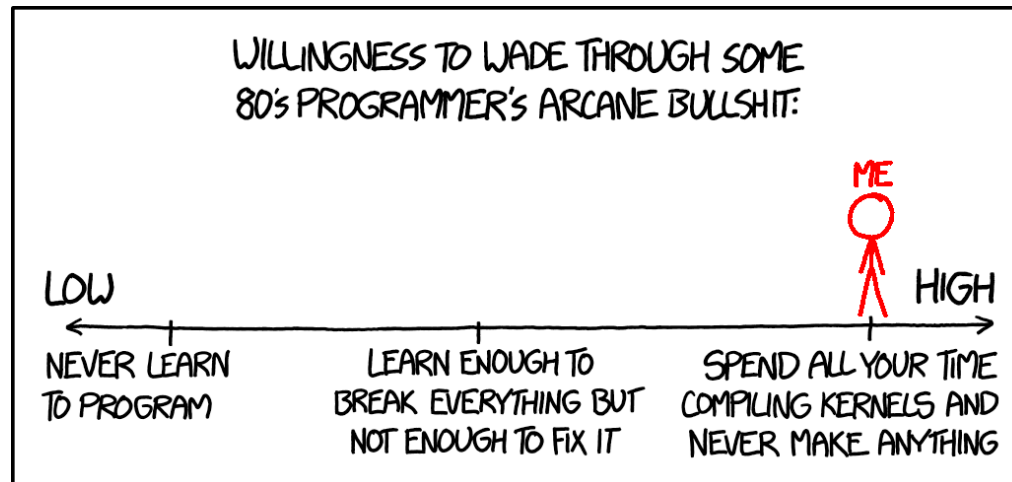
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Introduction

Arya Khanna



Programmer and all-round nerd



XKCD 1671

Arya Khanna

Bachelor of Comp Sci at TU Delft, 2021-24

Software engineer at NLnet Labs since Sep. 2024

- Rust-based DNS software: Domain, DNST, etc.

Open-source software made with ♥



Outline

1. Introduction
2. Requirements
3. Architecture
4. Demonstration
5. What's Next



News at NLnet Labs

We're developing many new projects in Rust

Dedicated 2024 to Domain, our Rust-based DNS library

Now we can write sophisticated DNS applications in Rust!



News at NLnet Labs

We've developed OpenDNSSEC for the last 20 years

It's served the community beyond our wildest dreams

Now, operators are telling us that they need more

So we interviewed them...

How do operators feel?

- Signers are uncommunicative
- Can't trust them to do anything
- Even daily routines are a hassle
- Things could fall apart at any time



Introducing Cascade



Introducing Cascade

Purpose-built DNSSEC signer, written in Rust

Built from scratch with the same expertise

Tailored for today's DNS operators – you!

Today

Releasing a proof-of-concept of Cascade

Production-ready release in time for 2026

Announcement regarding ODS coming soon

Designing Cascade

Designing Cascade

Prime Directive: Listen to the users!

How do operators feel?

- Signers are uncommunicative
- Can't trust them to do anything
- Even daily routines are a hassle
- Things could fall apart at any time

How do I feel?

- Partners are uncommunicative
- Can't trust them to do anything
- Even daily routines are a hassle
- Things could fall apart at any time



Building something you can trust

Cascade

Communicates how it's doing

Detailed, per-zone status output

Doesn't assume your feelings

Review zones before publishing

Is open to your needs

Manually control every step

Helps you with chores

Good support for MS, HA setups

... and so much more

Easy to interact with

CLI, REST API; Web UI coming soon

Good at doing the right thing

Well-tested defaults at every level

Flexible enough to fit you

Systemd, Prometheus, containerization

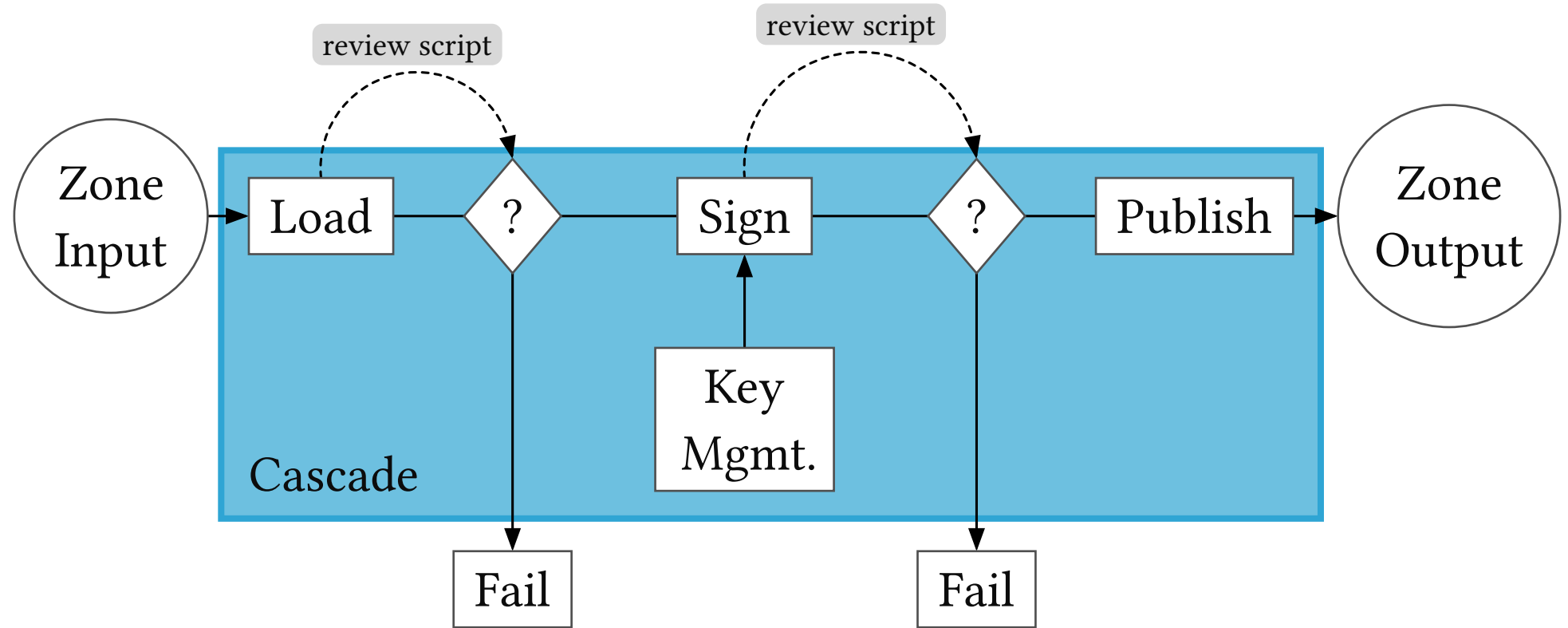


So what did we build?

So what did we build?

- A DNSSEC signer and key manager
- An architecture around the signing pipeline
- First-class support for zone review / approval
- A REST API for controlling every component
- Comprehensive status output via the CLI/API

So what did we build?



Cascade's per-zone pipeline.



Time for a demo!

`cascade.nl`
`netlabs.nl`

- A small DNSSEC-signed zone
- Unsigned contents served by NSD
- Signing with HSM-based ZSK + KSK
- Publicly served by another NSD

Time for a demo!

What we'll see

- Configuring Cascade
- Migrating the zone
- CLI & status reporting
- Some common workflows

Time for a demo!

Let's go!

What's next?

What do you think? How can we support you better?

Come talk to us, so we can understand your needs

Expect a production-ready release in early 2026

What's next?

But first, a quick detour...

Help fund our open-source development



Thank you!

Follow development



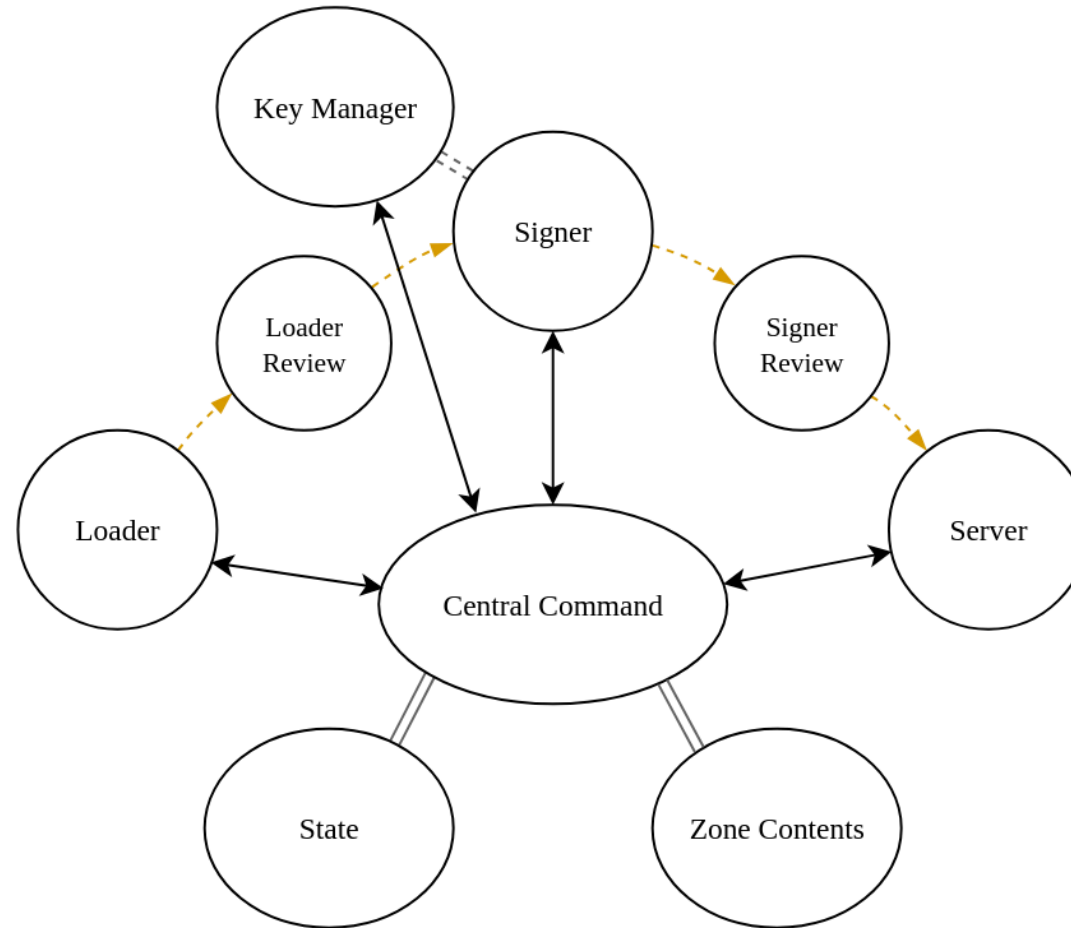
GitHub repository:
[NLnetLabs/cascade](https://github.com/NLnetLabs/cascade)



Main Page:
blog.nlnetlabs.nl/cascade

Presentation made with Typst, tinymist, fletcher, and tiaoma

Auxiliary slides



Cascade's overall architecture.