

# Nameshed

Modern DNSSEC signing



name•shed | 'neɪmʃɛd |

noun

the result of bikeshedding a working title for your DNS software and likely using it as the name you release with. See also, *Unbound*.

# 🍷 Introduction 🍷

# domain

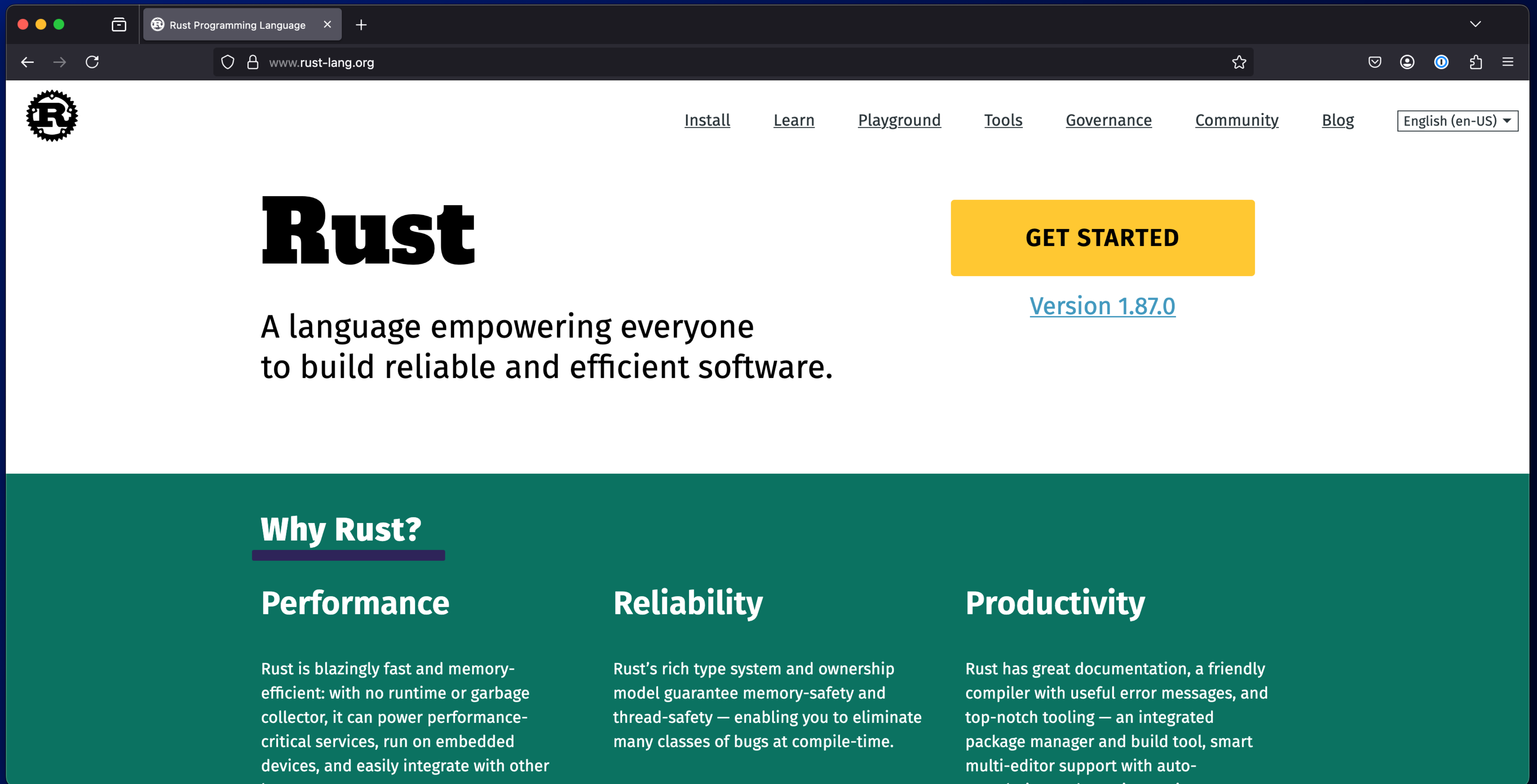
✦ EST. 2015 ✦



*a DNS library  
for Rust*





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# Rust

[GET STARTED](#)[Version 1.87.0](#)

A language empowering everyone  
to build reliable and efficient software.

## Why Rust?

### Performance

Rust is blazingly fast and memory-efficient: with no runtime or garbage collector, it can power performance-critical services, run on embedded devices, and easily integrate with other

### Reliability

Rust's rich type system and ownership model guarantee memory-safety and thread-safety — enabling you to eliminate many classes of bugs at compile-time.

### Productivity

Rust has great documentation, a friendly compiler with useful error messages, and top-notch tooling — an integrated package manager and build tool, smart multi-editor support with auto-



# Announcing Rust 1.87.0 and ten years of Rust!

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May 15, 2025 · The Rust Release Team

Live from the [10 Years of Rust celebration](#) in Utrecht, Netherlands, the Rust team is happy to announce a new version of Rust, 1.87.0!



Today's release day happens to fall exactly on the 10 year anniversary of [Rust 1.0](#)!



# The domain crate

Our ever expanding DNS library for Rust

- Started out as a Friday-project
- Received a massive boost in 2024 with a grant from Sovereign Tech Agency
  - A basic stub resolver, response caching, DNSSEC validation;
  - Zone loading, answering queries and zone transfers;
  - Key management and DNSSEC signing;
  - Proxy capabilities and DNS request routing;
  - Binaries for DNS inspection (`dnsi`) and a DNS toolbox (`dnst`).





# The domain crate

Our ever expanding DNS library for Rust

- Today, our Rust DNS projects have a team of six developers
- Forms the basis for the next 5+ years of DNS tooling from NLnet Labs
- Not just experimental — used extensively at Cloudflare, for example
- Runs in tandem with our projects in C

[blog.nlnetlabs.nl/the-next-five-years-of-dns-at-nlnet-labs/](https://blog.nlnetlabs.nl/the-next-five-years-of-dns-at-nlnet-labs/)

[blog.nlnetlabs.nl/overhauling-domain/](https://blog.nlnetlabs.nl/overhauling-domain/)





Not our only Rust project...

 **ROUTINATOR**

 **ROTONDA**

 **Krill**



☞ Experience ☞




# Packaging

- Binary Packages via `packages.nlnetlabs.nl`
  - Debian
  - Ubuntu
  - RHEL / Rocky Linux
- Docker
- Alternatively, build from source using `cargo`



# Documentation



0.14.2

Search docs

GETTING STARTED

Installation

Building From Source

Configuration

CORE

Data Processing

VRP Output Formats

Local Exceptions

Logging

SERVICE

Running as a Daemon

RTR Service

HTTP Service


User Interface


API Endpoints

Monitoring

INTERACTIVE

Running Interactively

 / Routinator 0.14.2

 Edit on GitHub

## Routinator 0.14.2

Routinator 3000 is free, open-source [RPKI](#) Relying Party software made by [NLnet Labs](#). The project is written in Rust, a programming language designed for performance and memory safety.

### Lightweight and portable

Routinator has minimal system requirements and it can run on almost any hardware and platform, with packages available for most. You can also easily run with Docker or Cargo, the Rust package manager.

### Full-featured and secure

Routinator runs as a service that periodically downloads and verifies RPKI data. The built-in HTTPS server offers a user interface, API endpoints for various file formats, as well as logging, status and Prometheus metrics.


### Flexible RPKI-to-Router (RTR) support

Routinator has a built-in RTR server to let routers fetch verified RPKI data. You can also run RTR as a separate daemon using our RPKI data proxy [RTRTR](#), letting you centralise validation and securely distribute processed data to various locations.


### Open-source with professional support services


NLnet Labs offers [professional support and consultancy services](#) with a service-level agreement. Community support is available on [Discord](#) and our [mailing list](#). Routinator is liberally licensed under the [BSD 3-Clause license](#).

chat 118 online

 Follow @nlnetlabs

3.1k

 Read the Docs

 stable

Versions

latest stable v0.14.2 v0.13.2 v0.12.2

Downloads

EPUB PDF

On Read the Docs

Project Home Builds

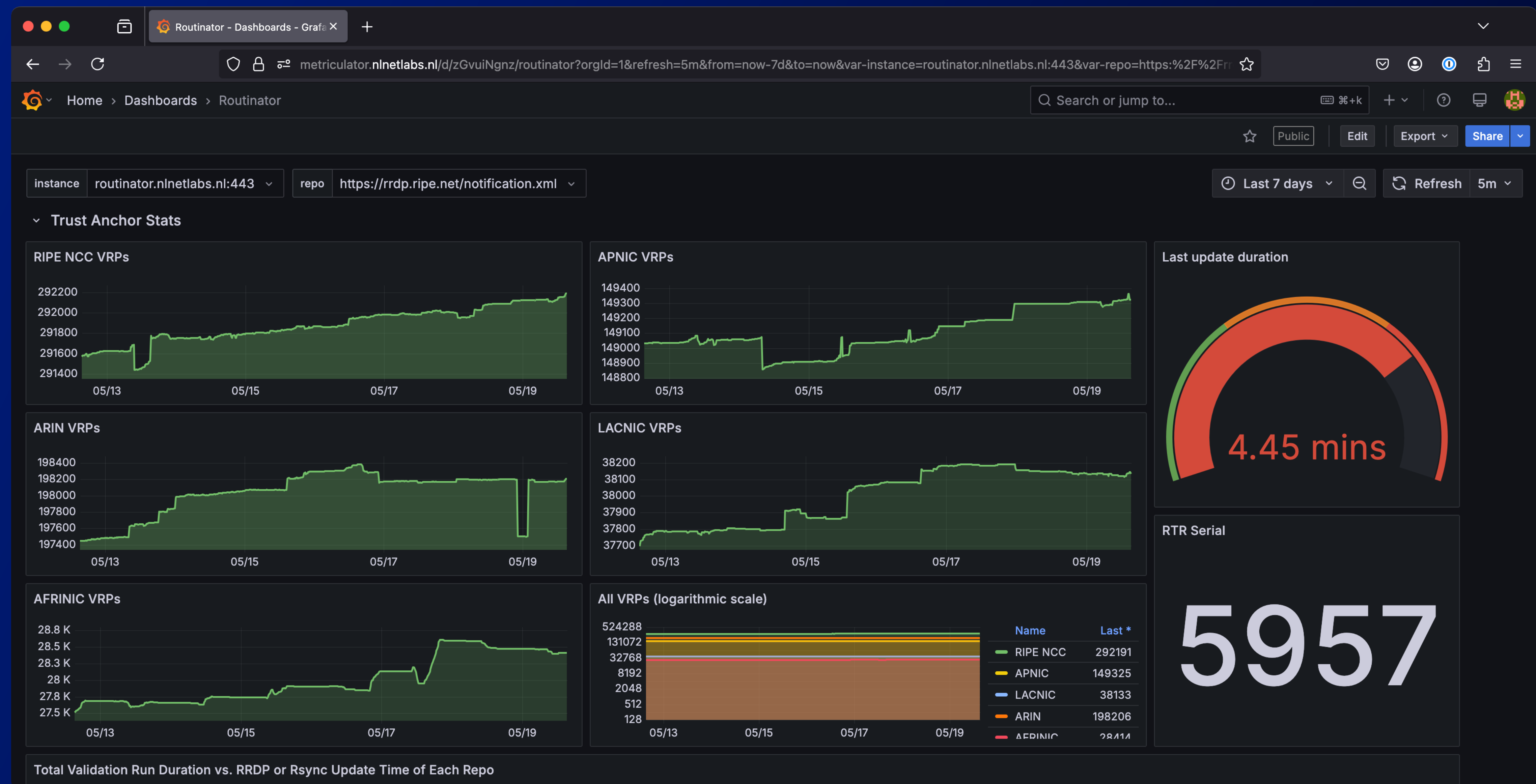
Search

Search docs

Addons documentation — Hosted by Read the Docs



# Monitoring





# API

routinator.nlnetlabs.nl/api/v1/validity X +

← → ↻

🔒 routinator.nlnetlabs.nl/api/v1/validity/3333/193.0.0.1/24

133% ☆

📄 🔄 ⓘ 📄 ☰

JSON Raw Data Headers

Save Copy Collapse All Expand All 🔍 Filter JSON

▼ validated\_route:

▼ route:

origin\_asn: "AS3333"

prefix: "193.0.0.0/24"

▼ validity:

state: "invalid"

reason: "length"

description: "At least one VRP Covers the Route Prefix, but the Route Prefix length is greater than the maximum length allowed by VRP(s) matching this route origin ASN"

▼ VRPs:

matched: []

unmatched\_as: []

▼ unmatched\_length:

▼ 0:

asn: "AS3333"

prefix: "193.0.0.0/21"

max\_length: "21"

generatedTime: "2025-05-19T13:54:43Z"

# User Interfaces

Krill - nlnetlabs

krill.nlnetlabs.nl/ui/cas/nlnetlabs

English

Certificate Authority nlnetlabs

Current Certificate Authority nlnetlabs

ROAs

ASPs

Parents

Repository

Search for ASN, prefix, state...

	ASN	Prefix	Comment		State									
>	0	2a04:b906::/48-48	Invalid only announcement at Coloclue		AS0 1									
	0	2a04:b907::/48-48	Invalid more specific at Coloclue, valid less specific at Vultr		REDUNDANT									
	0	185.49.142.0/24-24	Invalid more specific at Coloclue, valid less specific at Vultr		REDUNDANT									
∨	8587	2a04:b900::/30-32	Prefix at our office announced by Infracom		SEEN 1									
<div><div>Authorizes 1 announcements</div><div>Disallows 0 announcements</div></div> <table><thead><tr><th>ASN</th><th>Prefix</th><th>ASN</th><th>Prefix</th></tr></thead><tbody><tr><td>8587</td><td>2a04:b900::/30</td><td></td><td>No data</td></tr></tbody></table>							ASN	Prefix	ASN	Prefix	8587	2a04:b900::/30		No data
ASN	Prefix	ASN	Prefix											
8587	2a04:b900::/30		No data											
>	8587	185.49.140.0/23-23	Prefix at our office announced by Infracom		SEEN 1									
>	8587	2a04:b900::/30-30	Prefix at our office announced by Infracom		REDUNDANT 1									
>	16509	2a04:b905::/48-48	For AWS BYOIP		SEEN 1									

asnAS204325AS211321

ipv4185.49.140.0/22

ipv62a04:b900::/29



All combined with 25 years of  
DNS experience

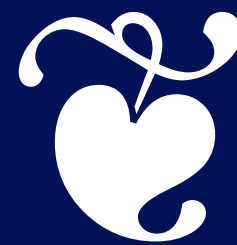
🐙 nameshed 🐙  
*a primary nameserver*



# A new DNSSEC-signing solution

- OpenDNSSEC has fulfilled its lifetime goals
- Served the DNS community well for many years
- Keep the strengths, improve on the weaknesses
- We intend to announce End-of-Life for OpenDNSSEC this year

# Stakeholder Interviews



*SIDN, DNS Belgium, RESTENA,  
CentralNIC, Netnod, Afnic,  
and many others...*



# What you told us

Some of the take-aways from our interviews

- Assurance that software behaves predictably
- Include the ability to add any external form of checks
- Offer sensible defaults, but include clear and precise controls
- Comprehensive documentation
- Modern statistics and monitoring
- Cater for container deployments; orchestration in AWS ECS, K8S or others

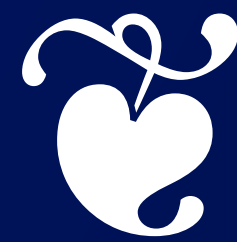
# What you told us

Some of the take-aways from our interviews

- Protection against sudden key changes or deletion
- CDS/CDNSKEY and ZONEMD support
- Migration path from OpenDNSSEC
- Offer an API
- Cater for advanced scenarios
  - Backup keys (offline KSK)
  - Multi-signer



# Design Goals



*Sensible Defaults*

*Controllability*

*Observability*

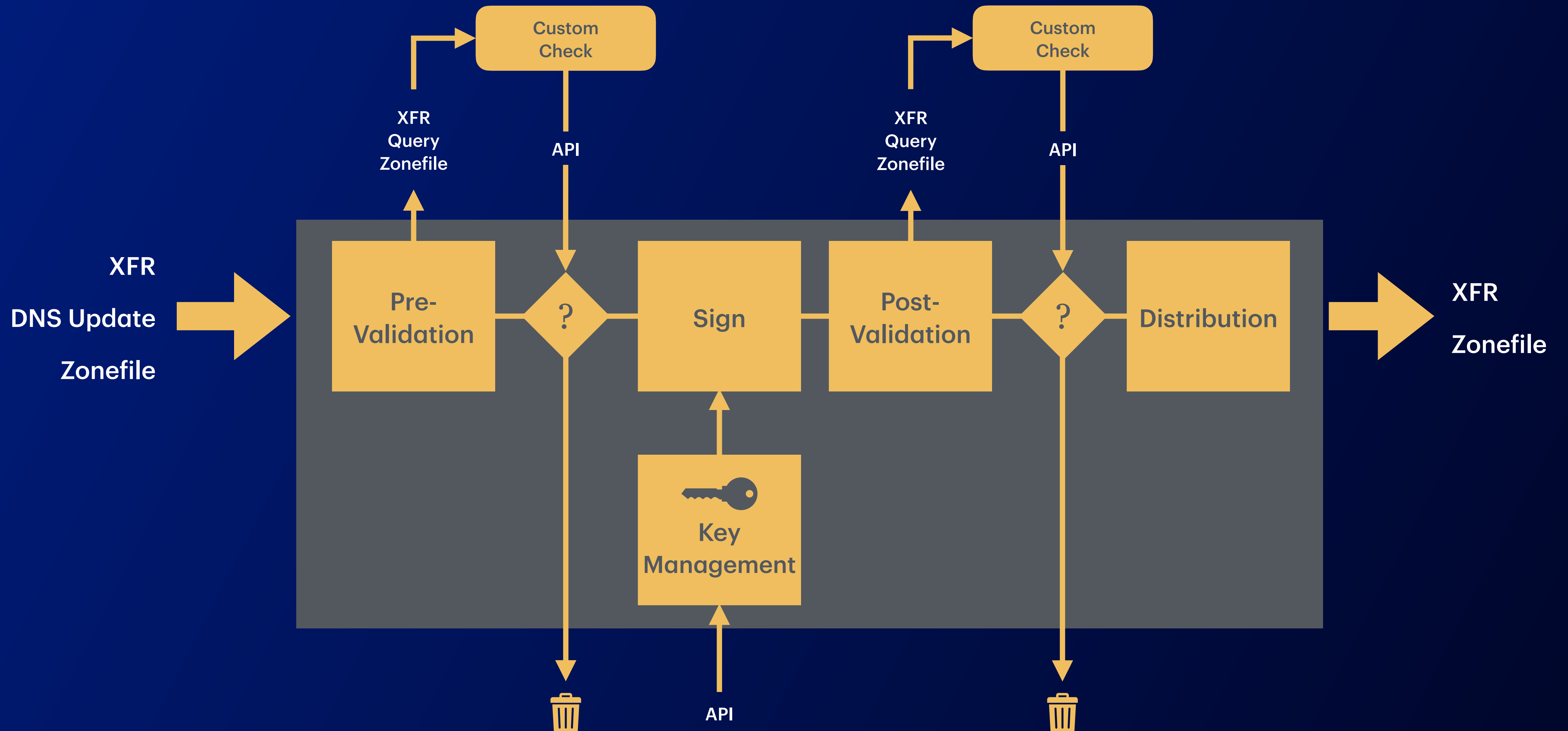
*Flexibility*

# Nameshed Components

- Zone Loader
- Zone Signer
- Key Manager
- Review / Public Server
- Central Command
- Zone Storage



# Nameshed Pipeline



# Planning

- Q2 2025: Refine Key Management
- Q3 2025: Prototype
- Q4 2025: 0.1 Release

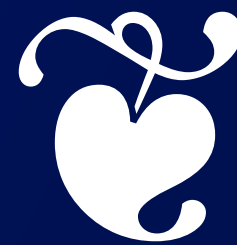
# Funding

Ensuring a sustainable future for our non-profit foundation

- Our products are forever open-source and liberally licensed
  - No freemium or “Subscription Edition”, ever
- Our primary income source is through Support Agreements
  - Direct access to the development team for expert assistance
  - Early security vulnerability notices under NDA
- Current nameshed development is financed from our reserves
- In the longer term, the project will have to stand on its own feet

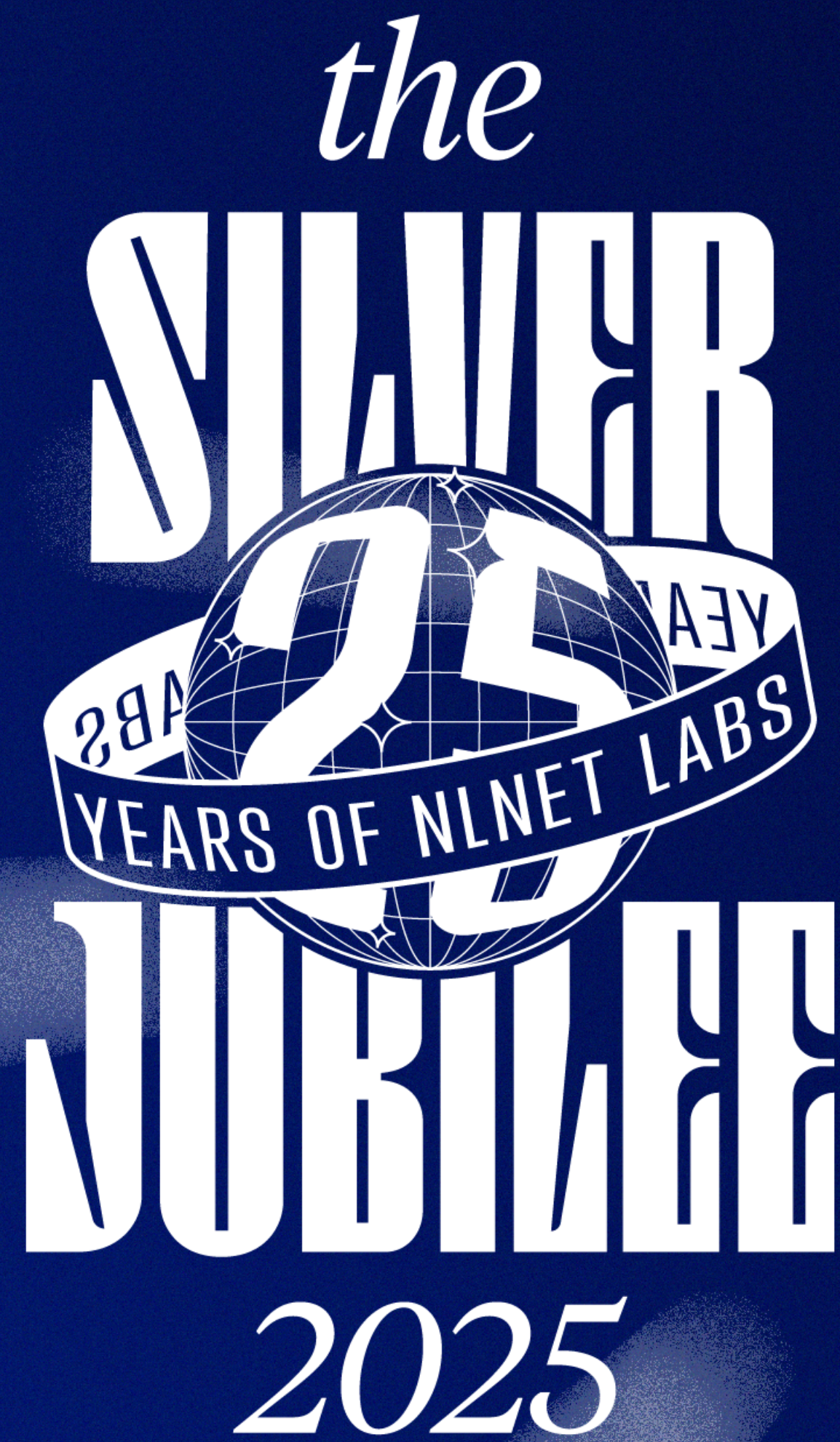


Talk to us about your  
wishes and needs!



*Benno and I are here for you.*





# Questions

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 [alex@nlnetlabs.nl](mailto:alex@nlnetlabs.nl)