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CloudNativeCon

Europe 2026

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Rust vs Go

Building a Container Network Stack from Scratch

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What is Podman?

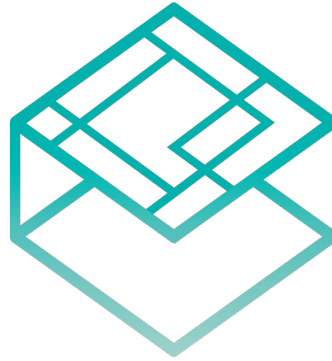
- Podman is a single-node container engine
- Natively rootless and daemonless
- Docker-compatible CLI interface
- Project started in 2017
- CNCF Sandbox since 2024



podman

Podman Networking

- Initially, the project used CNI
- Networking plugins used by Kubernetes
- Initial advantages
 - Rapid development
 - Commonality with Kubernetes
- Friction built gradually
 - Needed to write our own plugins
 - Did not use 95% of what CNI offered
 - UI mismatch



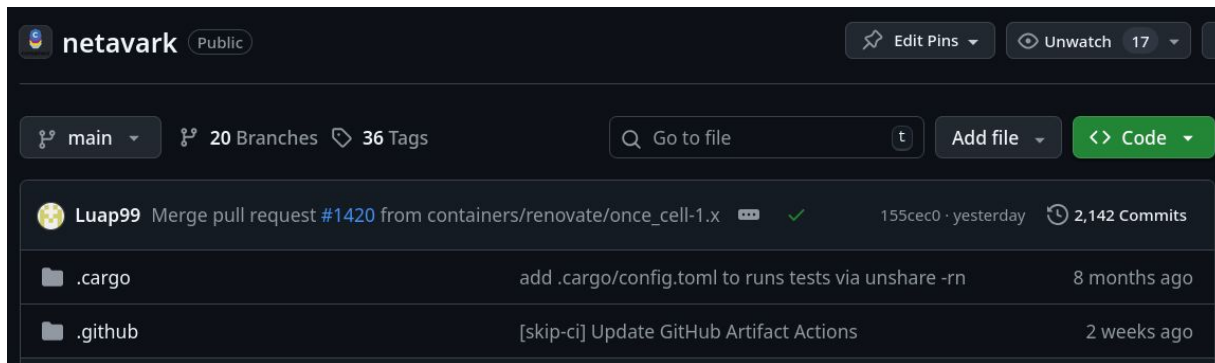
CNI

Why Switch?

- 2021: CNI Maintainers were considering dropping support for Podman
- We could fork...
 - But CNI is a poor match for what we want to do
- A rewrite seemed feasible

What we built: Netavark

- Container network setup & teardown
- Handles bridging, macvlan, ipvlan, firewall configuration, ioctls
- Monolithic, written in Rust
- Released 2022 with Podman 4.0
- Has a sister project, Aardvark-dns, handling container DNS



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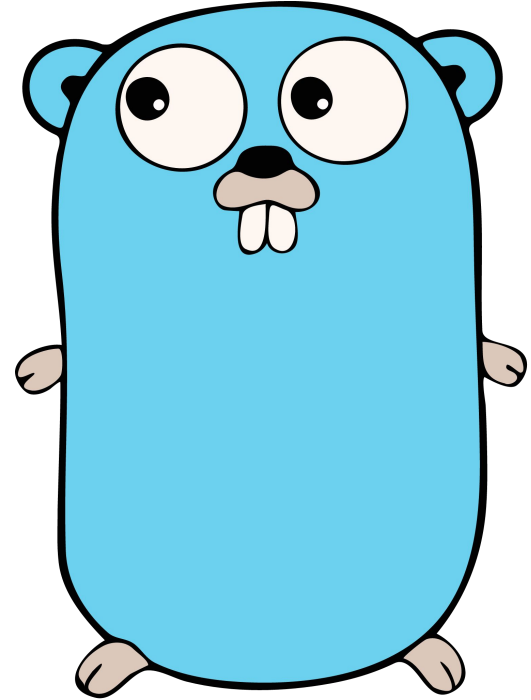


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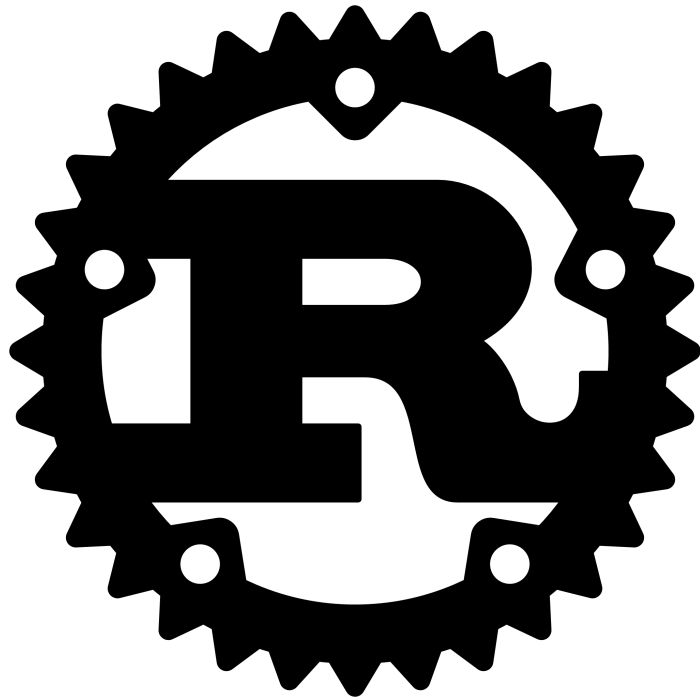
Why not Go?

- We almost wrote Podman in Rust
 - Ecosystem benefits were too big to ignore
- Much less ecosystem lock-in for Netavark
- Our maintainers were excited to work with a different language
- Supportive management tolerant of change



Why Rust, specifically?

- We already had it in mind
 - But we had reasons
- Did not want garbage collection
 - Low persistent memory footprint
- Liked Rust's expressive type system
- Liked Rust's error handling
- Willing to deal with complexity



How did it go?

- Netavark has been quite successful
- Most of our developers like Rust
 - The feeling is not unanimous
- Code review is much more difficult
- Limited number of available developers
 - Possibly unique to our team?



Netavark

**Shivang's recording starts
(Link [here](#))**

Benefits to the Ecosystem

- Direct Impact: Fixed a frustrating, long-standing Podman networking bug
- Upstream Contributions: Added major missing features to upstream Rust crates (netlink-packet-netfilter)
- Community Growth: Converts users into capable, confident contributors
- Shivang wrote a blog about his experiences - you can find it [here](#)



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Thank you!

Github (Main) – <http://github.com/containers/podman>

Github (Netavark) – <http://github.com/containers/netavark>

Web – <http://podman.io>

Youtube – <https://www.youtube.com/c/Podman>

