

# Nicholas Russo

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## Summary

Backend engineer with 2.5 years of experience building and optimizing distributed systems. Work includes performance optimization, API development, database systems, and testing infrastructure. Open source projects focus on systems programming and developer tooling.

## Skills

**Languages:** Python (Advanced), Rust (Advanced), Go (Advanced), C (Intermediate), C++ (Intermediate), JavaScript (Beginner), Mojo (Beginner)

**Backend/APIs:** FastAPI, Flask, Django, Zenith, Ruby on Rails, gRPC

**Databases:** PostgreSQL, SQLite, MySQL, Redis

**Infrastructure:** Docker, Linux (Fedora, Ubuntu, RHEL/CentOS, CoreOS, Gentoo), Kubernetes (Beginner)

**Cloud Platforms:** AWS, GCP, DigitalOcean, Cloudflare

**Tools:** Git, GitHub Actions, Zed, Neovim, mise, uv, Ghostty, Fish, ripgrep, fzf, fd, Tailscale

## Experience

### Software Engineer

January 2021 – May 2023

*Omnitier, Inc.*

- Optimized critical Python backend service by ~90%, reducing runtime from 45 minutes to 5 minutes by migrating to `os.scandir()` API (reduced system calls) and Path objects for efficient filesystem traversal
- Built comprehensive regression testing infrastructure using Go and Python, improving code stability across distributed services
- Developed gRPC API integrations and enhanced React frontend features, maintaining full-stack service reliability

## Projects

**OmenDB** | [github.com/omendb](https://github.com/omendb) | *Rust, Vector Database, Database Systems*

- PostgreSQL-compatible vector database in Rust with HNSW indexing and binary quantization. Implementing hybrid HTAP architecture with ALEX learned indexes for SQL. Targeting 10x faster queries and 24x better memory efficiency than pgvector at 10M+ vectors

**Zenith** | [github.com/nijaru/zenith](https://github.com/nijaru/zenith) | *Python, Web Framework, API Design*

- Python web framework with chainable query APIs, zero-config setup, and async request handling. Built for developer experience and production performance

**sy** | [github.com/nijaru/sy](https://github.com/nijaru/sy) | *Rust, CLI Tools, Systems Programming*

- File synchronization tool implementing rsync algorithm with TRUE O(1) rolling hash (2ns/op), Adler-32 + xxHash3 checksums. Streaming delta sync with constant 256KB memory, adaptive block sizing. 2-11x faster than rsync

**Kombrucha** | [github.com/nijaru/kombrucha](https://github.com/nijaru/kombrucha) | *Rust, Package Management, Developer Tools*

- Homebrew-compatible package manager with fully parallelized API operations, breadth-first dependency resolution, and in-memory LRU caching (1000 formulae + 500 casks). 5.5x faster for upgrade operations

**Pacabot** | *Python, AI/ML, Finance*

- Trading bot with market analysis, automated strategy execution, and risk management. Real-time data processing for algorithmic trading

## Awards

**2nd Place & Ingenico Winner, Money 20/20 Las Vegas 2016** | *Team Kairos*

- Developed cross-terminal payment application with REST API for business partnerships. Built with Go and PostgreSQL, deployed on CoreOS

## Education

**42 Silicon Valley**

*Computer Science*

2018 – 2020

*Fremont, CA*

**Las Positas College**

*Computer Science*

2014 – 2015, 2016 – 2018

*Livermore, CA*

- Computer Science Club President 2016 – 2017

**Dev Bootcamp**

*Web Development*

March 2016 – May 2016

*San Francisco, CA*