

Zack Newman

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Relevant Experience

Fast Data Services | Software Engineer

May 2016–Feb 2023 | Centennial, CO

- Redesigned principal codebase for predictive modeling of tax fraud supporting the daily responsibilities of the operations team and generating customers' final product. Significant enhancements included:
 - Decreased runtime from ≈ 6 hours to ≈ 40 minutes.
 - Reduced CPU utilization from $\approx 98\%$ on 16 cores distributed among 4 servers to $\approx 30\%$ on 1 core on 1 server.
 - Completely eliminated memory overflow exceptions.
 - Decreased database storage by a factor of ≈ 8 while simultaneously improving data manipulation language (DML) performance.
- Improved type safety leading to an increase in errors caught at compile time.
- Serve as the resident technical expert and provide guidance to coworkers on an as-needed basis.
- Found several SQL-injection bugs in both the GUI and backend.
- Discovered vulnerability allowing any employee the ability to extract the TOTP keys of other employees.

Projects

Self-hosting | Independent

Jan 2018–Present | Englewood, CO

- Built my own router and segmented networks across multiple VLANs.
- Routed /29 IPv4 and /48 IPv6 networks from VPS provider to my router via a VPN tunnel.
- Host my own hidden primary nameserver; password manager; NVR; and git, e-mail, web, NTP, VPN, and recursive DNS servers.

Information Security | Independent

Jan 2018–Present | Englewood, CO

- Made most hosted services only accessible via VPN server.
- Using pf(4), greatly limit what devices are allowed to communicate with each other.
- When possible, use strong public-key cryptography for primary factor of authentication (e.g., ed25519).
- For services that still require passwords, use unique, random 32-byte passwords stored in hosted password manager.
- Store secrets (e.g., SSH keys) on security token when possible.

Adblocker | Independent

Aug 2023–Oct 2023 | Englewood, CO

- Written in Rust.
- Downloads and parses blocklists from a config file.
- Transforms each value into a Response policy zone (RPZ) action.

Education

University of Colorado

BA in Mathematics

Minor in Ecology & Evolutionary Biology

May 2012 | Boulder, CO

GPA: 3.9/4.0

Links

 git.philomathiclif.com

 [philomathiclif](https://philomathiclif.com)

 philomathiclif.com

Coursework

Undergraduate

Abstract Algebra

Combinatorics

Differential Equations

Differential Geometry

Linear Algebra

Mathematical Analysis

Number Theory

Topology

Independent

Categories for the Working Mathematician

Computer Organization & Architecture

Coursera: Build A Modern Computer

edX: Intro to Functional Programming

Homotopy Type Theory

Learn You a Haskell for Great Good!

The Rust Programming Language

Skills

Programming Languages

Experienced

Rust • C# • T-SQL • Visual Basic

Proficient

Bash • KornShell

Familiar

Haskell • Python • \LaTeX

Software

Linux • OpenBSD • macOS • Windows

.NET • SQL Server • Git