Josh Kunz

Infrastructure and Systems Engineer

josh@kunz.xyz   @joshkunz   @jkz0

Work

Senior Software Engineer   Google, C++ Toolchain Team   2019-present

- Brought up new ARM cross-compiling toolchains in the Bazel build system for C++ and Go. Built a QEMU "user" mode based emulated test environment. Enabled performant, continuous, cross-architecture testing of over 10,000 client team binaries on existing test infrastructure.
- Triaged failures in client team binaries, and submitted fixes across a variety of toolchain components including: glibc, LLVM (Clang driver, LLD), and the Go and Python runtimes.
- Subject matter expert for emulator ↔ Linux interaction. Root caused several reports of flaky tests from client teams to a subtly incorrect implementation of `fork(2)` in QEMU user mode. Implemented `CLONE_VM` support in QEMU to work around this issue. Decreased flakiness in client team tests. Wrote a data analysis pipeline to measure flake rates of guest code to drive further work.
- Participated in a company-wide code review mentorship program. Reviewed Go code across 100s of projects by 100s of authors. Equivalent to mentoring ≈ 8 authors from start to finish.

Site Reliability Engineer   Google, Network Control Plane Team   2017-2019

- Operated Google's software network control plane, a five-nines availability service. Participated in 5m-response oncall rotation, and release roles.
- Led a project to develop a new automated configuration push service for the control plane software controller in Go. Executed a migration from the legacy system to the new system without downtime. Defined meaningful service level indicators (SLIs) and objectives (SLOs) based on client team needs. Developed monitoring and alerting for the push service.
- Consulted with software teams on reliability requirements for the introduction of major new software features.

Research Assistant   Flux Research Group   2014-2017

- Focus on automated network management with software defined networking (SDN), with an emphasis on edge deployments, Cloud networking, and security.

Education

Masters of Computer Science	University of Utah	2017
Bachelors of Computer Science	University of Utah	2017
Award: Outstanding Undergraduate Student Researcher	College of Engineering, University of Utah	2015

Publications

CapNet: Security and Least Authority in a Capability-Enabled Cloud	SoCC	2017
OpenEdge: A Dynamic and Secure Open Service Edge Network	IEEE NOMS	2016
KnowNet: Towards a Knowledge Plane for Enterprise Network Management	IEEE NOMS	2016

Skills

Professional Experience With: Go, Modern C++, Modern C, Typed Python, Bash, SQL, Version Control (git/Mercurial), Bazel, Docker, Linux, LLVM-based Toolchains, Crossbuilding, Software Emulation, Monitoring and Alerting, Software Defined Networking (SDN), Distributed Systems.

Some Experience With: Functional Programming (Haskell, OCaml, Scheme, etc.), R, Rust, TypeScript, Java, React.