Matthew Bruggeman

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Objective

Computer Science graduate interested in Cybersecurity and distributed systems. Skilled in many programming languages and tools, with a strong foundation in operating system design and security. Seeking a challenging role to contribute expertise in securing systems using novel technologies against emerging threats.

Work Experience

Cybersecurity Intern @ **Pacific Northwest National Laboratory** — *June 2022 to present*

- Created network simulations using NS3 and C++, deploying them with Docker to simulate traffic flowing through power grid infrastructure and LTE network topologies.
- Worked with virtualization and Ansible to implement a reproducible enterprise IT network for simulated Cybersecurity engagements, incorporating Active Directory, firewalls, proxies, and web caches.
- Architected services and applications built in Rust to simulate realistic email conversations using local LLMs while obfuscating network traffic and providing flexible a API for other applications to consume.
- Implemented an eBPF program in Rust to spoof IP addresses to generate simulated internet traffic.
- Deployed and configured a transparent Squid proxy to simulate internet access using cached content and a custom root CA, enabling isolated workstations to access public websites during engagements.
- Setup HTTP URL redirection to exfiltrate C2 traffic via HTTPS encryption and domain impersonation, mimicking legitimate web behavior to evade detection.
- Created a Python service to simulate external file delivery via SMTP, virtual USB devices, and SFTP shares.
- Built several web applications representing fictional companies using a LAMP stack, Tailwind, and Kerberos authentication for seamless login on Windows workstations.
- Developed a service to automate synchronization of LDAP accounts and virtual machine VNC connections between Apache CloudStack and Apache Guacamole by interfacing with MySQL and REST APIs.
- Implemented firm real-time serial data collection and processing for an embedded Linux system.

Freelance Development & System Administration — *March 2018 to December 2021*

- Developed full-stack Vue and React web applications handling dynamic content.
- Hardened machines and networked services, configured firewalls and routing, and monitored systems.

Education

B.S. Computer Science @ **Washington State University** – *Completed May 2025*

- Summa Cum Laude – 3.9 GPA
- Coursework in Cybersecurity, web development, systems programming, language design, and algorithms.

Skills

- Building declarative and reproducible systems focused on reliability
- Architecting networks and building networked services with robust APIs
- Securing and hardening complex networks using sandboxing and MAC
- Data processing using functional programming

Technologies

- Rust, TypeScript, C, C++, C#, Java, Go, Python
- Full-stack web: Vue, React, Express
- MySQL/MariaDB, Postgres, MongoDB, Redis
- Systems programming: user, kernel, eBPF, rt
- Debian, RHEL, NixOS, systemd
- Podman, Docker, bubblewrap
- Embedded: ESP32, Arduino, Raspberry Pi