Alan Sandoval

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Full-stack Skills

Languages: Rust, Python, C++, Bash, TypeScript, Go, English, Spanish
Cybersecurity: PKI, Zero Trust, cryptography, networks, deployment administration
Cloud technologies: AWS, Azure, WASM, Docker, Kubernetes

Experience

Systems Engineer, Liberas, Inc. – Ann Arbor, MI January 2021 – July 2024

- Provided control and monitoring of power distribution systems by creating and maintaining AWS and Azure cloud infrastructure with Terraform and other OSS (ex. Kubernetes, Authentik, Traefik Proxy, SPIFFE/SPIRE, and Skaffold) to automate a multi-node deployment including PKI, system logging, network policy, databases, and applications.
- Developed protocol adapters that integrate OCPP v1.6 and OCPP v2.0.1, DNP3.0, IEC 61131-3, IEC 61850, IEEE 1547, Modbus, Telnet, and OpenFMB to bridge grid equipment to EV Chargers.
- Designed and created web applications for the secure management of power systems with React and Next.js.
- Added network drivers and security features to a security-hardened Yocto Bitbake Linux kernel for i.MX 8 Arm Cortex.

Research Assistant, Colorado State University – Fort Collins, CO May – August 2020

- Mentored fellow undergraduate students on subjects such as SAE J1939, encryption exploits, WiFi hacks, PCB design and milling, controller area networks, and system security.
- Added to C libraries in order to implement message encryption within an unused portion of SAE J1939-71 by leveraging cryptographic hardware security modules.
- Applied WPA2 exploits to attack and examine heavy vehicle diagnostic tools and protocol security vulnerabilities.

Electrical Systems Integration and Verification Intern,
Volvo Group Trucks Technology – Greensboro, NC June – August 2019

- Completed feasibility study for tractor-mounted solar panels, which included data gathering and power analysis (using IPEtronik), wire and panel packaging, and cost margin calculations.
- Led a team of 5 to create and implement a Capture the Flag Challenge over CAN to be installed on a truck network for the 2019 Cyber Truck Challenge using a Raspberry Pi and Python.
- Assembled J1708 HVAC System test rig to simulate sensors and Electronic Control Units (ECU) on a truck dash.
- Developed a tractor ECU tester using Arduino with RS485 shield and with J1708/Power Line Carrier interface.

Projects

TeensySpresso github.com/SuperCoolAlan/TeensySpresso

- Designed, procured, and assembled PCB and 3D printed enclosure for espresso machine PID temperature control.
- Wrote C++ (Arduino) code for PID temperature control, MQTT interface for monitoring, and a MongoDB historian.

Hallett Motor Racing Circuit Video Streaming

- Designed and configured installation of mesh network and CCTV infrastructure for 1.8 mile road racing circuit.
- Set up and installed OSS running on a Linux server with Shinobi as a CCTV video recorder.
- Developed vehicle auto-tracking software for automated following of lead car.

‘04 Subaru WRX Rebuild

- Built, installed, and maintained new drivetrain, STi engine, transmission, and custom electrical harness to support programmable ECU resulting in gains of horsepower and driving stability.

Education

The University of Tulsa – Bachelor of Science - Computer and Electrical Engineering May 2021