Kevin Nause

Senior Security Software Engineer

Contact

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Programming

Rust, C, C++, C#, x86 & ARM Assembly, Go, Python, Java

Frameworks

OpenCL, OpenMP, Hadoop, Thrift, Qt, ASP .NET

Interests

Embedded Systems, Photography, Performance Vehicles

About

I enjoy low level programming on platforms such as embedded systems and operating systems. Working on wearable hacks and obtaining root access on mobile devices are also side interests. Computer security and static analysis are key interests of mine. I have been a Linux enthusiast since I typed "Hello World" for the first time and have adored penguins ever since. The first thing I do when I sit down at a computer is change the keyboard layout to Dvorak and plug in an IBM Model M keyboard.

Education

2016 **Bachelor of Applied Science (B.A.Sc.)** — University of Waterloo
Computer Engineering

Experience

Feb 2020 (to Present) **Microsoft** — Redmond, Washington
Senior Security Software Engineer
- Designing, implementing and porting security features to Windows
- Assisting external teams with implementing security requirements
- Researching future security technologies for business success

Languages Used: Rust, C, C++, x86 & ARM Assembly

Nov 2018 (1 yrs 3mos) **NCC Group** — Seattle, Washington
Senior Security Consultant
- Design audit for Bootloaders, RTOS, Linux, Android, and Windows
- Scoped and lead multi-week hardware focused client engagements
- Hardware teardown, flash dumping, bus probing
- Reverse engineering C, C#, and Java binaries
- Vulnerability assessment, code review, network pentesting
- ARM shell code creation and control highjacking attacks
- Automotive (CAN SAE J1939) and Robotics (ROS) security experience

Languages Used: C, ARM Assembly, Python, Go

Jul 2016 (2 yrs 5 mos) **Microsoft** — Redmond, Washington
Firmware Engineer II
- Working on ECs for platforms with Intel CPUs and Nvidia GPUs
- Experience with power sequencing, battery, and thermal subsystems
- Implementing inter-bus communications via USB, UART, SPI, I2C, SMBus
- Working with communication protocols such as TCP/IP, HID, RS-232
- Proficient with oscilloscopes and logic analyzers
- Experience with schematics, reference manuals, and errata for hardware peripherals

Products: Surface Hub, Surface Laptop
Hardware: NXP/Freescale K22 ARM Cortex-M4
Languages Used: C, ARM Assembly, C#, PowerShell

Aug 2015 (5 months) **Pebble Technology** — Kitchener, Ontario
Embedded Firmware Engineer
- Implemented device drivers, recovery firmware, and system applications on the Pebble OS (based on FreeRTOS)
- Primary focus was porting the current firmware to an older device with significantly less flash storage and a black and white screen
- Optimized anti-aliasing on 8-bit displays, and dithering on 1-bit displays

Products: Pebble, Pebble Time, Pebble Time Round
Hardware: STM32F4 ARM Cortex-M4, STM32F2 ARM Cortex-M3, TI CC2564 Languages Used: C, ARM Assembly, Python

Jan 2015 (4 months) **Motorola** Kitchener, Ontario

Security Engineer

- Discovered and patched vulnerabilities, resource leaks, and concurrency problems in Android OS, Motorola's MSM kernel, and Moto X sensor hub
- Used static analysis to assist in discovering security vulnerabilities
- Traced execution flow to isolate false positives or potential exploits

Products: Moto E/G/X, Moto 360
Hardware: TI OMAP 3, Qualcomm PM8921 PMIC, NXP 44701 NFC
Languages Used: C, C++, Java

Sep 2014 (8 months) **Computer Aided Reasoning Group** Waterloo, Ontario

Undergraduate Research Assistant, Unviersity of Waterloo

- Reported to Professor Vijay Ganesh
- Researched the topic of SAT solvers and their underlying heuristics
- Primary focus involved the relevance of backdoor variables and community structure for the VSIDS decision heuristic
- Experience with static analysis, symbolic execution, and Return Oriented Programming (ROP)

Languages Used: C, C++, x86 Assembly, Java

May 2014 (4 months) **ON Semiconductor** Waterloo, Ontario

Embedded Tools Developer

- Designed Bluetooth Low Energy GATT services for functions such as data streaming, audio streaming, and status updates
- Embedded programming with BLE enabled medical devices such as hearing aids, insulin monitors, and heart rate monitors
- Interfaced with Windows and Android client devices

Hardware: Nordic nRF51822 Bluetooth Low Energy Controller, ARM Cortex-M0
Languages Used: C, C++, Java, ARM Assembly

Sep 2013 (4 months) **eSolutionsGroup** Waterloo, Ontario

Mobile Developer

- Designed a real-time transit prediction system using GTFS data and protocol buffers
- Database design, MVC server communications, and mobile application development

Languages Used: C# (ASP .NET), SQL, JavaScript

May 2012 (16 months) **Regional Municipality of York** Richmond Hill, Ontario

Transit Management Systems

- Worked with GTFS data and real-time prediction feeds and contributed to the OneBusAway project
- Hands on work with transit embedded systems and fare management systems

Languages Used: C#, Java

Projects

Weekend projects demonstrating my learnings in Rust over the past year

Nov 2021 **Determinate** Github Repo

Procedural macro attributes to mark a function as determinate or indeterminate for testing runtime determinism.

Oct 2021 **NRF52 Firmware Demo** Github Repo

A demonstration of the Real-Time Interrupt-driven Concurrency (RTIC) framework running on the nrf52840.

Sep 2021 **Bare Metal Runtimes** Github Repo

Bare metal Rust runtimes for no_std for ARM and RISC-V toolchains.

May 2021 **Persistant Variables** Github Repo

A persistent variable type that serializes/deserializes its value to/from disk upon declaration and drop.