Mark V Senofsky

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Summary

I have 7 years of software engineering experience consisting of cutting-edge R&D and product engineering at both large and small DoD companies. I am currently looking to work at a startup.

Languages:

Proficient: Rust, C, Python

Familiar: Haskell, Elm, C++, Java, JavaScript, VHDL, Verilog, ASM (x86_64, RISC-V)

Technology / Tools:

The following is a brief overview of technology and tools I have worked with:

VCS/CI/CD: Utilized GitLab, Bitbucket, and GitHub Continuous Integration and Deployment tools to deploy Docker containers and Vagrant / Transient Virtual Machines for building and testing code while eliminating regressions

Operating Systems: Extensively administered Arch, Debian/Ubuntu, and RHEL/CentOS machines

Editors: Used neovim/vim/vi for the majority of development and Visual Studio Code for web development

Testing: Utilized Test Driven Development (TDD) and Behavior Driven Development (BDD) combined with techniques such as Orthogonal Array Testing, Equivalence Partitioning, Boundary Value Analysis, and Code Coverage

Virtualization: Developed applications using Xen hypervisor, QEMU, libvirt, and virsh

Systems Programming: Developed Kernel modules and user space system tools

Web Development: Developed small web apps using: Django, Hakyll, Flask, HTML, CSS w/BEM, jQuery, and React

Data Science: Used TensorFlow, Pandas, and SciKit-Learn for a data science tool with DARPA's SocialSim program

FPGA: Developed anti-tamper software and drivers for Xilinx Zedboard/Ultrascale/Virtex, using Vivado

Software Defined Radios: Used gnuradio with an Ettus USRP N210 to develop 802.11 applications

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Experience

Star Lab / Star Lab, a Wind River Company (Acquired), San Antonio / Austin, TX 2018 - Present
Senior Software Engineer
- Core engineer on Star Lab's product, Crucible, that extends Xen hypervisor with security focused tooling
- Involved with several SBIR proposals, 2 of which were awarded for a total of more than $2M in funding
- Lead engineer for data mining tools utilizing REST and GraphQL APIs and implemented processing techniques to support data scientists on a DARPA Phase II SBIR effort
- Lead engineer for a secure VDI infrastructure utilizing AWS, XenBlanket, and Docker as a security-through-isolation solution to an IARPA BAA
- Developed a command line utility tool that cleanly generates Intel QPI traffic by implementing a tiny Linux kernel that fits inside a processor's L2 cache and forces cache invalidations for customer R&D

Raytheon Centers of Innovation, San Antonio, TX, 2015 - 2018
Software Engineer
- Developed a Linux driver for a Virtex FPGA that implements anti-tamper features for a large-scale deployment
- Developed an attestation server whose primary purpose is to interrogate an embedded device to determine its integrity and counter any malicious behavior

Vulnerability Researcher
- Researched vulnerabilities on embedded Linux devices using reverse engineering and penetration testing tools including IDA Pro, binwalk, and Burp Suite
- Created custom tooling for reverse engineering and penetration testing efforts

Southwest Research Institute, San Antonio, TX, 2013 - 2014
Student Engineer in Division 9: Aerospace and Systems Engineering Group

- Developed prototype software for the Xilinx ZedBoard in conjunction with the Ettus USRP N210
- Performed QA for avionics equipment on the A-10 Thunderbolt II jet aircraft

Personal

Books / Articles:
- Currently writing the book "Linux Kernel Module Development" which focuses on learning Linux kernel module programming by completing coding exercises from the now-offline Eudyptula Challenge
- Wrote an article for Star Lab, "Introduction to the Linux Virtual Filesystem", which relates to our security product: https://www.starlab.io/blog/introduction-to-the-linux-virtual-filesystem-vfs-part-i-a-high-level-tour
- Wrote an article for Star Lab, "Nesting XenBlanket on AWS", which is related to an IARPA BAA project I worked on: https://www.starlab.io/blog/nesting-xenblanket-on-aws

Open Source Software
- One of the primary developers on Transient, a lightweight wrapper around QEMU
- Developed a DIMACS-parser for an SAT solver and contributed to dependent-types's book on "Learning How SAT Solvers Work via Marijn Heule's Microsat"

Competitions / Challenges
- Competed in DEFCON's 2020 Hack-A-Sat (Satellite Hacking competition) - our team (KIRBY) placed 19 out of 1278 scoring teams: https://quals.2020.hackasat.com/scoreboard/complete
- Competitive programmer in Project Euler, a mathematics-based programming competition

Speaking Engagements
- Guest lecturer on "Hardware Reverse Engineering" for Digital Forensic Analysis II at the University of Texas at San Antonio over multiple semesters
- Guest speaker on various security topics at the Computer Security Association related to OpenSSH, securing Linux systems, Penetration Testing, Reverse Engineering, and Capture-the-Flag (CTF) competitions
- Presented at a Austin meetup groups including Rust ATX and Austin Type Theory

Hobbies
- I enjoy practicing Muay Thai and Brazillian Jiu-Jitsu, weightlifting, running, hiking, reading, flying, and live music

Education

University of Texas at San Antonio (UTSA) - 2015
B.S. Electrical Engineering with an emphasis on Computer Engineering. GPA: 3.5
- Competed at the National Collegiate Cyber Defense Competition and won 1st place in Regionals
- Systems Administrator for several machines (Debian based, Red Hat based, BSD based, Arch)
- IEEE Robotics Team Captain - Competed in Southwest Regionals
- IEEE Circuit Design Team Captain - Competed in Southwest Regionals

I am an especially autodidactic person; the following is a subset of relevant resources I have used:

MIT OpenCourseWare
Signals and Systems, Circuits and Electronics, Linear Algebra, Multivariable Calculus, Single Variable Calculus

Stanford on Coursera
Machine Learning, Cryptography

Lastly, I am a strong practitioner of **Zettelkasten** and upkeep my own on a private repository on GitHub, although, I would be willing to share it if asked. Currently, my top 5 categories are related to:
- Software Engineering (design principles, testing techniques, code smells, refactoring, best practices, etc.)
- Programming Language Theory (object-oriented paradigms, functional paradigms, design patterns, etc.)
- Writing skills (technical writing, grant writing, SBIR proposals, sentence construction, best practices, etc.)
- Leadership skills (emotional intelligence, management skills, Agile development, people skills, etc.)
- Different CS topics (consensus, blockchain, 12 factor apps, machine learning, computer vision, etc.)