Gaurav Sharma

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Summary

Summer Automotive Engineering intern at Qualcomm and MS Computer Science student at the University of Utah, specializing in system software development, computer networks, and security. 4+ years of experience in Linux Device Drivers and Firmware development for Wireless SoCs, specializing in IEEE 802.11(Wi-Fi) MAC protocols, Linux kernel, and Embedded Systems.

Technical Skills

Programming Languages: C, C++, Python.
Operating Systems: Linux, Android, xv6
Platforms: ARM, MIPS, RISCV, x86
Build Systems: OpenWRT, Yocto

Software Tools: ADB, GDB, GCC, GNU Make, Wireshark, Omnipeek, Git, Perforce, Iperf, Docker, Kubernetes, LXC
Protocols: IEEE 802.11 a/b/g/n/ac/ax/i/k/v/r, WPS, TCP/IP, UDP, IPv4, ARP, DNS, DHCP, VLAN, 5G NR, 4G/LTE, gPTP, SOME/IP,UDS

Education

University of Utah, Salt Lake City, UT| GPA 3.71 *(Jan 2022 - Dec 2023)*
Masters of Science, Computer Science
Relevant course work: Network Security, Software and System Security, Security Operations, CPS/IoT Security, Advanced Operating Systems, Advanced Algorithms, Computer Architecture, Machine Learning, Interactive Computer Graphics

Punjab Engineering College, Chandigarh, India *(Aug 2013 - May 2017)*
Bachelor of Engineering, Electronics and Communication

Work Experience

Automotive Engineering Intern, Qualcomm | San Diego, CA *(May 2023 - Aug 2023)*
- Developed C/C++ applications using Yocto-based Telematics Application Framework (TelAF) that enables telematics functionality across platforms in the Snapdragon Digital Chassis, focusing mainly on automotive ethernet stack.
- Implemented gPTP (IEEE 802.1AS) based APIs using TelAF to be used across automotive applications aiming to synchronize audio-video and developed SELinux polices central to TelAF security.

Graduate Research Assistant, School of Computing| Salt Lake City, UT *(May 2022 - May 2023)*
- Led the effort to integrate Smart Grid applications to a 5G testbed using open-source power grid simulation and automation software stacks, learning about containerization(Kubernetes), cloud computing and microservice-based architectures.
- Investigated security architecture of 5G protocol for potential vulnerabilities and developed familiarity with 5G NR and 4G LTE cellular protocols, 3GPP standards and open-source cellular stacks like OAI and Open5GS.

Senior Software Engineer, Qualcomm | Bengaluru, India *(Jul 2021 - Dec 2021)*
- Targeted development on the Extended Reality WLAN chipsets to develop and debug features based on IEEE 802.11ax like TWT for AR/VR headsets (STA side) and developed familiarity with AR/VR architecture.
- Added enhancements in WPA Supplicant and Qualcomm's WLAN driver modules, including Wi-Fi Policy Manager and Channel Selection for customer specific AR/VR use cases. Gained experience with fuzzing WLAN drivers using syzkaller.

Senior Software Engineer, MediaTek| Noida, India *(July 2019 - July 2021)*
- Oversaw performance optimization aspects of the channel switch mechanism in AP to achieve minimum packet loss and debugged issues related to packet drop in host data path, developing understanding of the Linux Kernel's internals and network stack.
- Integrated support for hostapd in Linux Kernel and device drivers to use the latest WPA3 security features to mitigate KRACK and led the effort to debug Wi-Fi security-related issues in driver and FW for WPA3 certification process.
- Collaborated with SQA team at MediaTek and provided system and application support for Easy Mesh related issues.

Software Engineer, MediaTek | Noida, India *(June 2017 - June 2019)*
- Involved in the chip-bring up and development of kernel, device drivers and firmware for Wi-Fi protocols used in Access points.
- Implemented C-based CLI that selected the best channel using statistics fetched from the Wi-Fi driver using ioclts/netlink.
- Handled critical issues related to throughput, latency, state machines, TX/RX, data path and became proficient in packet analysis.

Academic Projects

Kernel development with xv6-RISCV *(Aug 2023 - Present)*
- Added custom enhancements in RISCV based xv6 kernel that includes custom scheduler, spinlocks and permission system.
- Implemented zero-copy ring buffers and speed-up the system calls like memcpy.

Machine Learning Library *(Jan 2023 – May 2023)*
- Implemented a ML Library using Python that includes support for ML algorithms like Perceptron, SVM, Logistic Regression etc.

Ocean Water Simulation using OpenGL and C/C++ *(Jan 2023 – May 2023)*
- Implemented an ocean simulation model based on Tessendorf's paper and explored the concepts of surface generation using FFT and real-time water rendering and lighting.