Omar Kthiri

Embedded Linux Software Engineer

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Summary

Embedded Linux Software Engineer with 3 years of professional experience working on embedded Linux systems in the smart metering domain at SAGEMCOM. Hands-on experience across low-level firmware development on STM32, Yocto/BSP customization, secure MCU–MPU communication, and industrial protocol integration. Comfortable working in both bare-metal environments (FreeRTOS / STM32H5) and Linux-based application environments (STM32MP1), within an Agile team of 8 engineers.

Education

Engineering Degree in Computer Science

Esprit

Aug 2023 — Present

Bachelor's Degree in Automation and Industrial Computing

Higher Institute of Technological Studies of Nabeul

Dec 2019 — Jun 2022

Embedded & Systems

C/C++, Embedded Linux & System Programming, Yocto Project / KAS, Device Drivers & BSP, STM32 (MCU/MPU — STM32H5, STM32MP1), Raspberry Pi, FreeRTOS, UART / DMA / I2C / SPI / GPIO, DLMS/COSEM (exposure), RAUC OTA Updates, dm-crypt / dm-verity / SELinux

Debugging & Profiling

JTAG / SWD, ST-Link, FTDI, OpenOCD, QEMU, ftrace, journalctl

Software & Tools

Work Experience

SAGEMCOM Aug 2023 — Present

Embedded Software Engineer

Global provider of smart metering solutions and critical infrastructure for energy and telecommunications, with a strong focus on reliability, performance, and cybersecurity.

- Designed and implemented an SRAM-based cache mechanism to preserve critical application state during watchdog resets, ensuring data continuity in fault scenarios — deployed across all smart metering product lines.
- Worked closely with the tech lead to adapt the STM32MP131A BSP layer to STM32MP131C hardware: device tree customization, UART integration, and boot sequence debugging — gradually assuming BSP maintenance responsibilities.
- Implemented MCU-to-MPU data transfer over UART using DMA on STM32H5 / STM32MP1, ensuring reliable telemetry without blocking the firmware main loop.
- Contributed to the design of a lightweight MCU–MPU communication protocol over UART, including custom header authentication, CRC integrity checks, and frame-size filtering on the MPU side.
- Participated in integration tasks involving the DLMS/COSEM stack for MCU–MPU data exchange in smart metering systems.
- Integrated the RAUC OTA update system (A/B scheme) with dm-crypt and dm-verity to enable secure firmware updates on STM32MP1-based hardware.
- Implemented real-time features on FreeRTOS for STM32H5, including task scheduling and inter-task communication.
- Diagnosed and resolved boot failures and peripheral integration issues using ST-Link, JTAG, FTDI, QEMU, ftrace, and journalctl in both bare-metal and Linux environments.
- Contributed to GitLab CI/CD workflows within an Agile/Scrum team of 8 engineers, including branch management, merge requests, and release tagging.
- Leveraged GitHub Copilot to accelerate development and reduce repetitive tasks in firmware and scripting.
- Participated in code reviews to ensure quality and adherence to best practices on mission-critical smart metering firmware.

Independent Software Contractor Jun 2021 — Aug 2023

Software Developer & IT Solutions Specialist

Via Freelancer.com — an international platform connecting companies with specialized software and security contractors.

- Conducted vulnerability research and fuzzing campaigns (libFuzzer, AFL) for a German university research pool (University of Bonn), identifying

Python, Bash Scripting, Docker, Git / GitLab / GitHub / SVN, GitLab CI/CD, Qt C++, GitHub Copilot, Protocols: MQTT, Modbus, HTTP/HTTPS

Security

Penetration Testing, Fuzzing (libFuzzer, AFL), Storage Encryption (LUKS / dm-crypt), Secure Boot (dm-verity, RAUC)

Soft Skills

Analytical Thinking, Team Collaboration, Problem Solving, Adaptability, Time Management

Languages

Arabic, French, English

Certifications

- Python (Basic) - HackerRank
- Soft Skills Certification - EFE

critical memory safety issues in C/Linux codebases.
- Developed C/C++ applications for embedded and desktop Linux/Windows targets across multiple international client projects.
- Automated client workflows using Python and Bash, reducing manual intervention in build and testing processes.
- Authored cybersecurity audit reports and remediation documentation for client deliverables.

Kromberg & Schubert Jan 2021 — Feb 2021

Technical Internship

Company specialized in the development and production of complex wiring systems for the automotive industry.

- Assisted with wiring and testing activities required for commissioning a new production line.
- Collaborated with the team to troubleshoot failures and ensure correct system operation.

Projects

Embedded Linux Distribution – Raspberry Pi Zero 2 W (Yocto) Aug 2025 — Present

https://github.com/YonK0/let_him_cook...

Custom embedded Linux distribution based on Yocto for Raspberry Pi Zero 2 W, focused on security hardening and build reproducibility.

- Created custom layers, defconfig files, and device tree overlays for embedded targets.
- Integrated kernel drivers, storage security (dm-crypt, SELinux, dm-verity), and OTA updates (RAUC) with an A/B partitioning scheme.
- Managed reproducible build environments using kas and Docker (kas-container), ensuring consistent configurations across developer machines and CI.
- Optimized sstate cache usage to speed up incremental builds.

Stephan Plöger, University of Bonn – C/Linux Study Pool Batch 5 Jul 2022 — Aug 2022

Software security project focused on fuzzing and vulnerability testing of C/C++ applications for a German university research pool.

- Executed fuzzing campaigns using libFuzzer and AFL to detect memory safety vulnerabilities in C/Linux codebases.
- Identified and reported critical vulnerabilities with detailed remediation documentation.
- Automated continuous fuzzing workflows for efficient and reproducible bug detection.