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Summary

Operating Systems engineer, with good standing in the Linux open-source community. Interested in kernel development positions with a heavy *mainline* / *upstream* focus.

Experience

Linutronix GmbH

Kernel Engineer

Uhdlingen-Mühlhofen, Germany

August 2018 – Present

Linutronix is a boutique kernel development shop, founded by Thomas Gleixner, with a focus on real-time Linux for the German industry. I took ownership of multiple successful projects for the robotics, automotive, health-care, and automation industries, covering all critical phases of the project. My tasks included:

- Early communication with customer's hardware teams (e.g. MSI vs. MSI-X, FPGA hardware enumeration formats, SoC interfaces, feasibility reports)
- Software design (kernel/usersp. boundaries, communication protocols, concurrency, lockless ringbuffers)
- Kernel drivers implementation (PCI root-complex, PCI endpoint, network, PHY, character, Multi-function devices, UIO, and irqchips)
- Official assessment for customer's existing kernel drivers (CAN, audio, FPGA)
- Platform bring-up for customer's boards (u-boot, kernel, and device-tree development)
- Root-filesystem customization and bring-up (yocto, debian)
- Production-level real-time kernel latency reports and stress testing
- Workshops for customer's engineering teams at projects end

I also provided multiple onsite full-week trainings to customers' engineering teams, managers, and tech leads. It covered their Linux use in the domains of: basic and advanced kernel development, real-time development and system design, root filesystems.

Harman Becker GmbH

Linux System Expert

Munich, Germany

September 2017 – August 2018

- Embedded Linux point of reference for company's BMW infotainment projects
- Reviewed, and merged, Linux kernel drivers created by suppliers
- Received Harman's "Be Brilliant" award for fixing critical production-line bugs

Valeo

Principal Software Engineer

Cairo, Egypt

September 2016 – August 2017

- Responsible for porting Valeo's Automatic Parking software to Embedded Linux (R-car)
- Created a company-wide Embedded linux platform using Yocto and Bitbake layers
- Designed multiple *security architectures* for adopting Linux into the automotive domain
- Mentored new embedded engineers; wrote official Linux development guidelines
- Provided project estimations; submitted team's yearly development-plans

- Valeo internal innovation challenge winner, 1st place: “Valeo in-Vehicle Cloud: A new automotive architecture” (3 patents pending - EU office)

Senior Software Engineer

July 2014 – September 2016

- Fixed upstream CAN networking drivers; 18 kernel patches ([link](#)) accepted
- Optimized u-boot booting time, over Freescale i.MX6, from 1.5 seconds to 100 milliseconds
- Optimized total Linux system boot time, over i.MX6, from 30+ seconds to 1 second
- Keywords: kernel, u-boot, systemd, CAN drivers, performance optimizations

Vireton

Sr. Software Developer

Cairo, Egypt

May 2013 – July 2014

- Responsible for the company’s back-end service, written in Scala and R
- Directly involved in the service software lifecycle: Assessment, Research, Design, Implementation, Re-factoring, Benchmarking, Optimization, and Bug-fixing
- Keywords: Software Engineering, Java, Scala, R, Apache Tinkerpop, NoSQL

Open-source Contributions

Security Research – Huawei routers 0-day

Jan - April 2017

- Exposed a zero-day vulnerability in the common Huawei Hg532n router
- Several ISPs, across the globe, provides this router *by default* to customers
- Authored a Metasploit *exploit module* ([link](#)) for the vulnerability; got quickly merged
- Huawei issued a *PSIRT release* ([link](#)) acknowledging & fixing the issue
- Keywords: Reverse engineering, IP networks, firewall, ARP, NAT, MIPS, Ruby

Contributing Member – Linux Kernel

2008 - present

- Authored 135 patches officially accepted upstream ([link](#))
- Helped in upstreaming the Smack Linux Security Module (LSM)
- Co-authored the *smackfs* virtual file system ([link](#))
- Added support for multiple Linux Security Modules ([link](#))
- Integrated Smack security module with the Audit subsystem
- *SaveOOPS*: a shim which saves kernel log to disk upon panic (pending, [link](#))
- *ViewOOPS*: a DRM-based kernel panic viewer (*in-progress*, [link](#))

Contributing Member – Linux Audio Stack (PulseAudio)

2015 - 2017

- Authored 32 patches officially accepted upstream ([link](#))
- Developed initial containers support: *memfds* ([link](#)) as official transport layer
- Developed runtime monitoring tools and generic bugfixes before each release
- In co-operation with maintainers, provided security analysis ([link](#)) of PA design
- Keywords: C, POSIX, containers, sand-boxing, latency

Author – “Cute” OS

2010 - 2014

- Created a fully-preemptive 64-bit SMP kernel for the x86 PC architecture ([link](#))
- Developed components include: a 512-Kbyte bootloader, virtual memory, dynamic memory allocation, concurrency primitives, an x86-64 optimized libc, APIC and IO-APIC interrupt-controllers support, BIOS MP-tables and e820 ACPI support, full SMP boot, a fair per-CPU scheduler, python scripts for plotting performance statistics, and several stress-tests for each kernel module
- Added persistence through a read/write Ext2 file system implementation

Education

Cairo University

2006 - 2010

- Faculty of Computers and Information – B.Sc. Computer Science
- Graduation grade: Very Good. Graduation Project grade: Excellent

References

- Recommendations from *all* earlier & existing positions managers. LinkedIn ([link](#))
- Officially merged Linux kernel and user-space contributions: links at CV, page 2