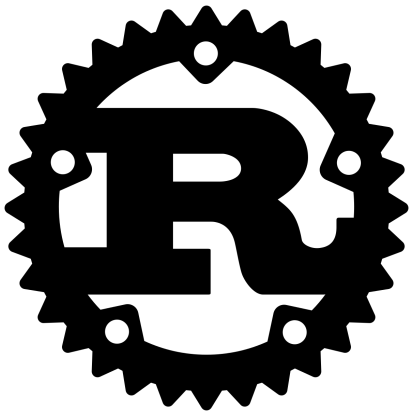
Chair of Network Architectures and Services
Department of Informatics
Technical University of Munich

Thesis B.Sc. | Thesis M.Sc. | IDP, Guided Research

Writing Network Drivers in Rust

Motivation

More and more drivers are moving from the kernel to the user space, for example, DPDK (https://dpdk.org) moves NIC drivers to the user space to increase performance. However, these new drivers are usually still written in C. Notable exceptions are Snabb (https://snabb.org) with a driver in Lua and pfq (https://pfq.io) featuring Haskell for parts of the network stack (but a C driver). Network drivers are relatively simple: we have written a simple user space network driver for Intel 10 Gbit/s in 1000 lines of C code: https://github.com/emmericp/ixy.



Research questions are: Why not write network drivers in Rust? Are there advantages over other languages? Are there disadvantages?

Your Task

Your task is to write a driver for the Intel 82599ES NIC from scratch in Rust. Avoid using a FFI or calls to C functions where possible and keep the code in idiomatic Rust.

- Look at our 82599ES implementation in ixy (https://github.com/emmericp/ixy)
- Implement a driver for the Intel 82599ES in idiomatic Rust
- Compare its performance with our C implementation
- Draw conclusions: should all drivers be written in Rust?

Contact

Paul Emmerich emmericp@net.in.tum.de