Thesis M.Sc.

IDP, HiWi

Extending the Functionality of the DPDK-based t4p4s P4 Target

Motivation

P4 is a programming language intended to describe the behavior of packet processing systems. P4 was introduced in 2014 and can be used to define entirely new networks with new protocols which behave differently from the networks we currently use. Compiler exist for a variety of targets (software, FPGA, SmartNIC, ASIC).

P4 programming language

t4p4s is a compiler for the software-based DPDK. It uses the official P4 compiler to generate a JSON representation of the P4 program. This JSON object is then parsed by t4p4s using python, which in turn creates C code. This C code is platform independent and is linked with platform specific (DPDK) functions.

Goal of this thesis is to extend the toolchain with functionality that is still missing to implement the complete P4 specification. This includes, for instance, the integration of hash functions, and cloning and recirculation of packets. Another possible task is to integrate P4Runtime into t4p4s, which is a standardized interface to the control plane.

Tasks

The thesis requires diving into P4 and the DPDK-based t4p4s backend.

- Get familiar with P4 and the t4p4s toolchain

- Improve or add functionality

- Test functionality by providing small P4 example programs

Experience with C programming is required. python experience is recommended.

Sources

- [1] https://p4.org/
- [2] https://github.com/P4ELTE/t4p4s

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