Chair of Network Architectures and Services
Department of Informatics
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Thesis B.Sc.

Thesis M.Sc.

Evaluation of the P4 software target p4c-dpdk

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. Compilers exist for a variety of targets (software, FPGA, SmartNIC, ASIC).

P4 programming language

The Dataplane Development Kit (DPDK) is an open-source collection of libraries and drivers for high performant packet processing. It runs in the userspace. The official P4 compiler (`p4c`) was recently extended by a new backend `p4c-dpdk`. This generates a specification file out of the P4 program which can be used as input to the Software Switch (SWX) Pipeline of DPDK.

The goal of this thesis is to get the toolchain running and to evaluate what features of the P4 language are currently supported. Moreover, the performance of several language features has to be evaluated. This can be compared to other P4 software targets like BMv2 or `t4p4s`.

Tasks

The thesis requires diving into DPDK and `p4c`:

- Get familiar with P4, DPDK, and the `p4c` compiler
- Test functionality by providing small P4 example programs
- Evaluate the performance
- Compare to other P4 (software) targets

Requirements

- Experience with C/C++ programming is recommended
- Experience with Linux is required

Sources

- https://p4.org/
- https://github.com/p4lang/p4c
- https://doc.dpdk.org/guides/prog_guide/packet_framework.html
- https://github.com/P4ELTE/t4p4s

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