**Thesis B.Sc.**

**Thesis M.Sc.**

**IDP**

# Complex Matching in Programmable Software Data Planes

## Motivation

P4 is a domain-specific programming language intended to describe the behavior of packet processing systems. P4 was introduced in 2014 and can define entirely new networks with new protocols that behave differently from our current networks. P4 follows a match-action pipeline model. Header fields are matched to table entries defining actions to execute and their parameters. For that, different types of matches can be used, e.g., exact, longest prefix matching, and ternary. Compilers exist for various targets (software, FPGA, SmartNIC, ASIC).

t4p4s [2] is a P4 compiler for the software-based DPDK. So far, t4p4s supports three match types during the match-action pipeline: *exact*, *lpm*, and *ternary*. For the latter one, only a naive (and therefore inperformant) algorithm is supplied. The goal of this thesis is to implement the complex match types *range* and/or *ternary* match type into t4p4s. For that, different suitable data structures and their implementations should be analyzed and evaluated.
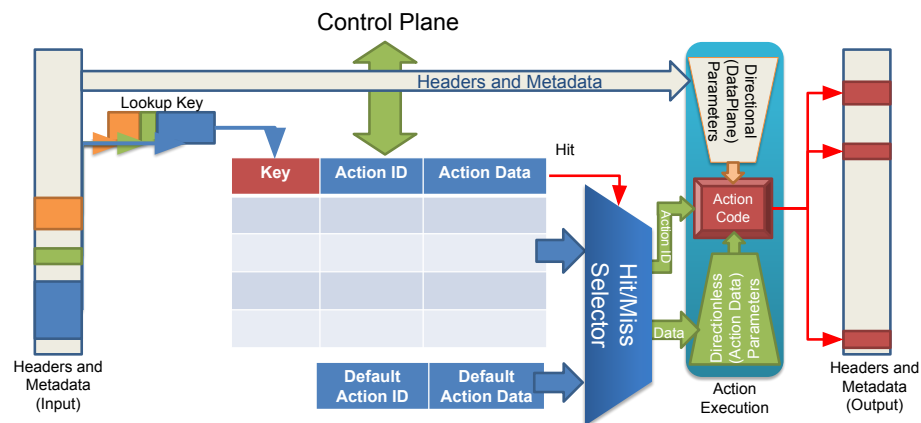


## Tasks

- Get familiar with P4, t4p4s, and the p4c compiler
- Evaluate different suitable data structures
- Integrate a well suited data structure into t4p4s
- Evaluate and model the performance

## Requirements

- Experience with Linux (ssh) is required
- Good knowledge about efficient algorithms and data structures is required
- Experience with C/Python programming is recommended

## Sources

- https://p4.org/
- https://github.com/P4ELTE/t4p4s

## Contact

Manuel Simon          simonm@net.in.tum.de
Henning Stubbe     stubbe@net.in.tum.de