Thesis B.Sc.

IDP

P4: A Programming Language for Packet Processing

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.

P4 programming language

This is possible because P4 allows to program P4-enabled forwarding devices. Currently forwarding devices like switches or routers can only be configured or programmed in a rather restrictive way. For instance, only certain protocols with pre-defined functions can be used. P4-enabled devices offer higher flexibility; they can be programmed to act as a switch or a router – but it does not stop there – the design of entirely new functions and devices becomes possible and gets as easy as just replacing a piece of software without the need to change any hardware.

Software implementations of P4 (www.p4.org) are already available. For this thesis different P4 implementations shall be identified, analyzed and evaluated. Of particular interest are the capabilities of P4 to implement packet scheduling which is used to implement different service qualities on a network.

Currently only software implementations exist, but a hardware switch directly supporting P4 is currently under development and expected to be available by the end of 2016. If results are promising (and the hardware is available) this work can be continued as a Master's Thesis or Guided Research.

Your Task

- Find implementations of P4
- Analyze the implementations you found
- Evaluate these implementations

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