



# “The right tool for the job” - Specialization using Data Plane HW/SW Decomposition

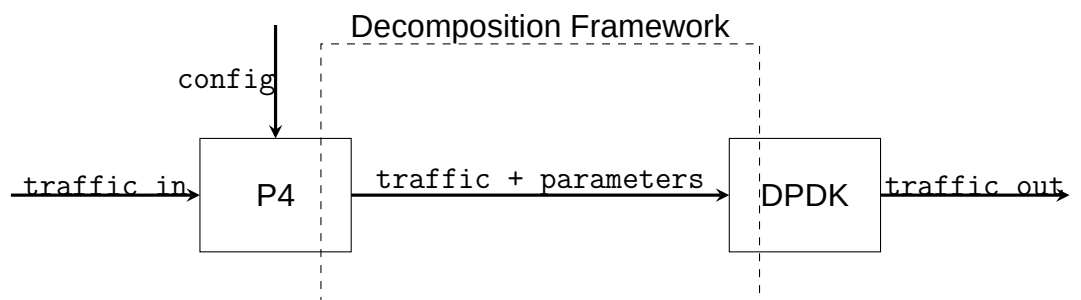
## Introduction

Developers of network data plane functions have more choices of hardware and software platforms and programming methods than ever before. One example is P4, a special purpose data plane programming language simplifying common tasks such as packet parsing, classification, forwarding, header rewriting, and to a certain degree also state keeping. Resulting programs can run on specialized hardware. Its control plane (“northbound”) interface, referred to as P4Runtime, can be used to update the configuration of the network element. However, some more complex network functions are not possible to express in P4, making it necessary to fall back to software implementations in general purpose programming languages. This can have performance, complexity, and maintainability implications.

Some network functions can be decomposed into a (stateful) P4 component and (mainly) stateless software packet processing, c.f. the figure below. Necessary parameters for the software component are a result of classification determined in P4. Those parameters can be transported “in-band” in the packet.

The goal of this thesis is to develop and study a generalized framework simplifying the interoperability between P4 and software.

## Figure



## Tasks

- identify a suitable serialization standard and interface description language
- add deserializer to (DPDK) software (helpful libraries likely exist)
- add serializer to P4 (helpful libraries likely do not exist)

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