

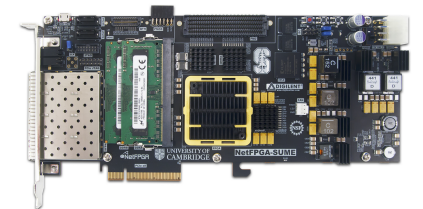
Thesis  
M.Sc.

IDP

# Does It Run Doom? Towards Running Arbitrary Programs on SUME

## Motivation

Working towards the separation of concerns which software-defined networking recommends, P4 [1] is a domain-specific programming language targeted at networking hardware, with a target-independent design in mind. NetFPGA SUME is a well-known FPGA-based PCIe networking card developed as part of the NetFPGA project [2]. Using the accompanying P4→NetFPGA [3] toolchain, developers are enabled to program the NetFPGA SUME and its FPGA with P4, instead of low-level programming languages such as VHDL or Verilog. Commonly, P4 is used to implement both traditional and nouveau protocols on supported hardware. Yet, P4 supports almost arbitrary packet structures and computations. Hence, enabling numerous possibilities. Goal of this thesis is to implement, model, and evaluate performance of an P4-based virtual machine for the NetFPGA SUME.



NetFPGA SUME supports P4

## Your Task

- Familiarize yourself with P4 language and NetFPGA platform
- Implement a LC-3 [4] virtual machine in P4
- Model the program's expected performance via pre-defined criteria
- Evaluate program performance in the chair's testbed [4]

[1] P4 — Language Consortium

[2] The P4→NetFPGA project

[3] The P4→NetFPGA Workflow for Line-Rate Packet Processing

[4] Little Computer 3 (LC-3)

Applicants should have previous hands-on experience with the topics involved.

## Contact

Henning Stubbe [stubbe@net.in.tum.de](mailto:stubbe@net.in.tum.de)

Eric Hauser [hauser@net.in.tum.de](mailto:hauser@net.in.tum.de)

