Thesis B.Sc.

Thesis M.Sc.

IDP

Latency Evaluation of Software Switches

Motivation

Using software switches is a method to overcome the problem of having specialized hardware for each type of packet processing in networks. Especially for emulated networks it is particularly important, as this enables to execute the switch and the virtual machines on the same host. Multiple such software switches are available such as VPP, Open vSwitch, VALE software switch, or others [3]. To analyze a complete network on one host, connections in hardware or hardware-assisted modes using SR-IOV can be used. This enables building larger networks using a small number of hosts still using the Network Interface Card to process the requests.

The target of this thesis is to analyse the performance characteristics, such as packet loss, latency, or throughput of different software switches, when multiple instances are executed on separated virtual machines on the same host with a specific focus on introduced latency. The network builds on SR-IOV using optimization parameter analyzed in [2]. An example of Open vSwitch analysis in a different scenario can be found in [1]. Moreover, suggesting the software switch for future usage in emulated, hardware-assisted networks improved for low-latency and reliable applications is a target of this thesis.

Your Profile

- General interest in computer networks
- Experience with Linux and Bash programming

Your Tasks

- Conducting research on software switches
- Measure latency characteristics of software switches on different topologies
- Compare results and suggest particular software solutions for future usage

Literature

[1] P. Emmerich, D. Raumer, S. Gallenmüller, F. Wohlfart, and G. Carle. Throughput and Latency of Virtual Switching with Open vSwitch: A Quantitative Analysis. July 2017.

[2] S. Gallenmüller, J. Naab, I. Adam, and G. Carle. 5G QoS: Impact of Security Functions on Latency. In *2020 IEEE/IFIP Network Operations and Management Symposium (NOMS 2020)*, Budapest, Hungary, Apr. 2020.

[3] T. Zhang, L. Linguaglossa, P. Giaccone, L. Iannone, and J. Roberts. Performance benchmarking of state-of-the-art software switches for nfv. *arXiv preprint arXiv:2003.13489*, 2020.

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