Thesis B.Sc.

Thesis M.Sc.

Guided Research

Hardware-assisted instant virtual network

Motivation

With SR-IOV, it is possible to share hardware network interfaces with multiple virtual machines bypassing the hypervisor, thus reducing virtualization overhead. Using SR-IOV to set up an entire measurement infrastructure leads to improved measurement results compared to fully virtualized solutions by mitigating the overhead of deploying large network topologies using hardware hosts, especially with their flexible setup [1].

Mininet is a network emulation tool for building instant virtual networks using virtual Ethernet pairs as connections and includes several ways to interact with systems [2]. Mininet has several forks, such as Containernet, with additional capabilities.

Therefore, this work aims to evaluate the existing Mininet and its forks, analyze the possibility of creating a new version with SR-IOV connections between hosts, implement a prototype, and evaluate the performance between your prototype and the original version on our chair's testbed resources.

Your Profile

- General interest in computer networks
- Experience with Linux and Python programming
- Experience with virtualization Solutions

Your Tasks

- Conducting research on single-root I/O-virtualization and Mininet
- Analyze the current available Mininet and its forks
- Extend Mininet or a selected fork to use SR-IOV instead of VETH
- Evaluate the prototype and its improvements

Literature

[1] 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.

[2] N. Handigol, B. Heller, V. Jeyakumar, B. Lantz, and N. McKeown. Mininet performance fidelity benchmarks. *Tech. Rep.*, 2012.

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