Surveying Virtual Network Functions on competing hardware platforms - A green approach

Rubens Figueiredo

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1 Abstract

2 Introduction

3 Accelerator Hardware Platforms

Start by introducing how we got to here. SDN = centralized CP, and all network functions can be executed in a decoupled fashion. For high data loads, just virtualising the applications might not be enough, therefore there is a need to offload the traffic forwarding to hardware. What hardware is then available for running the VFs, and how to choose between all of the offers?

[1]

3.1 Hardware Acceleration

3.1.1 FPGA

[2]

3.1.2 SmartNIC

[3] [4] [5]

3.1.3 Fixed Function ASIC

[6]

3.1.4 Programmable Hardware

P4

[6]

3.2 Software Acceleration

3.2.1 DPDK/ VPP

[7]

3.2.2 eBPF

4 Network Function Virtualization (NFV)

4.1 Virtual Functions

[8] [9] [10]

4.1.1 Mobile access networks

UPF, gNB offloading

[11]

4.1.2 Fixed access networks

BNG, AGF offloading

[12]

4.1.3 Fixed-Wireless (FiWi) Converged networks

4.1.4 Mobile Edge Computing

4.1.5 Time Sensitive Networks

4.2 Service Function Chaining

[13] [14] [15] [16]

4.2.1 Representation

find ways to represent multiple virtual functions - netplan

4.3 Organizations and Standards

[17] [18]

4.4 Control Planes

[19] [20]

5 VF Benchmarking methodologies

Now that the tecnhologies behind the hardware accelerators, we can analyse how are these systems being benchmarked. Which strategies exist, how to profile disaggregated systems.

5.1 Traffic generation

Expand the section name to include repeatability and general testing strategies

[21] [22] [23] [24] [25] [26]

5.2 Performance Metrics

[27] [28] [29] [30] [**?**] [31] [32] [33] [34] [35] [36] [37]

5.3 Performance Optimization

6 Energy Consumption

[38] [39] [40] [41]

7 Discussion

8 Research directions

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