



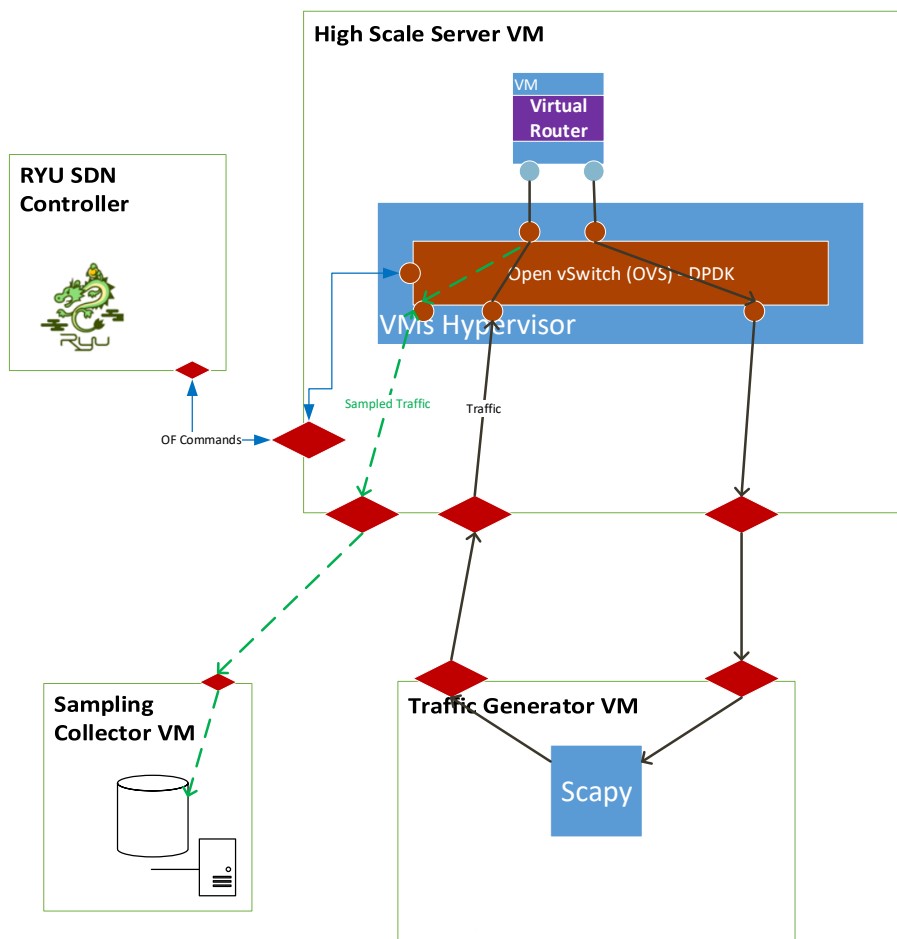
Sampling-On-Demand in Open vSwitch (OVS)

Abstract:

Network monitoring plays a significant role in network management. It is used for a variety of applications such as QOS, billing, traffic engineering, security and anomaly detection. While some of these applications require only flow statistics, many require more specific packet-level information. This requirement is fulfilled by having the network switches copy a fraction of the packets of specific flows and forward these packets to a monitoring device for further analysis. This process is known as sampling.

Sampling, when done on a hardware switch, can consume switch CPU resources if the sampled traffic is routed by the CPU towards the traffic collector server. When sampling is done on a software switch such as Open vSwitch (OVS), it might exhaust the switch CPU resources.

Sampling-on-demand monitoring is a new innovative framework that allows the SDN controller to determine which flows should be sampled in every switch and in what rate. The framework defines a new OpenFlow (OF) message sent by the controller to the switches. The message indicates which sampling rate should be used for each flow. This new message should be implemented both in the controller and in OVS.





Goals:

1. Read Sampling-on-Demand in SDN paper in: <https://www.dropbox.com/s/yqc9wfgximxjnye/NEPTUN-11-2017.pdf?dl=0>
2. Raise on the host Virtualized Linux Server VM the following:
 - a. RYU SDN Controller development environment. The controller should run on the host VM
 - b. OVS – DPDK latest stable version (2.9.x) development version
Refer to Instructions in:
<https://lccn-cs.atlassian.net/wiki/spaces/KB/pages/2097155>
 - c. Linux VM for the High Scale Server – where the OVS and internal VM with vRouter will run
 - d. Linux VM for the Traffic Generator
 - e. Linux VM for traffic collector
3. Generate traffic and verify traffic is routed via the vRouter correctly
4. Implement new OF command to instruct sampling of Ingress traffic. The implementation should be in OVS and in the SDN controller
5. Verify sampled traffic reaches the collector server VM
6. Bonus: check a way to perform VLAN encapsulation sampled traffic redirect in “data-plane”, rather than through CPU.

Requirements:

Introduction to Networking (236334)

Python Programming

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