Integration of Juniperś Control Plane (Tungsten Fabric) and Ciscoś Data Plane (VPP)

Performance Analysis of vRouter and VPP

SOFIONI NETWORKS

1 Purpose

This document is target to test and analyze the performance of Tungsten Fabric's data plane, vrouter and vector packet processing, vpp. This test report provides a guide to packet processing performance testing of the considered data planes. The report includes baseline performance data and provides system configuration and test cases. The aim of documenting these configurations and methods is not to imply a single "correct" approach, but rather to provide a baseline of well-tested configurations and test procedures.

2 Platform Specifications

2.1 Hardware Ingredients

Item	Description
Server Platform	Supermicro X10SRD-F
Processor	Intel(R) Xeon(R) CPU E5-2630 v4 @ 2.20GHz 20 cores
Memory	128GiB Total; 32GiB per channel, 4 channels
Local Storage	4TB HDD
NICs	Intel I350 Gigabit Network Connection; 1Gbit/s capacity

2.2 Software Versions

Item	Description
Host Operating System	CentOS Linux release 7.6.1810 Kernel Version: 3.10.0-957.1.3.el7.x86_64
VM Operating System	Fedora release 21 Kernel Version: 3.19.1-201.fc21.x86_64
QEMU-KVM	qemu-kvm 1.5.3 libvirtd (libvirt) 4.5.0
TRex	Traffic generator; latest version (v2.49) NIC driver: igb_uio; TRex Mode: stateless

3 Setup Details

Three nodes have been used in this analysis. One node acts as a controller and the rest of nodes are compute hosts. Controller is deployed on CentOS (7.6.1810 release) virtual machine while the compute service is deployed on physical machines. Three nodes setup of Tungsten Fabric and VPP environment is fully automated. Following instance.yaml (sample) file has been used for 3-node setup.

```
provider_config:
```

```
  kvm:
    image: CentOS-7-x86_64-GenericCloud-1805.qcow2
    image_url: https://cloud.centos.org/centos/7/images/
    vcpu: 6
    vram: 32012
    vdisk: 200
    subnet_prefix: 192.168.20.0
    subnet_netmask: 255.255.255.0
    gateway: 192.168.20.1
    nameserver: 192.168.20.2
    ssh_user: root
    ssh_pwd: secret
    ntpserver: 210.173.160.27
    domainsuffix: localdomain
  bms:
    ssh_user: root
    ssh_pwd: secret
    ntpserver: 210.173.160.27
    domainsuffix: localdomain
instances:
  server1:
    provider: kvm
    ip: {server_1 IP}
    roles:
      config_database:
      config:
      control:
      analytics_database:
      analytics:
      webui:
      openstack:
  server2:
    provider: bms
    ip: {server_2 IP}
    roles:
      openstack_compute:
      vrouter:
        PHYSICAL_INTERFACE: enp2s0f1
        AGENT_MODE: dpdk
  server3:
    provider: bms
    ip: {server_3 IP}
    roles:
      openstack_compute:
```

```
        vpp:
          PHYSICAL_INTERFACE: enp2s0f1
          AGENT_MODE: dpdk
contrail_configuration:
  CONTRAIL_VERSION: ocata-dev
  RABBITMQ_NODE_PORT: 5673
  AUTH_MODE: keystone
  CONTROLLER_NODES: {IP}
  CLOUD_ORCHESTRATOR: openstack
  IPFABRIC_SERVICE_IP: {IP}
  KEYSTONE_AUTH_HOST: {IP}
  KEYSTONE_AUTH_URL_VERSION: /v3
kolla_config:
  kolla_globals:
    kolla_internal_vip_address: {IP}
    contrail_api_interface_address: {IP}
    enable_haproxy: "no"
    enable_ironic: "no"
    enable_swift: "no"
  kolla_passwords:
    keystone_admin_password: secret
global_configuration:
  CONTAINER_REGISTRY: sofioni
  REGISTRY_PRIVATE_INSECURE: True
```

After successful deployment of above file, the setup looks like:

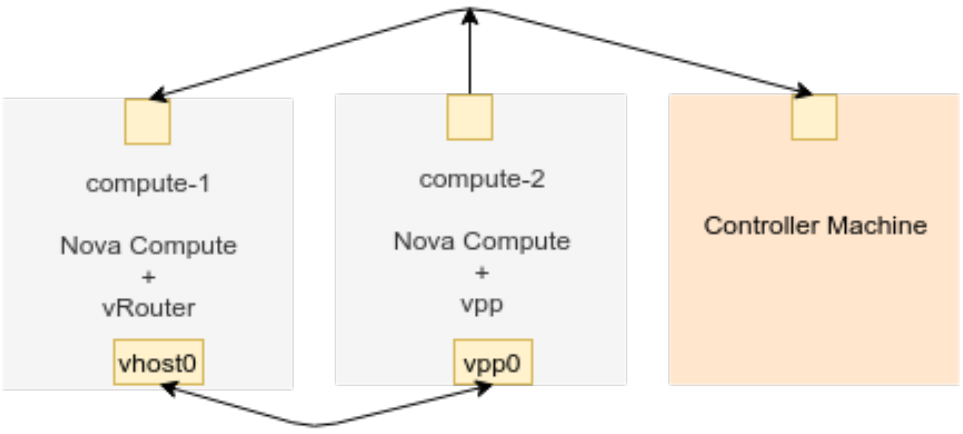

Figure 1: Setup after deployment

4 Use Cases

Several use cases have been examined in this section. Each use case is applied on a different setup to analyze the performance of vRouter and VPP under different scenarios.

4.1 Flvor Configuration

Flavor that has been used in the performance testing has features:

- 6 vCPUs
- 40 GiB RAM
- 200 HDD
- Metadata with hugepages enabled (Hw:large)
- Fedora 21

4.2 Use case# 1

4.2.1 Test Bed

Two VMs, trex-server and trex-client are launced on same compute host under same network as shown in Fig . TRex server throws traffic towards client which sends it back as a reply against each request made by TRex server.

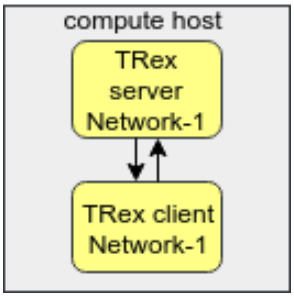

Figure 2: VMs spawned in same networks

4.2.2 Results

Following table shows the packets transferred by VPP and vRouter at NDR in the considered topology.

Data Plane	Max PPS at NDR	Packet size in bytes
VRouter	0.28mpps	64
VPP	0.36mpps	64

Undergiven snapshots represent the summary of traffic sent by TRex between time interval of 950 - 1000 seconds.

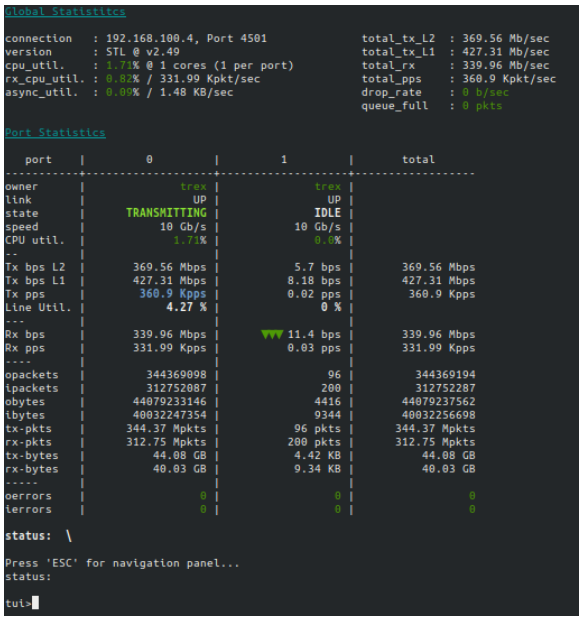

Figure 3: VPP traffic summary at no drop rate

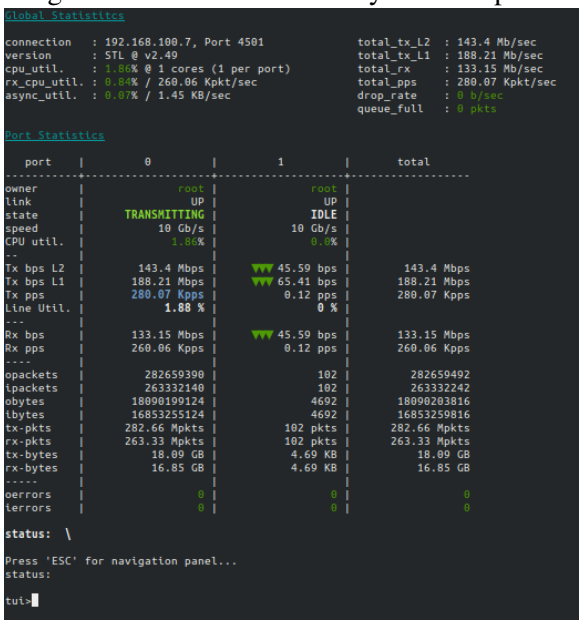

Figure 4: vRouter traffic summary at no drop rate