Documentation:

192.168.100.0/24

192.168.100.0/24

Worker1

Worker2

Master1

Master2

LB1

LB2

OVS

192.168.201.0/24

172.16.201.7

172.16.201.3

192.168.101.0/24

192.168.202.0/24

172.16.201.6

172.16.201.5

172.16.201.4

172.16.201.1

172.16.201.2

192.168.102.0/24

.1

.1

.1

.1

.2

.2

.2

.2

Towards ISP

The Content Provider Network is deployed with the user of Dell Servers.

Dell Servers were used for high computing.

Management network is 172.16.201.0/24.

The username to be used to login into each server is **contprov**.

Master1 and Master2 are serving as Kubernetes master nodes.

Worker1 and Worker2 are serving as Kubernetes worker nodes.

LB1 and LB2 contain RYU based load balancer applications for high availability.

**Python Files**

**Load balancer Application:**

**rotational.py**

Initially when a switch connects with the controller; TCP, IP and ARP flow entries are installed on the switch for directly connected interfaces. Additionally, flows to reach worker nodes are also installed.

The customer initially accesses the Content Provider webpage running in both the worker nodes. Once the customer requests for a new webpage of its own; the respective content is hosted in the containers using Kubernetes. Also, the TCP flows pointing to the respective URL assigned to the customers is installed.

A veth interface pair is created with one interface in OVS and another interface in a namespace with the IP of the URL of the customer.

Flows are also installed pointing to this newly created interface so that this interface will be used to signify if the content of the customer is up and running.

The TCP requests for the customer webpage will go to the container. However, the IP and ARP request will go to the veth interface present in the namespace.

Now when the customer sends a TCP requests for its own webpage, flows will be installed that points to the default gateway for that customer present in CPE.

**NAT will take place as follows:**

Customer Request for its webpage:

* Change destination IP address to the interface address of one master.
* Change the destination port to the 30000 series port assigned to the customer.
* Change the destination mac address to the mac address of interface of the master.
* Remove VLAN information.

Customer Reply comes from the Kubernetes node:

* Change the source IP address to the IP address of the URL.
* Change the source mac address to the mac address of the veth interface configured with the URL IP.
* Change the destination mac address to the mac address of the default gateway present on the CPE for the customer.
* Insert a VLAN assigned to that customer.
* Change the source port to 80.

**Checking Connection with different servers:**

**check\_connection.py**

The code is used to setup and monitor connection with different servers.

It tracks if the master or the worker goes down and changes the status accordingly.

It also keeps on setting up the connection once the connection to a server goes down.

**Data Files:**

**connection\_details.txt**

Contains the details of all the servers that are required by netmiko.

**connection\_status.txt**

Maintains the status of the connection with all the servers. This file will be updated by check\_connection.py file and will be used by rotational.py

**controller\_config.txt**

Contains initial configuration for controller.