PES UNIVERSITY

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WEEK :9

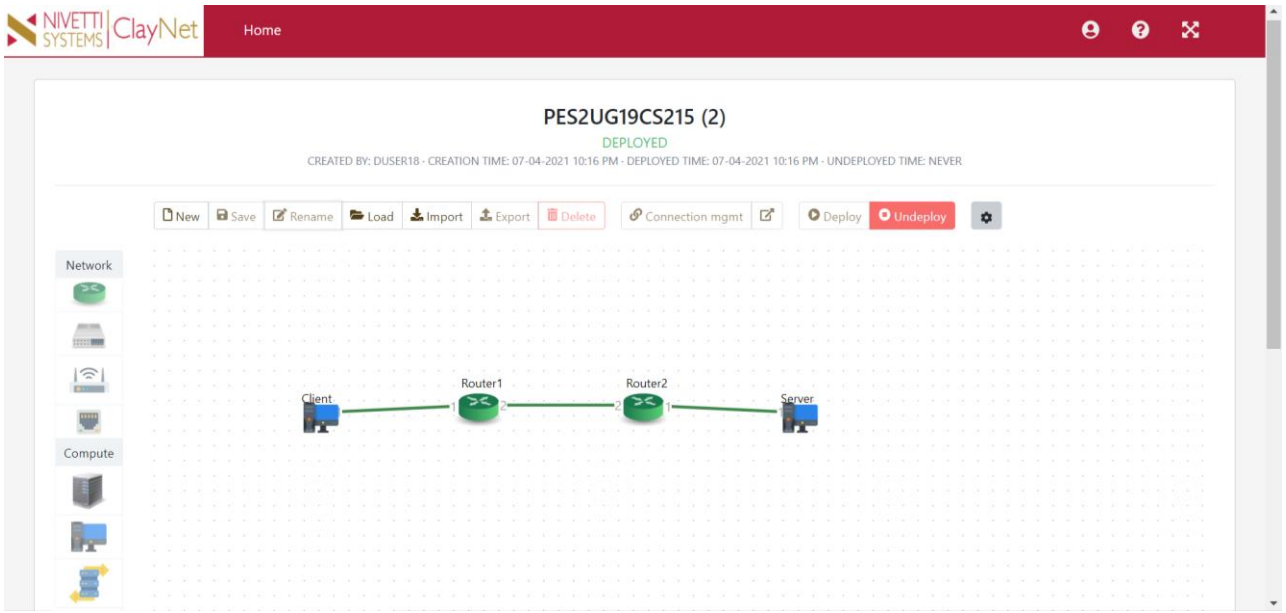
SUBJECT: Computer Network Laboratory

TITLE : Understand the building blocks and usage of ClayNet Network Virtualization platform with reference to OSI Layer.

Week 9

Understand the building blocks and usage of ClayNet Network Virtualization platform with reference to OSI Layer.

Topology:



Execution Tasks:

Task 1: Understand the network and compute components available in ClayNet.

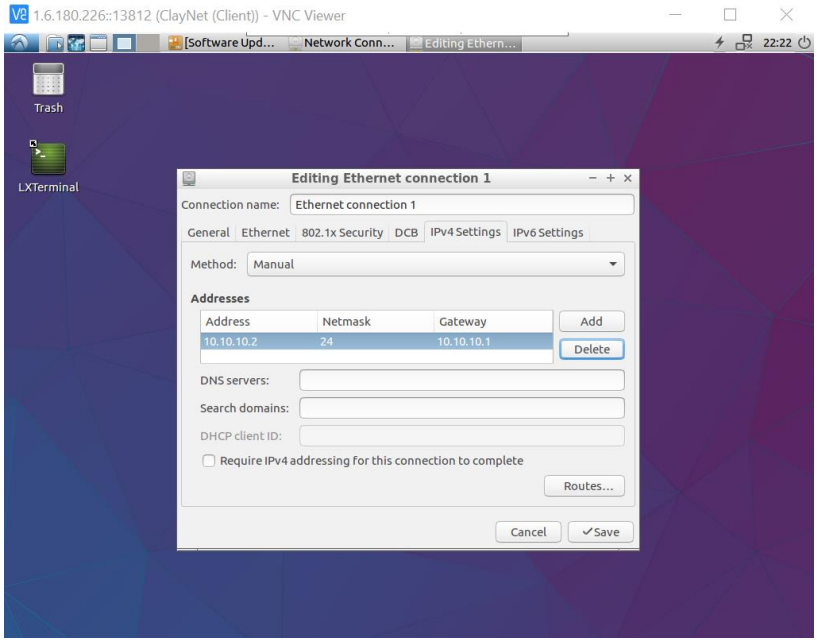
Task 2: Drag and drop the necessary components to create the given topology. Provide the names for compute, select OS (Ubuntu 16.04 – Lite or Ubuntu 16.04 – CLI) and RAM (512 MB) .

Task 3: Drag and drop the Routers and set the IP addresses for all the necessary router ports. (You can also set them later by right clicking on the router icon and selecting 'Device Configuration'.)

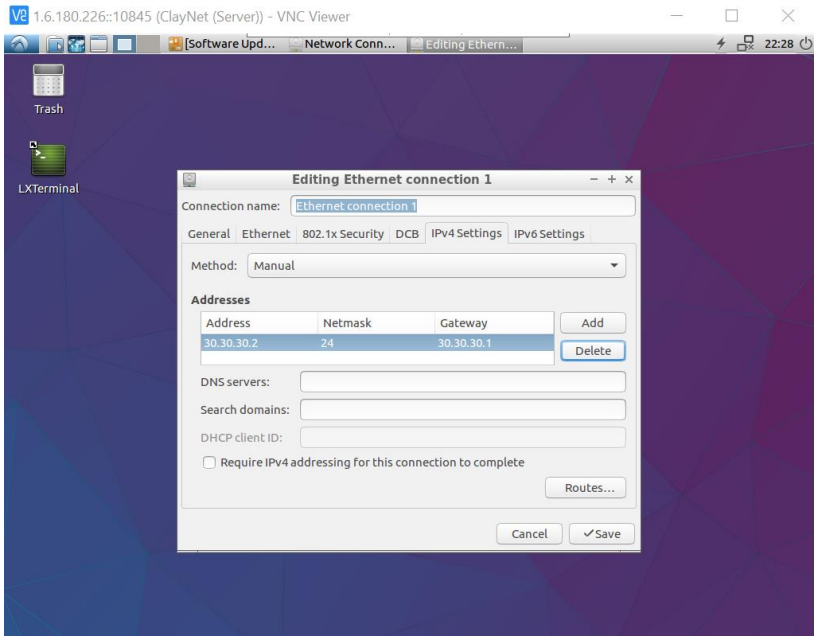
Task 4: Go to connection manager and select appropriate Source, Source ports, Target and Target ports and save the connection.

Task 5: To deploy the topology, save the topology first and deploy it by clicking 'Deploy' button available on the top. (Note: It will take few seconds or even minutes to deploy the topology for the first time).

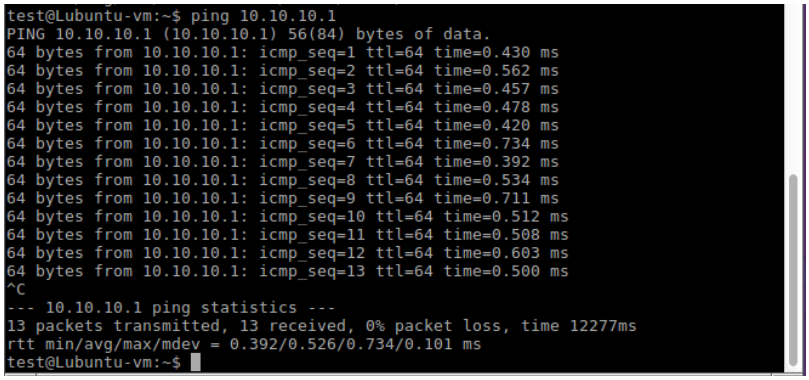
Task 6: Go to 'Remote Desktop' by right clicking on client and server icons and set the IP addresses accordingly. Also add the gateway address. (Login: user - test, password - test)
Client: IP Address ---> 10.10.10.2 Gateway ---> 10.10.10.1



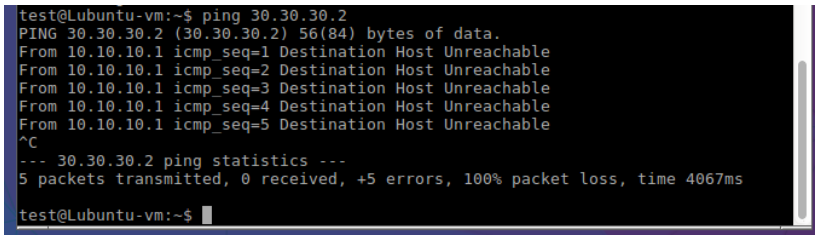
Server: IP Address ---> 30.30.30.2 Gateway ---> 30.30.30.1



Ping 10.10.10.1 on client



Task 7: From client, ping to server 30.30.30.2. Ping will not be successful and Router1 will reply with ‘Destination host unreachable’.

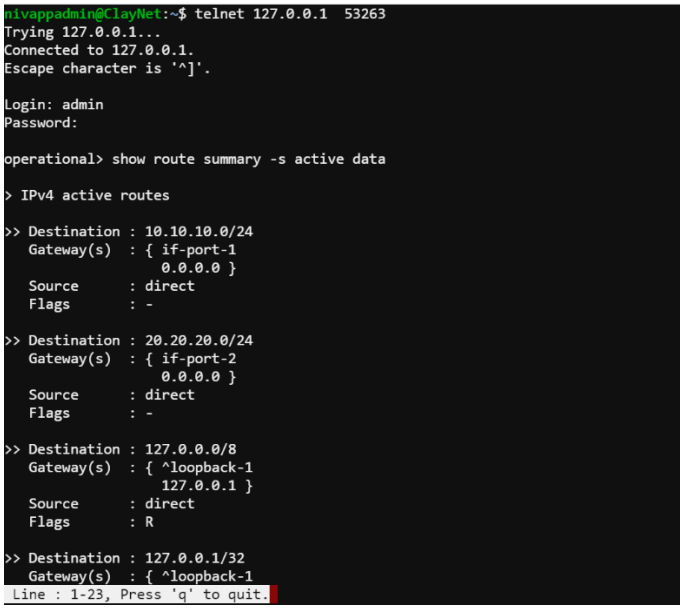


Task 8: Steps to add the routing table entries:

Step 1: Login to Router1 by right clicking on Router icon and selecting ‘Console Access’. (Type ‘Enter’ key once to get into Login screen. Username - admin, Password- admin@12345)

Step 2: Display the routing table to view all static routes using the command.

show route summary -s active data



Step 3: Configure a static route in Router1 for destination 30.30.30.0/24 with next-hop gateway as 20.20.20.2, which is the IP address of Router2.

```
operational> configure
Entering configuration mode with exclusive access.
configure> create parameter-group ip - route to-n30
Error: 'ip' is not a valid parameter group
configure> create parameter-group ip-route to-n30
Info: Parameter group instance created.
configure> set enable yes
configure> set router data
configure> set destination 30.30.30.0/24
configure> set next-hop gateway 20.20.20.2
configure> save
Info: Parameter group ip-route "to-n30" saved
configure> exit
operational>
```

Step 4: Check routing table again and verify that the route is added.

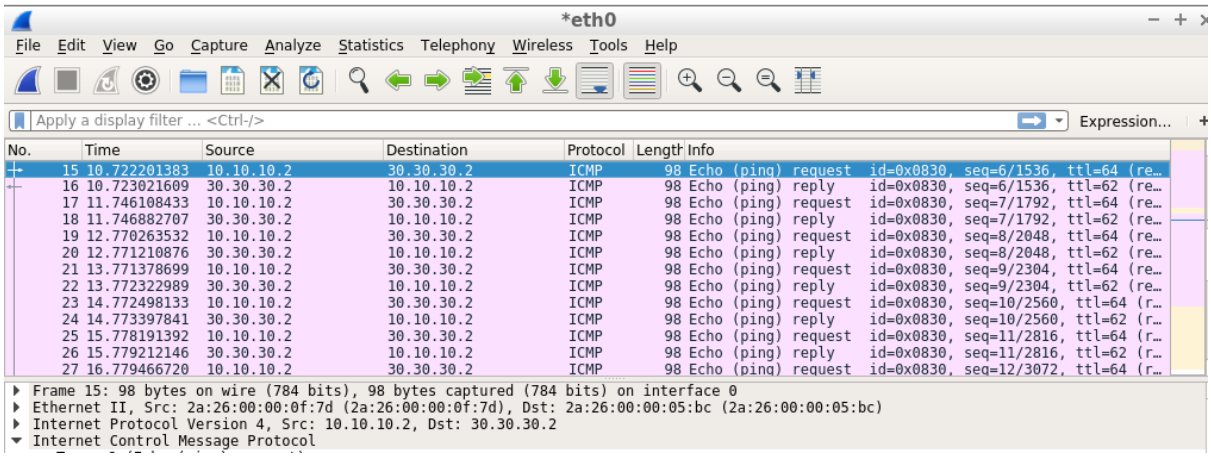
```
operational> show route summary -s active data

> IPv4 active routes

>> Destination : 10.10.10.0/24
   Gateway(s)  : { if-port-1
                   0.0.0.0 }
   Source      : direct
   Flags       : -

>> Destination : 20.20.20.0/24
   Gateway(s)  : { if-port-2
                   0.0.0.0 }
   Source      : direct
   Flags       : -

>> Destination : 30.30.30.0/24
   Gateway(s)  : { if-port-2
                   20.20.20.2 }
   Source      : static
   Flags       : -

>> Destination : 127.0.0.0/8
   Gateway(s)  : { ^loopback-1
 Line : 1-23, Press 'q' to quit.
```

Step 5: Repeat the steps 3 & 4 to configure a static route in Router2 for destination 10.10.10.0/24 with next-hop gateway as 20.20.20.1, which is the IP address of Router1.

```
Info: Parameter group instance created.
configure> set enable yes
configure> set router data
configure> set destination 10.10.10.0/24
configure> set next-hop gateway 20.20.20.1
configure> save
Info: Parameter group ip-route "to-n10" saved
configure> exit
```

Task 8: Now Ping will be successful as all the required routers are now configured. Observe the TTL getting decremented by 2 because two hops/routers are in between. Also keep the Wireshark ready for observation.

```
test@Lubuntu-vm:~$ ping 30.30.30.2
PING 30.30.30.2 (30.30.30.2) 56(84) bytes of data.
64 bytes from 30.30.30.2: icmp_seq=1 ttl=62 time=2.07 ms
64 bytes from 30.30.30.2: icmp_seq=2 ttl=62 time=1.04 ms
64 bytes from 30.30.30.2: icmp_seq=3 ttl=62 time=1.21 ms
64 bytes from 30.30.30.2: icmp_seq=4 ttl=62 time=1.03 ms
64 bytes from 30.30.30.2: icmp_seq=5 ttl=62 time=0.858 ms
64 bytes from 30.30.30.2: icmp_seq=6 ttl=62 time=0.846 ms
64 bytes from 30.30.30.2: icmp_seq=7 ttl=62 time=0.792 ms
64 bytes from 30.30.30.2: icmp_seq=8 ttl=62 time=0.977 ms
64 bytes from 30.30.30.2: icmp_seq=9 ttl=62 time=0.962 ms
64 bytes from 30.30.30.2: icmp_seq=10 ttl=62 time=0.919 ms
64 bytes from 30.30.30.2: icmp_seq=11 ttl=62 time=1.03 ms
64 bytes from 30.30.30.2: icmp_seq=12 ttl=62 time=0.925 ms
64 bytes from 30.30.30.2: icmp_seq=13 ttl=62 time=0.974 ms
^Z
[1]+  Stopped                 ping 30.30.30.2
```



Task 9: Also observe the output of tracepath -n 30.30.30.2 command on Client