PES UNIVESITY
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Date: 03/04/2021

Subject: Computer Network Laboratory

WEEK No: 9

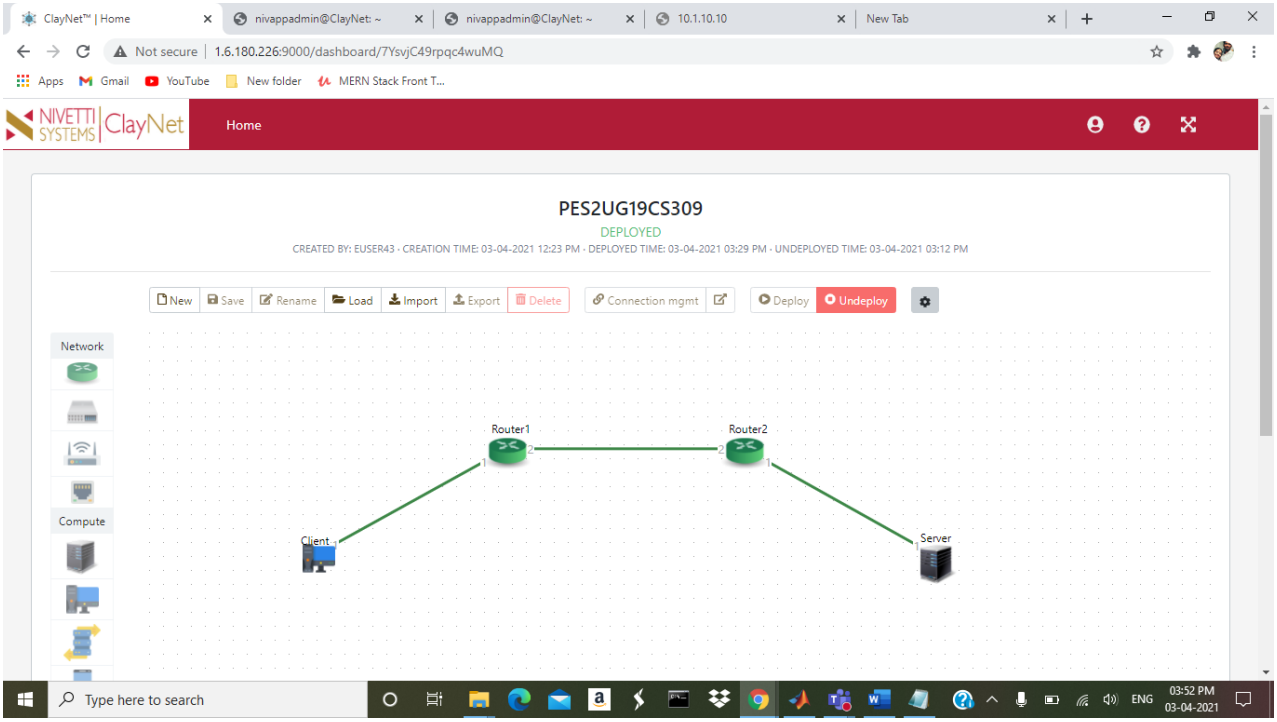
Objective: Understand the building blocks and usage of ClayNet Network Virtualization platform with reference to OSI Layer.

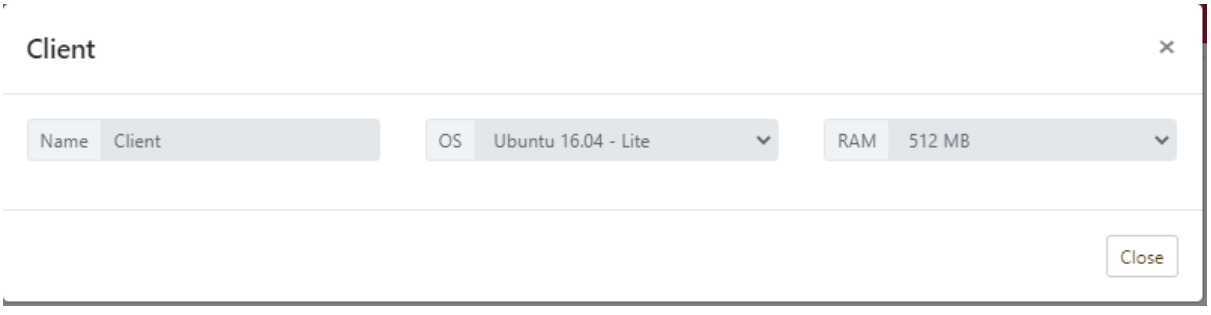
Topology 1: Create a topology in ClayNet, as shown in following figure.

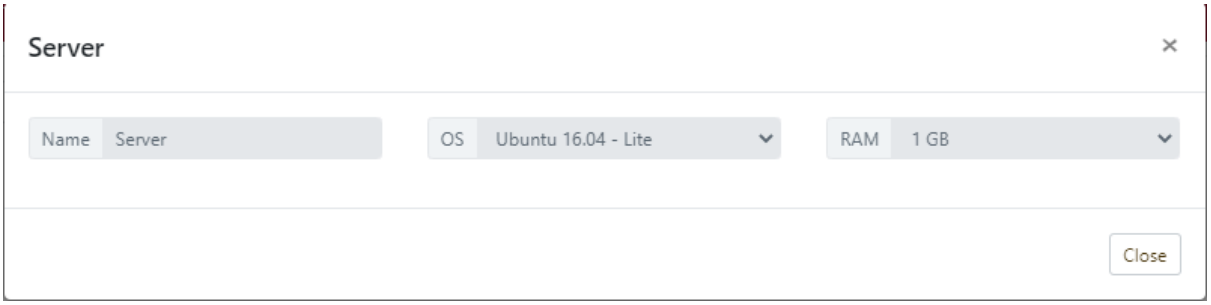
Execution Tasks:

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

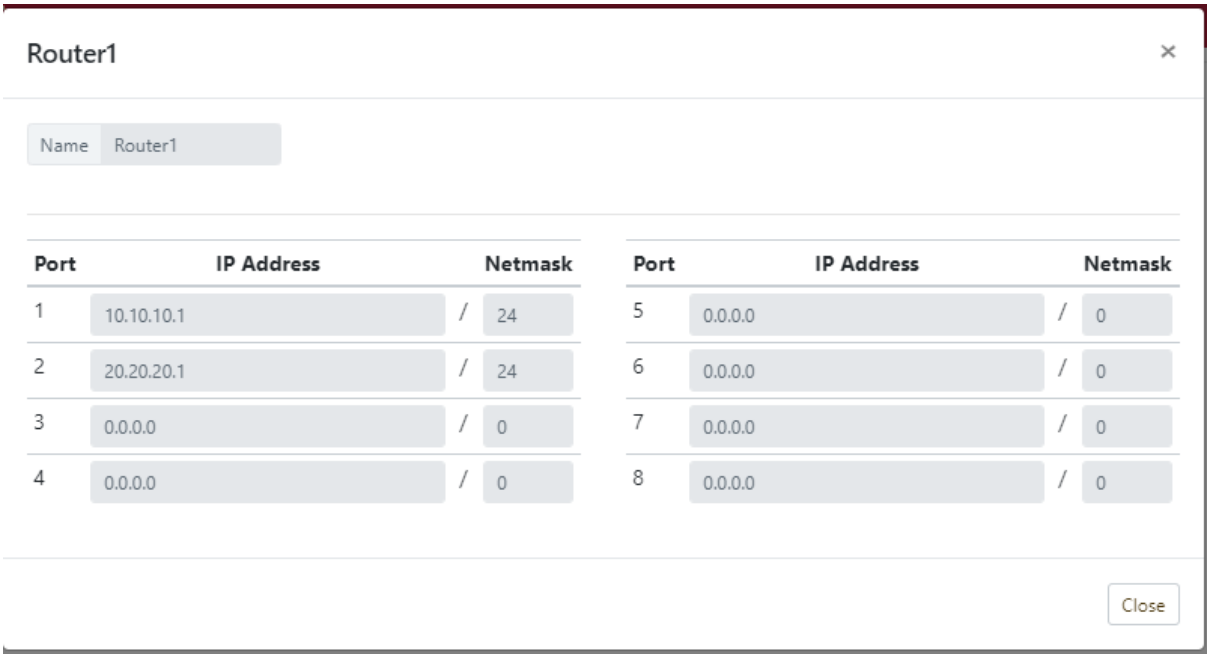
Task 2: Drag and drop the necessary components to create the given topology. Provide the names for compute, select OS (Ubuntu 16.04 – Lite or Ubuntu 16.04 – CLI) and RAM (512 MB) as shown below.

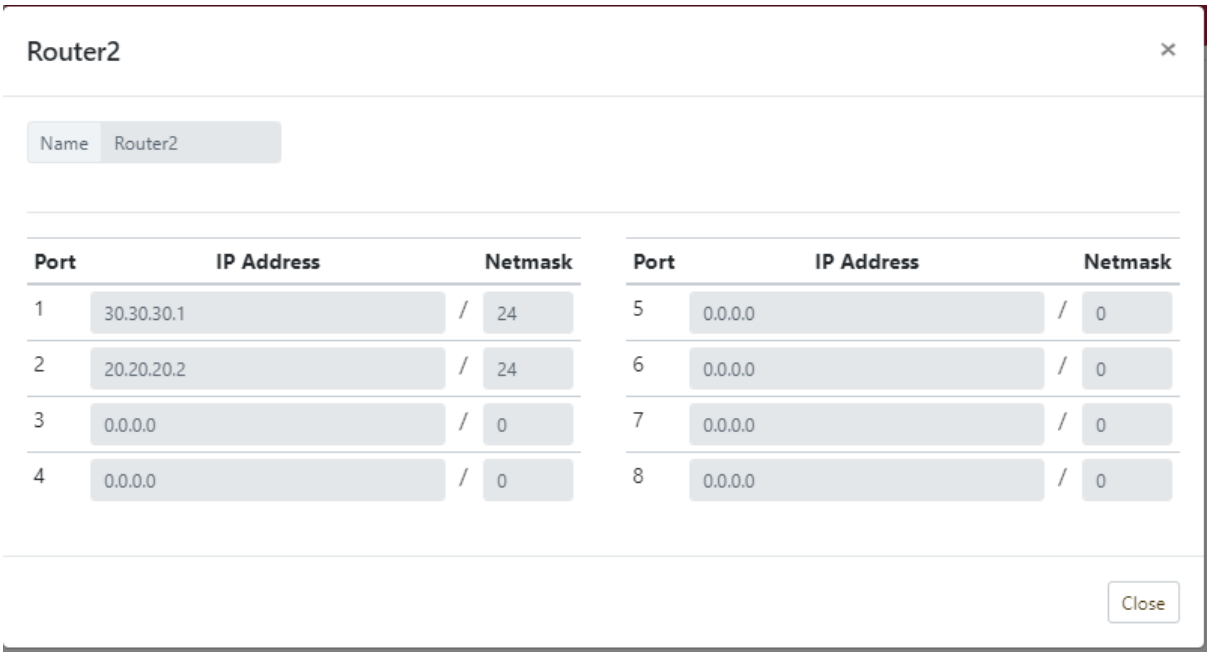






Task 3: Drag and drop the Routers and set the IP addresses for all the necessary router ports. (You can also set them later by right clicking on the router icon and selecting 'Device Configuration'.)





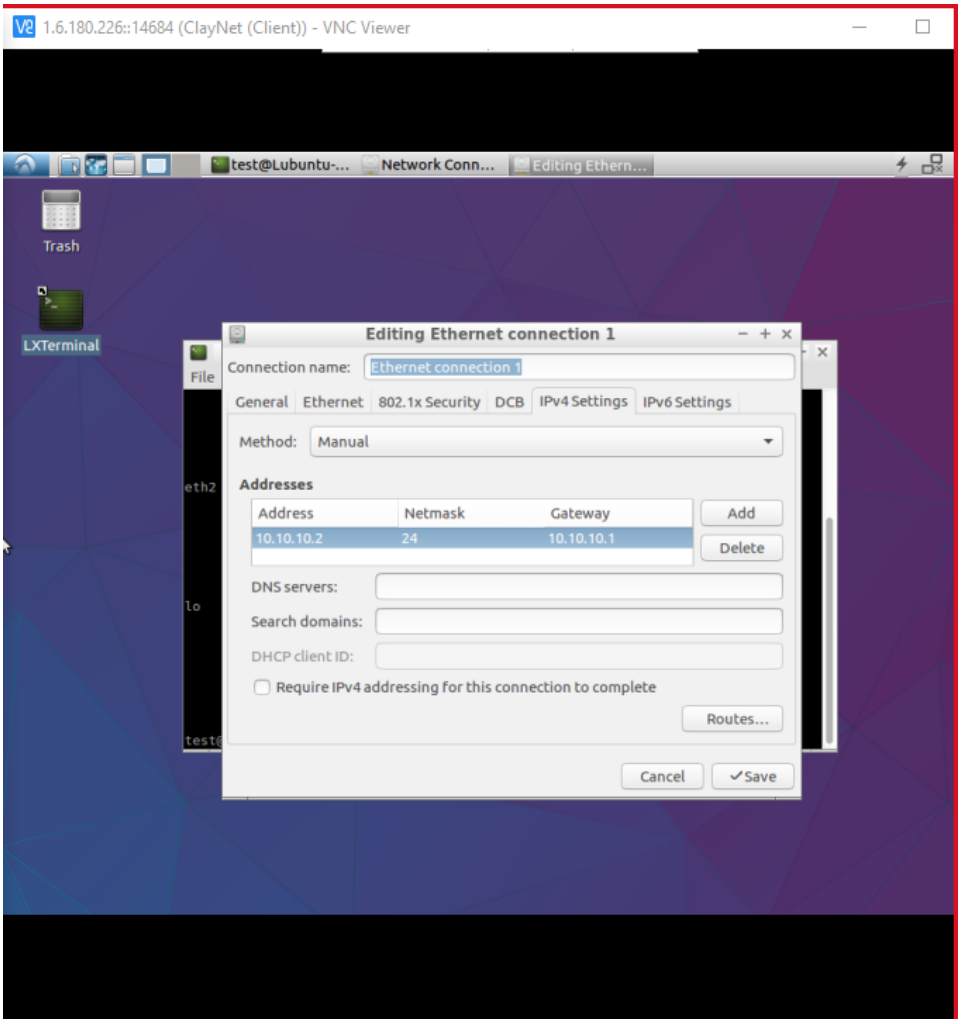
Task 4: Go to connection manager and select appropriate Source, Source ports, Target and Target ports and save the connection.

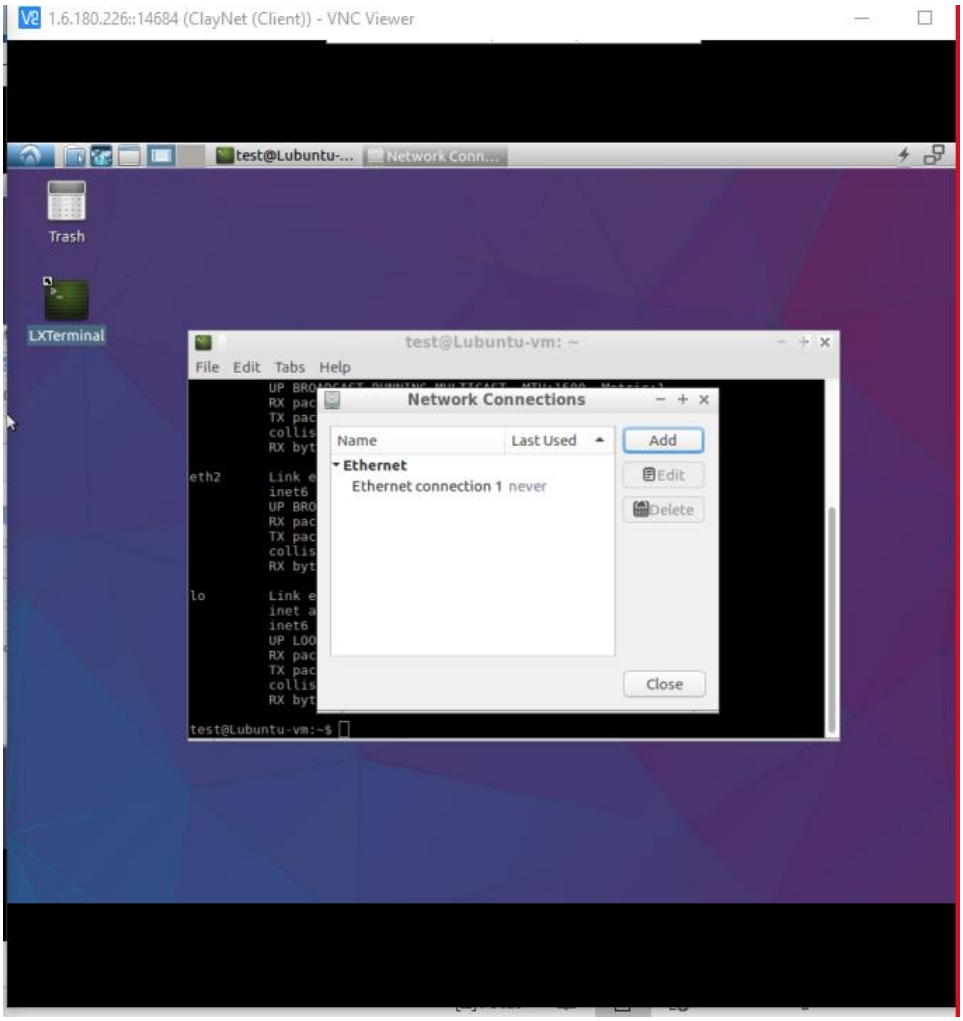
Task 5: To deploy the topology, save the topology first and deploy it by clicking 'Deploy' button available on the top. (Note: It will take few seconds or even minutes to deploy the topology for the first time).

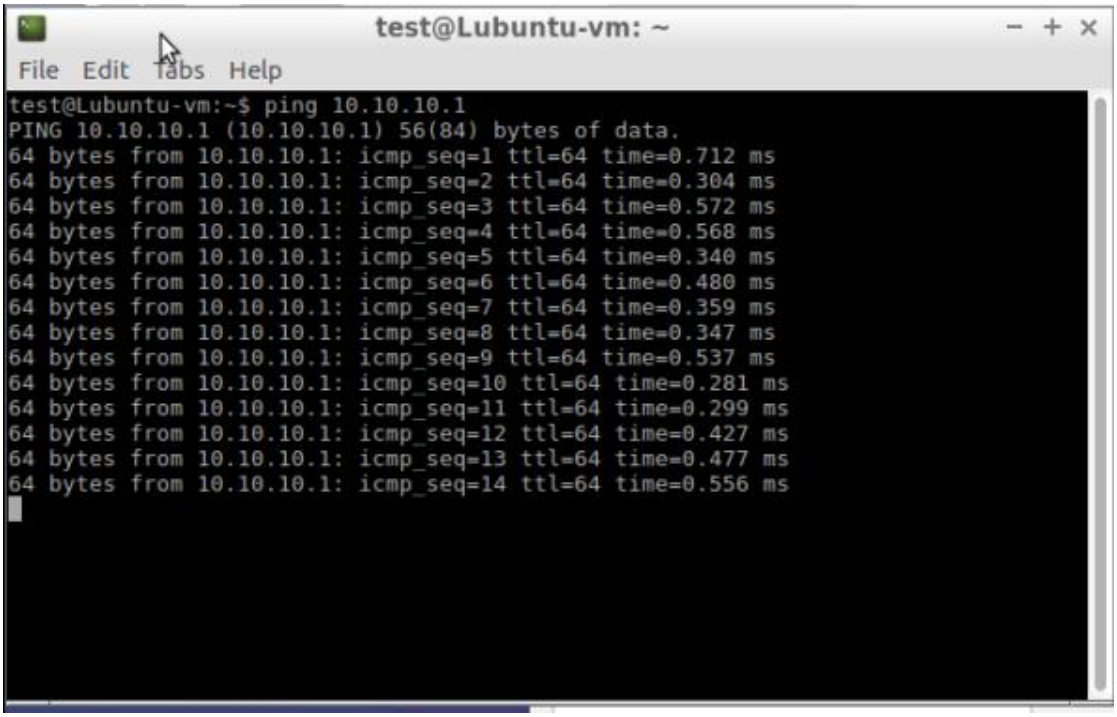
Task 6: Go to 'Remote Desktop' by right clicking on client and server icons and set the IP addresses accordingly. Also add the gateway address. (Login: user - test, password - test)

Client:

IP Address ---> 10.10.10.2 Gateway ---> 10.10.10.1


1.6.180.226::14684 (ClayNet (Client)) - VNC Viewer
test@Lubuntu-...
Network Conn...
Editing Ethern...
Trash
LXTerminal
Editing Ethernet connection 1
Connection name:
Ethernet connection 1
General
Ethernet
802.1x Security
DCB
IPv4 Settings
IPv6 Settings
Method:
Manual
Addresses
Address
Netmask
Gateway
Add
10.10.10.2
24
10.10.10.1
Delete
DNS servers:
Search domains:
DHCP client ID:
Require IPv4 addressing for this connection to complete
Routes...
Cancel
Save

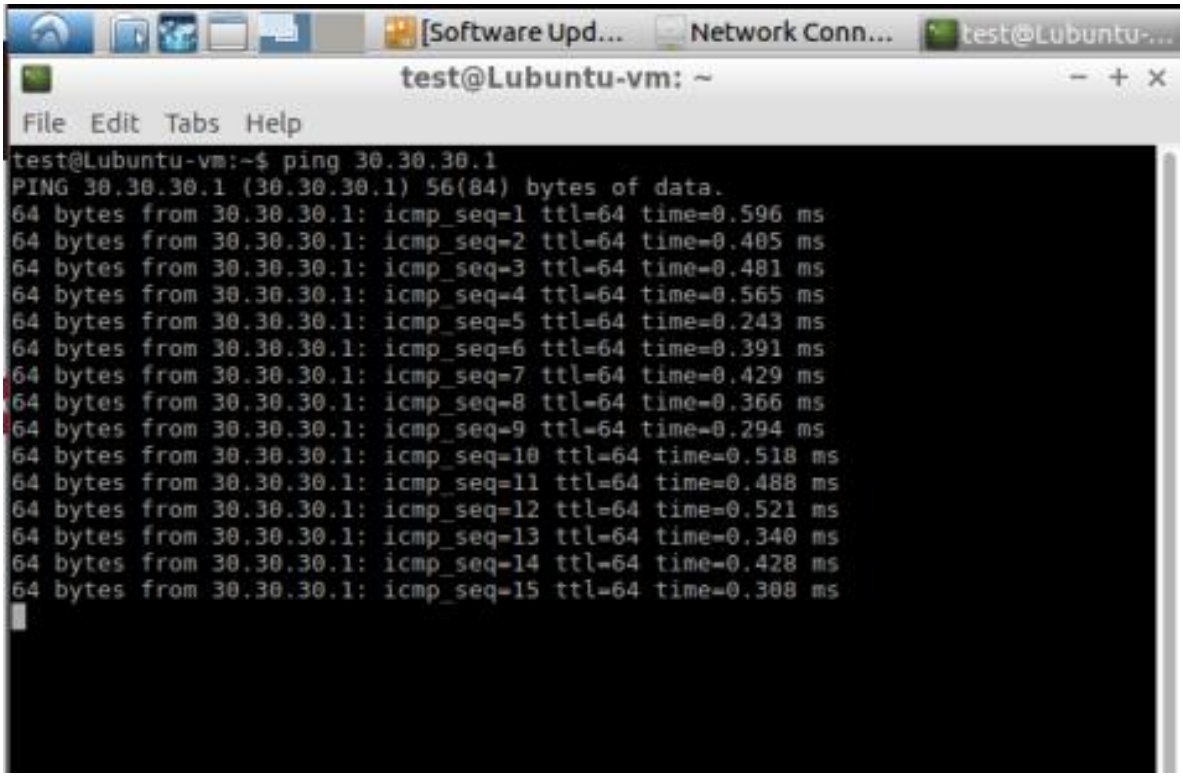

1.6.180.226::14684 (ClayNet (Client)) - VNC Viewer
test@Lubuntu-...
Network Conn...
Trash
LXTerminal
test@Lubuntu-vm: ~
File Edit Tabs Help
Network Connections
Name
Last Used
Add
Ethernet
Ethernet connection 1 never
Edit
Delete
Close
test@Lubuntu-vm:~$



Server:

IP Address ---> 30.30.30.2 Gateway ---> 30.30.30.1

Task 6: From client, ping to server 30.30.30.2.



Task 7: Set up the following routing table entries for Routers 1 & 2.

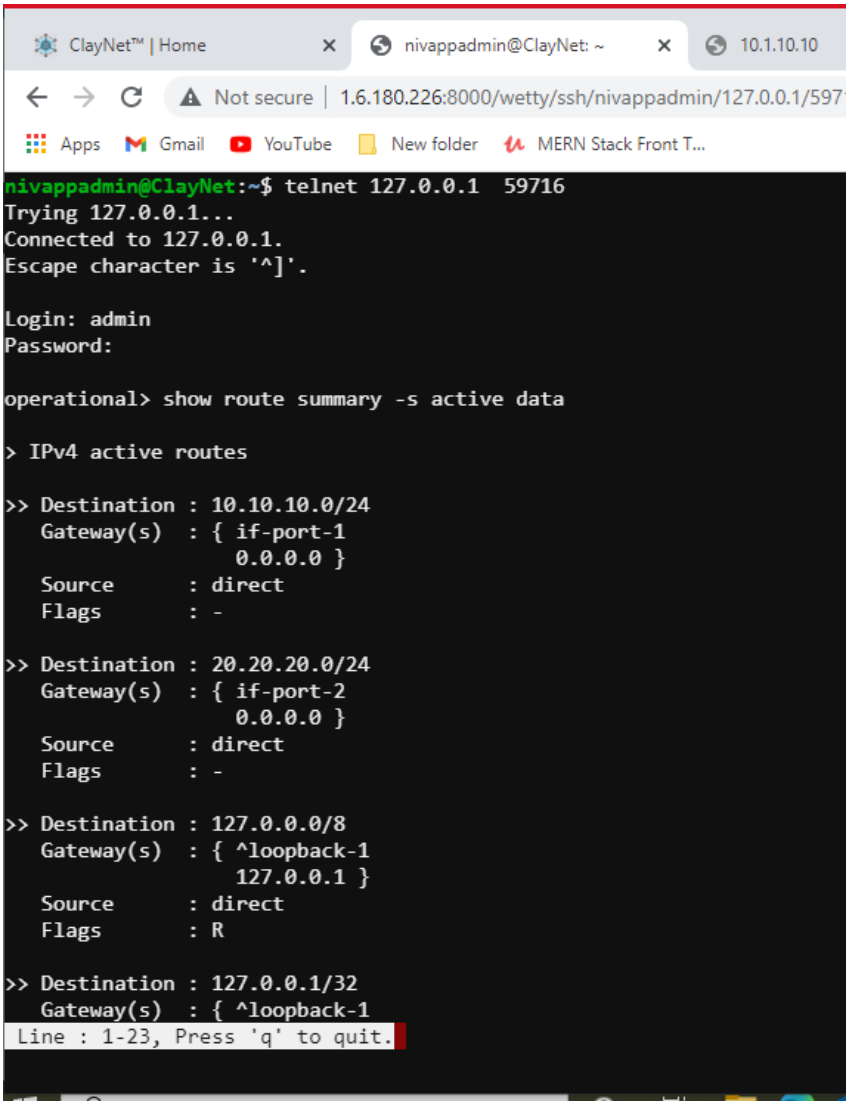
Routers	Destination	Next hop gateway	Via
Router 1	30.30.30.0	20.20.20.2	Direct
Router 2	10.10.10.0	20.20.20.1	Direct

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 - test, Password- test@12345)

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

show route summary -s active data



Note in routing table of Router1 that there is no route to reach the destination network 30.30.30.0/24. Go to configure mode and start configuring the router for all the possible routes.

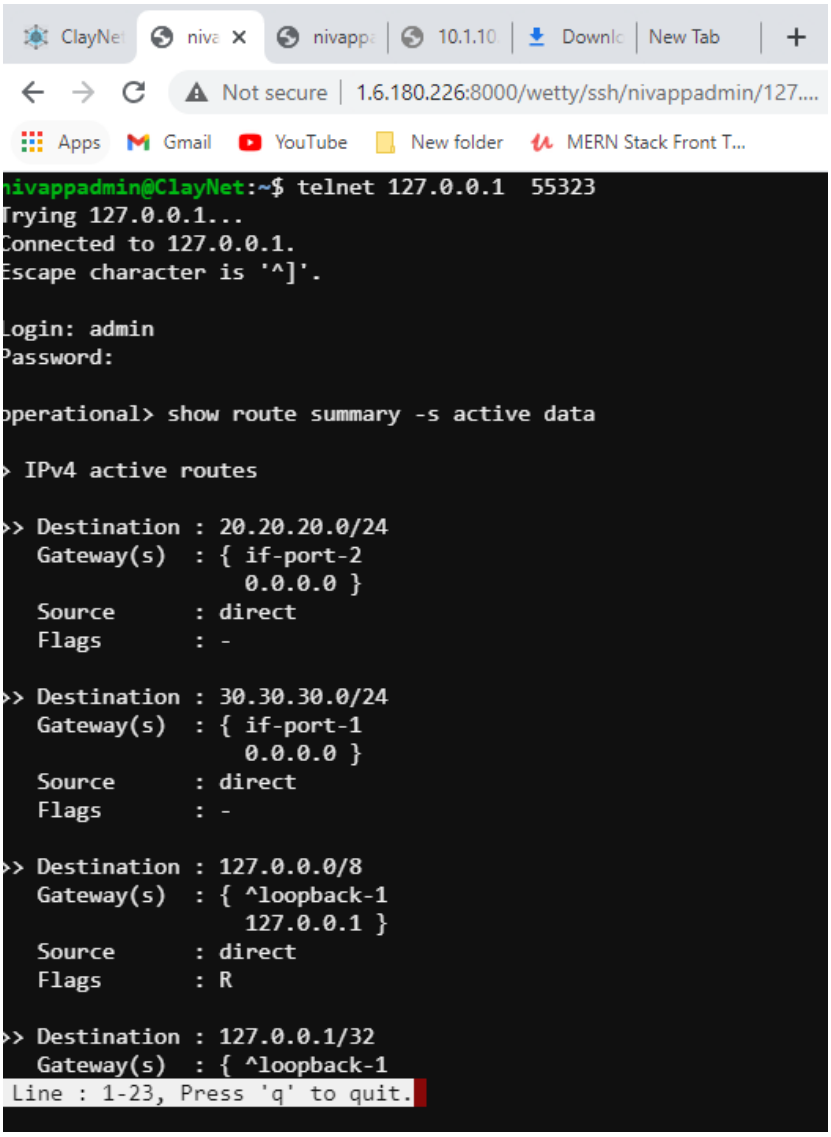
Step 3: Configure a static route in Router1 for destination 30.30.30.0/24 with next-hop gateway as 20.20.20.2, which is the IP address of Router2.

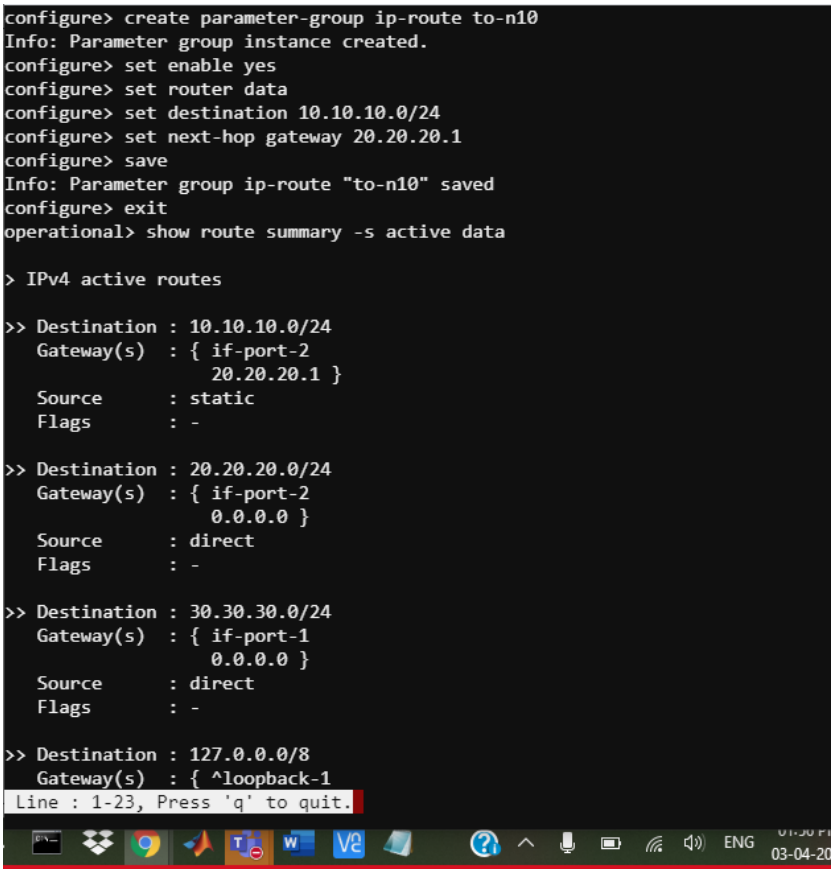
```
operational> configure
Entering configuration mode with exclusive access.
configure> create parameter-group ip-route to n30
Error: Extra argument(s) specified
configure> create parameter-group ip-route to-n30
Info: Parameter group instance created.
configure> set enable yes
configure> set router 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>
```

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

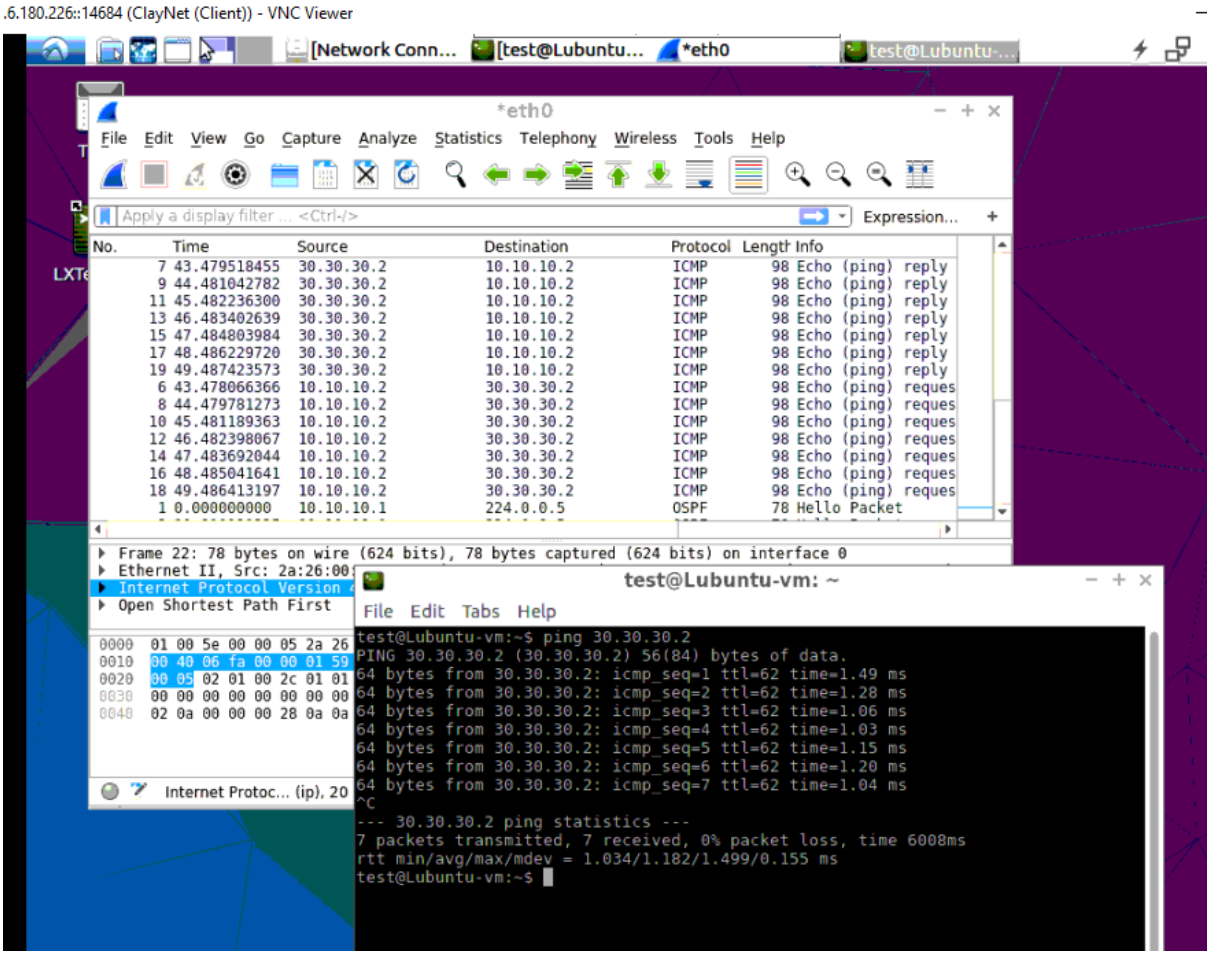
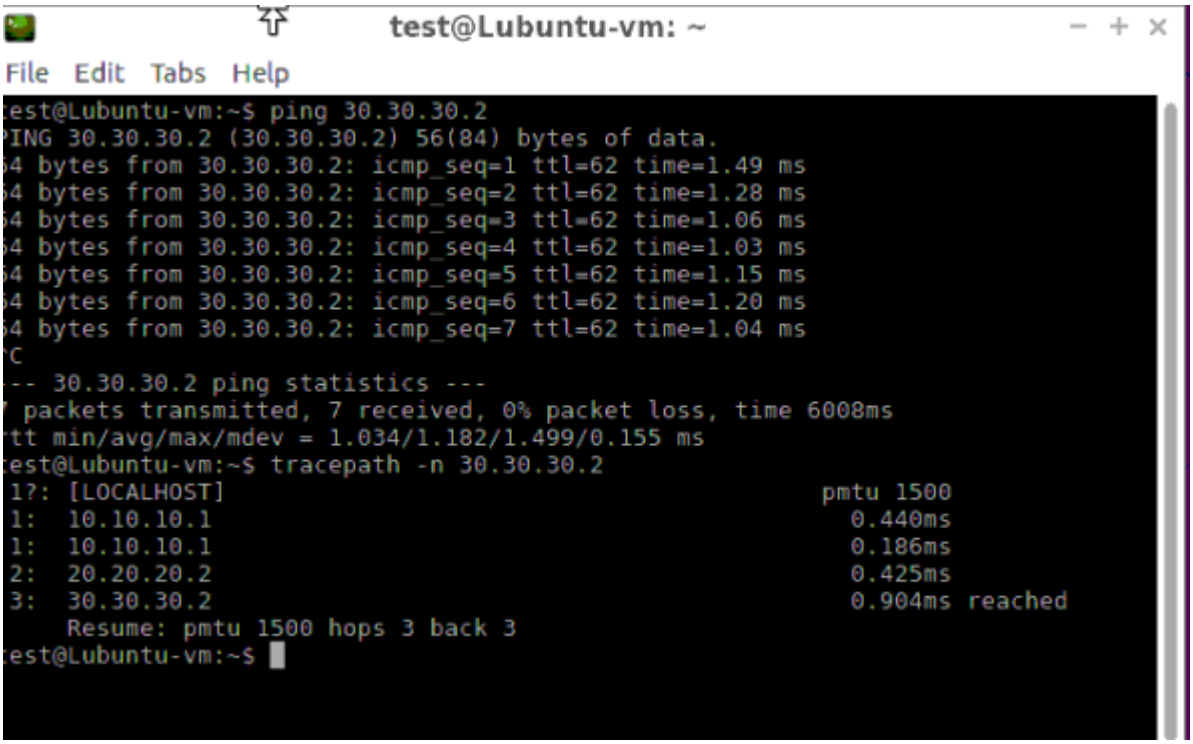
```
configure> create parameter-group ip-route to-n30
Info: Parameter group instance created.
configure> set enable yes
configure> set router data
configure> set destination 30.30.30.0/24
configure> set next-hop gateway 20.20.20.2
configure> save
Info: Parameter group ip-route "to-n30" saved
configure> exit
operational> 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.


ClayNet
niva
nivapp
10.1.10
Downlc
New Tab
Not secure
1.6.180.226:8000/wetty/ssh/nivappadmin/127....
Apps
Gmail
YouTube
New folder
MERN Stack Front T...
ivappadmin@ClayNet:~$ telnet 127.0.0.1 55323
rying 127.0.0.1...
onnected to 127.0.0.1.
scape character is '^]'.
ogin: admin
assword:
perational> show route summary -s active data
> IPv4 active routes
>> 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-1
0.0.0.0 }
Source : direct
Flags : -
>> Destination : 127.0.0.0/8
Gateway(s) : { ^loopback-1
127.0.0.1 }
Source : direct
Flags : R
>> Destination : 127.0.0.1/32
Gateway(s) : { ^loopback-1
Line : 1-23, Press 'q' to quit.


configure> create parameter-group ip-route to-n10
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
operational> show route summary -s active data
> IPv4 active routes
>> Destination : 10.10.10.0/24
Gateway(s) : { if-port-2
20.20.20.1 }
Source : static
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-1
0.0.0.0 }
Source : direct
Flags : -
>> Destination : 127.0.0.0/8
Gateway(s) : { ^loopback-1
Line : 1-23, Press 'q' to quit.
ENG
03-04-20

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.



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