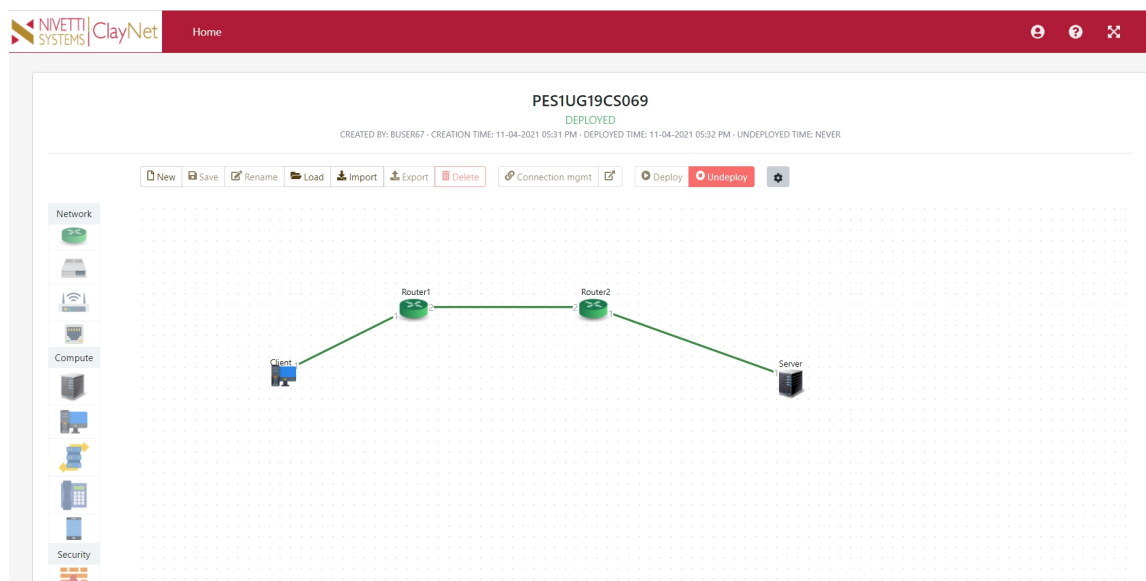


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“B” Section

TASK 1 : IPv4 Addressing and Topology Creation

The following topology is created and deployed on ClayNet.



The configuration of all the end-system devices are :

End System	IP Address	Gateway
Client	10.10.10.2/24	10.10.10.1
Server	30.30.30.2/24	30.30.30.1

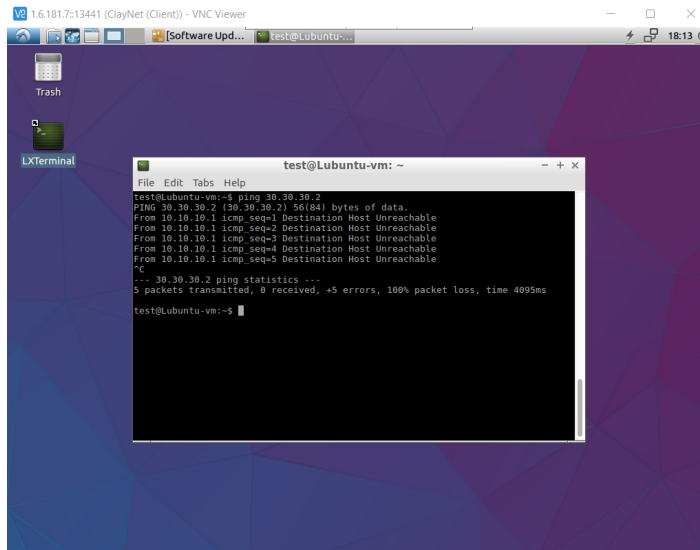
Similarly, the routers are configured as:

Router	Interface Number (port)	IP Address
Router1	1	10.10.10.1/24
Router1	2	20.20.20.1/24
Router2	1	30.30.30.1/24
Router2	2	20.20.20.2/24

Ping Command

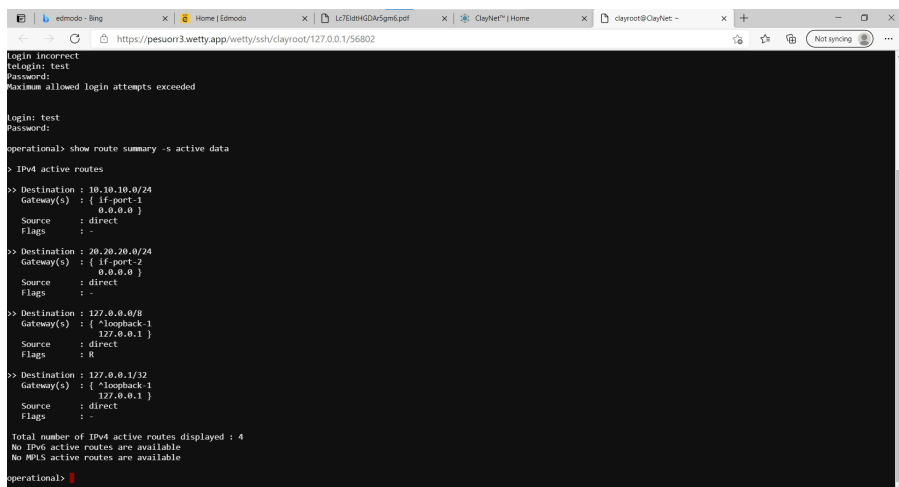
From Client, a ping command is made to Server.

However, this ping command fails because the routing table entries have not been configured for Router1 and Router2.



Configuration of Routing Table Entries

Router 1



Routing Table Entry after configuration.

```
configure> save
Info: Parameter group ip-route "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
              127.0.0.1 }
Source      : direct
Flags      : R

>> Destination : 127.0.0.1/32
Gateway(s) : { *loopback-1
              127.0.0.1 }
Source      : direct
Flags      : -

Total number of IPv4 active routes displayed : 5
No IPv6 active routes are available
No MPLS active routes are available

operational> []
```

Router 2

```
clayroot@claynet:~$ telnet 127.0.0.1 55811
Trying 127.0.0.1...
Connected to 127.0.0.1.
Escape character is '^['.

login: test
Password:

operational> 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
              127.0.0.1 }
Source      : direct
Flags      : -

Total number of IPv4 active routes displayed : 4
No IPv6 active routes are available
No MPLS active routes are available

operational> []
```

Routing Table Entry after configuration

```

configure save
Info: Parameter group ip-route "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
              127.0.0.1 }
Source      : direct
Flags       : R

>> Destination : 127.0.0.1/32
Gateway(s) : { ^loopback-1
              127.0.0.1 }
Source      : direct
Flags       : -

Total number of IPv4 active routes displayed : 5
No IPv6 active routes are available
No MPLS active routes are available

operational> ]

```

Observations

Client and Server are now reachable from each other. To verify this, the ping command is again used to ICMP request packets to the other.

```
test@Ubuntu-vm: ~  
File Edit Tabs Help  
test@Ubuntu-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=1.16 ms  
64 bytes from 30.30.30.2: icmp_seq=2 ttl=62 time=1.23 ms  
64 bytes from 30.30.30.2: icmp_seq=3 ttl=62 time=1.22 ms  
64 bytes from 30.30.30.2: icmp_seq=4 ttl=62 time=0.928 ms  
64 bytes from 30.30.30.2: icmp_seq=5 ttl=62 time=1.05 ms  
64 bytes from 30.30.30.2: icmp_seq=6 ttl=62 time=1.05 ms  
64 bytes from 30.30.30.2: icmp_seq=7 ttl=62 time=0.918 ms  
64 bytes from 30.30.30.2: icmp_seq=8 ttl=62 time=1.12 ms  
64 bytes from 30.30.30.2: icmp_seq=9 ttl=62 time=1.01 ms  
64 bytes from 30.30.30.2: icmp_seq=10 ttl=62 time=0.786 ms  
64 bytes from 30.30.30.2: icmp_seq=11 ttl=62 time=1.07 ms  
64 bytes from 30.30.30.2: icmp_seq=12 ttl=62 time=0.894 ms  
64 bytes from 30.30.30.2: icmp_seq=13 ttl=62 time=0.877 ms  
64 bytes from 30.30.30.2: icmp_seq=14 ttl=62 time=1.00 ms  
64 bytes from 30.30.30.2: icmp_seq=15 ttl=62 time=1.07 ms  
64 bytes from 30.30.30.2: icmp_seq=16 ttl=62 time=1.03 ms  
64 bytes from 30.30.30.2: icmp_seq=17 ttl=62 time=0.917 ms  
64 bytes from 30.30.30.2: icmp_seq=18 ttl=62 time=0.938 ms  
64 bytes from 30.30.30.2: icmp_seq=19 ttl=62 time=0.927 ms  
64 bytes from 30.30.30.2: icmp_seq=20 ttl=62 time=0.953 ms  
64 bytes from 30.30.30.2: icmp_seq=21 ttl=62 time=1.29 ms  
64 bytes from 30.30.30.2: icmp_seq=22 ttl=62 time=1.00 ms
```

The following Wireshark Packet Capture shows ICMP request packets being sent from Client to Server.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	10.10.10.1	224.0.0.5	OSPF	78	Hello Packet
2	10.010176431	10.10.10.1	224.0.0.5	OSPF	78	Hello Packet
3	12.450034268	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request
4	12.451157085	30.30.30.2	10.10.10.2	ICMP	98	Echo (ping) reply
5	13.451428538	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request
6	13.452629668	30.30.30.2	10.10.10.2	ICMP	98	Echo (ping) reply
7	14.452817575	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request
8	14.454009094	30.30.30.2	10.10.10.2	ICMP	98	Echo (ping) reply
9	15.454295183	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request
10	15.455185561	30.30.30.2	10.10.10.2	ICMP	98	Echo (ping) reply
11	16.455371262	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request
12	16.456395203	30.30.30.2	10.10.10.2	ICMP	98	Echo (ping) reply
13	17.456286198	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request
14	17.457316725	30.30.30.2	10.10.10.2	ICMP	98	Echo (ping) reply
15	18.457440934	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request
16	18.458335348	30.30.30.2	10.10.10.2	ICMP	98	Echo (ping) reply
17	19.488314988	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request
18	19.489415729	30.30.30.2	10.10.10.2	ICMP	98	Echo (ping) reply
19	20.020327185	10.10.10.1	224.0.0.5	OSPF	78	Hello Packet
20	20.489604675	10.10.10.2	30.30.30.2	ICMP	98	Echo (ping) request

eth0: <live capture in progress> Packets: 55 · Displayed: 55 (100.0%) Profile: Default

The following screenshot displays the outcome of the traceroute command from Client to Server.

```
test@Lubuntu-vm: ~
File Edit Tabs Help
test@Lubuntu-vm:~$ tracepath -n 30.30.30.2
17: [LOCALHOST] pmtu 1500
1: 10.10.10.1 0.524ms
1: 10.10.10.1 0.224ms
2: 20.20.20.2 0.573ms
3: 30.30.30.2 0.723ms reached
Resume: pmtu 1500 hops 3 back 3
test@Lubuntu-vm:~$
```