

COMPUTER NETWORKS

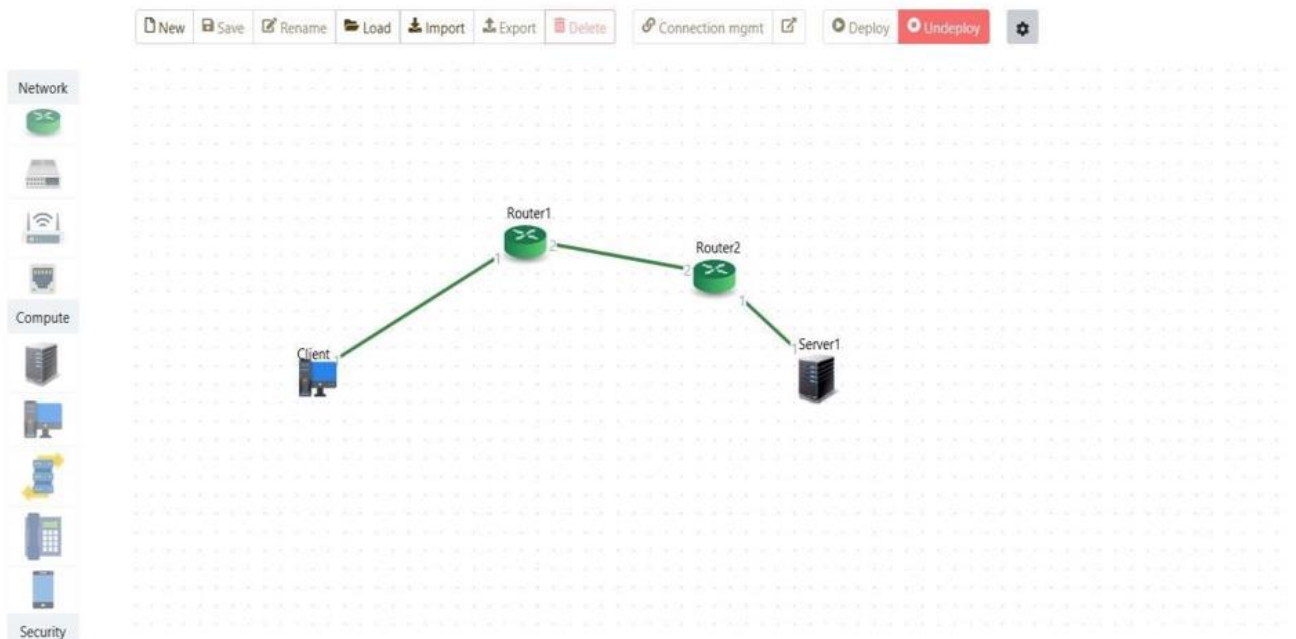
WEEK 8

PES1UG19CS545

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Claynet – IPv4 Static Addressing and routing

The following topology is created and deployed in claynet.



Configurations of End systems :

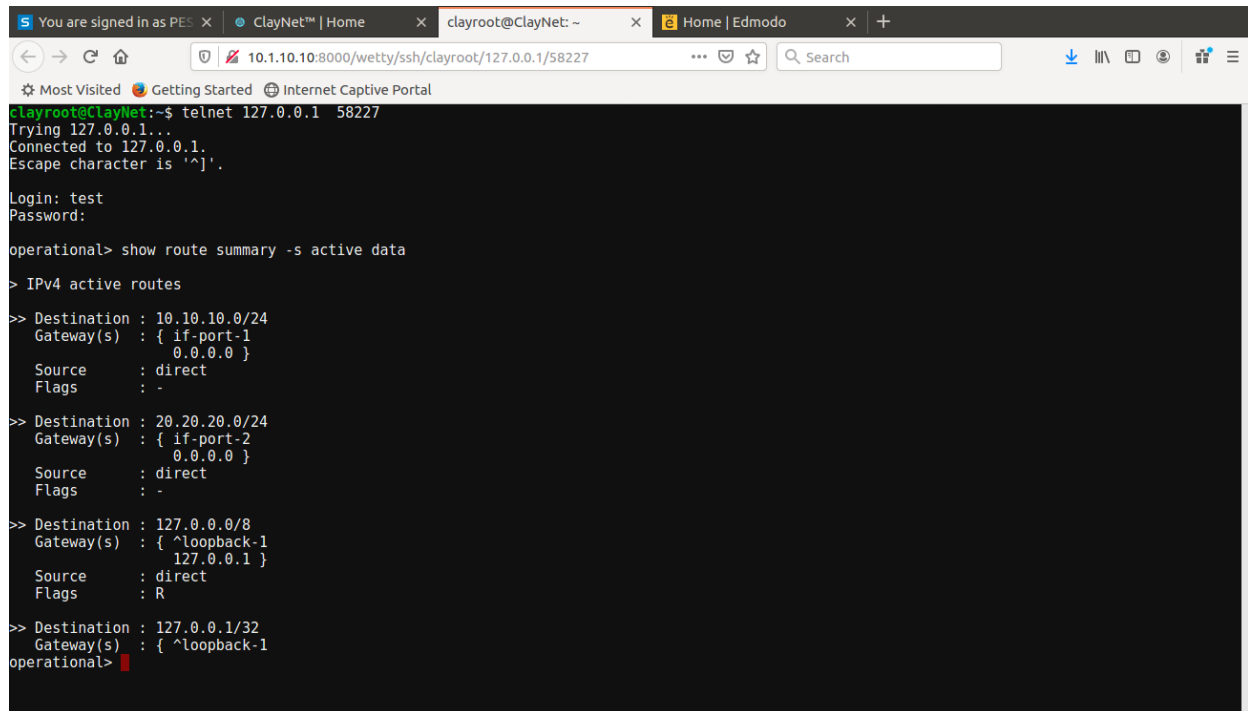
End System	IP Address	Gateway
Client	10.10.10.2/24	10.10.10.1
Server	30.30.30.2/24	30.30.30.1

Routers Configuration:

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

Configuring Routing Table entries

Router 1:



```
clayroot@ClayNet:~$ telnet 127.0.0.1 58227
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

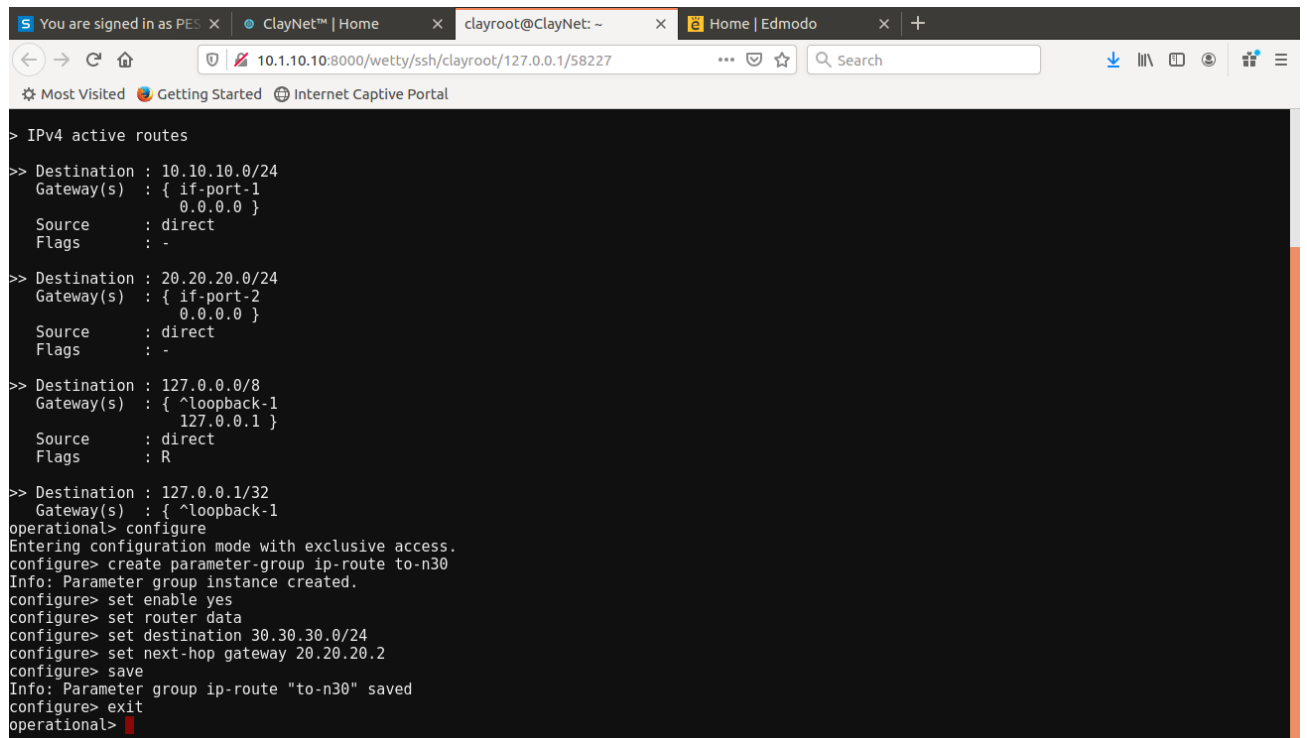
>> Destination : 10.10.10.0/24
   Gateway(s)   : { if-port-1
                   0.0.0.0 }
   Source       : direct
   Flags        : -

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

>> Destination : 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        : R
operational>
```

Router 2:



```
> IPv4 active routes

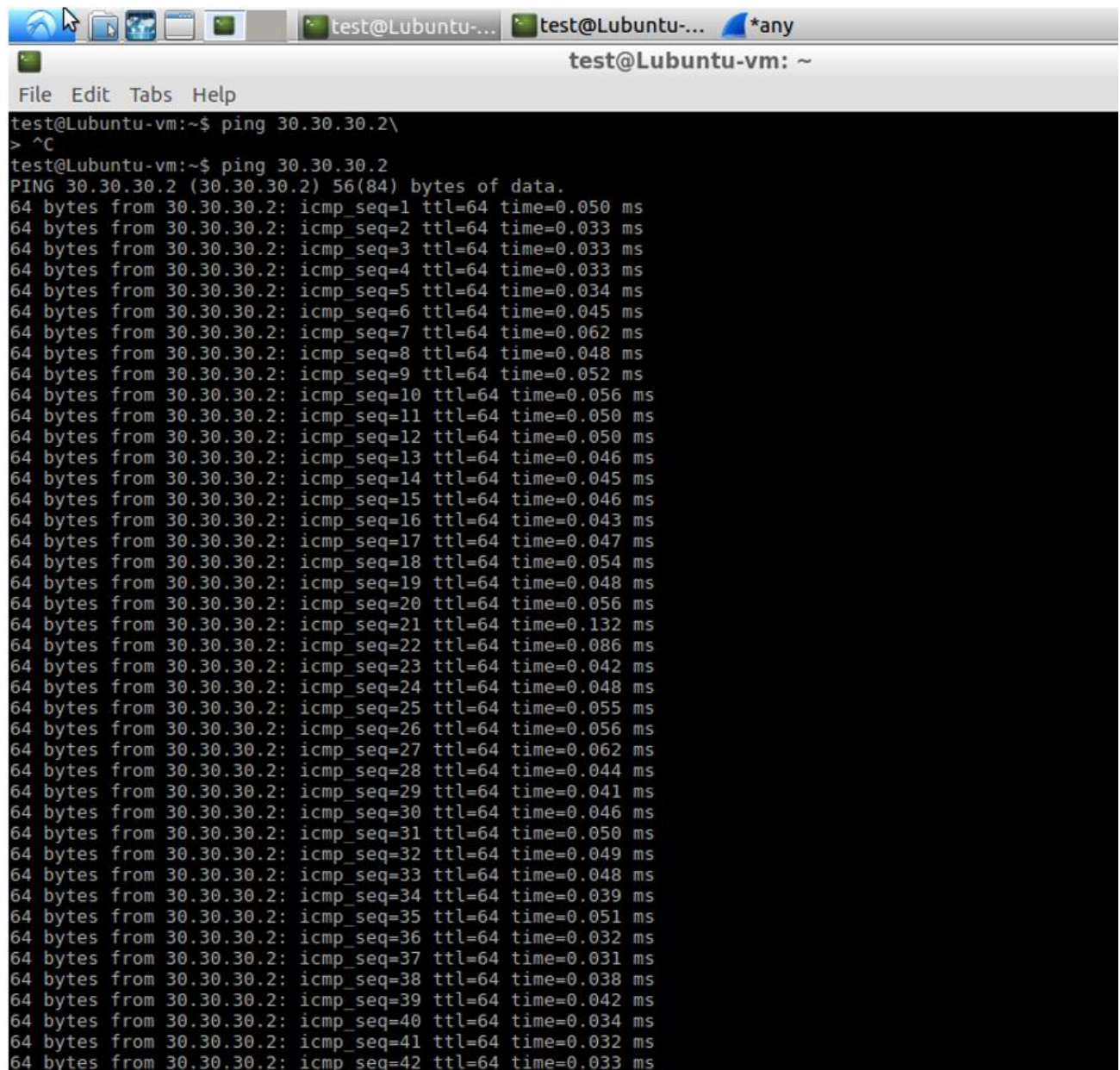
>> Destination : 10.10.10.0/24
   Gateway(s)   : { if-port-1
                   0.0.0.0 }
   Source       : direct
   Flags        : -

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

>> Destination : 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        : R
operational> configure
Entering configuration mode with exclusive access.
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>
```

Client and server are now reachable. We can verify that by using the ping command.

A screenshot of a Linux terminal window. The window title is "test@Lubuntu-vm: ~". The terminal shows a user typing "ping 30.30.30.2" and pressing Enter. The output shows a successful ping to 30.30.30.2 with 56(84) bytes of data. The output lists 42 successful ping attempts, each showing "64 bytes from 30.30.30.2: icmp_seq=X ttl=64 time=Y ms" where X ranges from 1 to 42 and Y represents the round-trip time in milliseconds. The window has a standard Ubuntu desktop environment with a taskbar at the top showing icons for a web browser, file manager, and terminal. The terminal window has a menu bar with "File", "Edit", "Tabs", and "Help".

```
test@Lubuntu-vm:~$ ping 30.30.30.2
> ^C
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=64 time=0.050 ms
64 bytes from 30.30.30.2: icmp_seq=2 ttl=64 time=0.033 ms
64 bytes from 30.30.30.2: icmp_seq=3 ttl=64 time=0.033 ms
64 bytes from 30.30.30.2: icmp_seq=4 ttl=64 time=0.033 ms
64 bytes from 30.30.30.2: icmp_seq=5 ttl=64 time=0.034 ms
64 bytes from 30.30.30.2: icmp_seq=6 ttl=64 time=0.045 ms
64 bytes from 30.30.30.2: icmp_seq=7 ttl=64 time=0.062 ms
64 bytes from 30.30.30.2: icmp_seq=8 ttl=64 time=0.048 ms
64 bytes from 30.30.30.2: icmp_seq=9 ttl=64 time=0.052 ms
64 bytes from 30.30.30.2: icmp_seq=10 ttl=64 time=0.056 ms
64 bytes from 30.30.30.2: icmp_seq=11 ttl=64 time=0.050 ms
64 bytes from 30.30.30.2: icmp_seq=12 ttl=64 time=0.050 ms
64 bytes from 30.30.30.2: icmp_seq=13 ttl=64 time=0.046 ms
64 bytes from 30.30.30.2: icmp_seq=14 ttl=64 time=0.045 ms
64 bytes from 30.30.30.2: icmp_seq=15 ttl=64 time=0.046 ms
64 bytes from 30.30.30.2: icmp_seq=16 ttl=64 time=0.043 ms
64 bytes from 30.30.30.2: icmp_seq=17 ttl=64 time=0.047 ms
64 bytes from 30.30.30.2: icmp_seq=18 ttl=64 time=0.054 ms
64 bytes from 30.30.30.2: icmp_seq=19 ttl=64 time=0.048 ms
64 bytes from 30.30.30.2: icmp_seq=20 ttl=64 time=0.056 ms
64 bytes from 30.30.30.2: icmp_seq=21 ttl=64 time=0.132 ms
64 bytes from 30.30.30.2: icmp_seq=22 ttl=64 time=0.086 ms
64 bytes from 30.30.30.2: icmp_seq=23 ttl=64 time=0.042 ms
64 bytes from 30.30.30.2: icmp_seq=24 ttl=64 time=0.048 ms
64 bytes from 30.30.30.2: icmp_seq=25 ttl=64 time=0.055 ms
64 bytes from 30.30.30.2: icmp_seq=26 ttl=64 time=0.056 ms
64 bytes from 30.30.30.2: icmp_seq=27 ttl=64 time=0.062 ms
64 bytes from 30.30.30.2: icmp_seq=28 ttl=64 time=0.044 ms
64 bytes from 30.30.30.2: icmp_seq=29 ttl=64 time=0.041 ms
64 bytes from 30.30.30.2: icmp_seq=30 ttl=64 time=0.046 ms
64 bytes from 30.30.30.2: icmp_seq=31 ttl=64 time=0.050 ms
64 bytes from 30.30.30.2: icmp_seq=32 ttl=64 time=0.049 ms
64 bytes from 30.30.30.2: icmp_seq=33 ttl=64 time=0.048 ms
64 bytes from 30.30.30.2: icmp_seq=34 ttl=64 time=0.039 ms
64 bytes from 30.30.30.2: icmp_seq=35 ttl=64 time=0.051 ms
64 bytes from 30.30.30.2: icmp_seq=36 ttl=64 time=0.032 ms
64 bytes from 30.30.30.2: icmp_seq=37 ttl=64 time=0.031 ms
64 bytes from 30.30.30.2: icmp_seq=38 ttl=64 time=0.038 ms
64 bytes from 30.30.30.2: icmp_seq=39 ttl=64 time=0.042 ms
64 bytes from 30.30.30.2: icmp_seq=40 ttl=64 time=0.034 ms
64 bytes from 30.30.30.2: icmp_seq=41 ttl=64 time=0.032 ms
64 bytes from 30.30.30.2: icmp_seq=42 ttl=64 time=0.033 ms
```

Wireshark packet capture:

The screenshot shows a Linux desktop environment. In the background, a terminal window displays the command `test@Lubuntu-vm:~$ ping 30.30.30.2` and its output, showing successful ping responses from 30.30.30.2 to 30.30.30.2. In the foreground, the Wireshark network protocol analyzer is open, capturing traffic on interface 0. The packet list shows several ICMP Echo (ping) request and reply packets. The packet details pane for the selected packet (No. 838) shows the following structure:

- Frame 1: 100 bytes on wire (800 bits), 100 bytes captured (800 bits) on interface 0
- Linux cooked capture
- Internet Protocol Version 4, Src: 10.10.10.2, Dst: 30.30.30.2
- Internet Control Message Protocol

The packet bytes pane shows the raw data of the selected packet, including the ICMP Echo (ping) request and reply fields.

Using tracepath command:

```
test@Lubuntu-vm:~$ tracepath -n 30.30.30.2
  1?: [LOCALHOST]                pmtu 1500
  1:  10.10.10.1                  0.345ms
  1:  10.10.10.1                  0.256ms
  2:  20.20.20.2                  0.493ms
  3:  30.30.30.2                  0.907ms reached
    Resume: pmtu 1500 hops 3 back 3
test@Lubuntu-vm:~$
```