

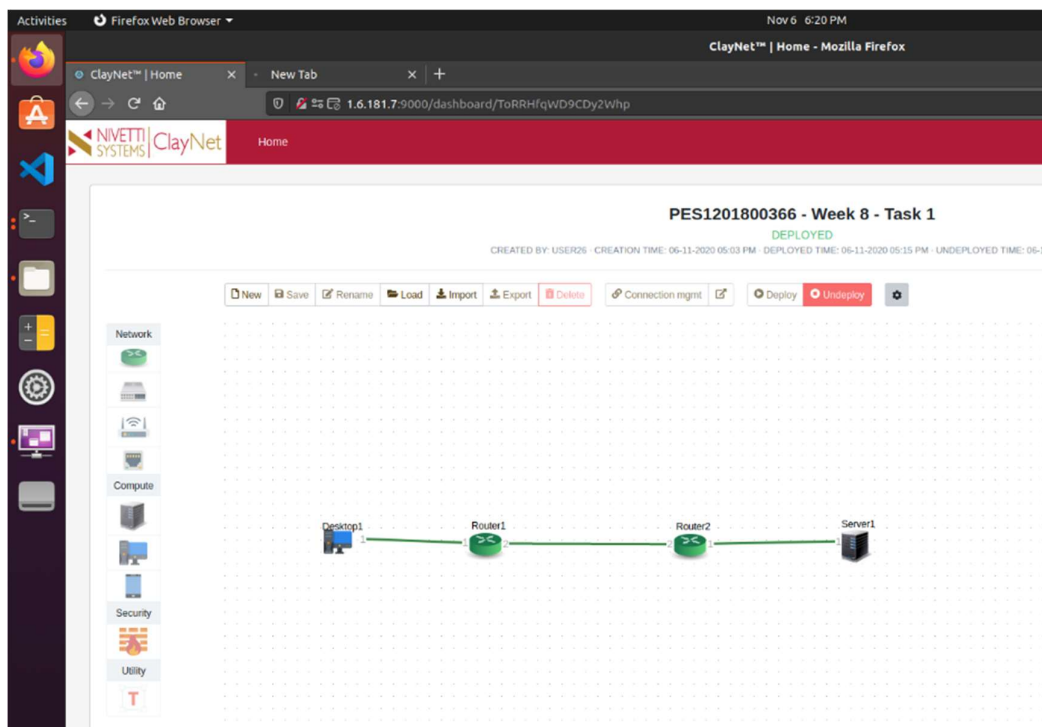
CN Lab Report – Week 8

PES1201800366

Aditeya Baral

1. IPv4 Addressing and Topology Creation

- The following topology is created and deployed on **ClayNet**.



- The configuration of all the end-system devices is shown below.

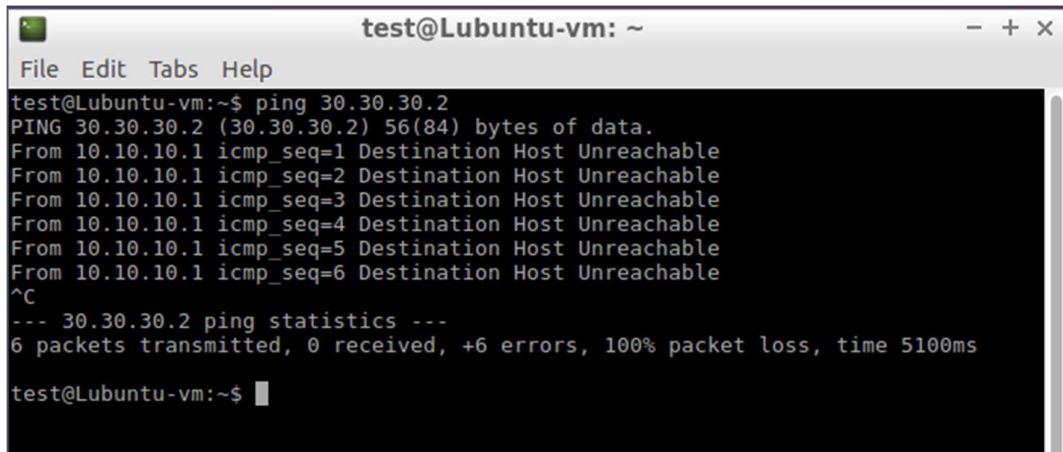
End System	IP Address	Gateway
Desktop1	10.10.10.2/24	10.10.10.1
Server1	30.30.30.2/24	30.30.30.1

- Similarly, the routers are configured in the same manner.

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

2. Ping Command

- From Desktop1, a **ping** command is made to Server1.
- However, this ping command fails because the routing table entries have not been configured yet for Router1 and Router2.
- We obtain a **Destination Host Unreachable** status.

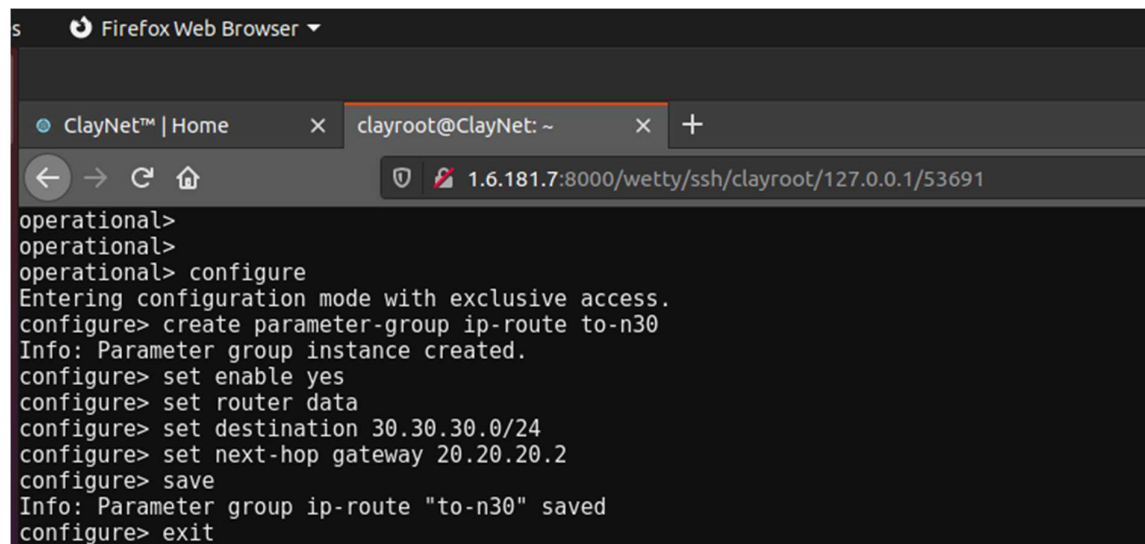


```
test@Lubuntu-vm: ~  
File Edit Tabs Help  
test@Lubuntu-vm:~$ ping 30.30.30.2  
PING 30.30.30.2 (30.30.30.2) 56(84) bytes of data.  
From 10.10.10.1 icmp_seq=1 Destination Host Unreachable  
From 10.10.10.1 icmp_seq=2 Destination Host Unreachable  
From 10.10.10.1 icmp_seq=3 Destination Host Unreachable  
From 10.10.10.1 icmp_seq=4 Destination Host Unreachable  
From 10.10.10.1 icmp_seq=5 Destination Host Unreachable  
From 10.10.10.1 icmp_seq=6 Destination Host Unreachable  
^C  
--- 30.30.30.2 ping statistics ---  
6 packets transmitted, 0 received, +6 errors, 100% packet loss, time 5100ms  
test@Lubuntu-vm:~$
```

3. Configuration of Routing Table Entries

3.1 Router 1

- The Routing Table entries for Router 1 are configured using the below commands in the console window.



```
operational>  
operational>  
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
```

- The resulting Routing Table Entry is shown below.

```

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

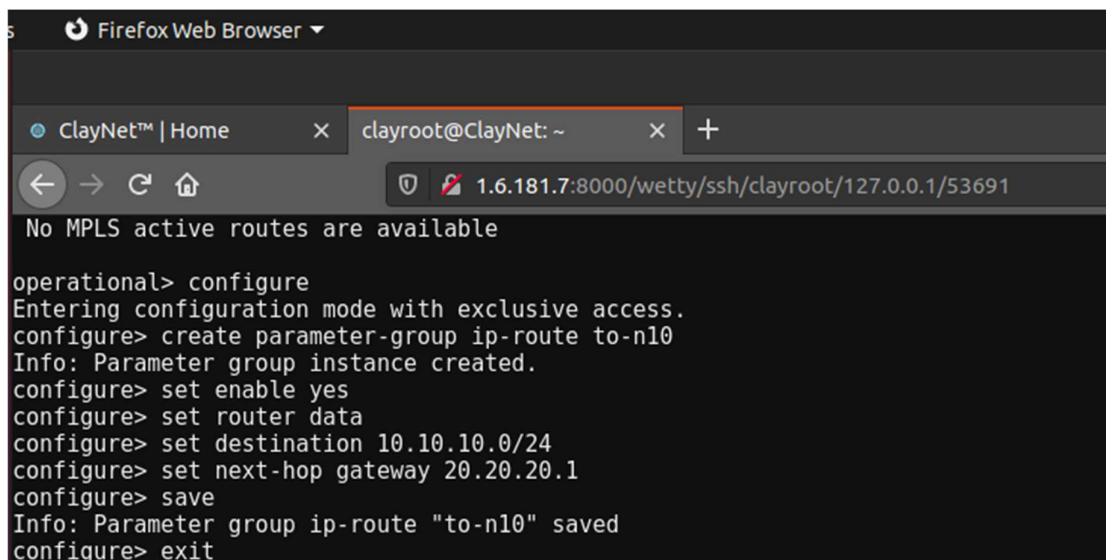
>> Destination : 127.0.0.1/32
   Gateway(s)  : { ^loopback-1
                   127.0.0.1 }
   Source      : direct
   Flags       : -

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

```

3.1 Router 2

- The Routing Table entries for Router 2 are configured using the below commands in the console window.



The screenshot shows a Firefox Web Browser window with a single tab titled "clayroot@ClayNet: ~". The address bar displays "1.6.181.7:8000/wetty/ssh/clayroot/127.0.0.1/53691". The terminal content shows the following commands and output:

```

No MPLS active routes are available

operational> configure
Entering configuration mode with exclusive access.
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

```

- The resulting Routing Table Entry is shown below.

```
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

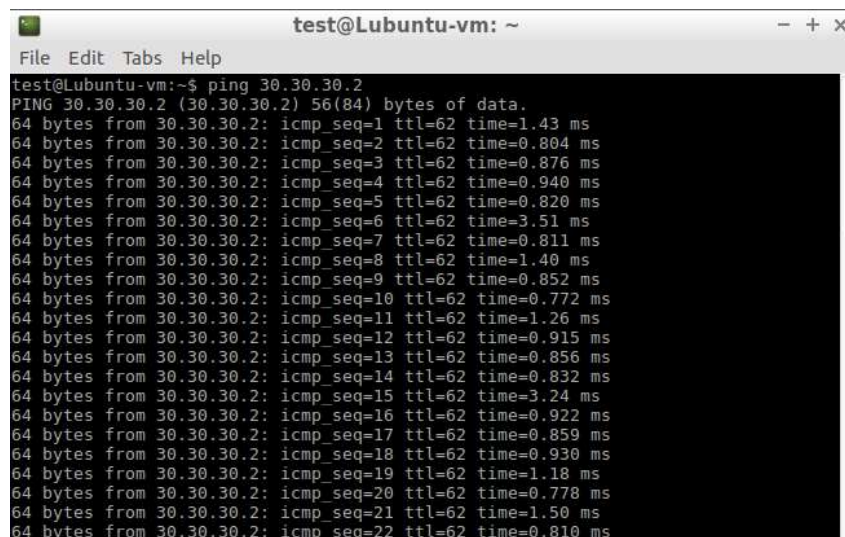
>> Destination : 127.0.0.1/32
Gateway(s) : { ^loopback-1
               127.0.0.1 }
Source      : direct
Flags      : -

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

operational>
```

4. Observations

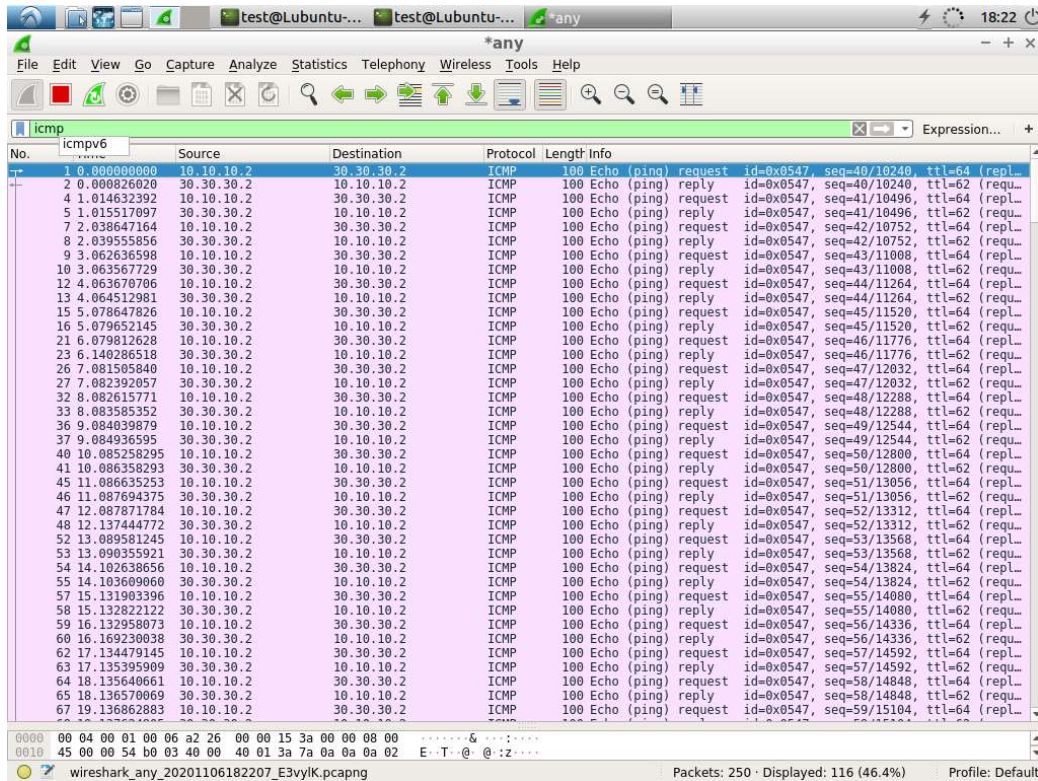
- Desktop1 and Server1 are now reachable from each other.
- To verify this, the **ping** command is again used to ICMP request packets to the other.
- Since there are 2 hops between the systems, the TTL value is decremented by 2. Hence the value is decremented from its default value of 64 to 62.



```
test@Lubuntu-vm: ~
File Edit Tabs Help

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=1.43 ms
64 bytes from 30.30.30.2: icmp_seq=2 ttl=62 time=0.804 ms
64 bytes from 30.30.30.2: icmp_seq=3 ttl=62 time=0.876 ms
64 bytes from 30.30.30.2: icmp_seq=4 ttl=62 time=0.940 ms
64 bytes from 30.30.30.2: icmp_seq=5 ttl=62 time=0.820 ms
64 bytes from 30.30.30.2: icmp_seq=6 ttl=62 time=3.51 ms
64 bytes from 30.30.30.2: icmp_seq=7 ttl=62 time=0.811 ms
64 bytes from 30.30.30.2: icmp_seq=8 ttl=62 time=1.40 ms
64 bytes from 30.30.30.2: icmp_seq=9 ttl=62 time=0.852 ms
64 bytes from 30.30.30.2: icmp_seq=10 ttl=62 time=0.772 ms
64 bytes from 30.30.30.2: icmp_seq=11 ttl=62 time=1.26 ms
64 bytes from 30.30.30.2: icmp_seq=12 ttl=62 time=0.915 ms
64 bytes from 30.30.30.2: icmp_seq=13 ttl=62 time=0.856 ms
64 bytes from 30.30.30.2: icmp_seq=14 ttl=62 time=0.832 ms
64 bytes from 30.30.30.2: icmp_seq=15 ttl=62 time=3.24 ms
64 bytes from 30.30.30.2: icmp_seq=16 ttl=62 time=0.922 ms
64 bytes from 30.30.30.2: icmp_seq=17 ttl=62 time=0.859 ms
64 bytes from 30.30.30.2: icmp_seq=18 ttl=62 time=0.930 ms
64 bytes from 30.30.30.2: icmp_seq=19 ttl=62 time=1.18 ms
64 bytes from 30.30.30.2: icmp_seq=20 ttl=62 time=0.778 ms
64 bytes from 30.30.30.2: icmp_seq=21 ttl=62 time=1.50 ms
64 bytes from 30.30.30.2: icmp_seq=22 ttl=62 time=0.810 ms
```

- The following Wireshark Packet Capture shows ICMP request packets being sent from Desktop1 to Server1.



- The following screenshot displays the outcome of the traceroute command from Desktop1 to Server1.

