

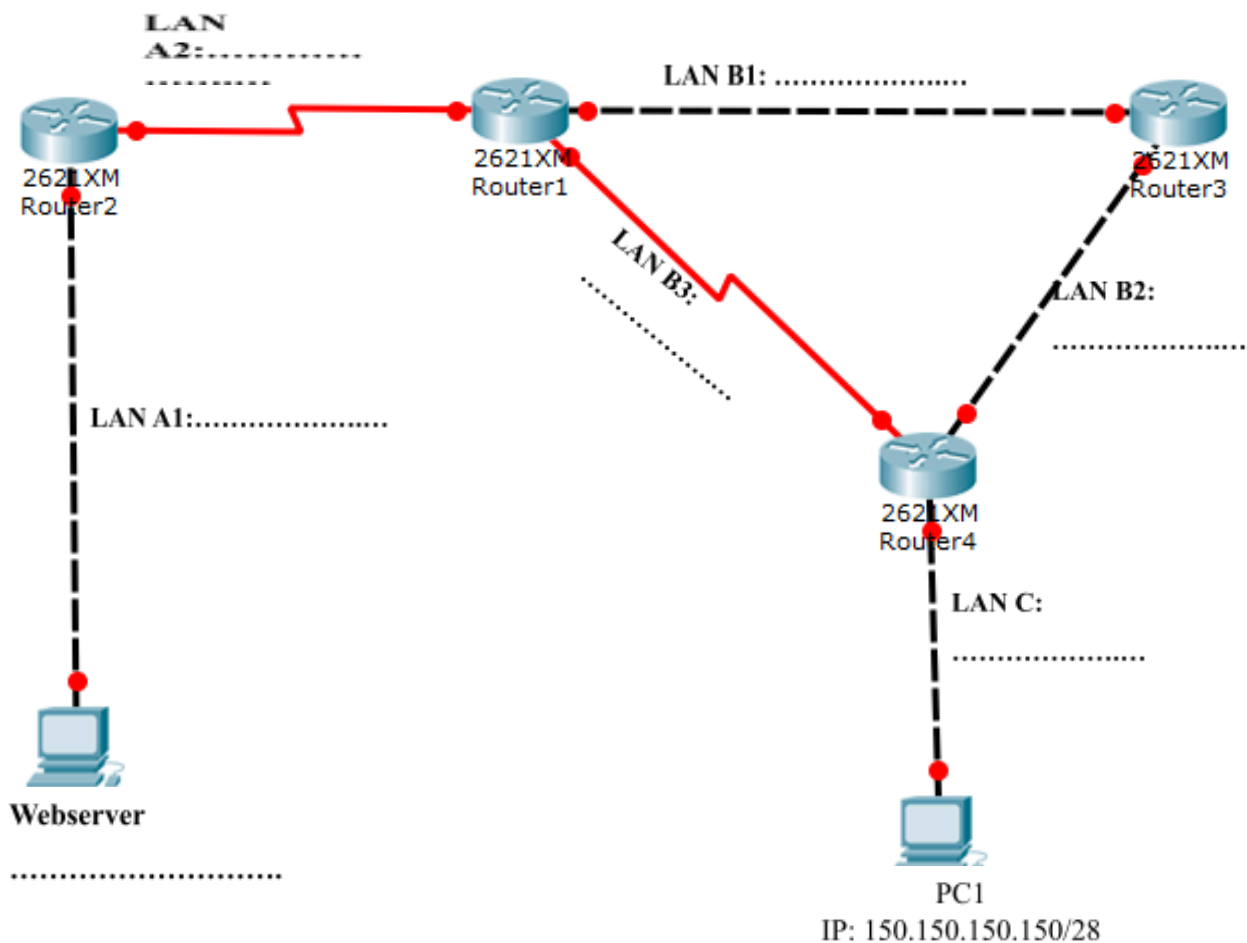
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ID: B2206008

Group: M02

Construct a network system as follows:

- LAN A has a single network address of 156.156.156.0/24, using static routing. LAN A is divided into 2 subnets, consisting of A1 and A2. In addition, there is a Web server running a simple webpage showing “YEAH! My name is *YOUR_FULL_NAME*” (replace *YOUR_FULL_NAME* by your full name) in LAN A1.
- LAN B1 has a network address of 140.140.140.0/27, using the RIPv2 protocol.
- LAN B2 has a network address of 140.140.140.128/27, using the RIPv2 protocol.
- LAN B3 has a network address of 140.140.140.192/27, using the RIPv2 protocol.
- LAN C includes PC1 and Router 4. The IP address of PC1 is 150.150.150.150/28.

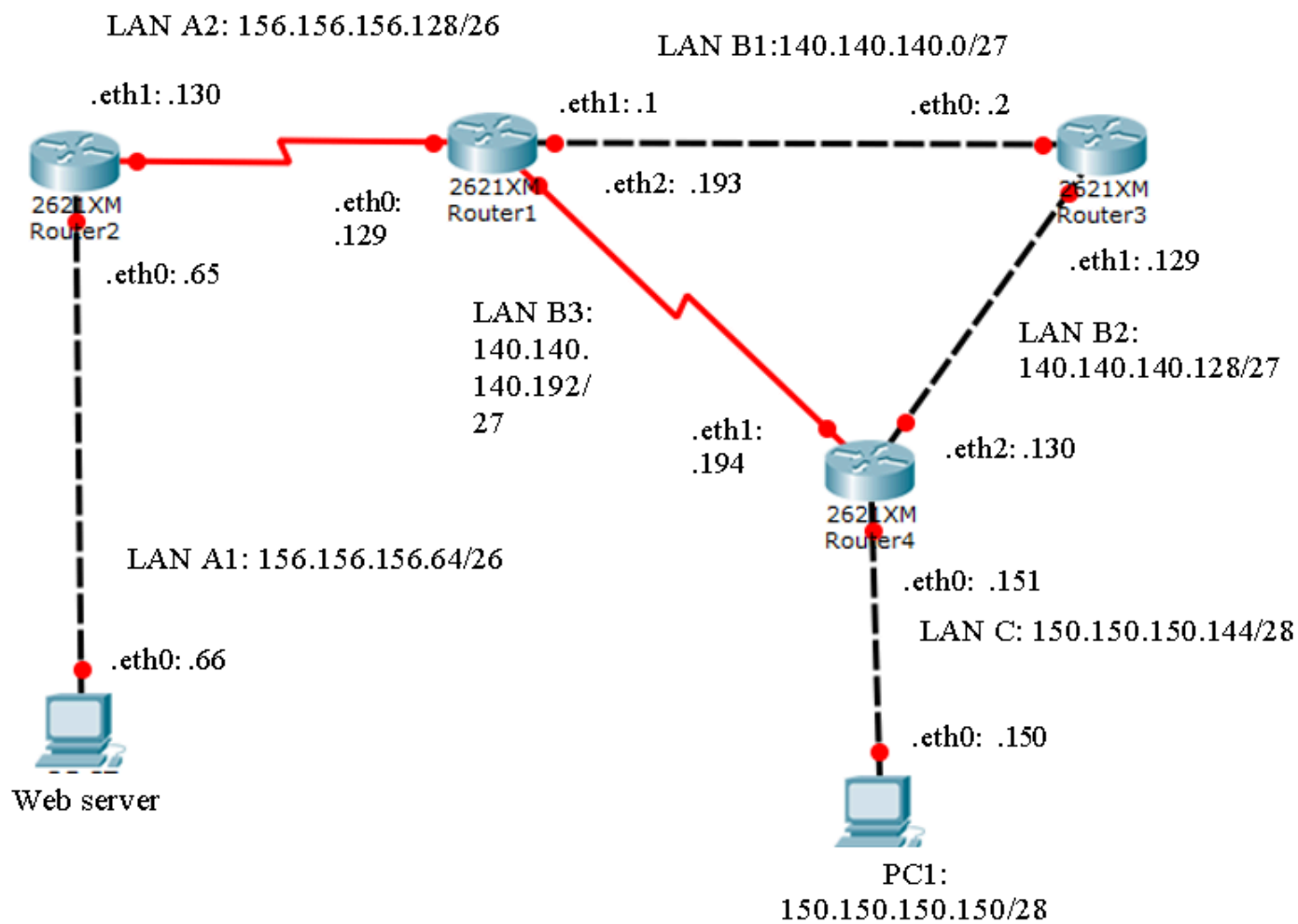


Please take screenshots showing:

1. (0,5 point) select and assign the IP addresses for all of the Ethernet interfaces.
2. (1,0 point) the directory tree structure of this network system (using the *tree* command).
3. (1,0 point) the content of the file *lab.conf*?
4. (5,0 points) the content of all files *. *startup*
5. (1,0 point) the contents of all files and commands you use in order to set up the web service on the web server
6. (0,5 point) the command line to check the hops for transmitting data from PC1 to the web server?
List all hops between PC1 and the Web server.
7. (1,0 points) check the network system constructed (using the *ping* command).

*****GOOD LUCK*****

1. Select and assign the IP addresses for all of the Ethernet interfaces.



2. The directory tree structure of this network system (using the *tree* command).

UbuntuB2206008 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

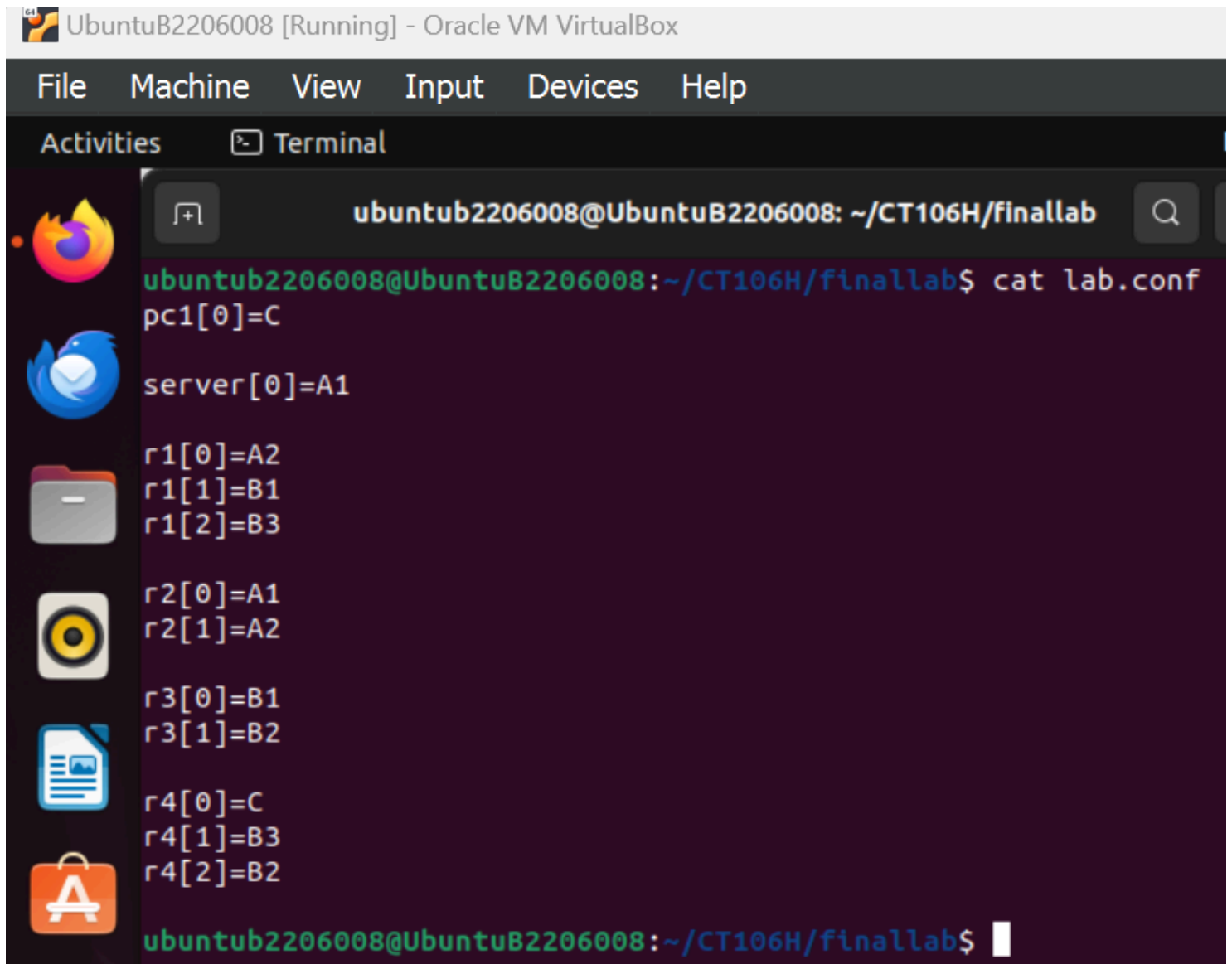
Activities Terminal

ubuntub2206008@UbuntuB2206008: ~/CT106H/finallab

```
ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$ tree
.
├── lab.conf
├── pc1
├── pc1.startup
├── r1
│   └── etc
│       └── quagga
│           ├── daemons
│           ├── ripd.conf
│           └── zebra.conf
├── r1.startup
├── r2
├── r2.startup
├── r3
│   └── etc
│       └── quagga
│           ├── daemons
│           ├── ripd.conf
│           └── zebra.conf
├── r3.startup
├── r4
│   └── etc
│       └── quagga
│           ├── daemons
│           ├── ripd.conf
│           └── zebra.conf
├── r4.startup
├── server
│   └── var
│       └── www
│           └── html
│               └── index.html
├── server.startup
└── shared

16 directories, 17 files
ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$
```

3. The content of the file *lab.conf*?



The screenshot shows a terminal window titled "UbuntuB2206008 [Running] - Oracle VM VirtualBox". The terminal is running the command `cat lab.conf` in the directory `~/CT106H/finallab`. The output of the command is as follows:

```
pc1[0]=C
server[0]=A1
r1[0]=A2
r1[1]=B1
r1[2]=B3
r2[0]=A1
r2[1]=A2
r3[0]=B1
r3[1]=B2
r4[0]=C
r4[1]=B3
r4[2]=B2
```

The terminal prompt is `ubuntub2206008@UbuntuB2206008: ~/CT106H/finallab$`.

4. The content of all files *.startup

UbuntuB2206008 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal Nov 12

ubuntub2206008@UbuntuB2206008: ~/CT106H/finallab

```
ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$ cat r1.startup
ifconfig eth0 156.156.156.129/26 up
ifconfig eth1 140.140.140.1/27 up
ifconfig eth2 140.140.140.193/27 up
route add -net 156.156.156.0/24 gw 156.156.156.130
/etc/init.d/quagga start

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$ cat r2.startup
ifconfig eth0 156.156.156.65/26 up
ifconfig eth1 156.156.156.130/26 up
route add default gw 156.156.156.129

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$ cat r3.startup
ifconfig eth0 140.140.140.2/27 up
ifconfig eth1 140.140.140.129/27 up
route add default gw 140.140.140.1
/etc/init.d/quagga start

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$ cat r4.startup
ifconfig eth0 150.150.150.151/28 up
ifconfig eth1 140.140.140.194/27 up
ifconfig eth2 140.140.140.130/27 up
route add default gw 140.140.140.193
/etc/init.d/quagga start

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$ cat server.startup
ifconfig eth0 156.156.156.66/26 up
route add default gw 156.156.156.65
/etc/init.d/apache2 start

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$ cat pc1.startup
ifconfig eth0 150.150.150.152/28 up
route add default gw 150.150.150.151

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$
```

ubuntub2206008@UbuntuB2206008: ~/CT106H/finallab

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab\$ cat r1/etc/quagga/daemons

zebra=yes

bgpd=no

ospfd=no

ospf6d=no

ripd=yes

ripngd=no

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab\$ cat r1/etc/quagga/ripd.conf

hostname ripd

password zebra

enable password zebra

router rip

network 140.140.140.0/24

redistribute connected

log file /var/log/zebra/ripd.log

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab\$ cat r1/etc/quagga/zebra.conf

hostname r1

password zebra

enable password zebra

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab\$

ubuntub2206008@UbuntuB2206008: ~/CT106H/finallab

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab\$ cat r3/etc/quagga/zebra.conf

hostname r3

password zebra

enable password zebra

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab\$ cat r4/etc/quagga/zebra.conf

hostname r4

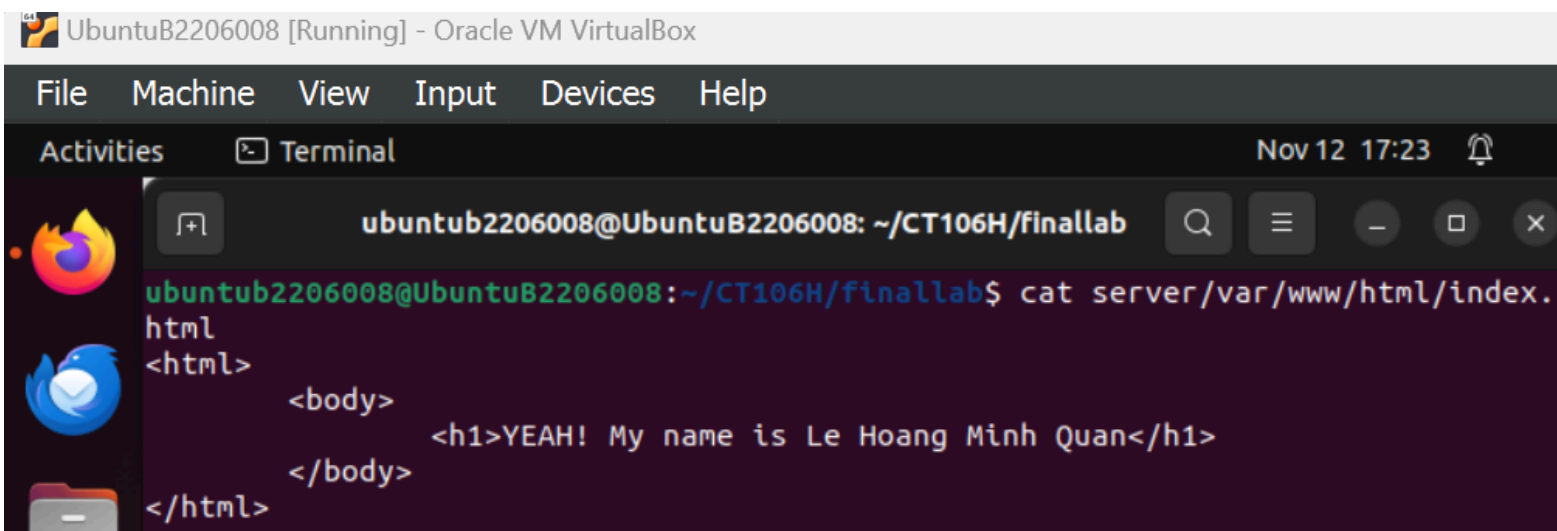
password zebra

enable password zebra

ubuntub2206008@UbuntuB2206008:~/CT106H/finallab\$

5. The contents of all files and commands you use in order to set up the web service on the web server

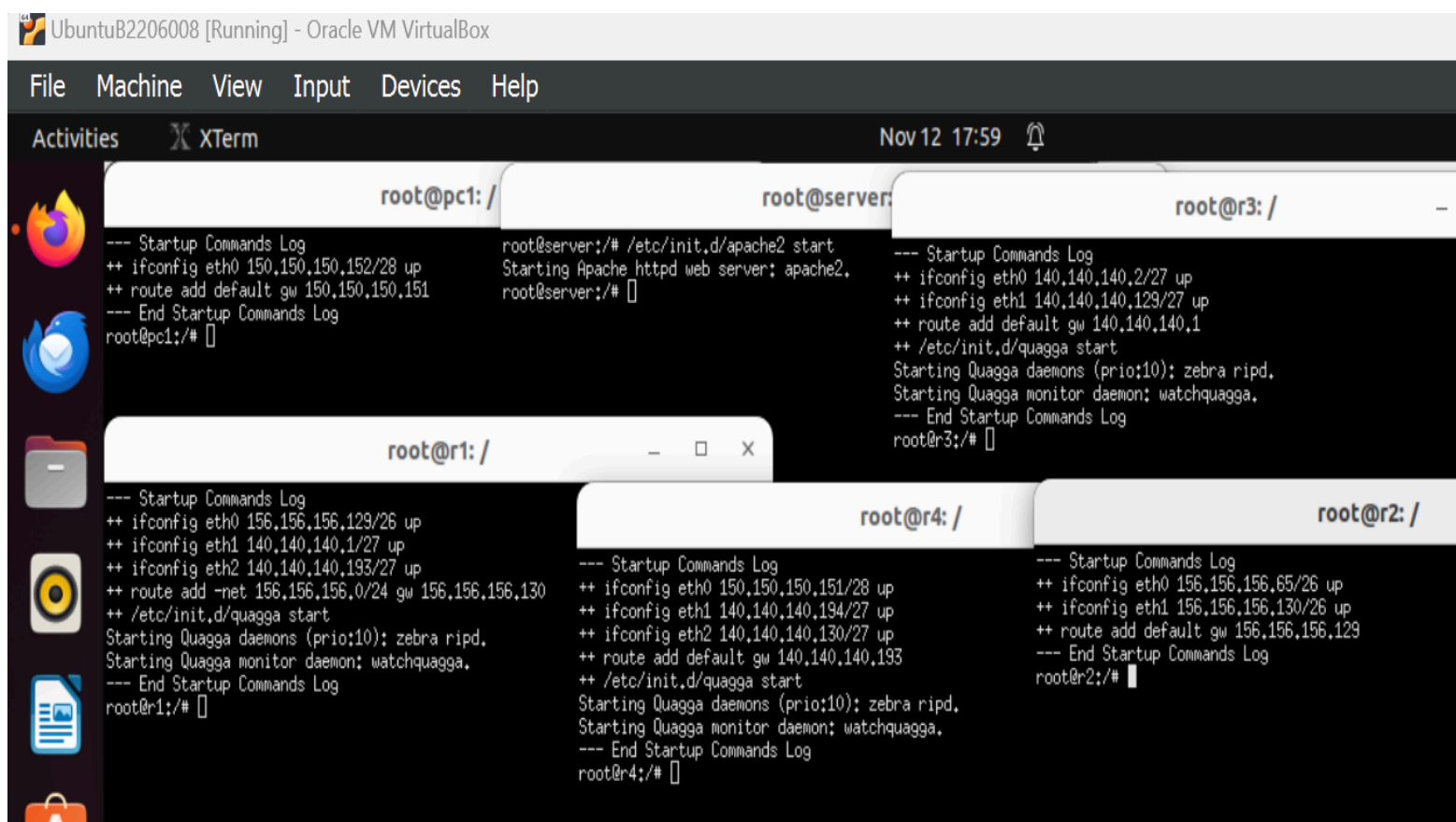
- Content of index.html file:



The screenshot shows a terminal window titled 'ubuntub2206008@UbuntuB2206008: ~/CT106H/finallab'. The user has executed the command 'cat server/var/www/html/index.html'. The output of the command is as follows:

```
ubuntub2206008@UbuntuB2206008:~/CT106H/finallab$ cat server/var/www/html/index.html
<html>
    <body>
        <h1>YEAH! My name is Le Hoang Minh Quan</h1>
    </body>
</html>
```

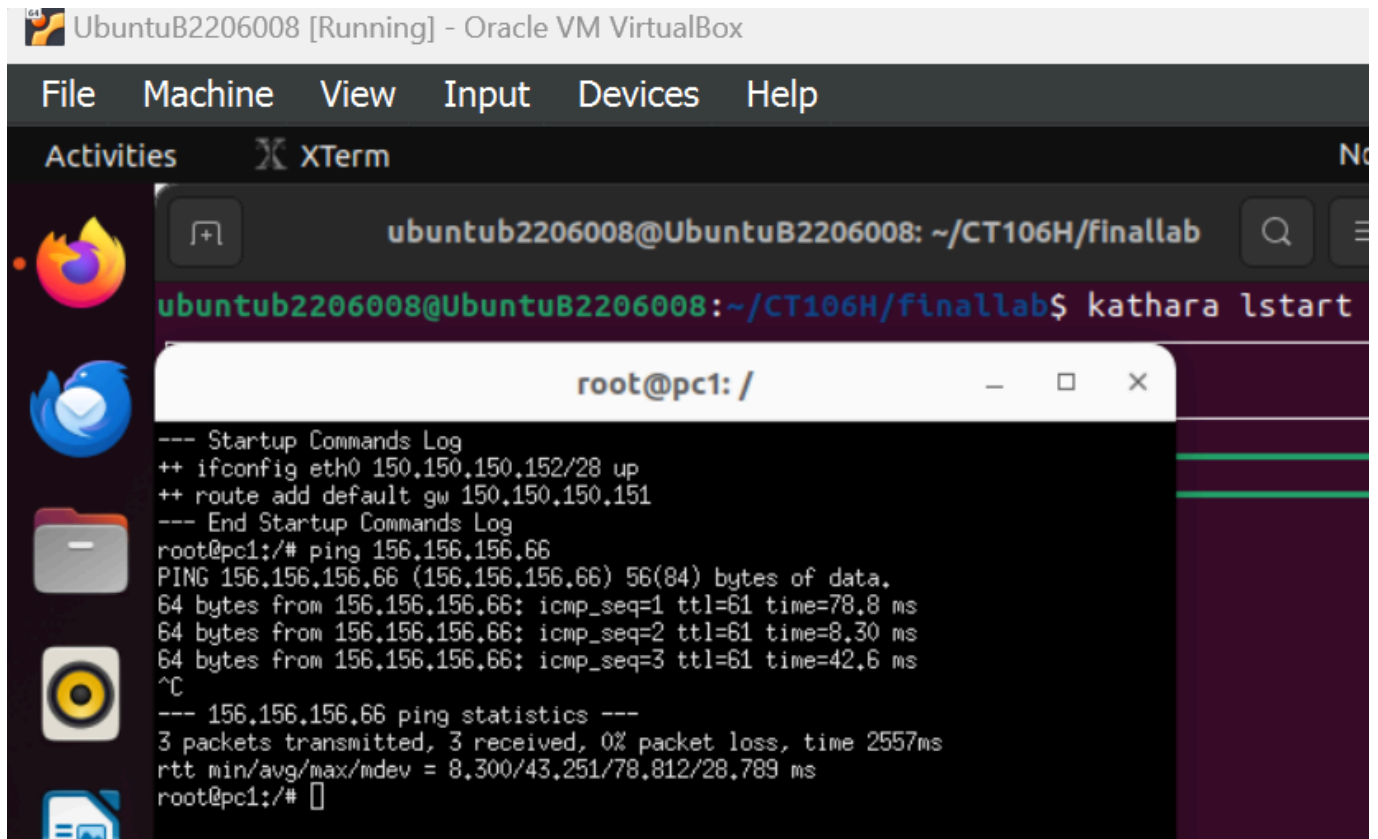
- kathara lstart



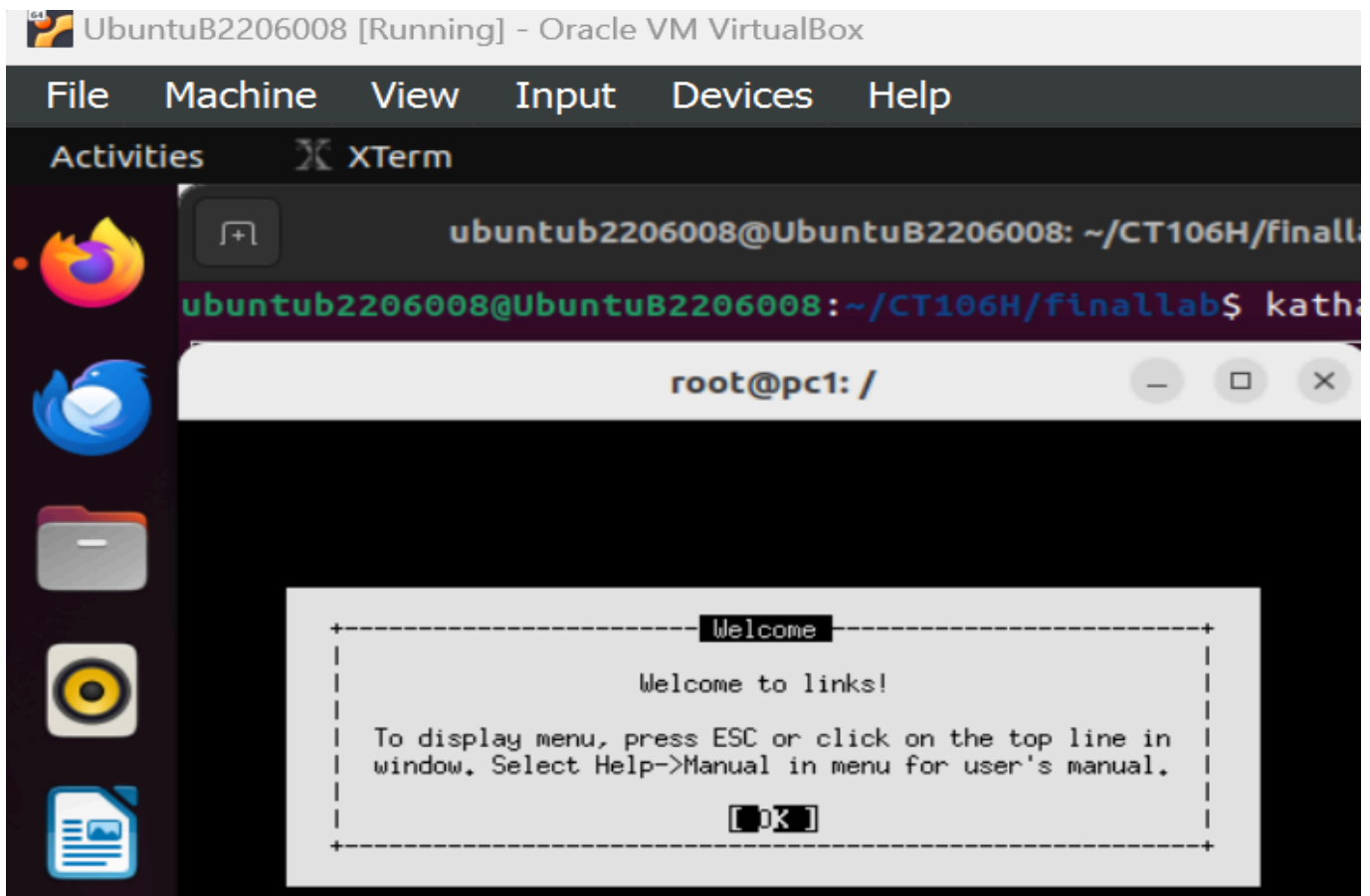
The screenshot displays several terminal windows, each representing a different host in a network topology. Each window shows the output of the 'kathara lstart' command, which includes startup logs for network interfaces, routing, and Quagga daemons. The hosts shown are:

- root@pc1: /**: Shows startup logs for interfaces eth0 (150.150.150.152/28), eth1 (140.140.140.129/27), and eth2 (140.140.140.193/27). It also shows the addition of a default gateway and the startup of Quagga daemons.
- root@server: /**: Shows the startup of the Apache web server.
- root@r3: /**: Shows startup logs for interfaces eth0 (140.140.140.2/27) and eth1 (140.140.140.129/27), the addition of a default gateway, and the startup of Quagga daemons.
- root@r1: /**: Shows startup logs for interfaces eth0 (156.156.156.129/26), eth1 (140.140.140.1/27), and eth2 (140.140.140.193/27). It also shows the addition of a default gateway and the startup of Quagga daemons.
- root@r4: /**: Shows startup logs for interfaces eth0 (150.150.150.151/28), eth1 (140.140.140.194/27), and eth2 (140.140.140.130/27). It also shows the addition of a default gateway and the startup of Quagga daemons.
- root@r2: /**: Shows startup logs for interfaces eth0 (156.156.156.65/26) and eth1 (156.156.156.130/26). It also shows the addition of a default gateway and the startup of Quagga daemons.

- On pc1:
 - ping to server: ping 156.156.156.66

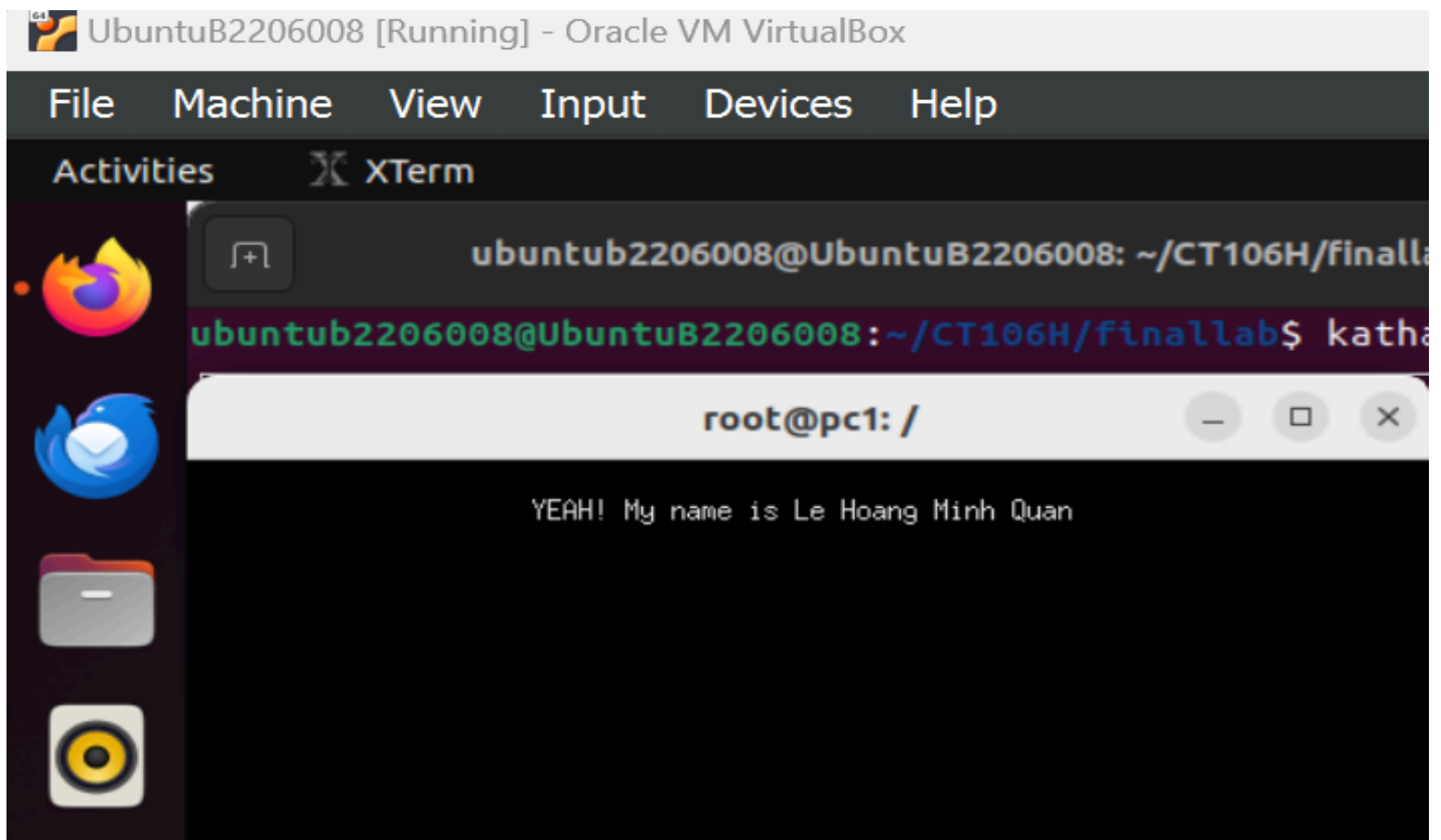
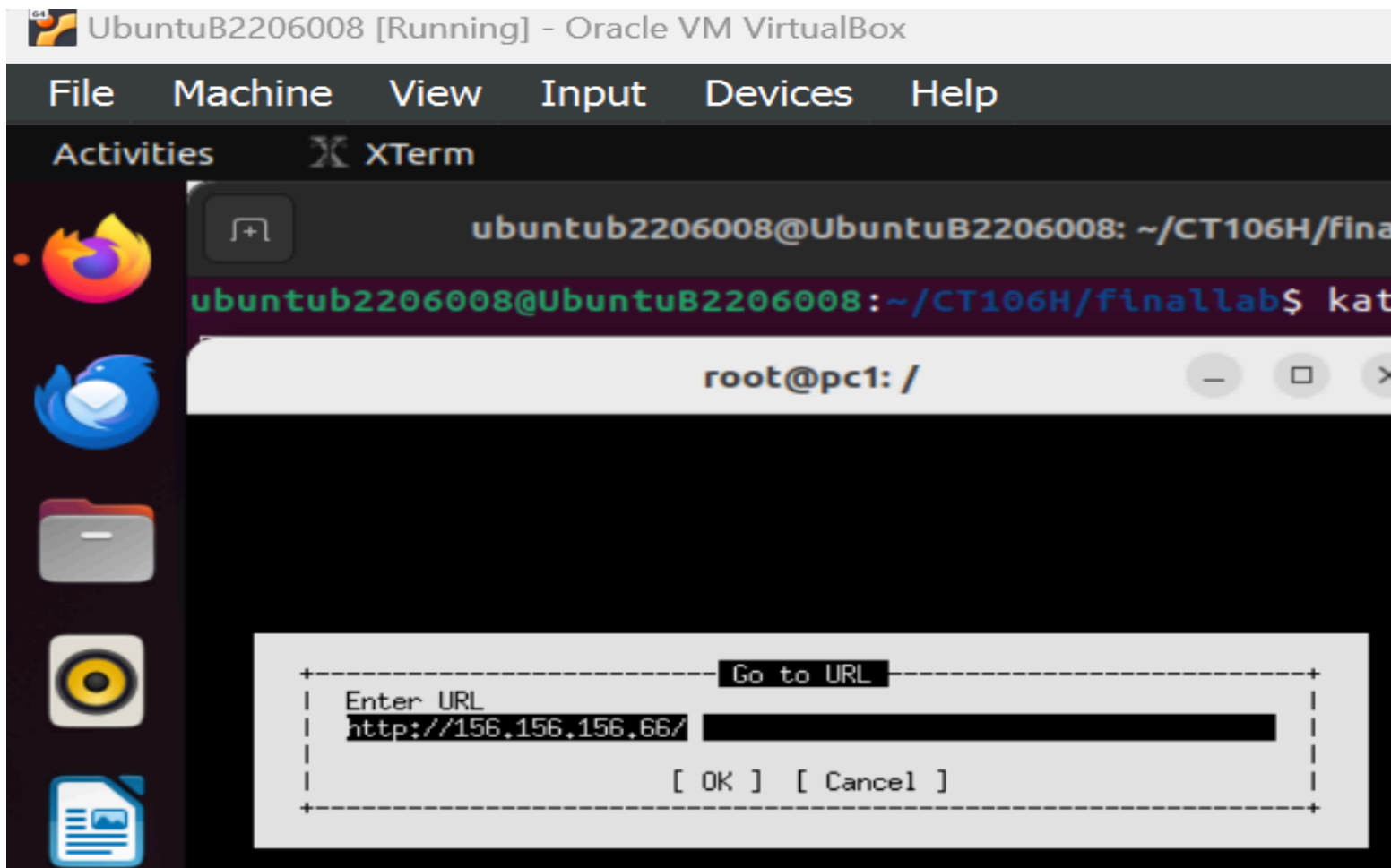


- Use links command
 - links



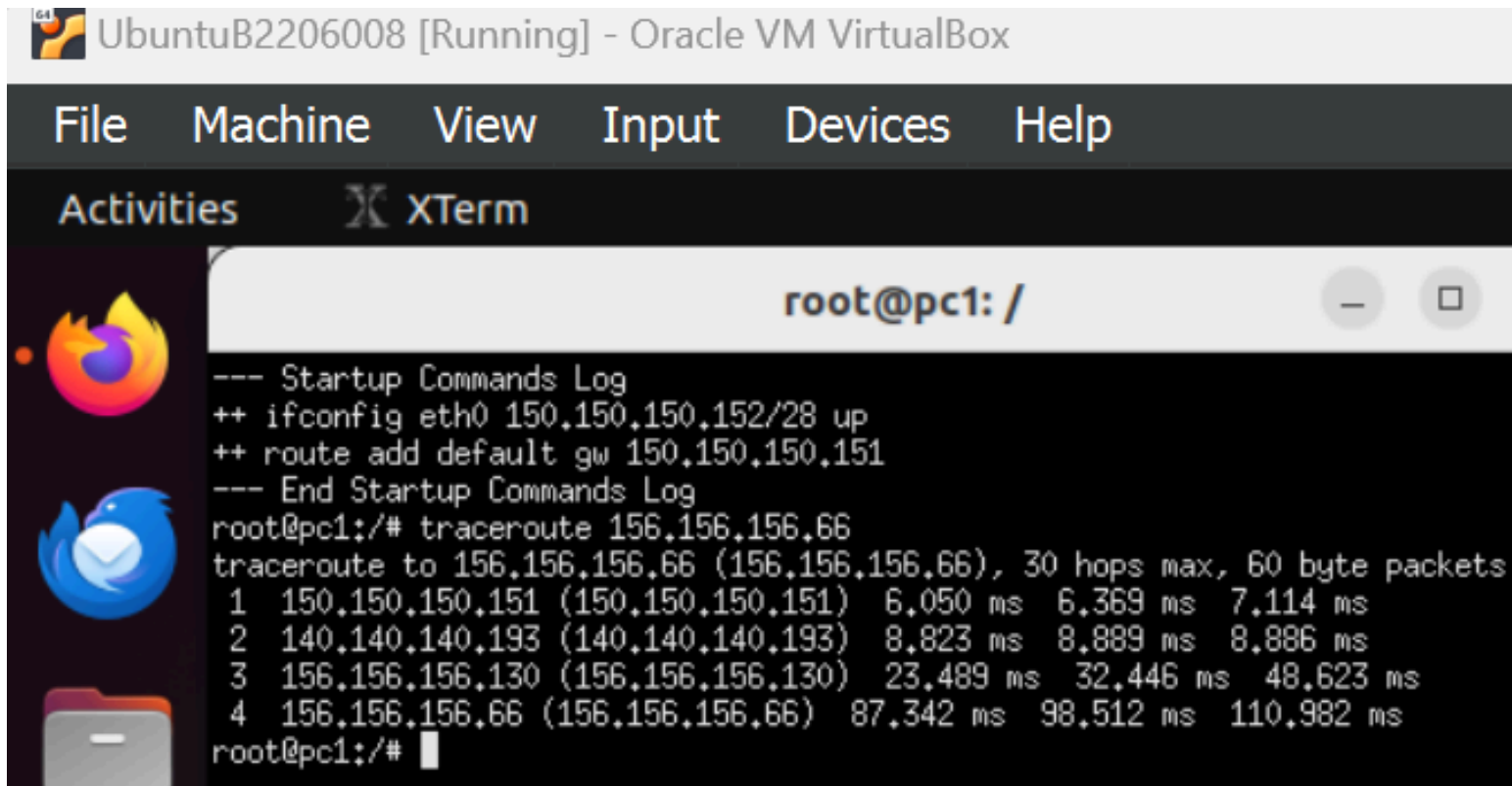
- Go to server by URL

- Press “F10” then choose “Go to URL” and type the server address <http://156.156.156.66/>



6. The command line to check the hops for transmitting data from PC1 to the web server? List all hops between PC1 and the Web server.

- Use traceroute command
- On pc1:
traceroute 156.156.156.66

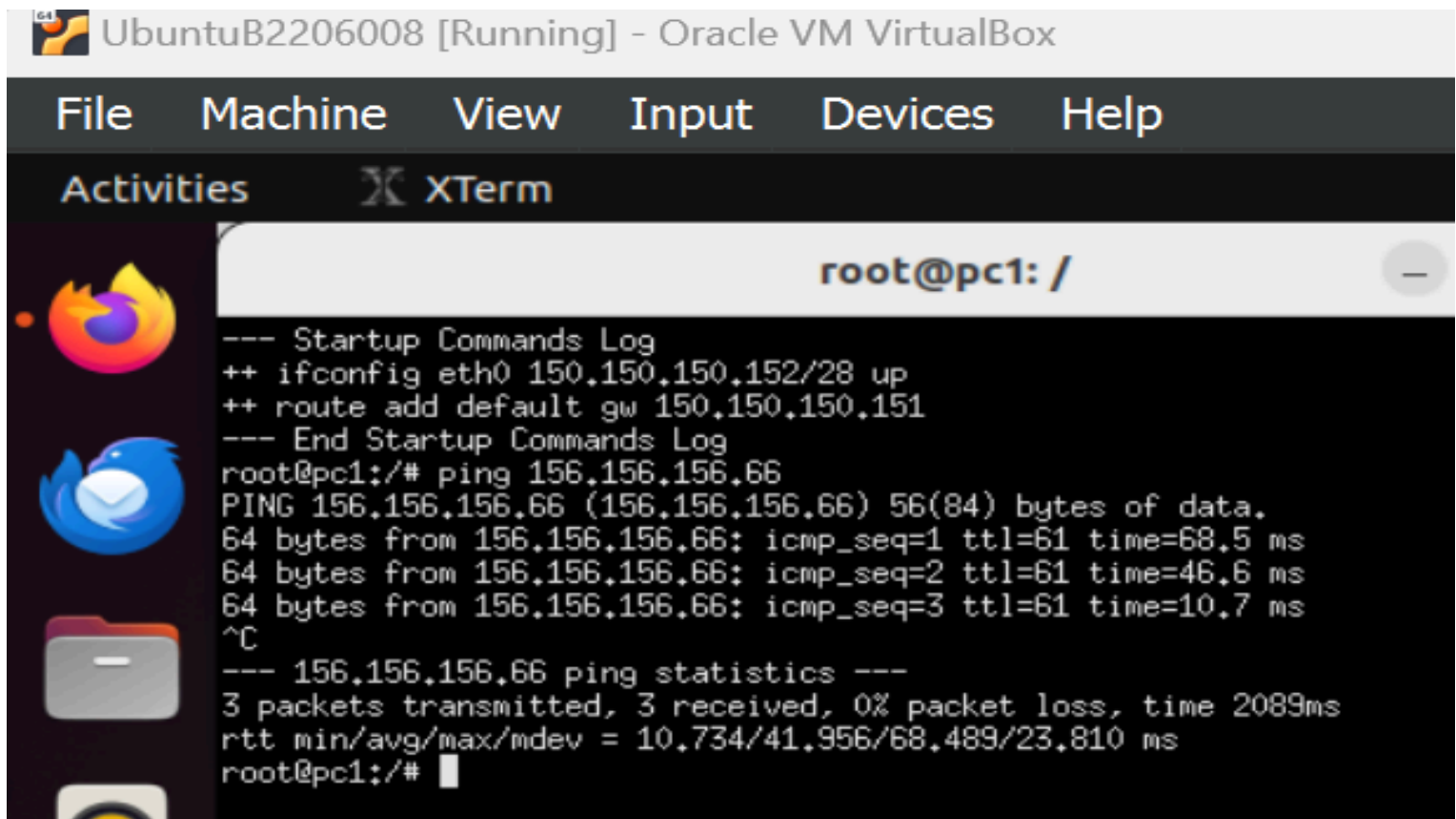


```
--- Startup Commands Log
++ ifconfig eth0 150.150.150.152/28 up
++ route add default gw 150.150.150.151
--- End Startup Commands Log
root@pc1:/# traceroute 156.156.156.66
traceroute to 156.156.156.66 (156.156.156.66), 30 hops max, 60 byte packets
 1 150.150.150.151 (150.150.150.151) 6.050 ms 6.369 ms 7.114 ms
 2 140.140.140.193 (140.140.140.193) 8.823 ms 8.889 ms 8.886 ms
 3 156.156.156.130 (156.156.156.130) 23.489 ms 32.446 ms 48.623 ms
 4 156.156.156.66 (156.156.156.66) 87.342 ms 98.512 ms 110.982 ms
root@pc1:/#
```

- Hop between pc1 and server:
4 hops:
Hop 1: 150.150.150.151 (r4 eth0)
Hop 2: 140.140.140.193 (r1 eth2)
Hop 3: 156.156.156.130 (r2 eth1)
Hop 4: 156.156.156.66 (server eth0)

7. Check the network system constructed (using the *ping* command).

- On pc1:
 - ping 156.156.156.66



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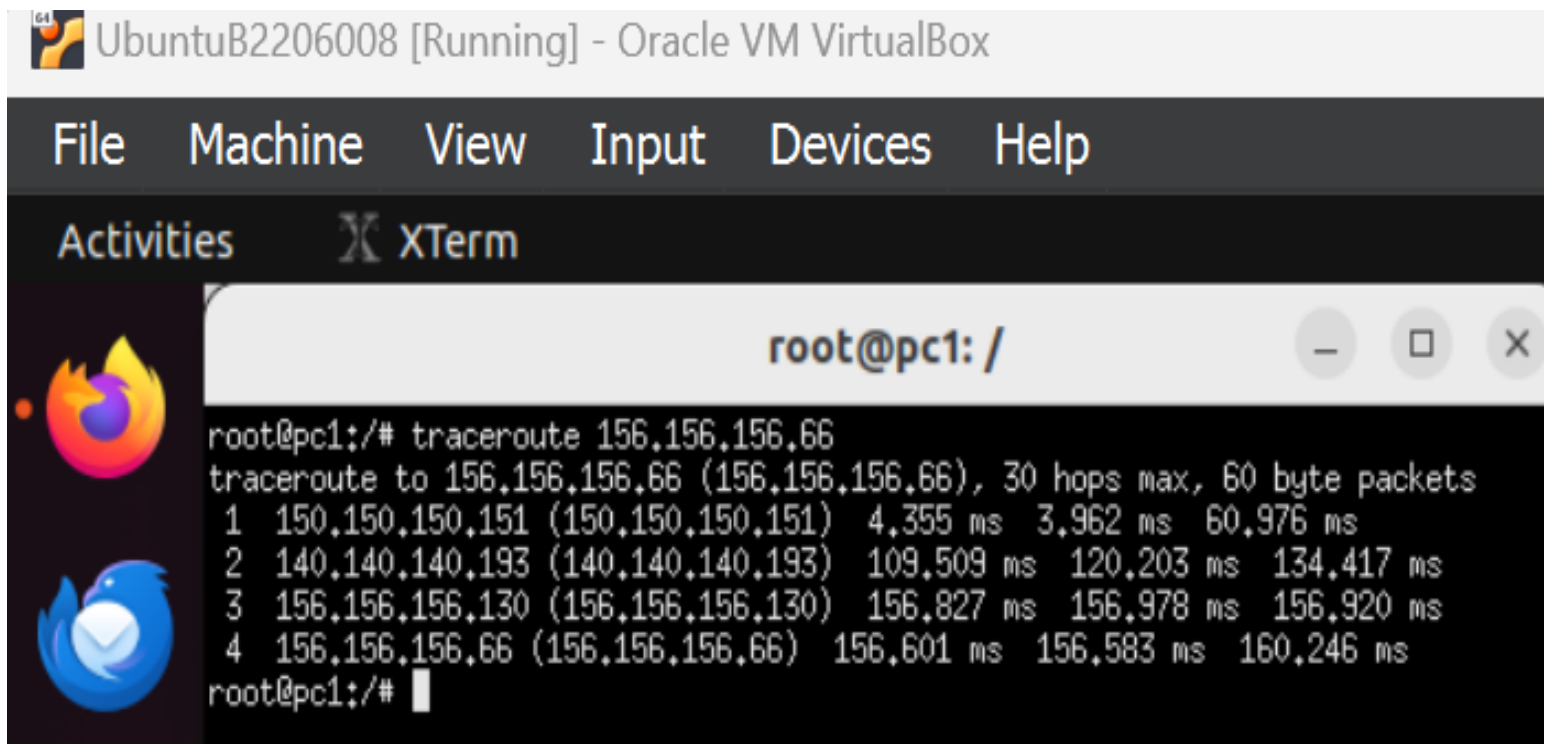
File Machine View Input Devices Help

Activities XTerm

```
root@pc1: /

--- Startup Commands Log
++ ifconfig eth0 150.150.150.152/28 up
++ route add default gw 150.150.150.151
--- End Startup Commands Log
root@pc1:/# ping 156.156.156.66
PING 156.156.156.66 (156.156.156.66) 56(84) bytes of data.
64 bytes from 156.156.156.66: icmp_seq=1 ttl=61 time=68.5 ms
64 bytes from 156.156.156.66: icmp_seq=2 ttl=61 time=46.6 ms
64 bytes from 156.156.156.66: icmp_seq=3 ttl=61 time=10.7 ms
^C
--- 156.156.156.66 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2089ms
rtt min/avg/max/mdev = 10.734/41.956/68.489/23.810 ms
root@pc1:/#
```

- traceroute 156.156.156.66



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File Machine View Input Devices Help

Activities XTerm

```
root@pc1: /

root@pc1:/# traceroute 156.156.156.66
traceroute to 156.156.156.66 (156.156.156.66), 30 hops max, 60 byte packets
 1 150.150.150.151 (150.150.150.151) 4.355 ms 3.962 ms 60.976 ms
 2 140.140.140.193 (140.140.140.193) 109.509 ms 120.203 ms 134.417 ms
 3 156.156.156.130 (156.156.156.130) 156.827 ms 156.978 ms 156.920 ms
 4 156.156.156.66 (156.156.156.66) 156.601 ms 156.583 ms 160.246 ms
root@pc1:/#
```