LAB 5

CONSTRUCT A SIMPLE NETWORK

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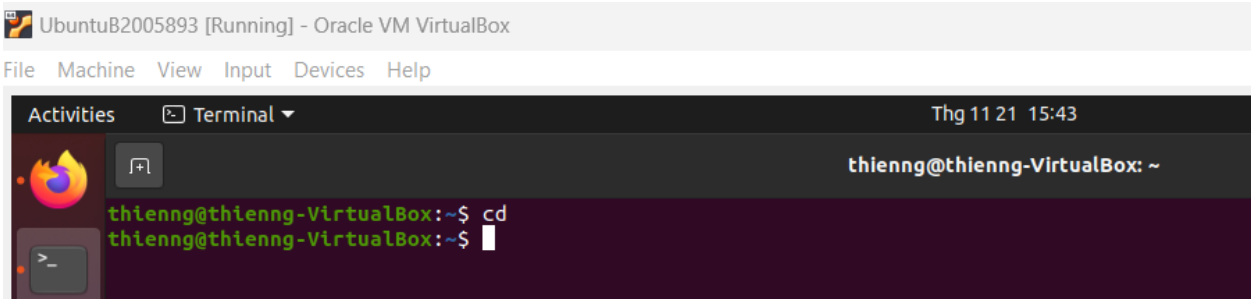
Group: M01

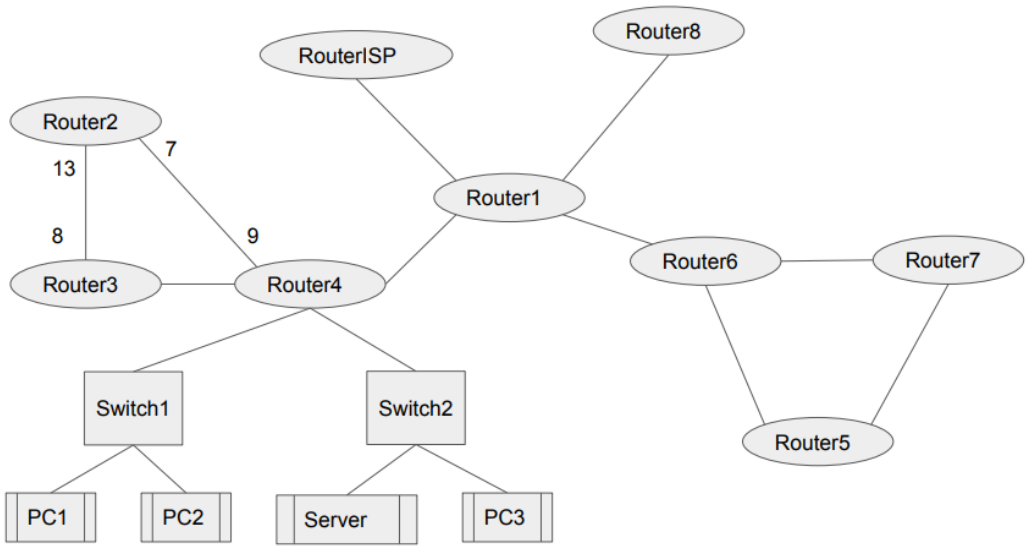
Submission: an ID_NAME_Lab05.pdf file describes clearly how did you solve the problem

Exercise 0: change the directory to your home directory

Answer: $cd



Exercise: Construct the network



Original network 142.12.128.0/20

→Netmask: 255.255.240.0

→Broadcast: 142.12.143.255

➔ The network has 6 LAN, in order to store it we need to use 3 bits for subnetting and 9 bits for representing hosts

# LAN	Subnet	Netmask	Broadcast	IP Range
1	142.12.128.0/23	255.255.254.0	142.12.129.255	142.12.128.1 - 142.12.129.254
2	142.12.130.0/23	255.255.254.0	142.12.131.255	142.12.130.1 - 142.12.131.254
3	142.12.132.0/23	255.255.254.0	142.12.133.255	142.12.132.1 - 142.12.133.254
4	142.12.134.0/23	255.255.254.0	142.12.135.255	142.12.134.1 - 142.12.135.254
5	142.12.136.0/23	255.255.254.0	142.12.137.255	142.12.136.1 - 142.12.137.254
6	142.12.138.0/23	255.255.254.0	142.12.139.255	142.12.138.1 - 142.12.139.254

Original network 190.190.190.0/25

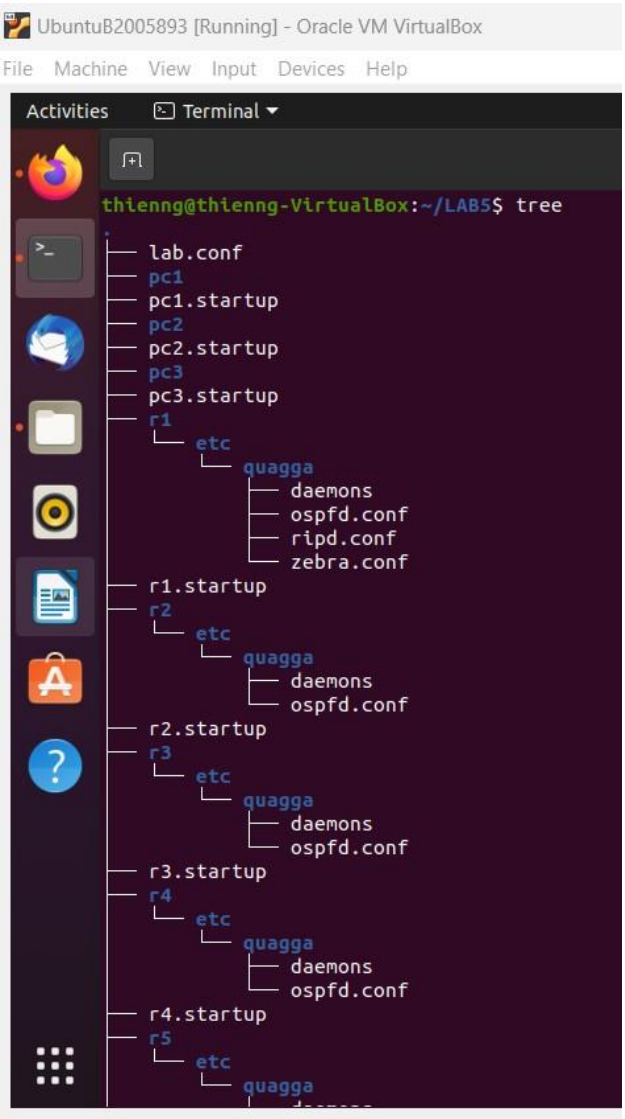
→Netmask: 255.255.255.128

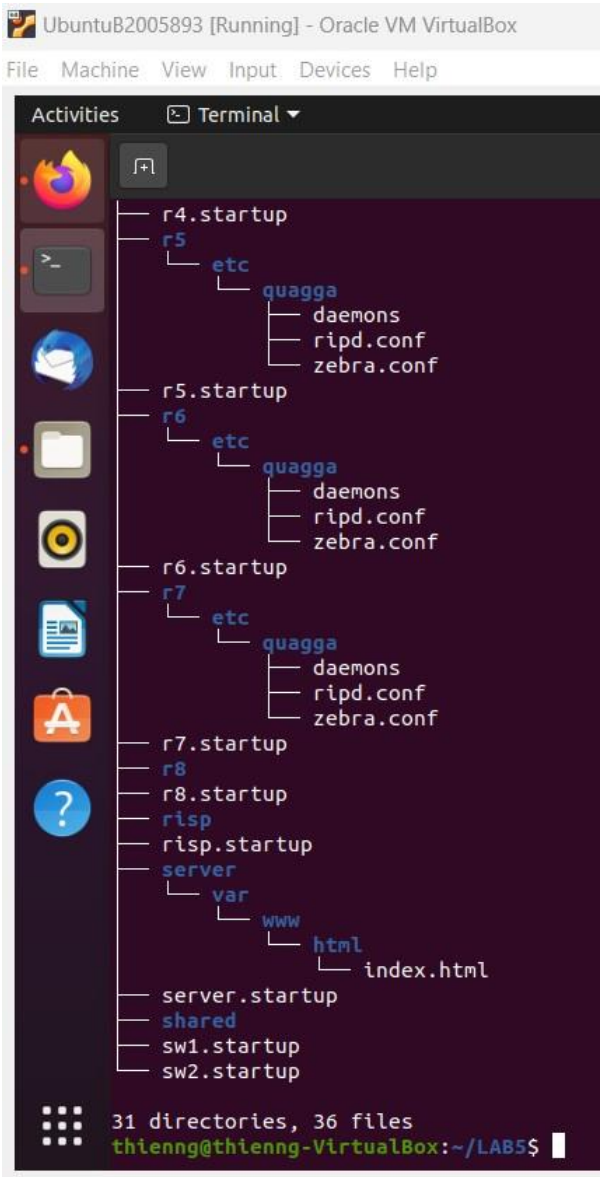
→Broadcast: 190.190.190.127

➔ The network has 5 Lan, in order to store it we need to use 3 bits for subnetting and 4 bits for representing hosts

# LAN	Subnet	Netmask	Broadcast	IP Range
1	190.190.190.0/28	255.255.255.240	190.190.190.15	190.190.190.1 - 190.190.190.14
2	190.190.190.16/28	255.255.255.240	190.190.190.31	190.190.190.17 - 190.190.190.30
3	190.190.190.32/28	255.255.255.240	190.190.190.47	190.190.190.33 - 190.190.190.46
4	190.190.190.48/28	255.255.255.240	190.190.190.63	190.190.190.49 - 190.190.190.62
5	190.190.190.64/28	255.255.255.240	190.190.190.79	190.190.190.65 - 190.190.190.78

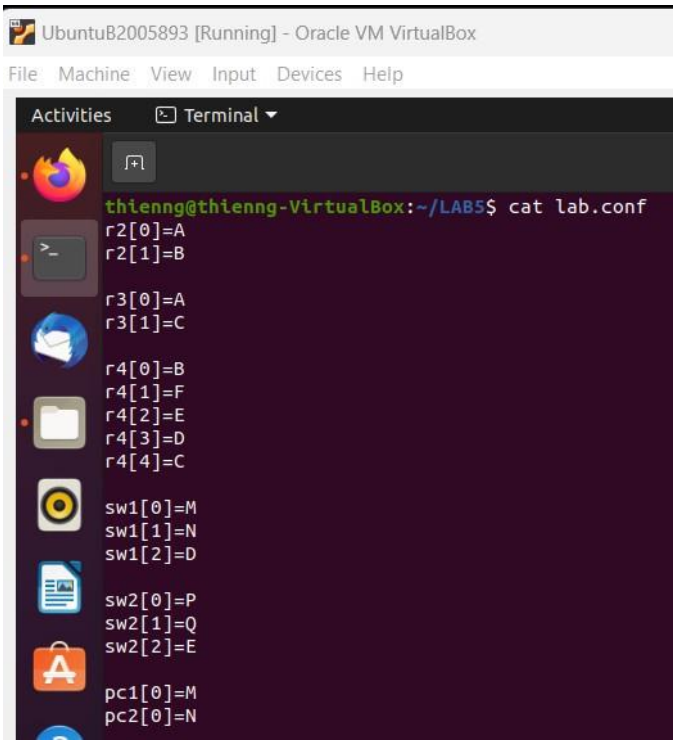
1. Files and Folders

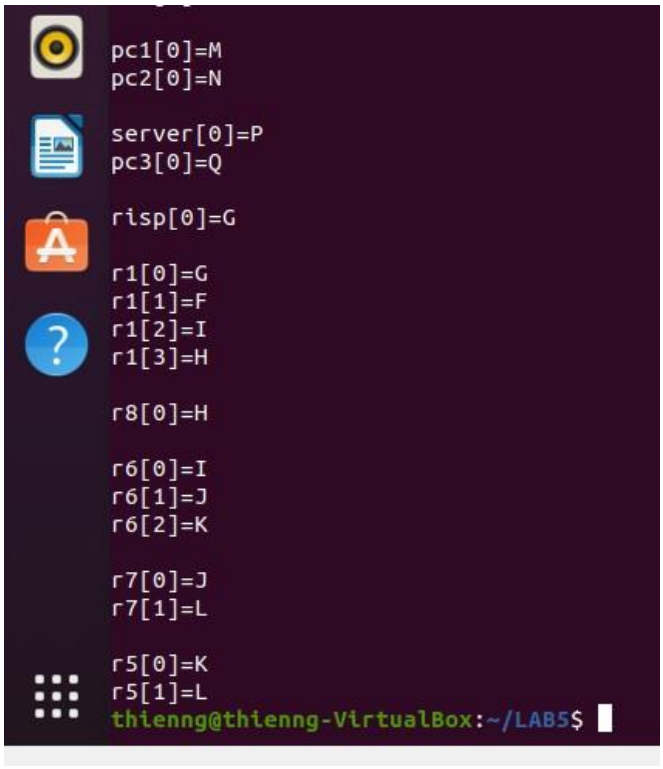




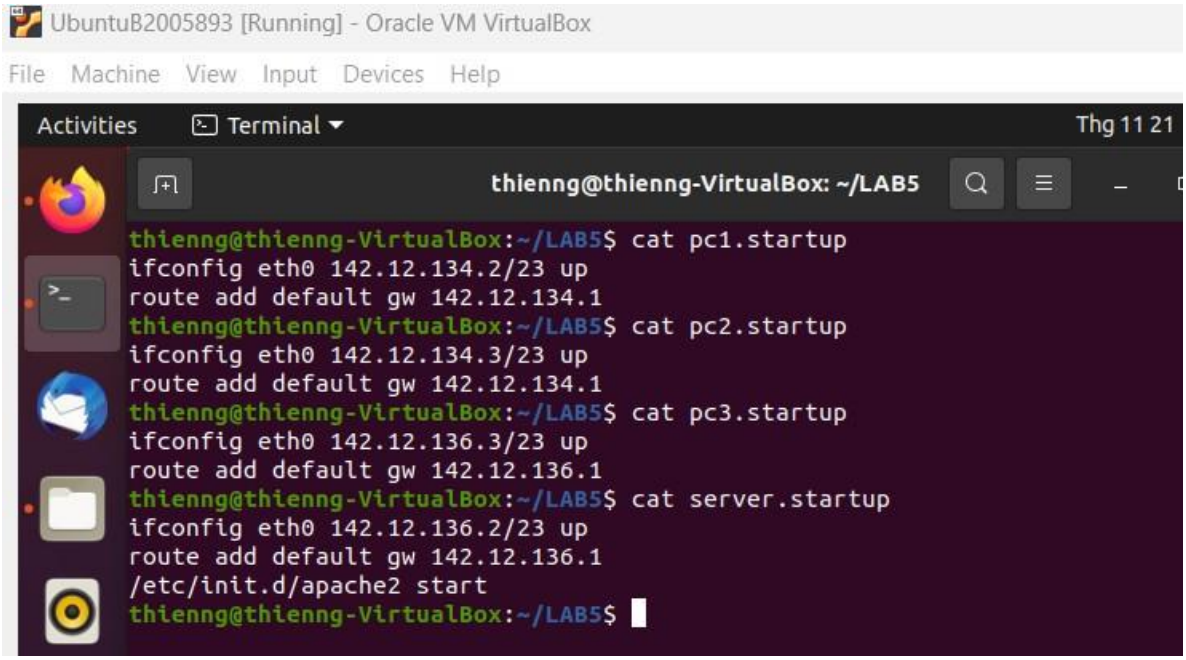
2. Files configurations

➔ $ cat lab.conf

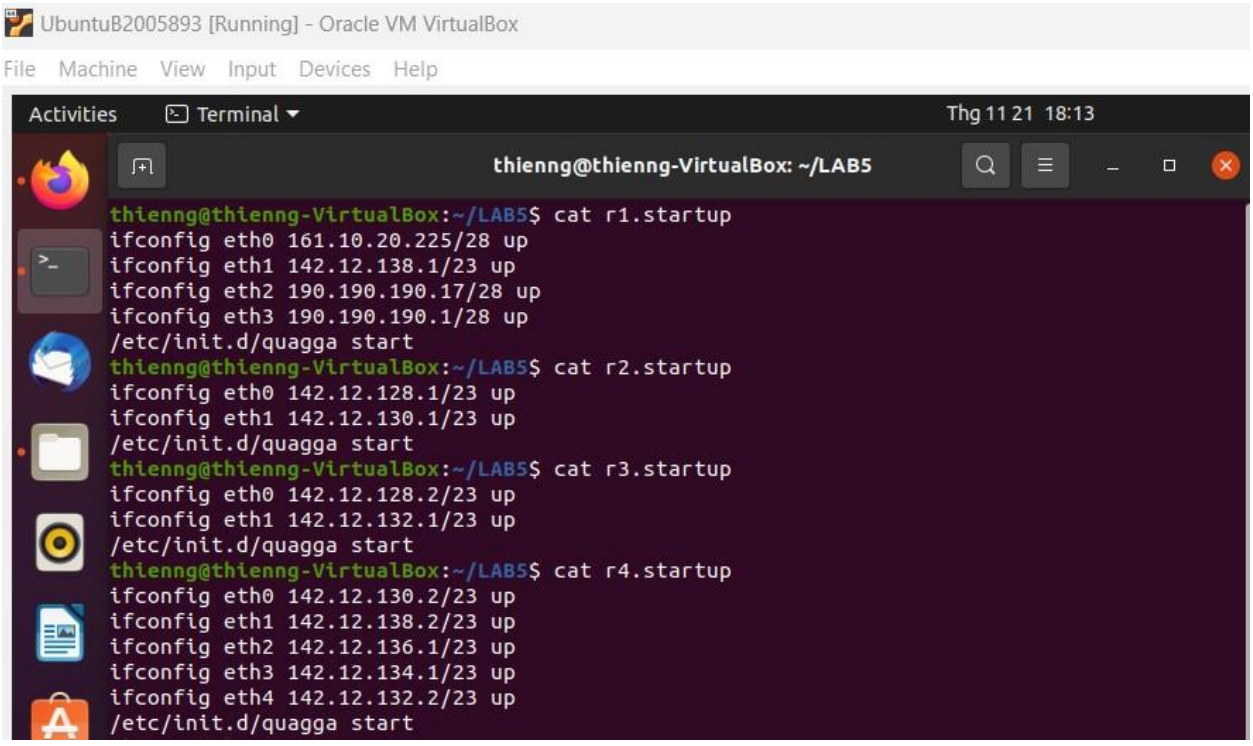


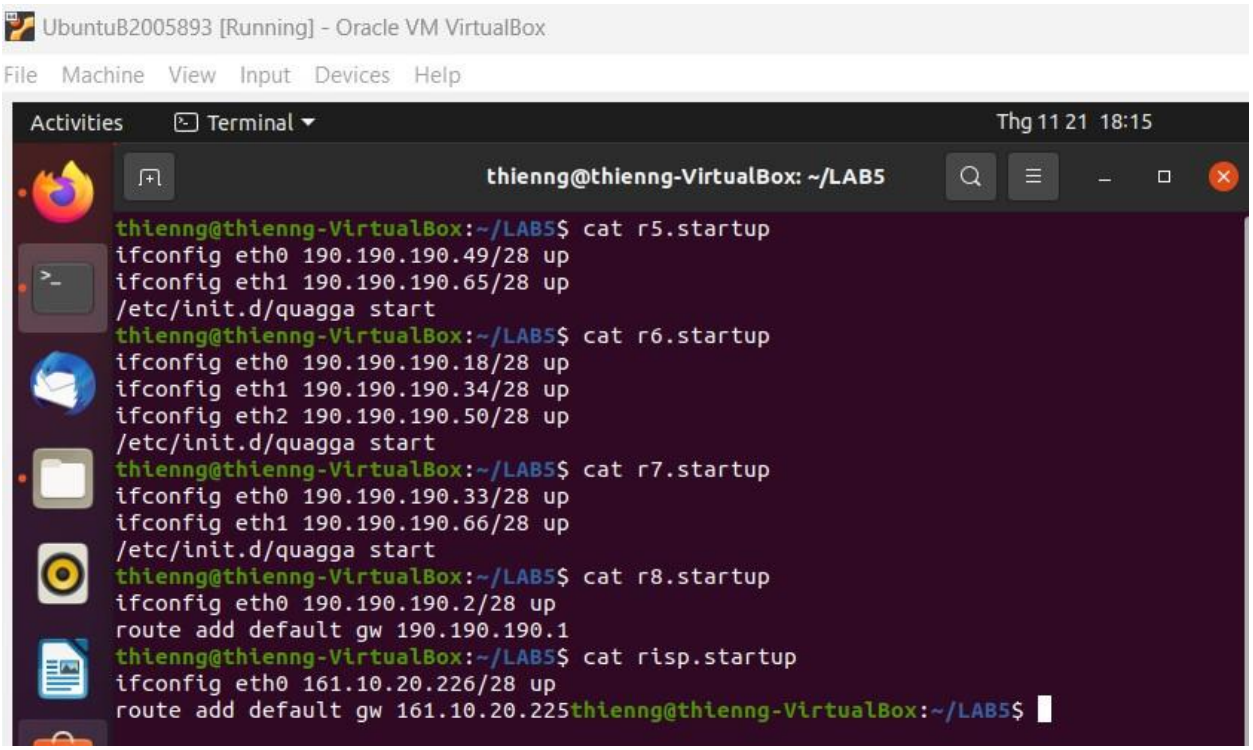


➔ Cat the PCs and the server

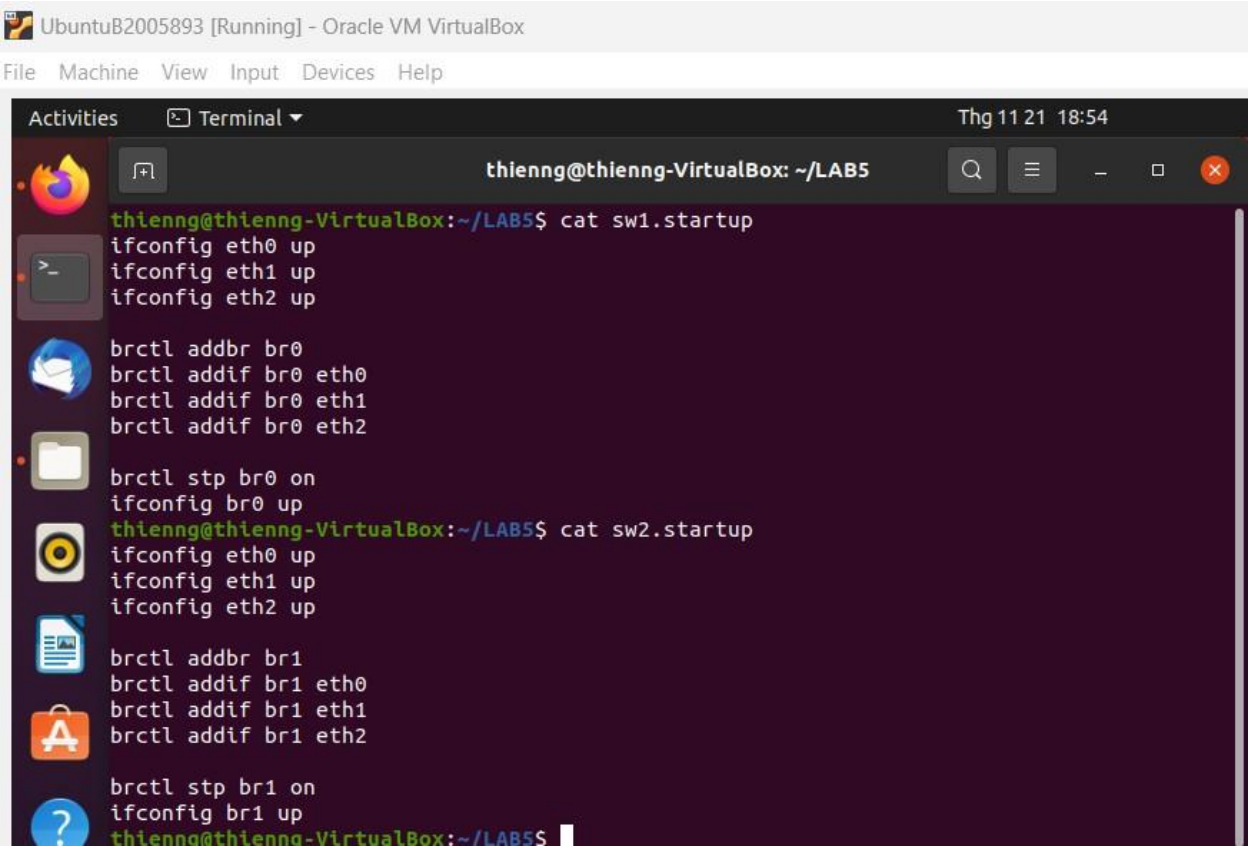


➔ Cat the routers

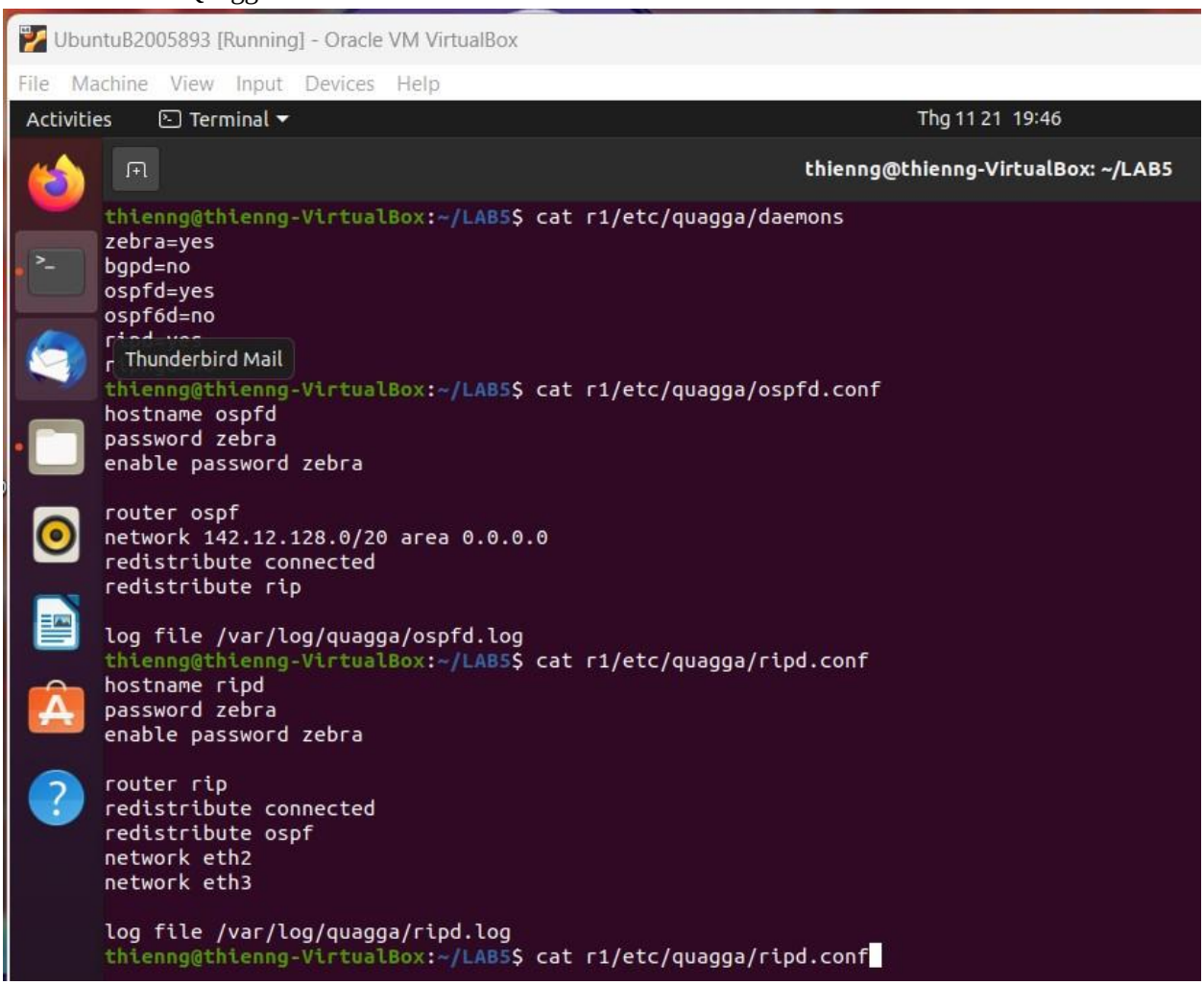


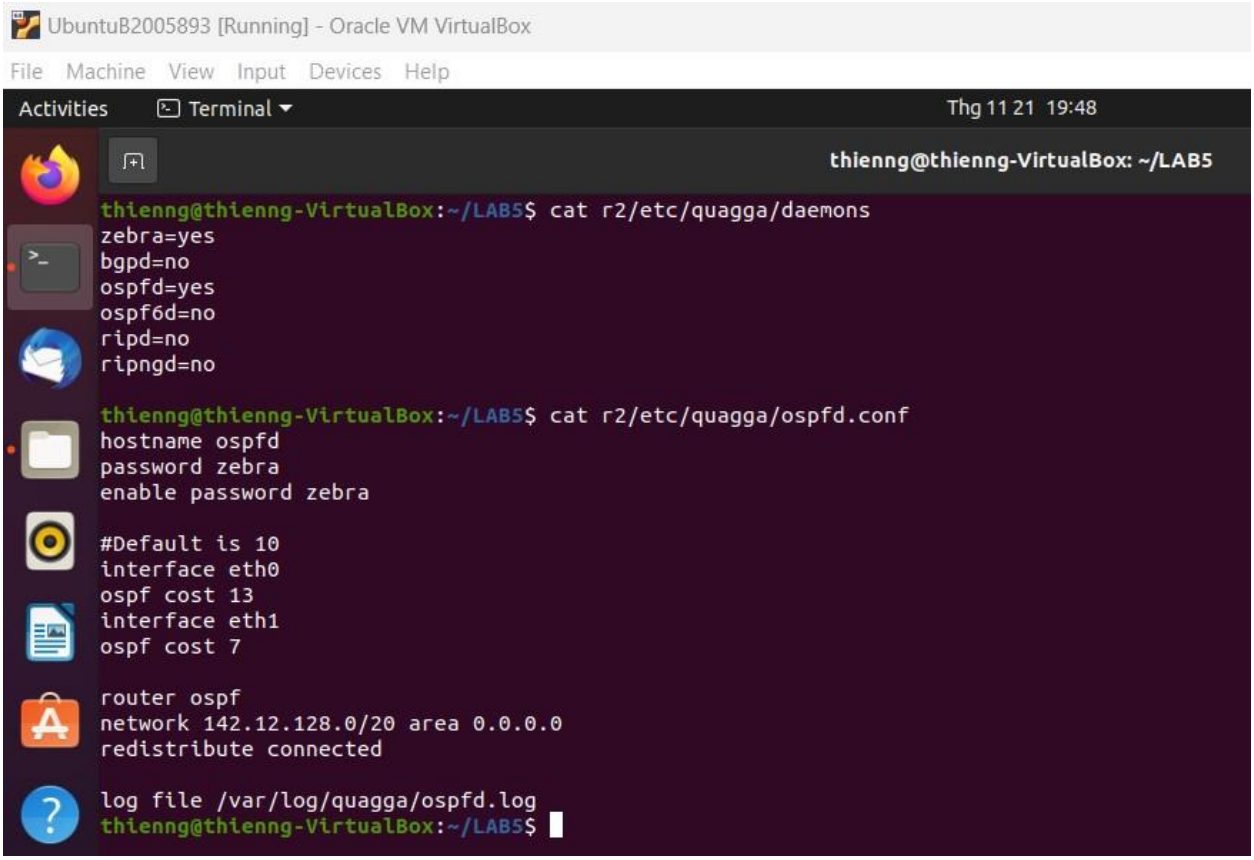


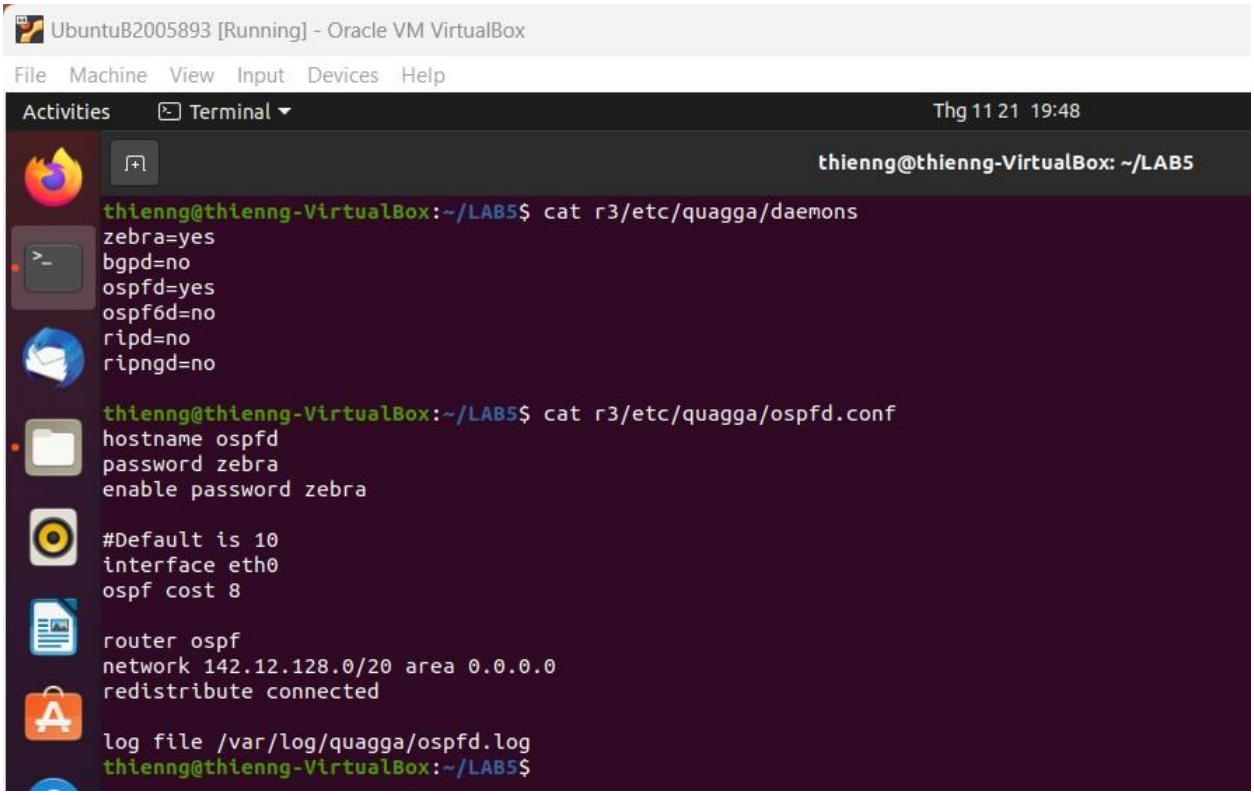
➔ Cat the switches

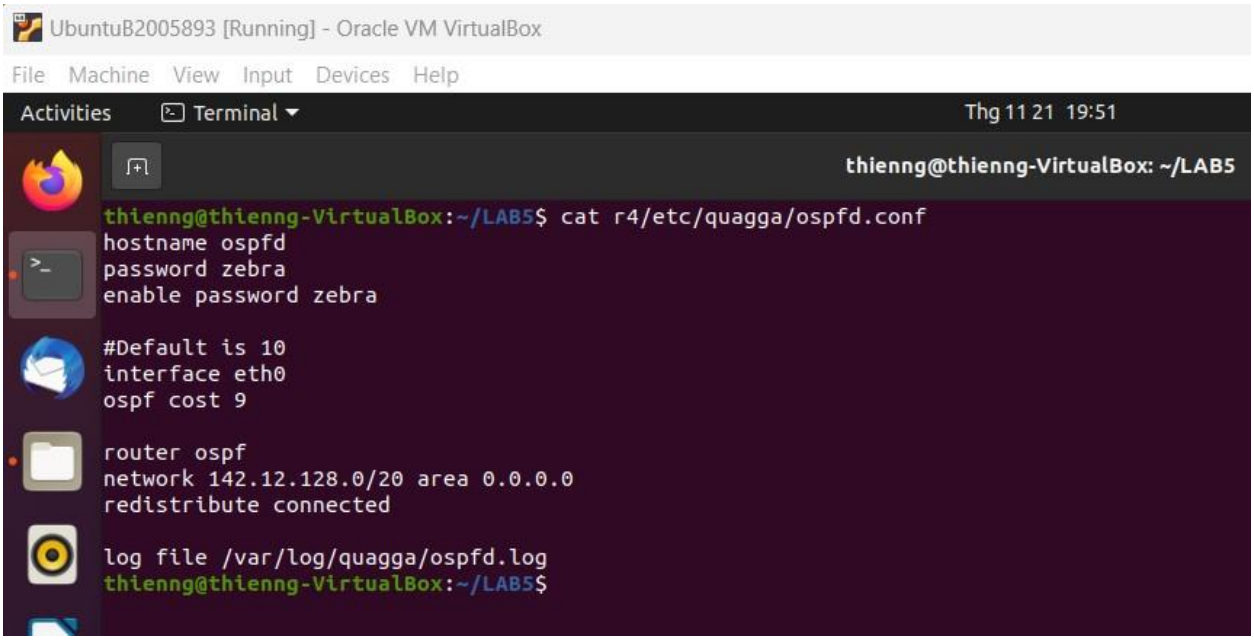


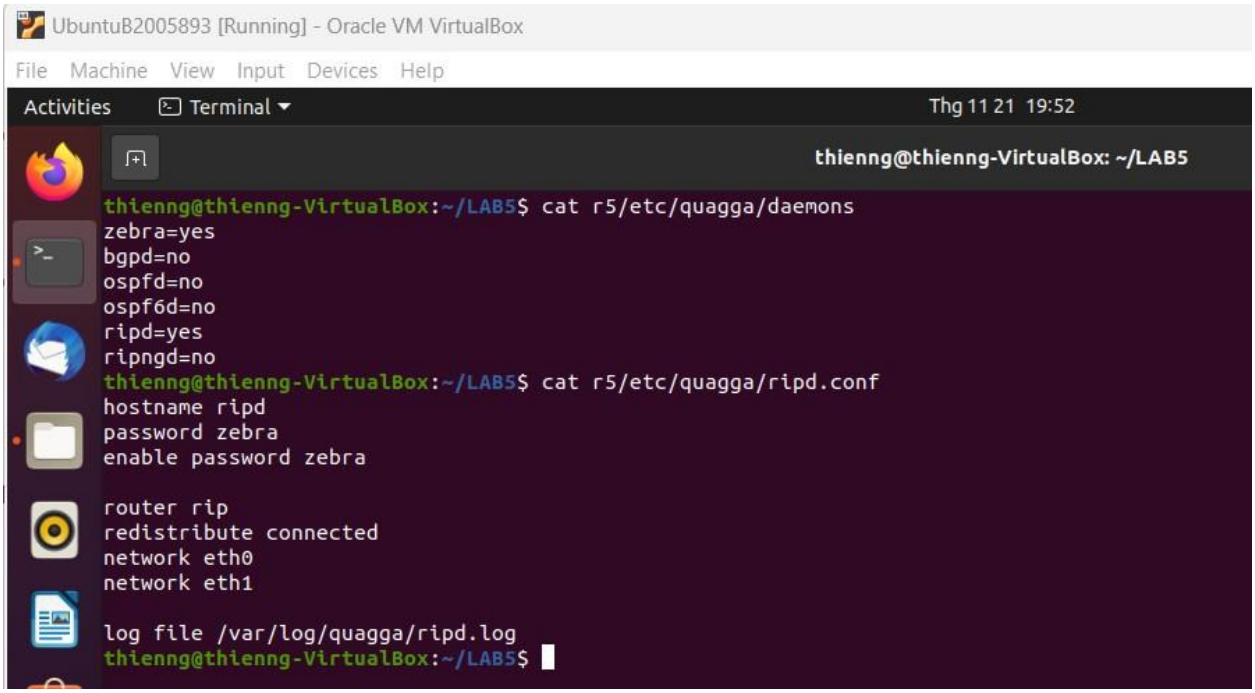
3. Cat the Quagga in each router

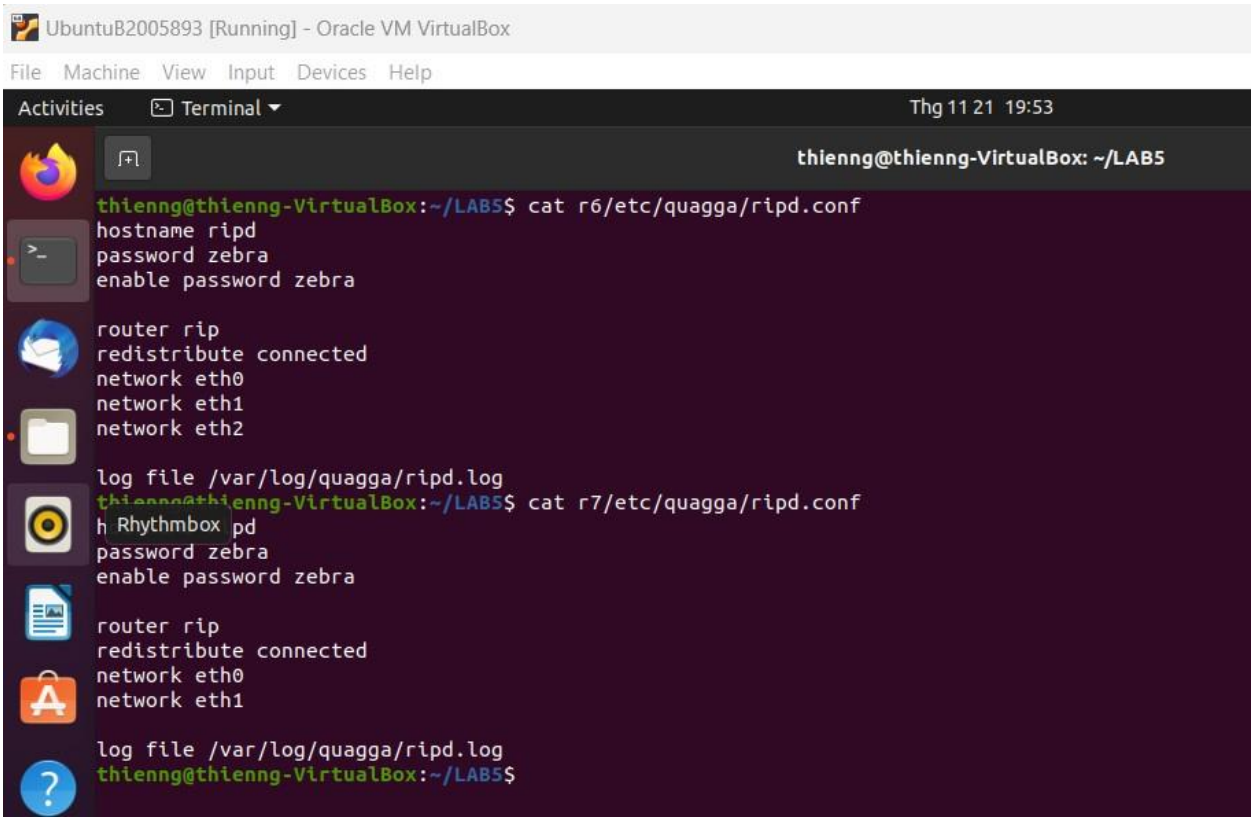


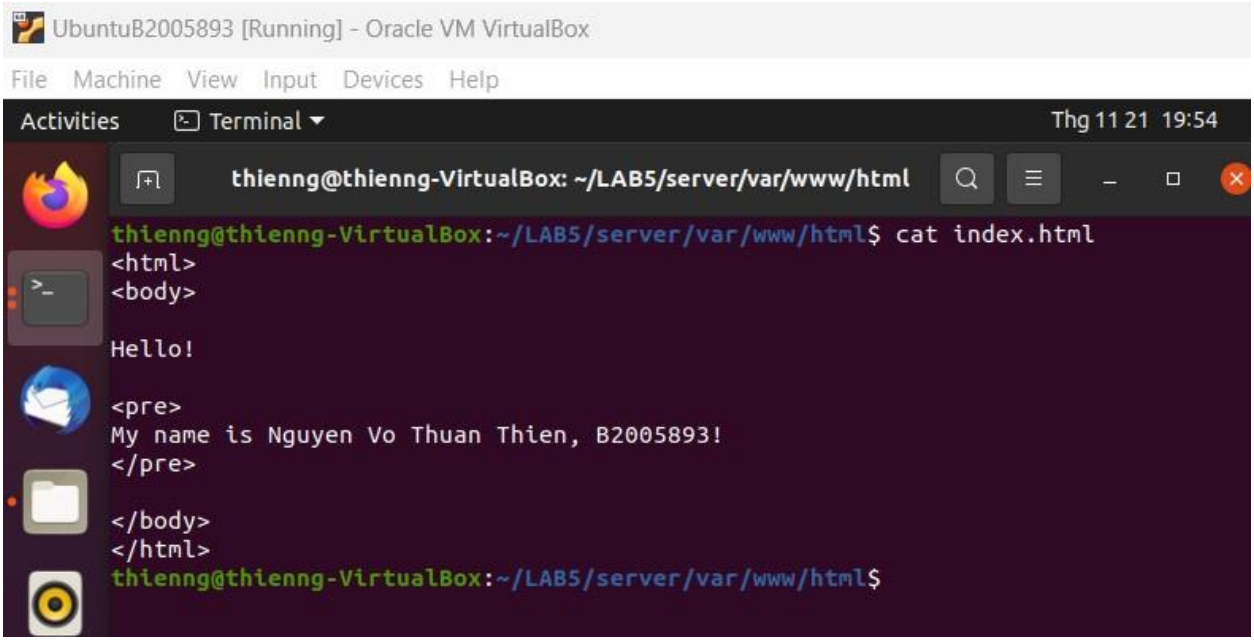

UbuntuB2005893 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thg 11 21 19:48
thienng@thienng-VirtualBox: ~/LAB5
thienng@thienng-VirtualBox:~/LAB5$ cat r2/etc/quagga/daemons
zebra=yes
bgpd=no
ospfd=yes
ospf6d=no
ripd=no
ripngd=no
thienng@thienng-VirtualBox:~/LAB5$ cat r2/etc/quagga/ospfd.conf
hostname ospfd
password zebra
enable password zebra
#Default is 10
interface eth0
ospf cost 13
interface eth1
ospf cost 7
router ospf
network 142.12.128.0/20 area 0.0.0.0
redistribute connected
log file /var/log/quagga/ospfd.log
thienng@thienng-VirtualBox:~/LAB5$


UbuntuB2005893 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thg 11 21 19:48
thienng@thienng-VirtualBox: ~/LAB5
thienng@thienng-VirtualBox:~/LAB5$ cat r3/etc/quagga/daemons
zebra=yes
bgpd=no
ospfd=yes
ospf6d=no
ripd=no
ripngd=no
thienng@thienng-VirtualBox:~/LAB5$ cat r3/etc/quagga/ospfd.conf
hostname ospfd
password zebra
enable password zebra
#Default is 10
interface eth0
ospf cost 8
router ospf
network 142.12.128.0/20 area 0.0.0.0
redistribute connected
log file /var/log/quagga/ospfd.log
thienng@thienng-VirtualBox:~/LAB5$

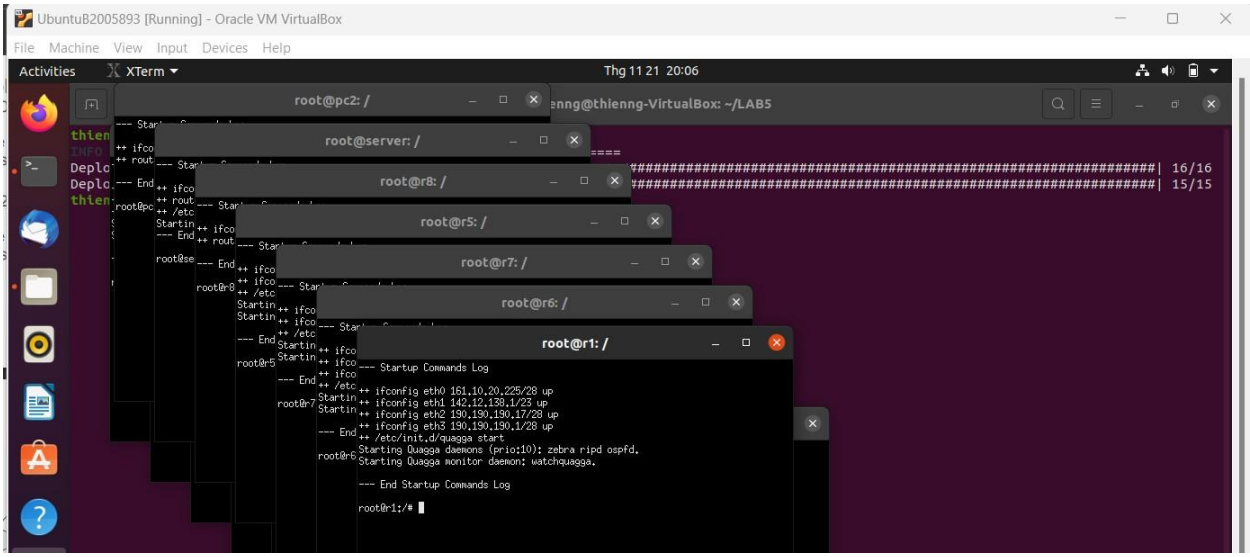

UbuntuB2005893 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thg 11 21 19:51
thienng@thienng-VirtualBox: ~/LAB5
thienng@thienng-VirtualBox:~/LAB5$ cat r4/etc/quagga/ospfd.conf
hostname ospfd
password zebra
enable password zebra
#Default is 10
interface eth0
ospf cost 9
router ospf
network 142.12.128.0/20 area 0.0.0.0
redistribute connected
log file /var/log/quagga/ospfd.log
thienng@thienng-VirtualBox:~/LAB5$


UbuntuB2005893 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thg 11 21 19:52
thienng@thienng-VirtualBox: ~/LAB5
thienng@thienng-VirtualBox:~/LAB5$ cat r5/etc/quagga/daemons
zebra=yes
bgpd=no
ospfd=no
ospf6d=no
ripd=yes
ripngd=no
thienng@thienng-VirtualBox:~/LAB5$ cat r5/etc/quagga/ripd.conf
hostname ripd
password zebra
enable password zebra
router rip
redistribute connected
network eth0
network eth1
log file /var/log/quagga/ripd.log
thienng@thienng-VirtualBox:~/LAB5$

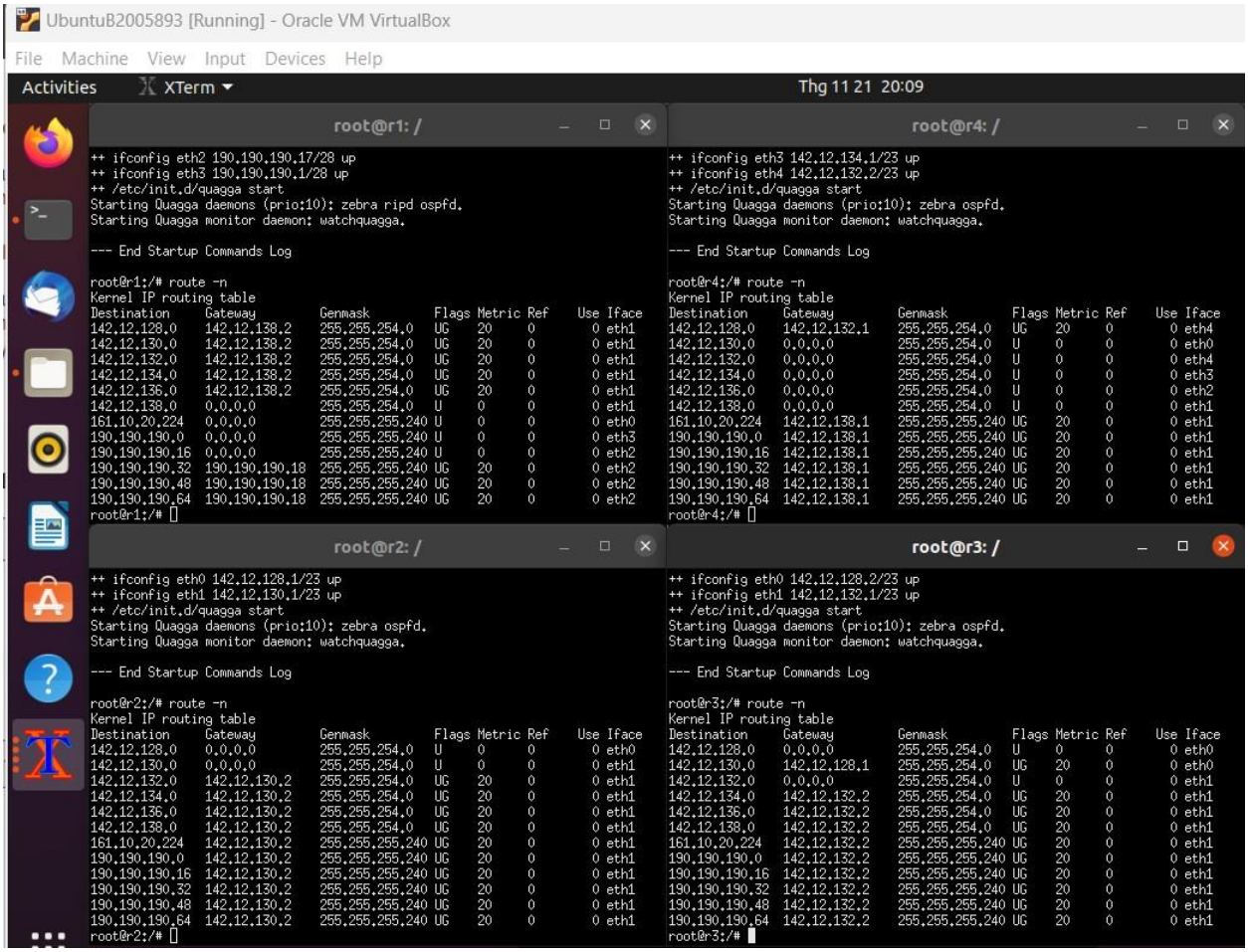

UbuntuB2005893 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thg 11 21 19:53
thienng@thienng-VirtualBox: ~/LAB5
thienng@thienng-VirtualBox:~/LAB5$ cat r6/etc/quagga/ripd.conf
hostname ripd
password zebra
enable password zebra
router rip
redistribute connected
network eth0
network eth1
network eth2
log file /var/log/quagga/ripd.log
thienng@thienng-VirtualBox:~/LAB5$ cat r7/etc/quagga/ripd.conf
Rhythmbox
password zebra
enable password zebra
router rip
redistribute connected
network eth0
network eth1
log file /var/log/quagga/ripd.log
thienng@thienng-VirtualBox:~/LAB5$

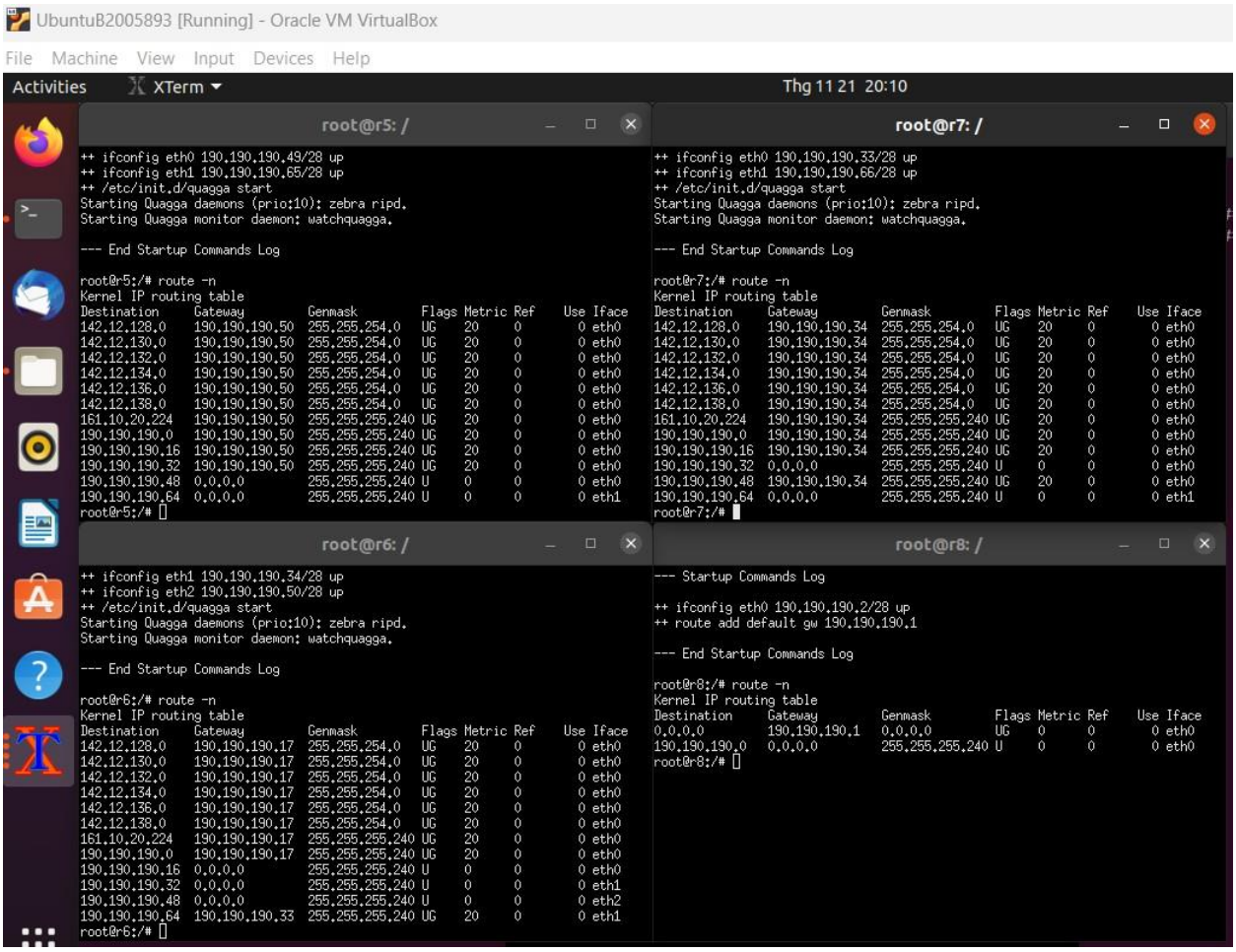

UbuntuB2005893 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thg 11 21 19:54
thienng@thienng-VirtualBox: ~/LAB5/server/var/www/html
thienng@thienng-VirtualBox:~/LAB5/server/var/www/html$ cat index.html
<html>
<body>
Hello!
<pre>
My name is Nguyen Vo Thuan Thien, B2005893!
</pre>
</body>
</html>
thienng@thienng-VirtualBox:~/LAB5/server/var/www/html$

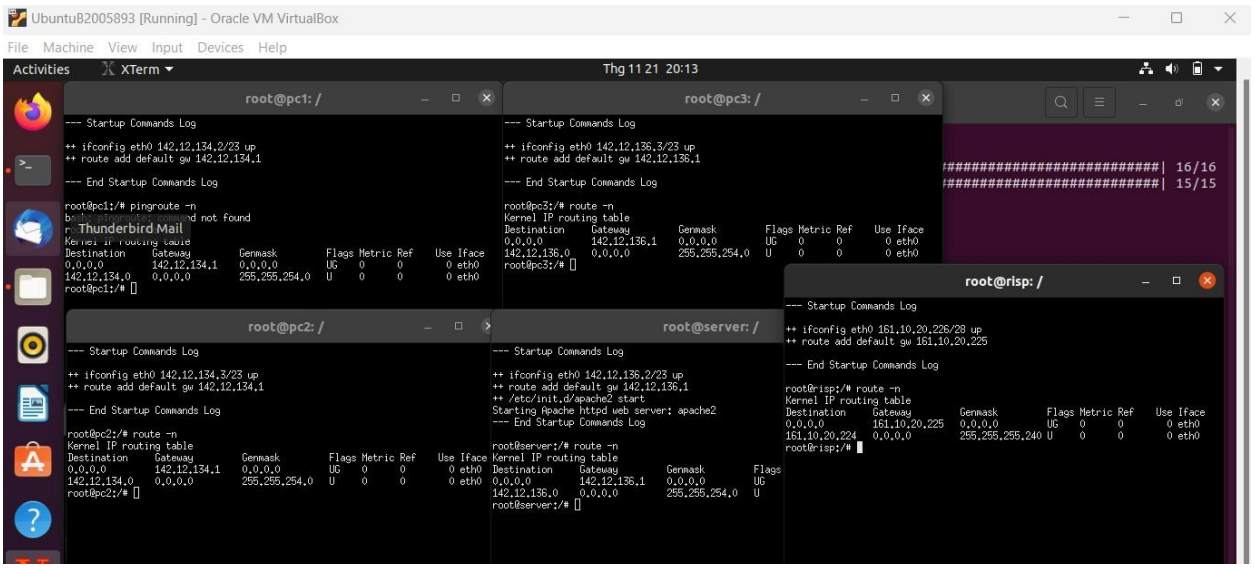
4. Start Kathara



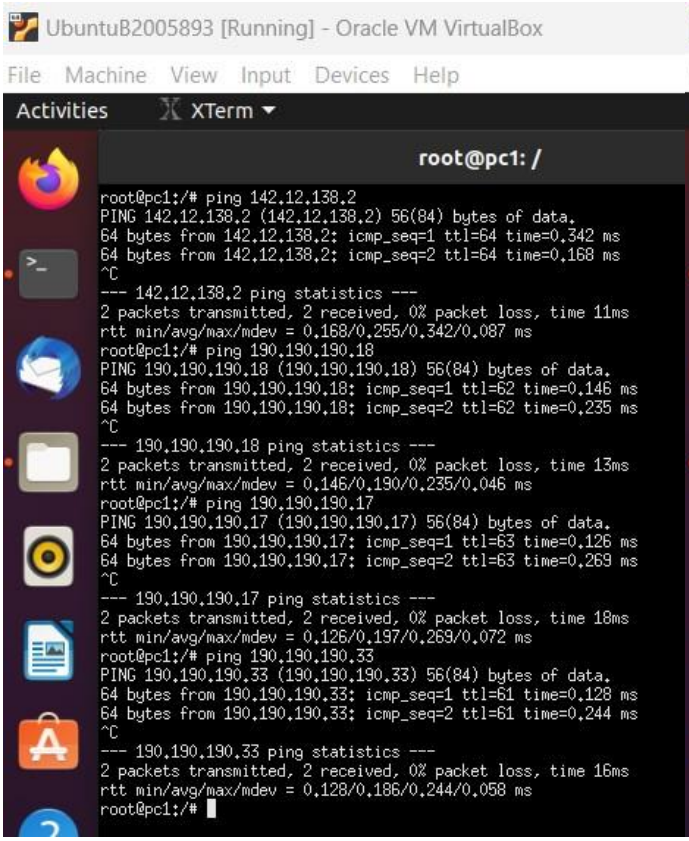
5. Routing tables

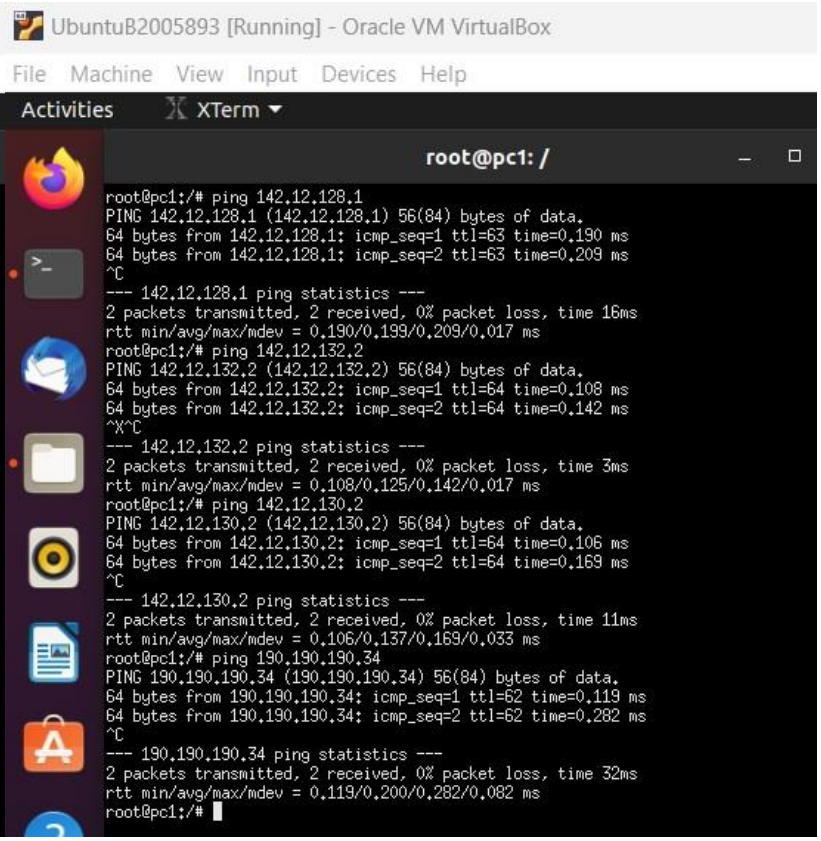



UbuntuB2005893 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities XTerm Thg 11 21 20:10
root@r5: /
++ ifconfig eth0 190.190.190.49/28 up
++ ifconfig eth1 190.190.190.65/28 up
++ /etc/init.d/quagga start
Starting Quagga daemons (prio:10): zebra ripd.
Starting Quagga monitor daemon: watchquagga.
--- End Startup Commands Log
root@r5:/# route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
142.12.128.0 190.190.190.50 255.255.254.0 UG 20 0 0 eth0
142.12.130.0 190.190.190.50 255.255.254.0 UG 20 0 0 eth0
142.12.132.0 190.190.190.50 255.255.254.0 UG 20 0 0 eth0
142.12.134.0 190.190.190.50 255.255.254.0 UG 20 0 0 eth0
142.12.136.0 190.190.190.50 255.255.254.0 UG 20 0 0 eth0
142.12.138.0 190.190.190.50 255.255.254.0 UG 20 0 0 eth0
161.10.20.224 190.190.190.50 255.255.255.240 UG 20 0 0 eth0
190.190.190.0 190.190.190.50 255.255.255.240 UG 20 0 0 eth0
190.190.190.16 190.190.190.50 255.255.255.240 UG 20 0 0 eth0
190.190.190.32 190.190.190.50 255.255.255.240 UG 20 0 0 eth0
190.190.190.48 0.0.0.0 255.255.255.240 U 0 0 0 eth0
190.190.190.64 0.0.0.0 255.255.255.240 U 0 0 0 eth1
root@r5:/#
root@r7: /
++ ifconfig eth0 190.190.190.33/28 up
++ ifconfig eth1 190.190.190.66/28 up
++ /etc/init.d/quagga start
Starting Quagga daemons (prio:10): zebra ripd.
Starting Quagga monitor daemon: watchquagga.
--- End Startup Commands Log
root@r7:/# route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
142.12.128.0 190.190.190.34 255.255.254.0 UG 20 0 0 eth0
142.12.130.0 190.190.190.34 255.255.254.0 UG 20 0 0 eth0
142.12.132.0 190.190.190.34 255.255.254.0 UG 20 0 0 eth0
142.12.134.0 190.190.190.34 255.255.254.0 UG 20 0 0 eth0
142.12.136.0 190.190.190.34 255.255.254.0 UG 20 0 0 eth0
142.12.138.0 190.190.190.34 255.255.254.0 UG 20 0 0 eth0
161.10.20.224 190.190.190.34 255.255.255.240 UG 20 0 0 eth0
190.190.190.0 190.190.190.34 255.255.255.240 UG 20 0 0 eth0
190.190.190.16 190.190.190.34 255.255.255.240 UG 20 0 0 eth0
190.190.190.32 0.0.0.0 255.255.255.240 U 0 0 0 eth0
190.190.190.48 190.190.190.34 255.255.255.240 UG 20 0 0 eth0
190.190.190.64 0.0.0.0 255.255.255.240 U 0 0 0 eth1
root@r7:/#
root@r6: /
++ ifconfig eth1 190.190.190.34/28 up
++ ifconfig eth2 190.190.190.50/28 up
++ /etc/init.d/quagga start
Starting Quagga daemons (prio:10): zebra ripd.
Starting Quagga monitor daemon: watchquagga.
--- End Startup Commands Log
root@r6:/# route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
142.12.128.0 190.190.190.17 255.255.254.0 UG 20 0 0 eth0
142.12.130.0 190.190.190.17 255.255.254.0 UG 20 0 0 eth0
142.12.132.0 190.190.190.17 255.255.254.0 UG 20 0 0 eth0
142.12.134.0 190.190.190.17 255.255.254.0 UG 20 0 0 eth0
142.12.136.0 190.190.190.17 255.255.254.0 UG 20 0 0 eth0
142.12.138.0 190.190.190.17 255.255.254.0 UG 20 0 0 eth0
161.10.20.224 190.190.190.17 255.255.255.240 UG 20 0 0 eth0
190.190.190.0 190.190.190.17 255.255.255.240 UG 20 0 0 eth0
190.190.190.16 0.0.0.0 255.255.255.240 U 0 0 0 eth0
190.190.190.32 0.0.0.0 255.255.255.240 U 0 0 0 eth1
190.190.190.48 0.0.0.0 255.255.255.240 U 0 0 0 eth2
190.190.190.64 190.190.190.33 255.255.255.240 UG 20 0 0 eth1
root@r6:/#
root@r8: /
--- Startup Commands Log
++ ifconfig eth0 190.190.190.2/28 up
++ route add default gw 190.190.190.1
--- End Startup Commands Log
root@r8:/# route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 190.190.190.1 0.0.0.0 UG 0 0 0 eth0
190.190.190.0 0.0.0.0 255.255.255.240 U 0 0 0 eth0
root@r8:/#

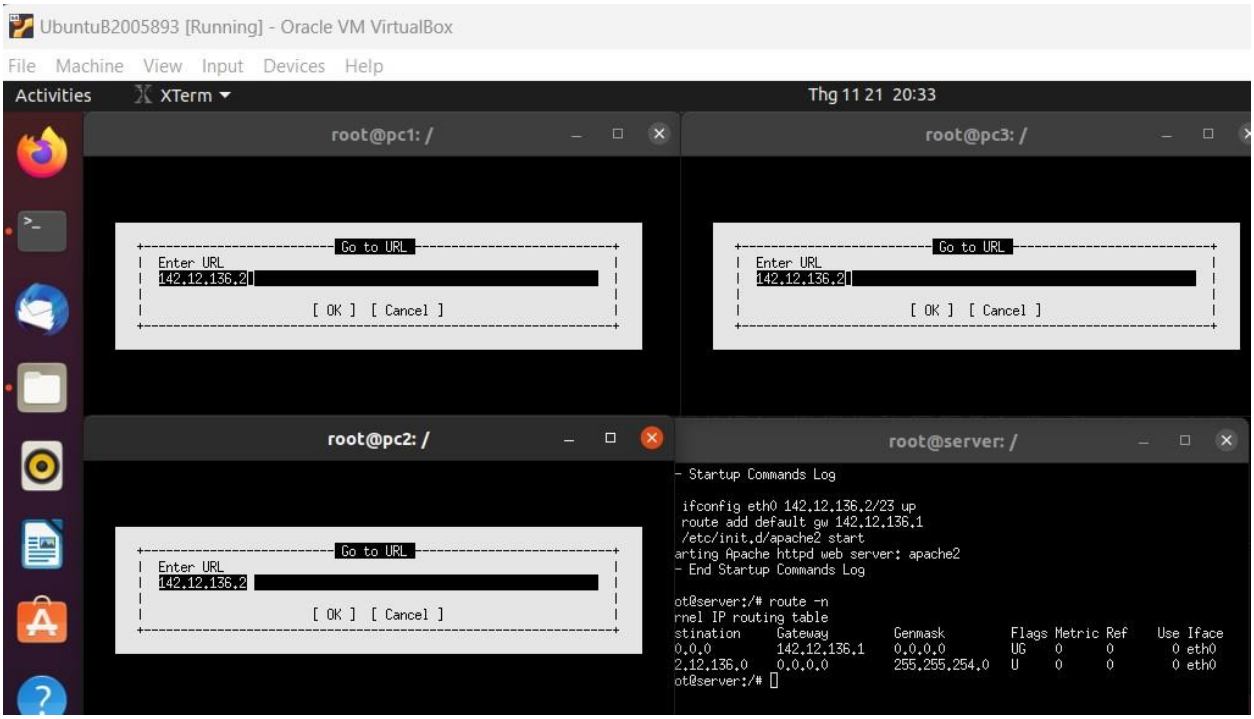

UbuntuB2005893 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities XTerm Thg 11 21 20:13
root@pc1: /
--- Startup Commands Log
++ ifconfig eth0 142.12.134.2/23 up
++ route add default gw 142.12.134.1
--- End Startup Commands Log
root@pc1:/# pingroute -n
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 142.12.134.1 0.0.0.0 UG 0 0 0 eth0
142.12.134.0 0.0.0.0 255.255.254.0 U 0 0 0 eth0
root@pc1:/#
root@pc3: /
--- Startup Commands Log
++ ifconfig eth0 142.12.136.3/23 up
++ route add default gw 142.12.136.1
--- End Startup Commands Log
root@pc3:/# route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 142.12.136.1 0.0.0.0 UG 0 0 0 eth0
142.12.136.0 0.0.0.0 255.255.254.0 U 0 0 0 eth0
root@pc3:/#
root@risp: /
--- Startup Commands Log
++ ifconfig eth0 161.10.20.226/28 up
++ route add default gw 161.10.20.225
--- End Startup Commands Log
root@risp:/# route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 161.10.20.225 0.0.0.0 UG 0 0 0 eth0
161.10.20.224 0.0.0.0 255.255.255.240 U 0 0 0 eth0
root@risp:/#
root@pc2: /
--- Startup Commands Log
++ ifconfig eth0 142.12.134.3/23 up
++ route add default gw 142.12.134.1
--- End Startup Commands Log
root@pc2:/# route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 142.12.134.1 0.0.0.0 UG 0 0 0 eth0
142.12.134.0 0.0.0.0 255.255.254.0 U 0 0 0 eth0
root@pc2:/#
root@server: /
--- Startup Commands Log
++ ifconfig eth0 142.12.136.2/23 up
++ route add default gw 142.12.136.1
++ /etc/init.d/apache2 start
Starting Apache httpd web server: apache2
--- End Startup Commands Log
root@server:/# route -n
Kernel IP routing table
Destination Gateway Genmask Flags
0.0.0.0 142.12.136.1 0.0.0.0 UG
142.12.136.0 0.0.0.0 255.255.254.0 U
root@server:/#

6. Testing connectivity



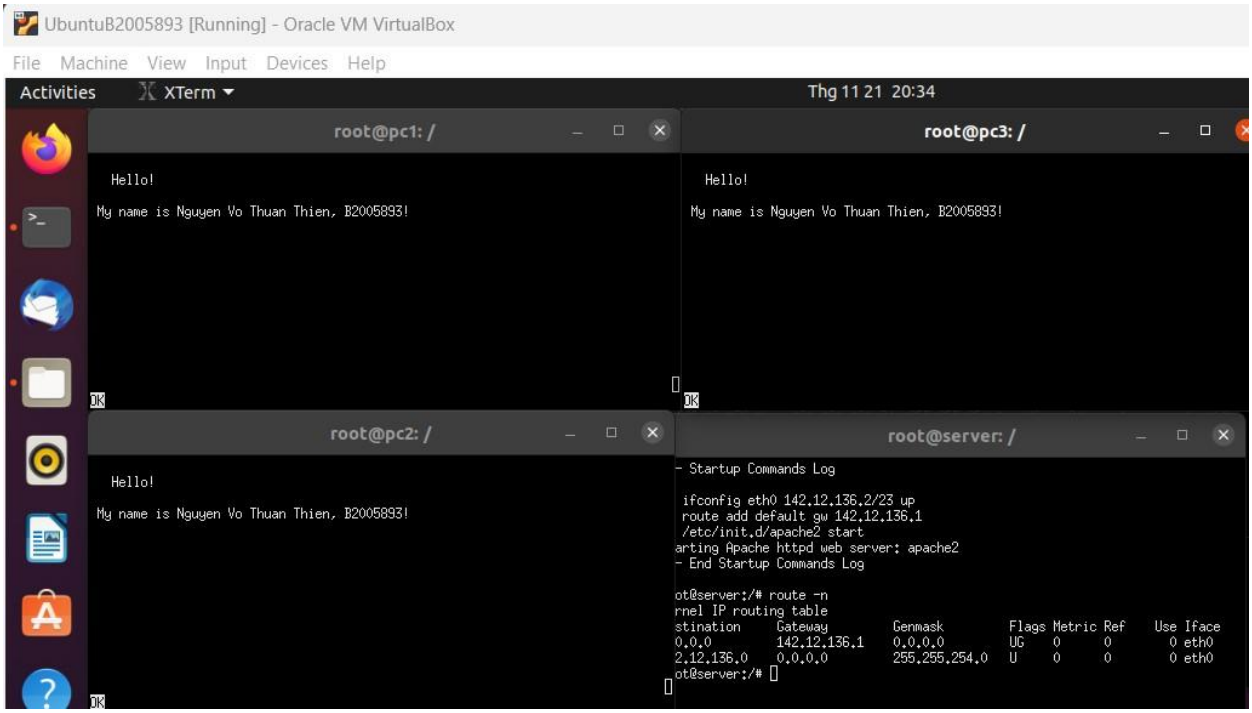
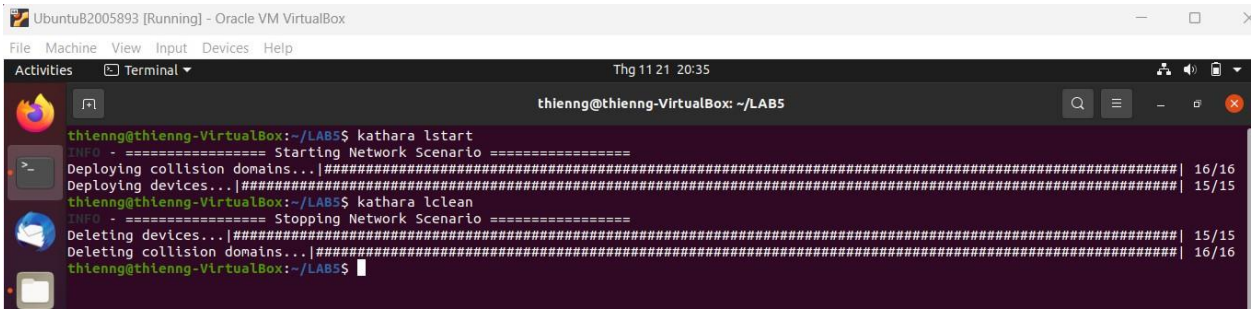


7. Ready to connect to server



8. Result

➔ The Server provides a web service which shows “My name is Nguyen Vo Thuan Thien, B2005893!”



9. Delete all VMs