

LAB 1



Họ tên và MSSV: Ha La Phin B2110093

Nhóm học phần: 11

- Các sinh viên bị phát hiện sao chép bài của nhau sẽ nhận 0đ cho tất cả bài thực hành của môn này.
- Bài nộp phải ở dạng PDF. Tên file PDF đặt theo cấu trúc “CT112_MSSV_Lab1_HoTen”. Ví dụ, SV có MSSV là B1234 và Họ tên là “Nguyễn Văn A”; tên file sẽ đặt như sau “CT112_B1234_Lab1_NguyenVanA”.
- File nộp cần cung cấp đầy đủ các bước giải quyết bài toán.

Bài 1:

```
Ubuntu_B2110093 [Running] - Oracle VM VirtualBox
Activities XTerm Thg 2 20 22:51
halaphin@laphin: ~/Desktop/BaiTap1
halaphin@laphin:~$ mkdir ~/Desktop/BaiTap1
halaphin@laphin:~$ cd ~/Desktop/BaiTap1
halaphin@laphin:~/Desktop/BaiTap1$ kathara vstart -n pc1 --eth 0:A
INFO - ===== Starting Device =====
Deploying collision domains...|#####
##| 1/1
Deploying
##| 1/1
root@pc1:/# halaphin@laphin:
```

```
##| 1/1
halaphin@laphin:~/Desktop/BaiTap1$ kathara vstart -n pc2 --eth 0:A
INFO - ===== Starting Device =====
Deploying collision domains...|#####
Deploying devices...|#####
##| 1/1
halaphin@laphin:~/Desktop/BaiTap1$ root@pc2:/#
```

Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

Activities XTerm ▾

Thg 2 20 22:55

root@pc1: /

```
root@pc1:/# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
      ether 0a:2b:ce:bd:36:b6 txqueuelen 1000 (Ethernet)
      RX packets 0 bytes 0 (0.0 B)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 0 bytes 0 (0.0 B)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
      inet 127.0.0.1 netmask 255.0.0.0
      loop txqueuelen 1000 (Local Loopback)
      RX packets 0 bytes 0 (0.0 B)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 0 bytes 0 (0.0 B)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@pc1:/# █
```

Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

Activities XTerm ▾

Thg 2 20 22:56

root@pc1: /

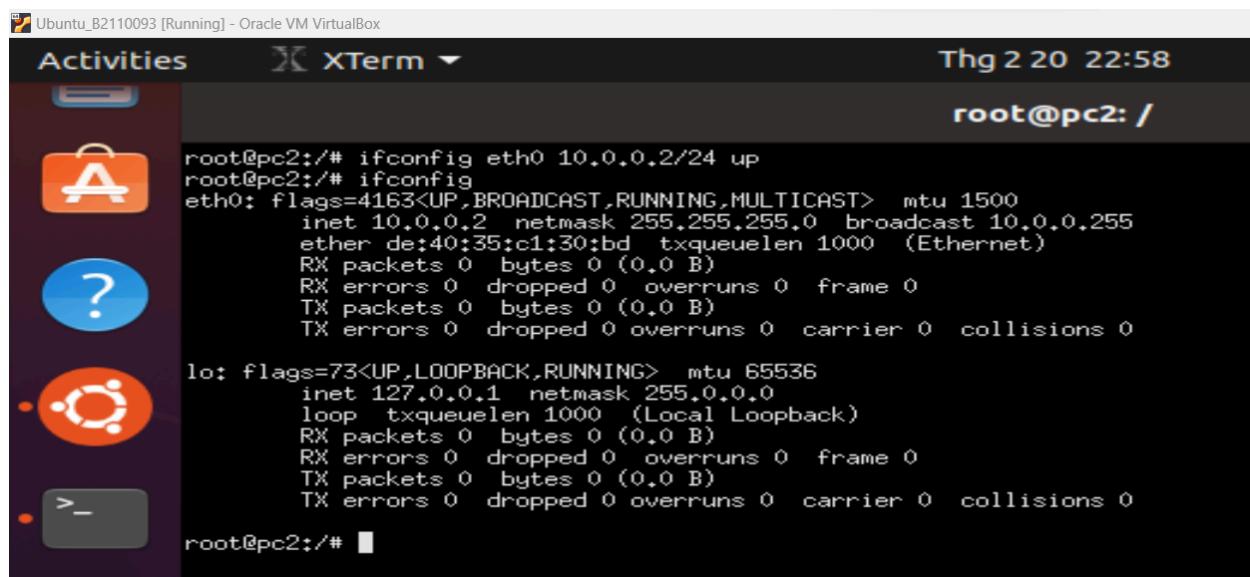
```
root@pc1:/# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
      ether 0a:2b:ce:bd:36:b6 txqueuelen 1000 (Ethernet)
      RX packets 0 bytes 0 (0.0 B)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 0 bytes 0 (0.0 B)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
      inet 127.0.0.1 netmask 255.0.0.0
      loop txqueuelen 1000 (Local Loopback)
      RX packets 0 bytes 0 (0.0 B)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 0 bytes 0 (0.0 B)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@pc1:/# ifconfig eth0 10.0.0.1/24 up
root@pc1:/# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
      inet 10.0.0.1 netmask 255.255.255.0 broadcast 10.0.0.255
      ether 0a:2b:ce:bd:36:b6 txqueuelen 1000 (Ethernet)
      RX packets 0 bytes 0 (0.0 B)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 0 bytes 0 (0.0 B)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
      inet 127.0.0.1 netmask 255.0.0.0
      loop txqueuelen 1000 (Local Loopback)
      RX packets 0 bytes 0 (0.0 B)
      RX errors 0 dropped 0 overruns 0 frame 0
      TX packets 0 bytes 0 (0.0 B)
      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

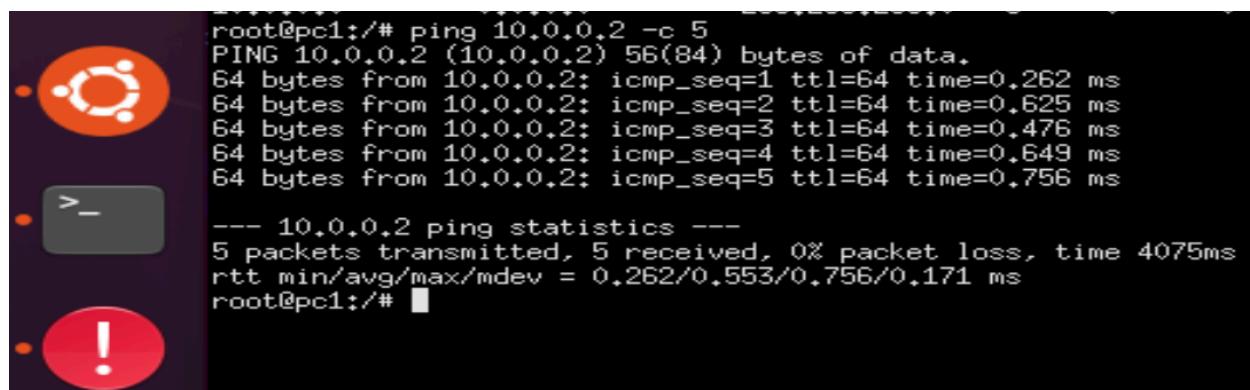
root@pc1:/# █
```



```
root@pc2:/# ifconfig eth0 10.0.0.2/24 up
root@pc2:/# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.0.2 netmask 255.255.255.0 broadcast 10.0.0.255
                ether de:40:35:bd:c1:30 brd txqueuelen 1000 (Ethernet)
                RX packets 0 bytes 0 (0.0 B)
                RX errors 0 dropped 0 overruns 0 frame 0
                TX packets 0 bytes 0 (0.0 B)
                TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

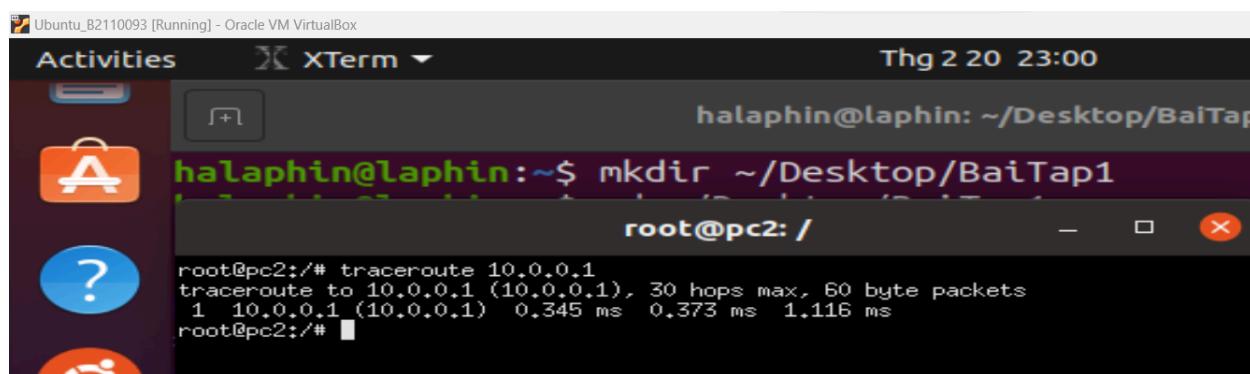
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
                loop txqueuelen 1000 (Local Loopback)
                RX packets 0 bytes 0 (0.0 B)
                RX errors 0 dropped 0 overruns 0 frame 0
                TX packets 0 bytes 0 (0.0 B)
                TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@pc2:/#
```



```
root@pc1:/# ping 10.0.0.2 -c 5
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=0.262 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.625 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.476 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.649 ms
64 bytes from 10.0.0.2: icmp_seq=5 ttl=64 time=0.756 ms

--- 10.0.0.2 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4075ms
rtt min/avg/max/mdev = 0.262/0.553/0.756/0.171 ms
root@pc1:/#
```

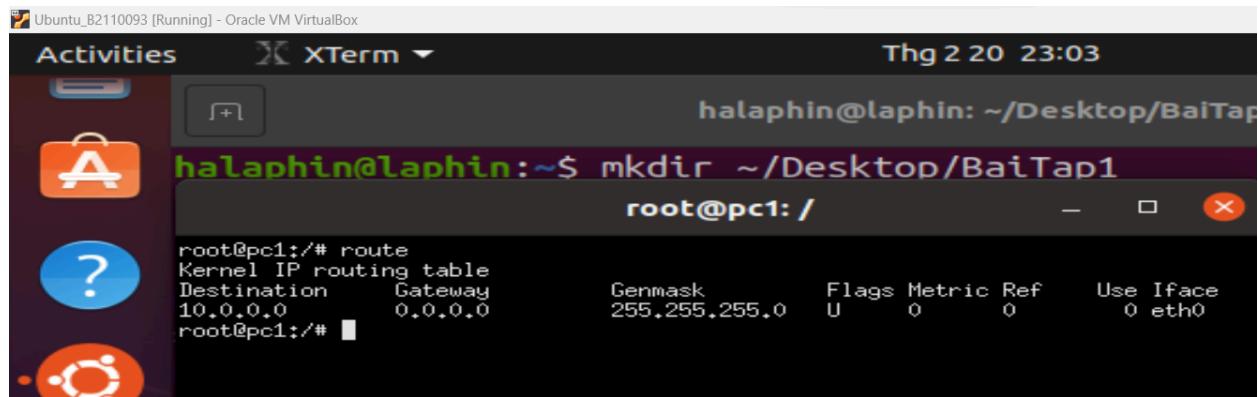


```
halaphin@laphin: ~/Desktop/BaiTap
halaphin@laphin:~$ mkdir ~/Desktop/BaiTap1
root@pc2: /
```

```
root@pc2:/# traceroute 10.0.0.1
traceroute to 10.0.0.1 (10.0.0.1), 30 hops max, 60 byte packets
 1  10.0.0.1 (10.0.0.1)  0.345 ms  0.373 ms  1.116 ms
root@pc2:/#
```

Traceroute 10.0.0.1:

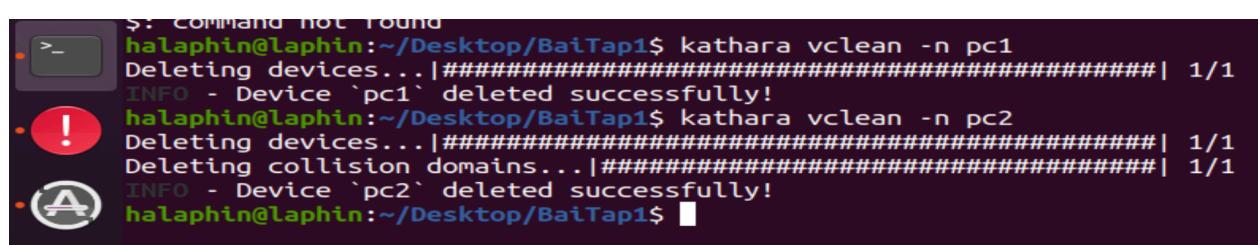
- Dòng đầu hiển thị số bước nhảy tối đa là 30 và kích thước các gói byte được gửi là 60 byte
- Dòng tiếp theo là danh sách các route đi đến host IP (chỉ có 1 route), bao gồm các round-trip time (RTT)



```
halaphin@laphin:~$ mkdir ~/Desktop/BaiTap1
root@pc1: /
root@pc1:/# route
Kernel IP routing table
Destination      Gateway      Genmask        Flags Metric Ref    Use Iface
10.0.0.0        0.0.0.0    255.255.255.0 U     0      0          0 eth0
root@pc1:/#
```

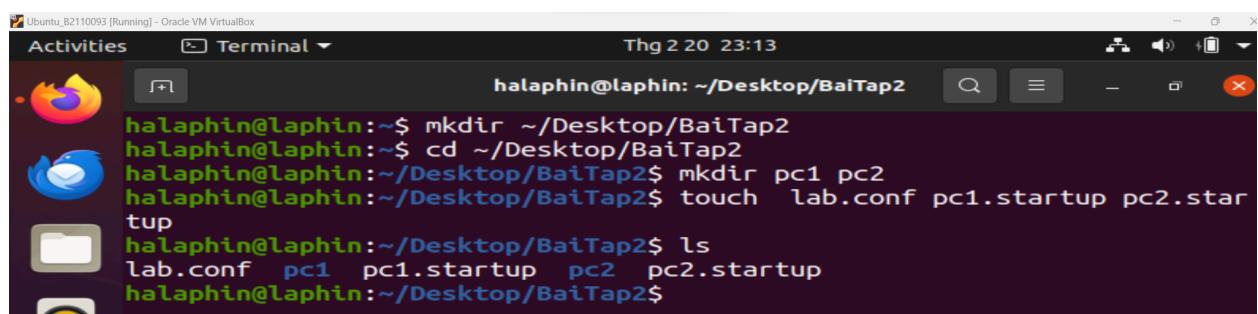
Route:

- Thể hiện đích đến, gateway, genmask, Flags, Metric, Ref, Use và Iface
- Flags U có nghĩa route đang hoạt động

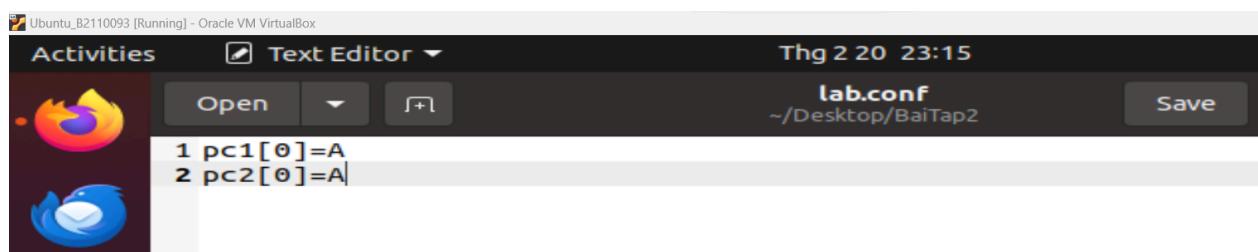


```
$: command not found
halaphin@laphin:~/Desktop/BaiTap1$ kathara vclean -n pc1
Deleting devices...|#####
INFO - Device `pc1` deleted successfully!
halaphin@laphin:~/Desktop/BaiTap1$ kathara vclean -n pc2
Deleting devices...|#####
Deleting collision domains...|#####
INFO - Device `pc2` deleted successfully!
halaphin@laphin:~/Desktop/BaiTap1$
```

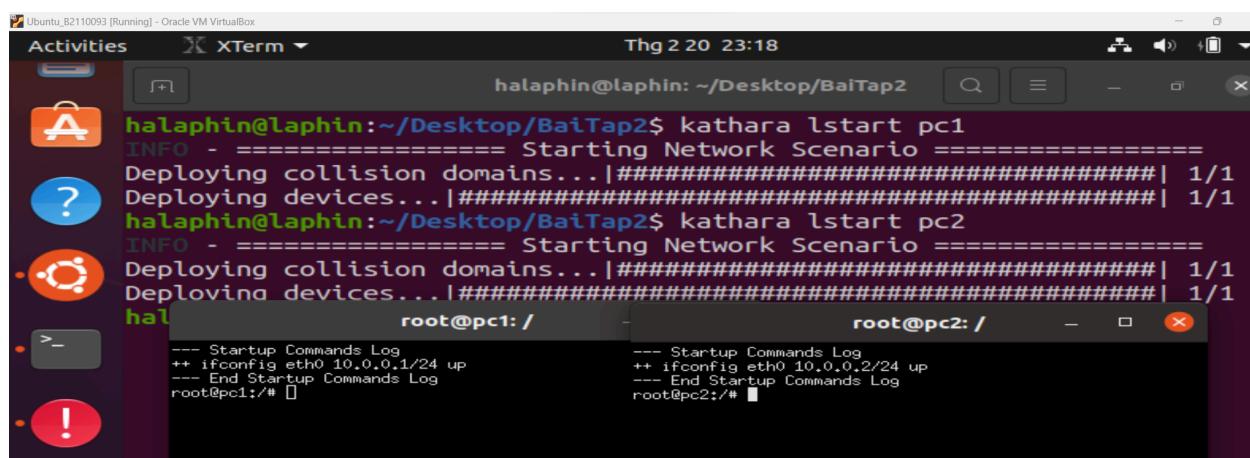
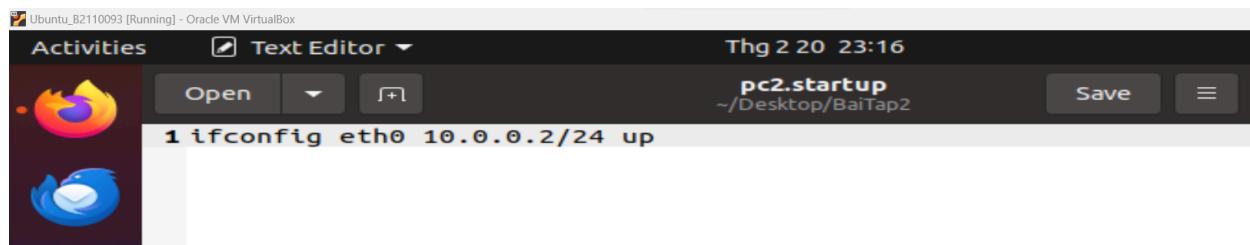
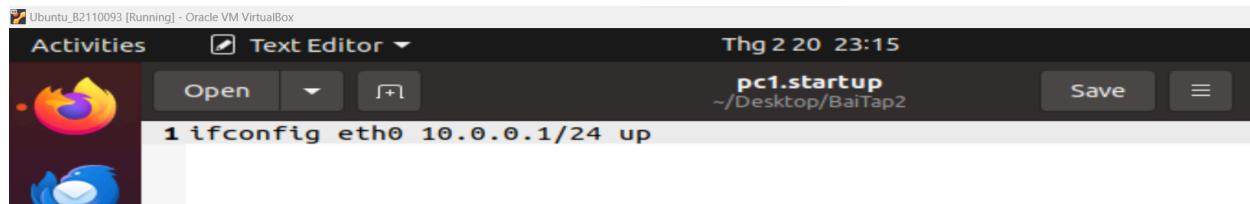
Bài 2:



```
halaphin@laphin:~$ mkdir ~/Desktop/BaiTap2
halaphin@laphin:~$ cd ~/Desktop/BaiTap2
halaphin@laphin:~/Desktop/BaiTap2$ mkdir pc1 pc2
halaphin@laphin:~/Desktop/BaiTap2$ touch lab.conf pc1.startup pc2.startup
halaphin@laphin:~/Desktop/BaiTap2$ ls
lab.conf  pc1  pc1.startup  pc2  pc2.startup
halaphin@laphin:~/Desktop/BaiTap2$
```



```
1 pc1[0]=A
2 pc2[0]=A
```



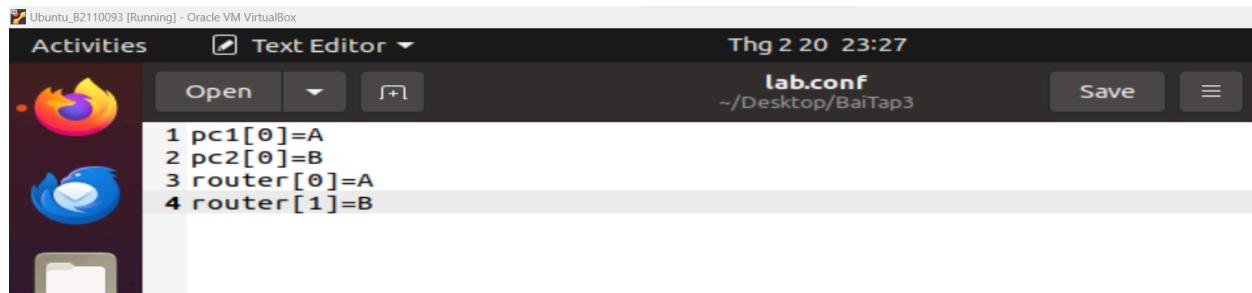
```
--- Startup Commands Log
++ ifconfig eth0 10.0.0.1/24 up
--- End Startup Commands Log
root@pc1:/# ifconfig eth0 10.0.0.2/24 up
root@pc1:/# ping 10.0.0.2 -c 5
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=0.045 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.063 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.053 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.041 ms
64 bytes from 10.0.0.2: icmp_seq=5 ttl=64 time=0.060 ms

--- 10.0.0.2 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4077ms
rtt min/avg/max/mdev = 0.041/0.052/0.063/0.008 ms
root@pc1:/# traceroute 10.0.0.2
traceroute to 10.0.0.2 (10.0.0.2), 30 hops max, 60 byte packets
 1  10.0.0.2 (10.0.0.2)  0.246 ms  0.185 ms  0.175 ms
root@pc1:/# route
Kernel IP routing table
Destination      Gateway          Genmask        Flags Metric Ref    Use Iface
10.0.0.0          0.0.0.0        255.255.255.0 U     0      0        0 eth0
root@pc1:/#
```

```
halaphin@laphin:~/Desktop/BaiTap2$ kathara lstart pc1
INFO - ===== Starting Network Scenario =====
Deploying collision domains...|#####
Deploying devices...|#####
halaphin@laphin:~/Desktop/BaiTap2$ kathara lstart pc2
INFO - ===== Starting Network Scenario =====
Deploying collision domains...|#####
Deploying devices...|#####
halaphin@laphin:~/Desktop/BaiTap2$ kathara wipe
Are you sure to wipe Kathara? (y/n) y
halaphin@laphin:~/Desktop/BaiTap2$
```

Bài 3:

```
halaphin@laphin:~/Desktop/BaiTap3$ mkdir pc1 pc2 router
halaphin@laphin:~/Desktop/BaiTap3$ touch lab.conf pc1.startup pc2.startup
halaphin@laphin:~/Desktop/BaiTap3$ ls
lab.conf  pc1  pc1.startup  pc2  pc2.startup  router  router.startup
halaphin@laphin:~/Desktop/BaiTap3$
```



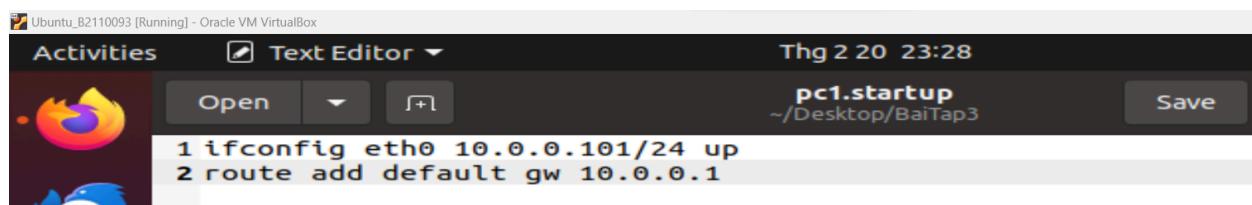
Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

Activities Text Editor lab.conf ~ /Desktop/BaiTap3

Thg 2 20 23:27

Open Save

```
1 pc1[0]=A
2 pc2[0]=B
3 router[0]=A
4 router[1]=B
```



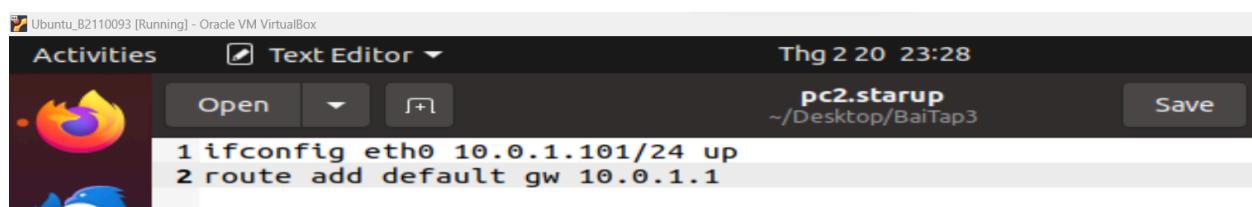
Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

Activities Text Editor pc1.startup ~ /Desktop/BaiTap3

Thg 2 20 23:28

Open Save

```
1 ifconfig eth0 10.0.0.101/24 up
2 route add default gw 10.0.0.1
```



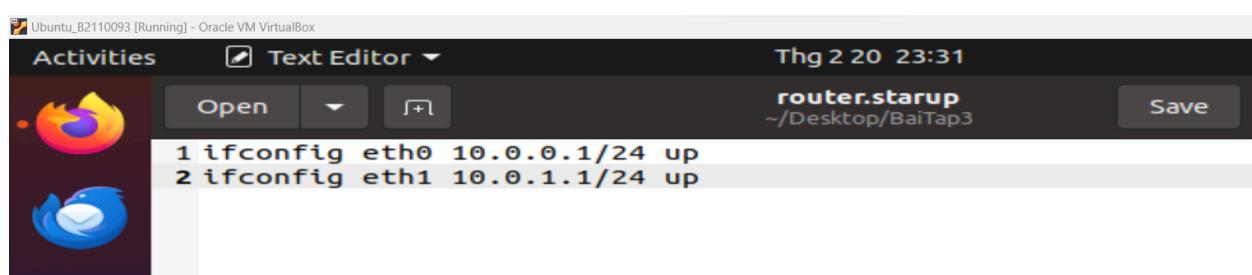
Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

Activities Text Editor pc2.startup ~ /Desktop/BaiTap3

Thg 2 20 23:28

Open Save

```
1 ifconfig eth0 10.0.1.101/24 up
2 route add default gw 10.0.1.1
```



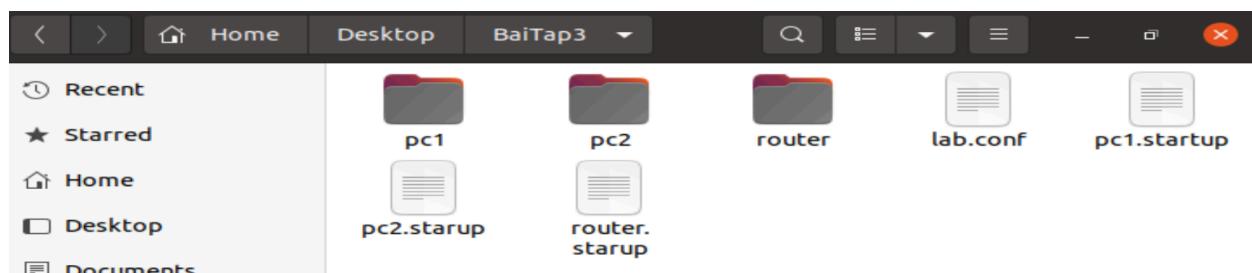
Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

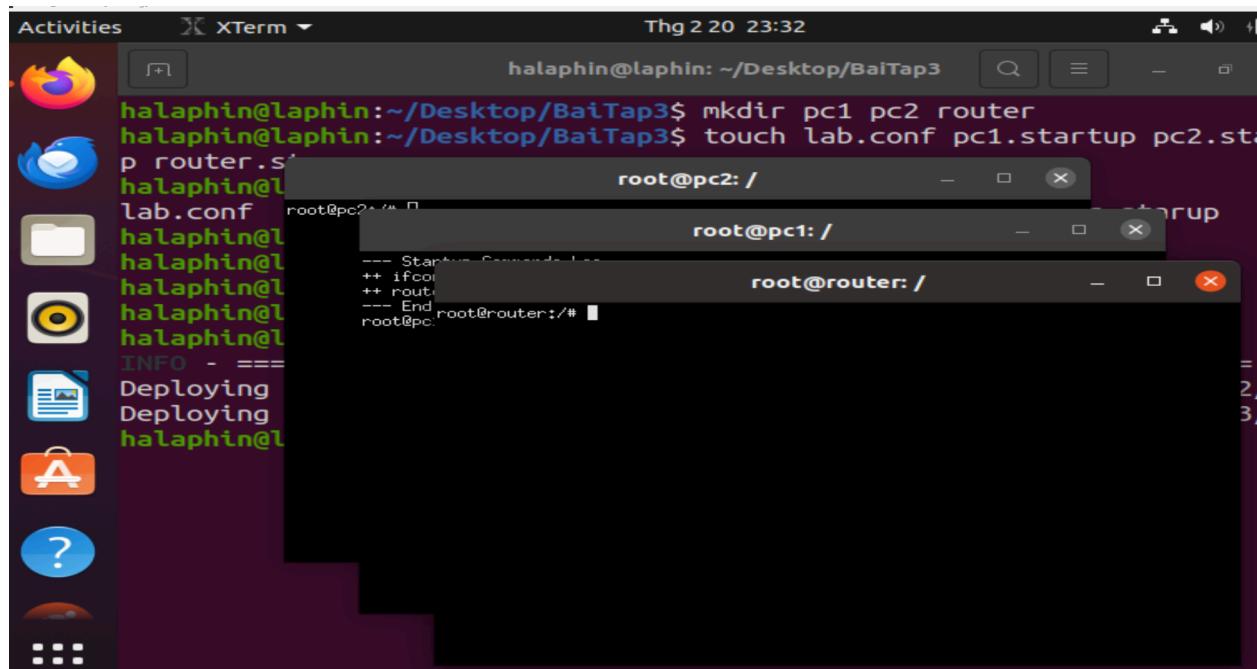
Activities Text Editor router.startup ~ /Desktop/BaiTap3

Thg 2 20 23:31

Open Save

```
1 ifconfig eth0 10.0.0.1/24 up
2 ifconfig eth1 10.0.1.1/24 up
```





```
root@pc1: /
```

```
--- Startup Commands Log
++ ifconfig eth0 10.0.0.101/24 up
++ route add default gw 10.0.0.1
--- End Startup Commands Log
root@pc1:/# ping 10.0.1.101 -c 3
PING 10.0.1.101 (10.0.1.101) 56(84) bytes of data.
From 10.0.0.101 icmp_seq=1 Destination Host Unreachable
From 10.0.0.101 icmp_seq=2 Destination Host Unreachable
From 10.0.0.101 icmp_seq=3 Destination Host Unreachable

--- 10.0.1.101 ping statistics ---
3 packets transmitted, 0 received, +3 errors, 100% packet loss, time 2037ms
pipe 3
root@pc1:/# ping 10.0.0.1 -c 3
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.
From 10.0.0.101 icmp_seq=1 Destination Host Unreachable
From 10.0.0.101 icmp_seq=2 Destination Host Unreachable
From 10.0.0.101 icmp_seq=3 Destination Host Unreachable

--- 10.0.0.1 ping statistics ---
3 packets transmitted, 0 received, +3 errors, 100% packet loss, time 2037ms
pipe 3
root@pc1:/# ping 10.0.1.1 -c 3
PING 10.0.1.1 (10.0.1.1) 56(84) bytes of data.
From 10.0.0.101 icmp_seq=1 Destination Host Unreachable
From 10.0.0.101 icmp_seq=2 Destination Host Unreachable
From 10.0.0.101 icmp_seq=3 Destination Host Unreachable

--- 10.0.1.1 ping statistics ---
3 packets transmitted, 0 received, +3 errors, 100% packet loss, time 2052ms
pipe 3
root@pc1:/#
```

```
root@pc1:/# traceroute 10.0.0.1
traceroute to 10.0.0.1 (10.0.0.1), 30 hops max, 60 byte packets
 1  10.0.0.101 (10.0.0.101)  3068.521 ms !H  3068.466 ms !H  3068.461 ms !H
root@pc1:/# traceroute 10.0.1.101
traceroute to 10.0.1.101 (10.0.1.101), 30 hops max, 60 byte packets
 1  10.0.0.101 (10.0.0.101)  3067.963 ms !H  3067.927 ms !H  3067.925 ms !H
root@pc1:/# route
Kernel IP routing table
Destination      Gateway          Genmask        Flags Metric Ref    Use Iface
default          10.0.0.1        0.0.0.0       UG    0      0        0 eth0
10.0.0.0         0.0.0.0        255.255.255.0 U     0      0        0 eth0
root@pc1:/#
```

```
halaphin@laphin:~/Desktop/BaiTap3$ kathara wipe
Are you sure to wipe Kathara? (y/n) y
halaphin@laphin:~/Desktop/BaiTap3$
```

Bài 4:

```
halaphin@laphin:~/Desktop/BaiTap4$ mkdir pc1 pc2 pc3 pc4 router
halaphin@laphin:~/Desktop/BaiTap4$ touch lab.conf pc1.startup pc2.startup pc3.startup pc4.startup router.startup
halaphin@laphin:~/Desktop/BaiTap4$ ls
lab.conf      pc2                  pc3.startup   router
pc1          pc2.startup        pc4          router.startup
pc1.startup  pc3                  pc4.startup
```

```
1 pc1[0]=A
2 pc2[0]=B
3 pc3[0]=A
4 pc4[0]=B
5 router[0]=A
6 router[1]=B
```

Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

Activities Text Editor Thg 2 20 23:42

pc1.startup ~/Desktop/BaiTap4

```
1 ifconfig eth0 10.0.0.101/24 up
2 route add default gw 10.0.0.1
```

tu_B2110093 [Running] - Oracle VM VirtualBox

Activities Text Editor Thg 2 20 23:42

pc2.startup ~/Desktop/BaiTap4

```
1 ifconfig eth0 10.0.1.101/24 up
2 route add default gw 10.0.1.1
```

Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

Activities Text Editor Thg 2 20 23:43

pc3.startup ~/Desktop/BaiTap4

```
1 ifconfig eth0 10.0.0.102/24 up
2 route add default gw 10.0.0.1
```

Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

Activities Text Editor Thg 2 20 23:43

pc4.startup ~/Desktop/BaiTap4

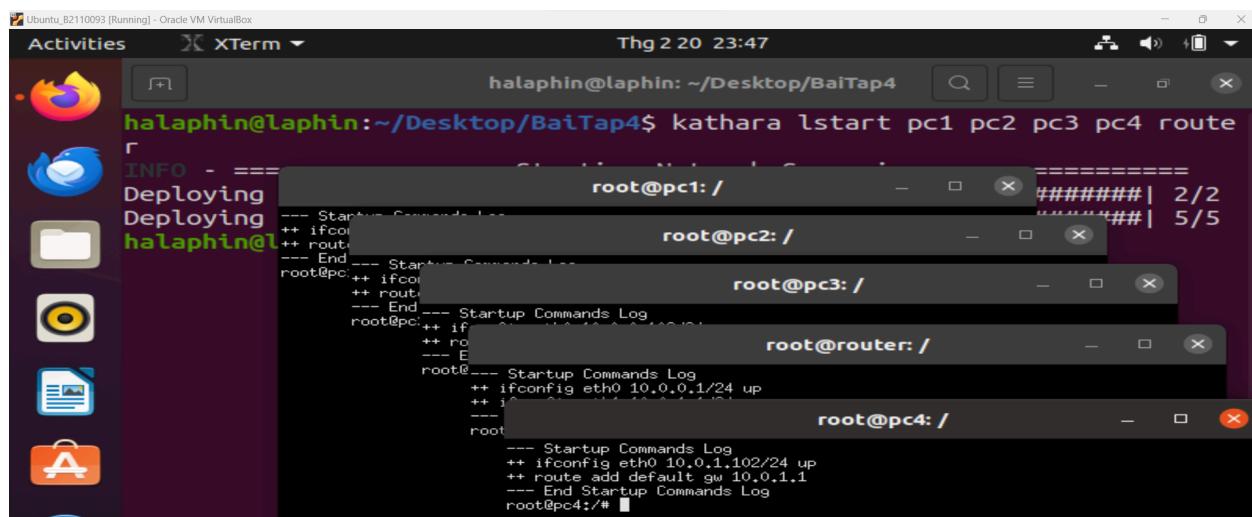
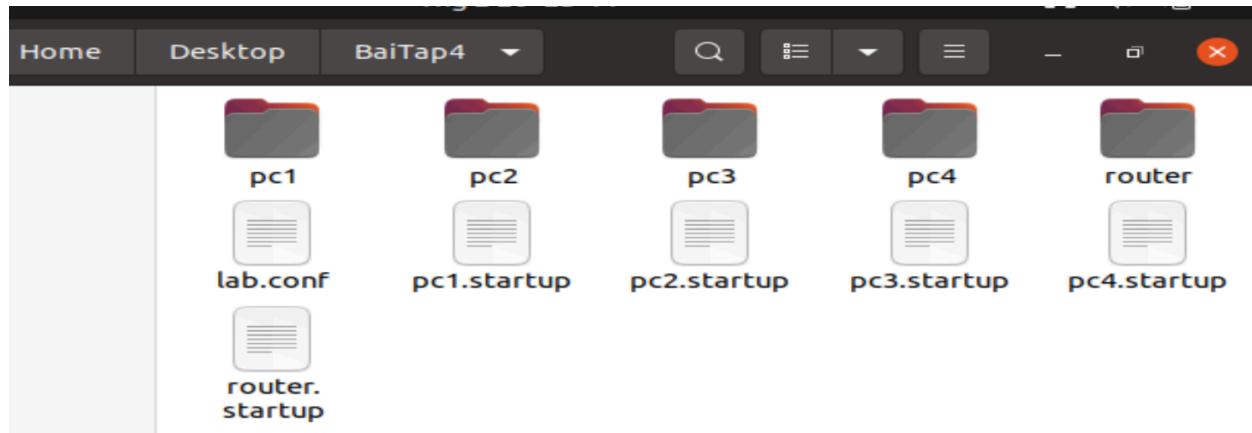
```
1 ifconfig eth0 10.0.1.102/24 up
2 route add default gw 10.0.1.1
```

Ubuntu_B2110093 [Running] - Oracle VM VirtualBox

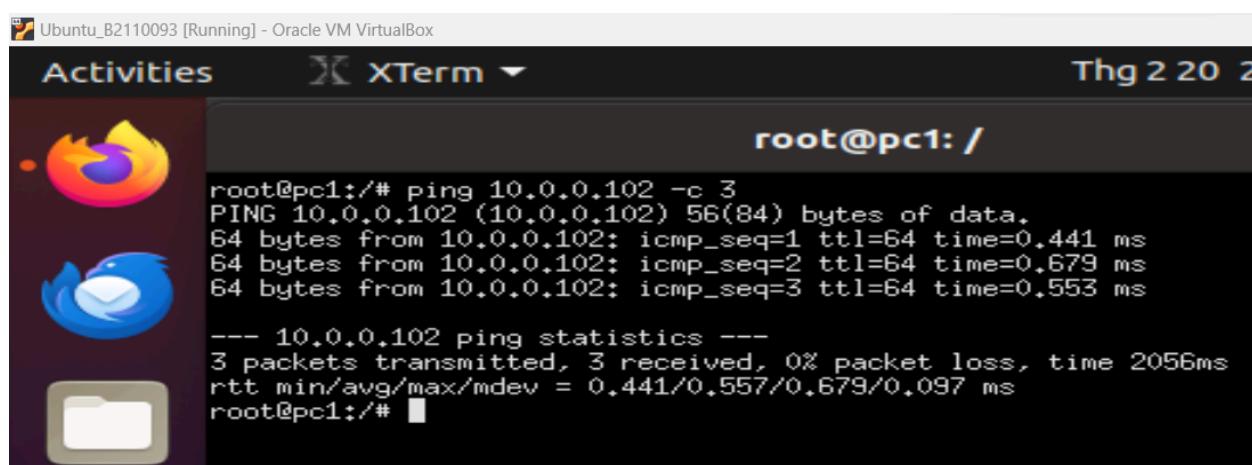
Activities Text Editor Thg 2 20 23:43

router.startup ~/Desktop/BaiTap4

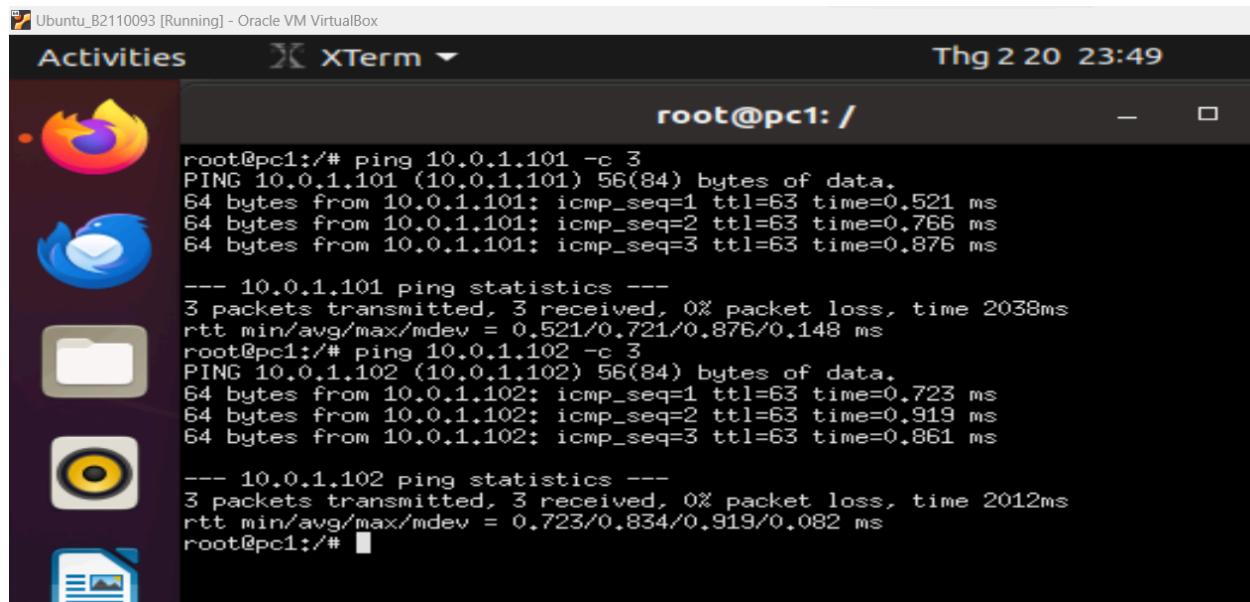
```
1 ifconfig eth0 10.0.0.1/24 up
2 ifconfig eth1 10.0.1.1/24 up
```



- Ping pc3:

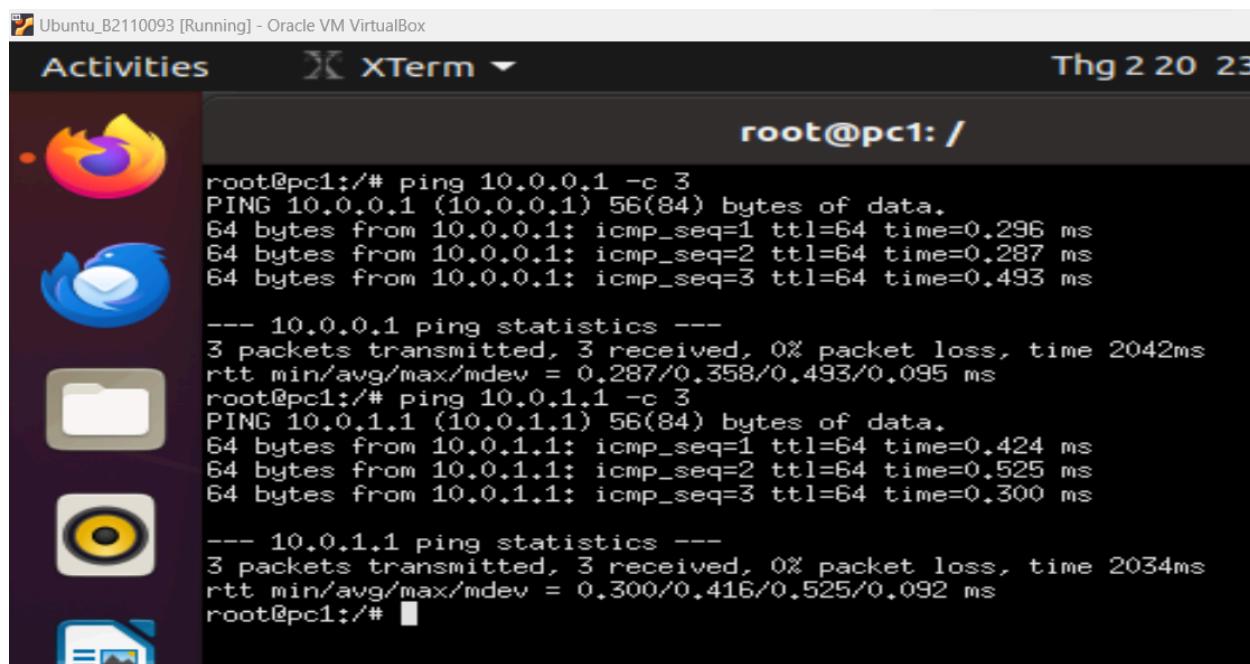


- Ping pc2 và pc4:



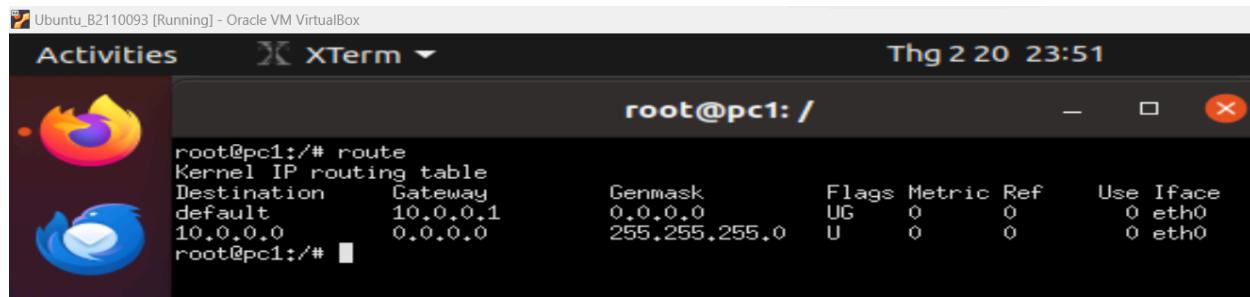
```
root@pc1:/# ping 10.0.1.101 -c 3
PING 10.0.1.101 (10.0.1.101) 56(84) bytes of data.
64 bytes from 10.0.1.101: icmp_seq=1 ttl=63 time=0.521 ms
64 bytes from 10.0.1.101: icmp_seq=2 ttl=63 time=0.766 ms
64 bytes from 10.0.1.101: icmp_seq=3 ttl=63 time=0.876 ms
--- 10.0.1.101 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2038ms
rtt min/avg/max/mdev = 0.521/0.721/0.876/0.148 ms
root@pc1:/# ping 10.0.1.102 -c 3
PING 10.0.1.102 (10.0.1.102) 56(84) bytes of data.
64 bytes from 10.0.1.102: icmp_seq=1 ttl=63 time=0.723 ms
64 bytes from 10.0.1.102: icmp_seq=2 ttl=63 time=0.919 ms
64 bytes from 10.0.1.102: icmp_seq=3 ttl=63 time=0.861 ms
--- 10.0.1.102 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2012ms
rtt min/avg/max/mdev = 0.723/0.834/0.919/0.082 ms
root@pc1:/#
```

- Ping router:



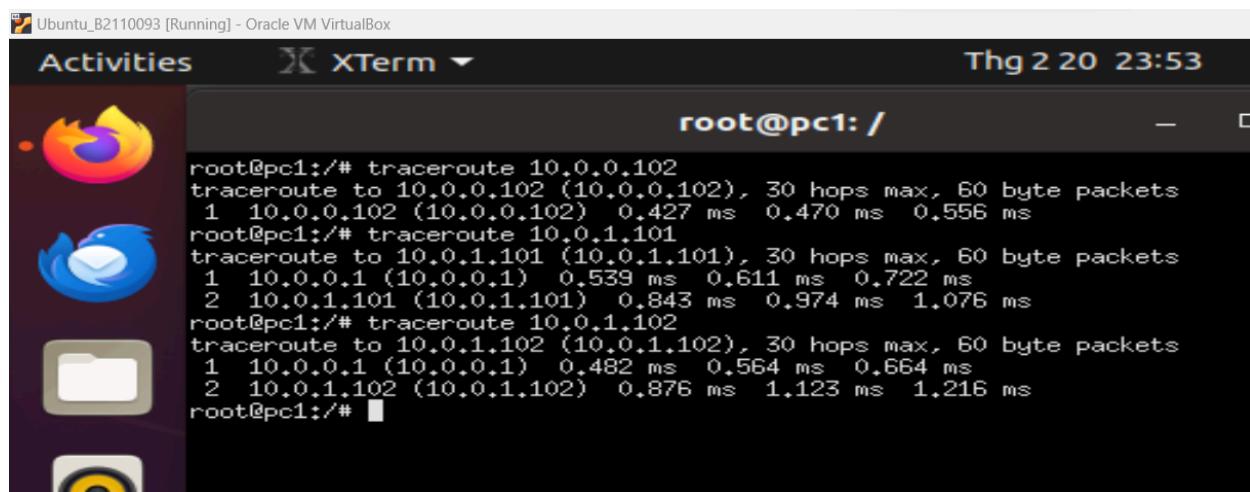
```
root@pc1:/# ping 10.0.0.1 -c 3
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.
64 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=0.296 ms
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=0.287 ms
64 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=0.493 ms
--- 10.0.0.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2042ms
rtt min/avg/max/mdev = 0.287/0.358/0.493/0.095 ms
root@pc1:/# ping 10.0.1.1 -c 3
PING 10.0.1.1 (10.0.1.1) 56(84) bytes of data.
64 bytes from 10.0.1.1: icmp_seq=1 ttl=64 time=0.424 ms
64 bytes from 10.0.1.1: icmp_seq=2 ttl=64 time=0.525 ms
64 bytes from 10.0.1.1: icmp_seq=3 ttl=64 time=0.300 ms
--- 10.0.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2034ms
rtt min/avg/max/mdev = 0.300/0.416/0.525/0.092 ms
root@pc1:/#
```

- Route

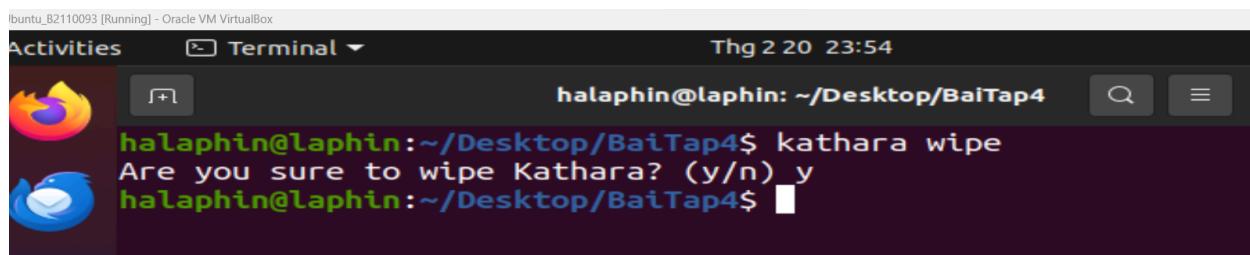


```
root@pc1:/# route
Kernel IP routing table
Destination      Gateway         Genmask        Flags Metric Ref    Use Iface
default          10.0.0.1        0.0.0.0       UG     0      0        0 eth0
10.0.0.0        0.0.0.0        255.255.255.0 U        0      0        0 eth0
root@pc1:/#
```

- traceroute:



```
root@pc1:/# traceroute 10.0.0.102
traceroute to 10.0.0.102 (10.0.0.102), 30 hops max, 60 byte packets
 1  10.0.0.102 (10.0.0.102)  0.427 ms  0.470 ms  0.556 ms
root@pc1:/# traceroute 10.0.1.101
traceroute to 10.0.1.101 (10.0.1.101), 30 hops max, 60 byte packets
 1  10.0.0.1 (10.0.0.1)  0.539 ms  0.611 ms  0.722 ms
 2  10.0.1.101 (10.0.1.101)  0.843 ms  0.974 ms  1.076 ms
root@pc1:/# traceroute 10.0.1.102
traceroute to 10.0.1.102 (10.0.1.102), 30 hops max, 60 byte packets
 1  10.0.0.1 (10.0.0.1)  0.482 ms  0.564 ms  0.664 ms
 2  10.0.1.102 (10.0.1.102)  0.876 ms  1.123 ms  1.216 ms
root@pc1:/#
```



```
halaphin@laphin:~/Desktop/BaiTap4$ kathara wipe
Are you sure to wipe Kathara? (y/n) y
halaphin@laphin:~/Desktop/BaiTap4$
```