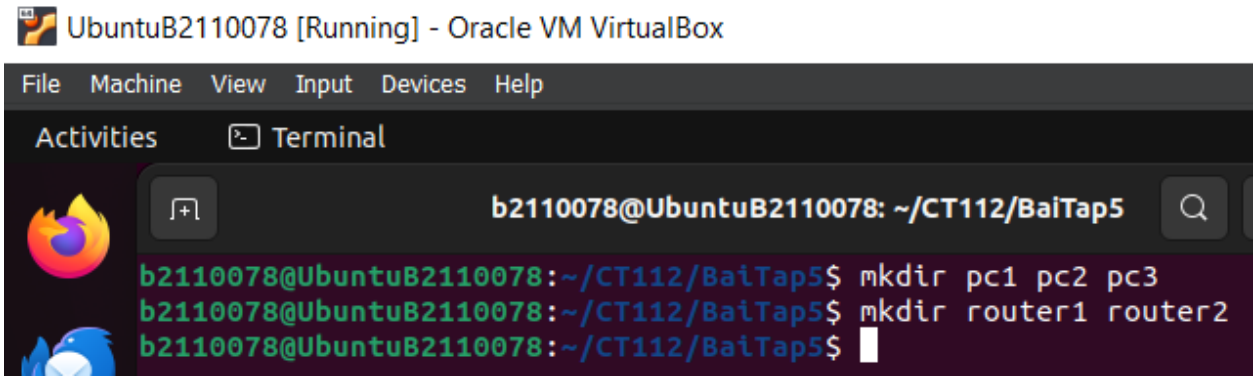
LAB 2

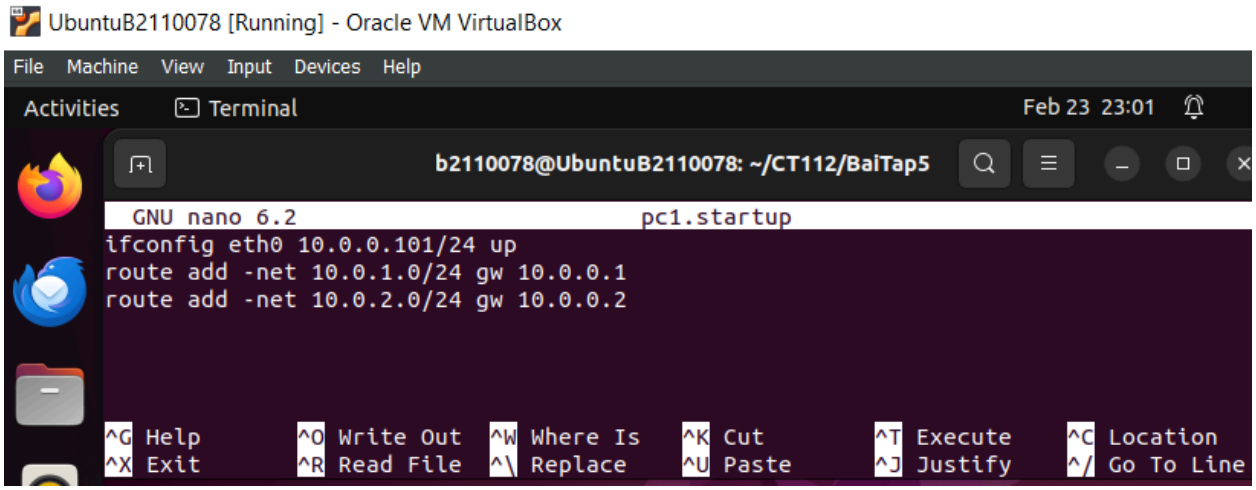
Họ tên và MSSV: Quách Minh Hớn - B2110078

Nhóm học phần: 11

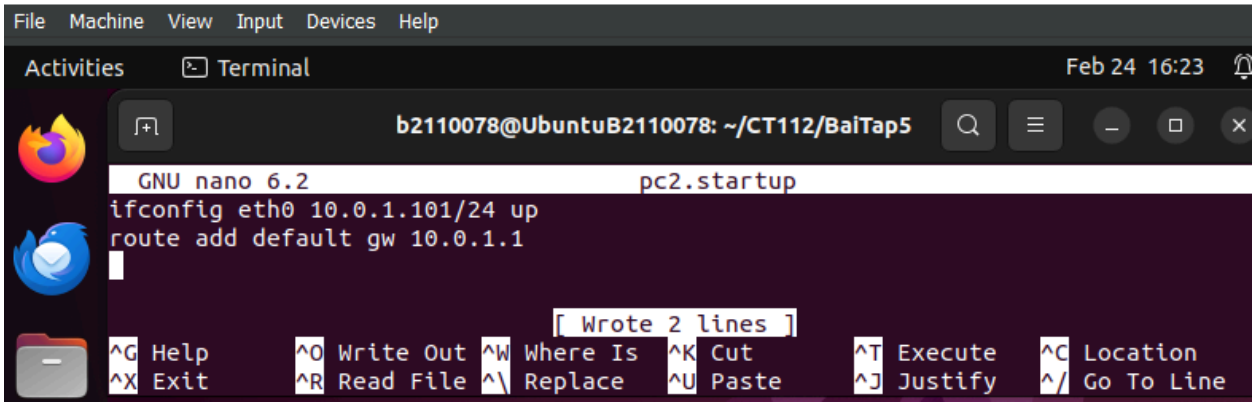
- *Các sinh viên bị phát hiện sao chép bài của nhau sẽ nhận 0đ cho tất cả bài thực hành của môn này.*
- *Bài nộp phải ở dạng PDF.* Tên file PDF đặt theo cấu trúc "CT112_*MSSV_Lab2_HoTen*". Ví dụ, SV có MSSV là B1234 và Họ tên là "Nguyễn Văn A"; tên file sẽ đặt như sau "CT112_B1234_Lab2_NguyenVanA".
- *File nộp cần cung cấp đầy đủ các bước giải quyết bài toán.*

Bài 5: chuyển về thư mục home

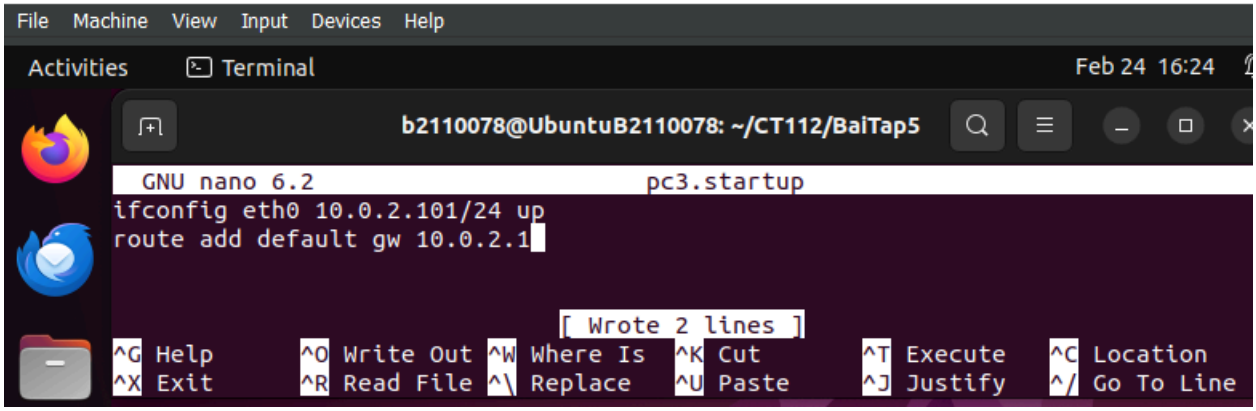




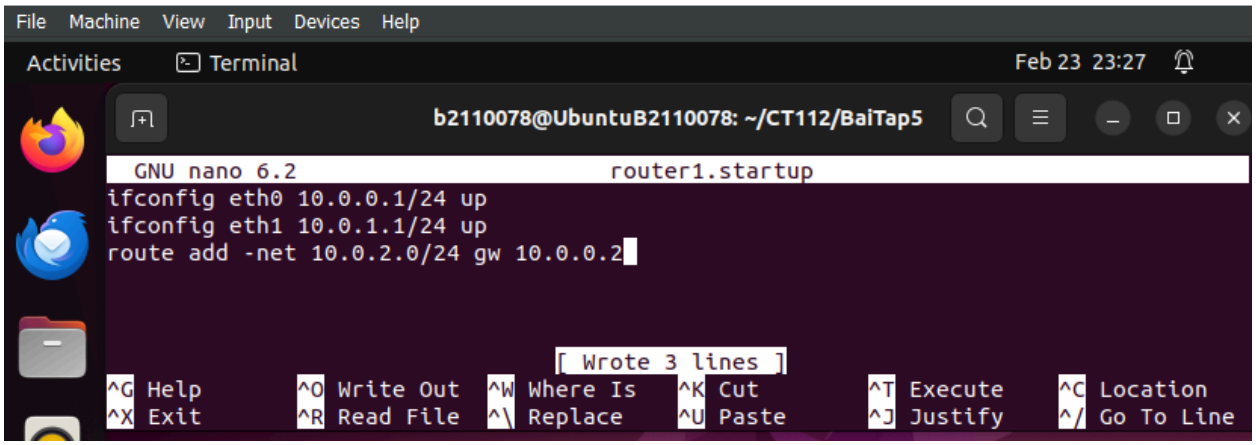
UbuntuB2110078 [Running] - Oracle VM VirtualBox



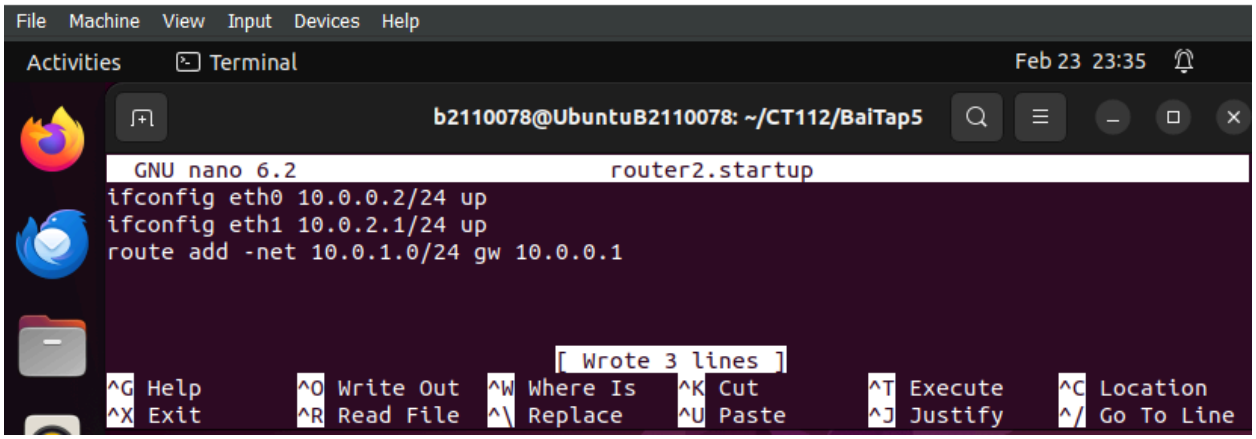
UbuntuB2110078 [Running] - Oracle VM VirtualBox



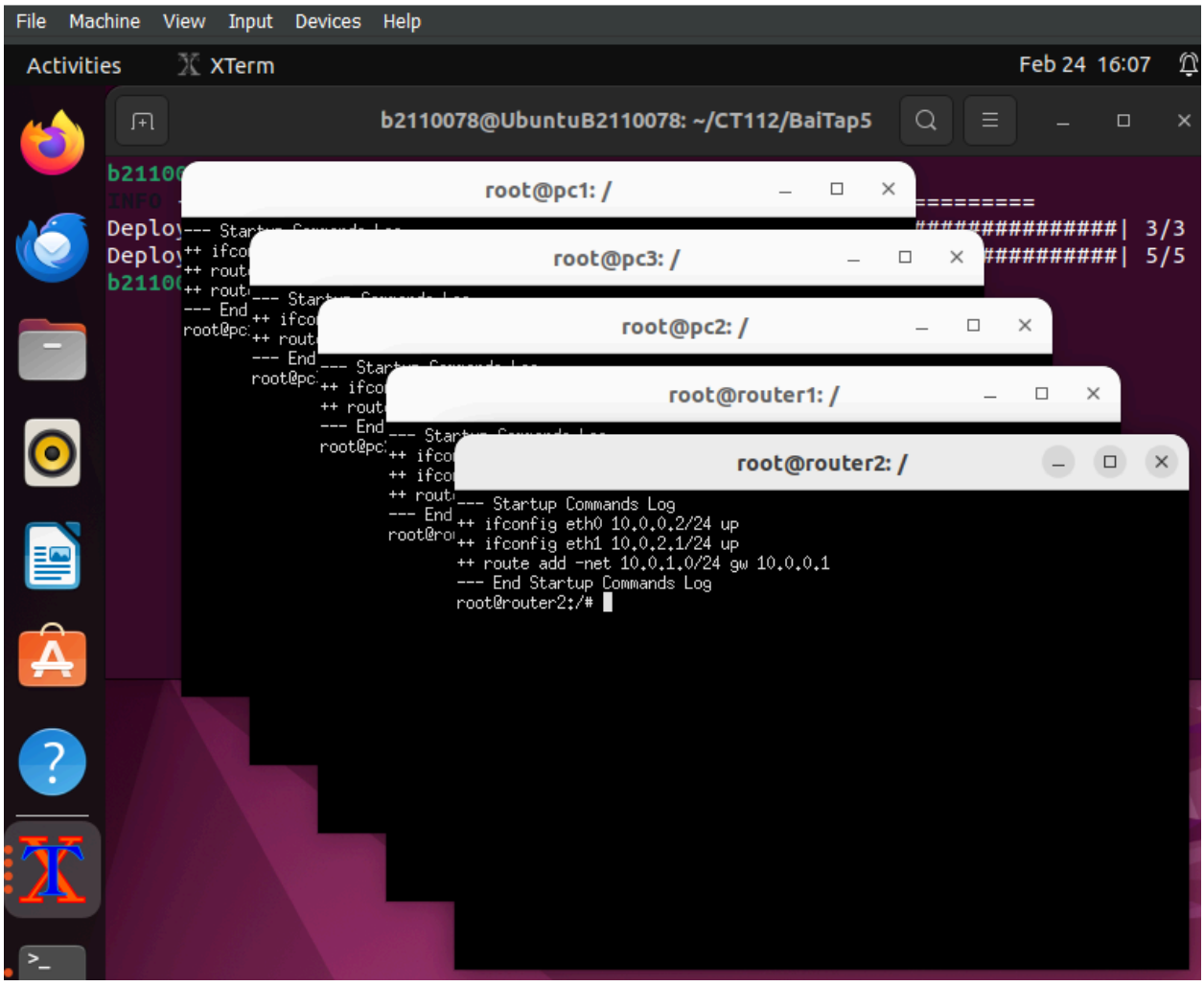
UbuntuB2110078 [Running] - Oracle VM VirtualBox

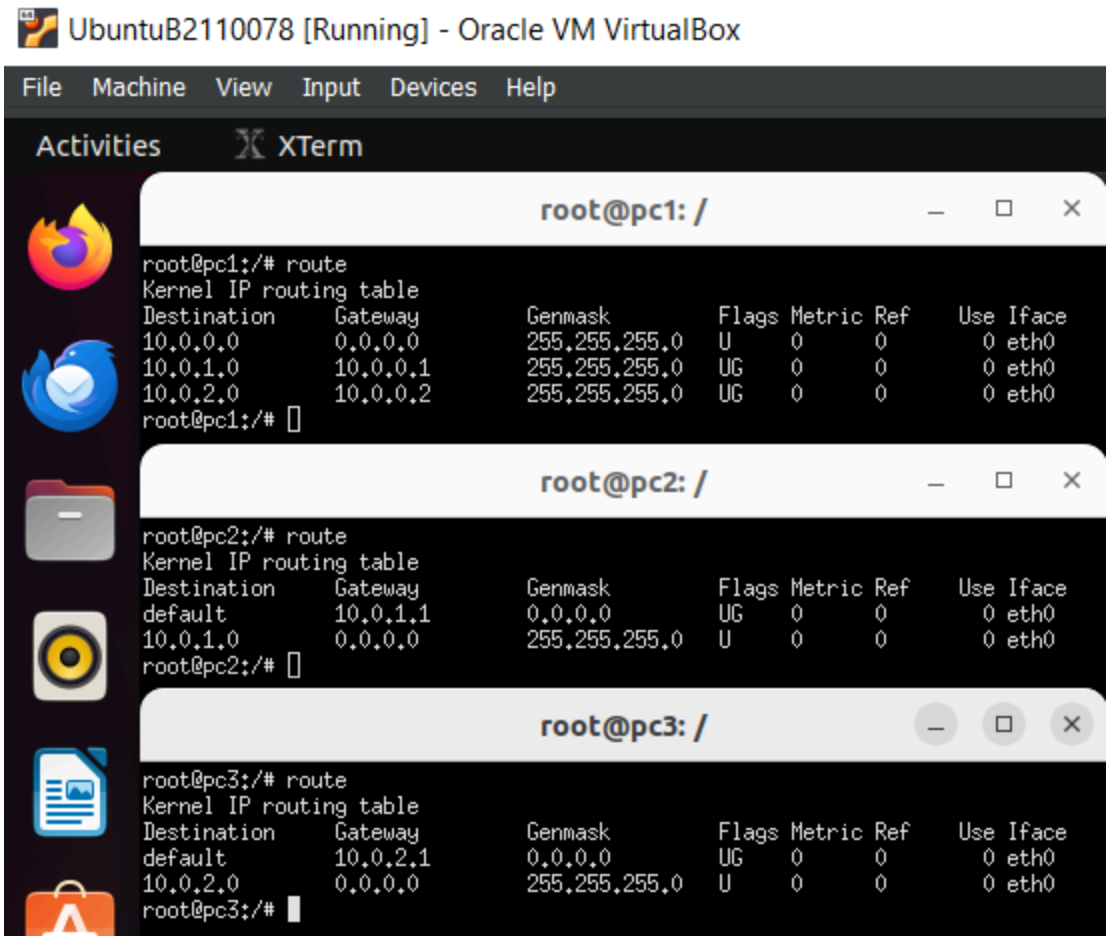


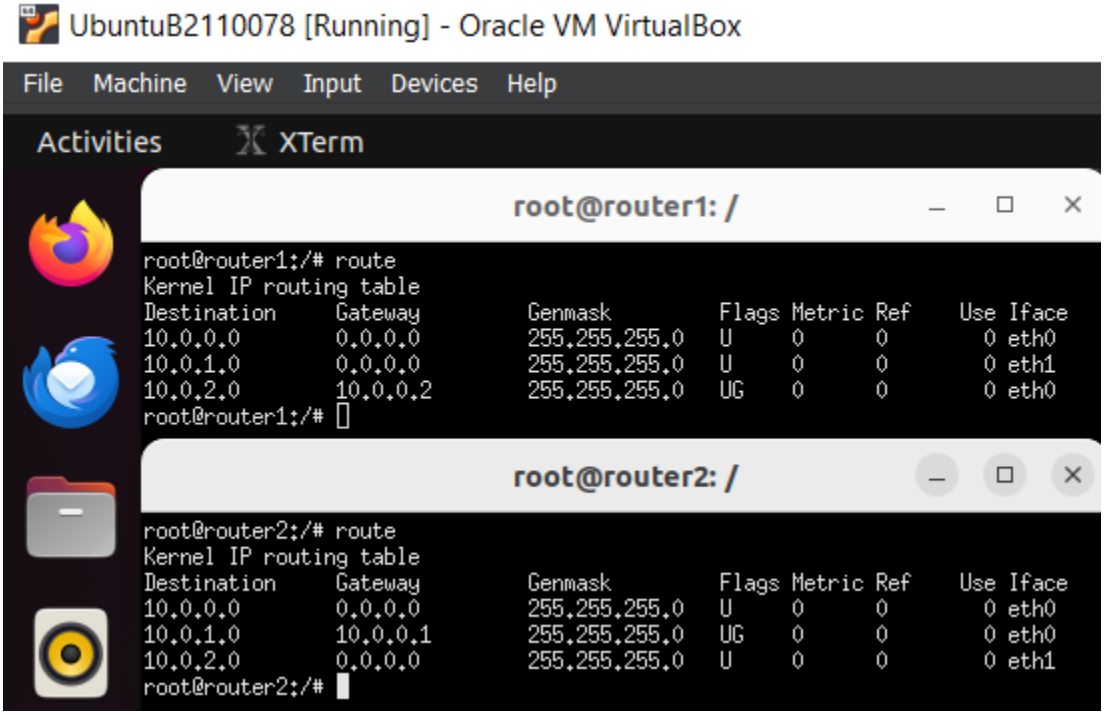
UbuntuB2110078 [Running] - Oracle VM VirtualBox

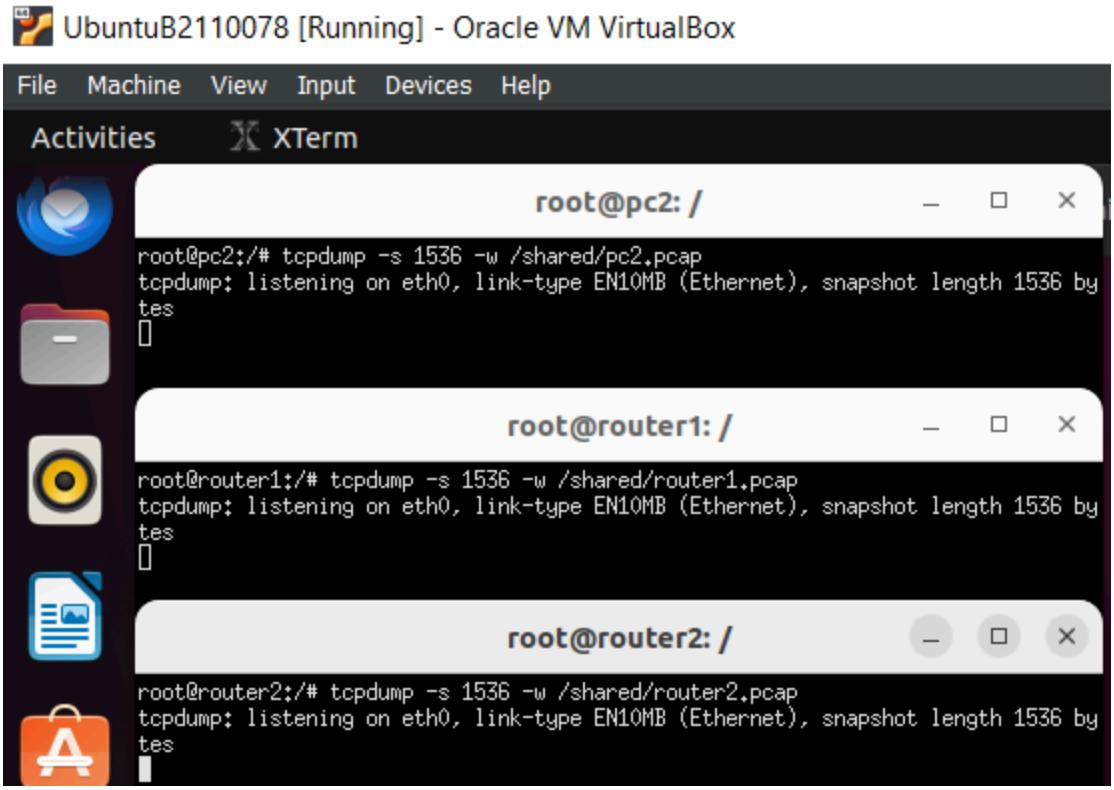


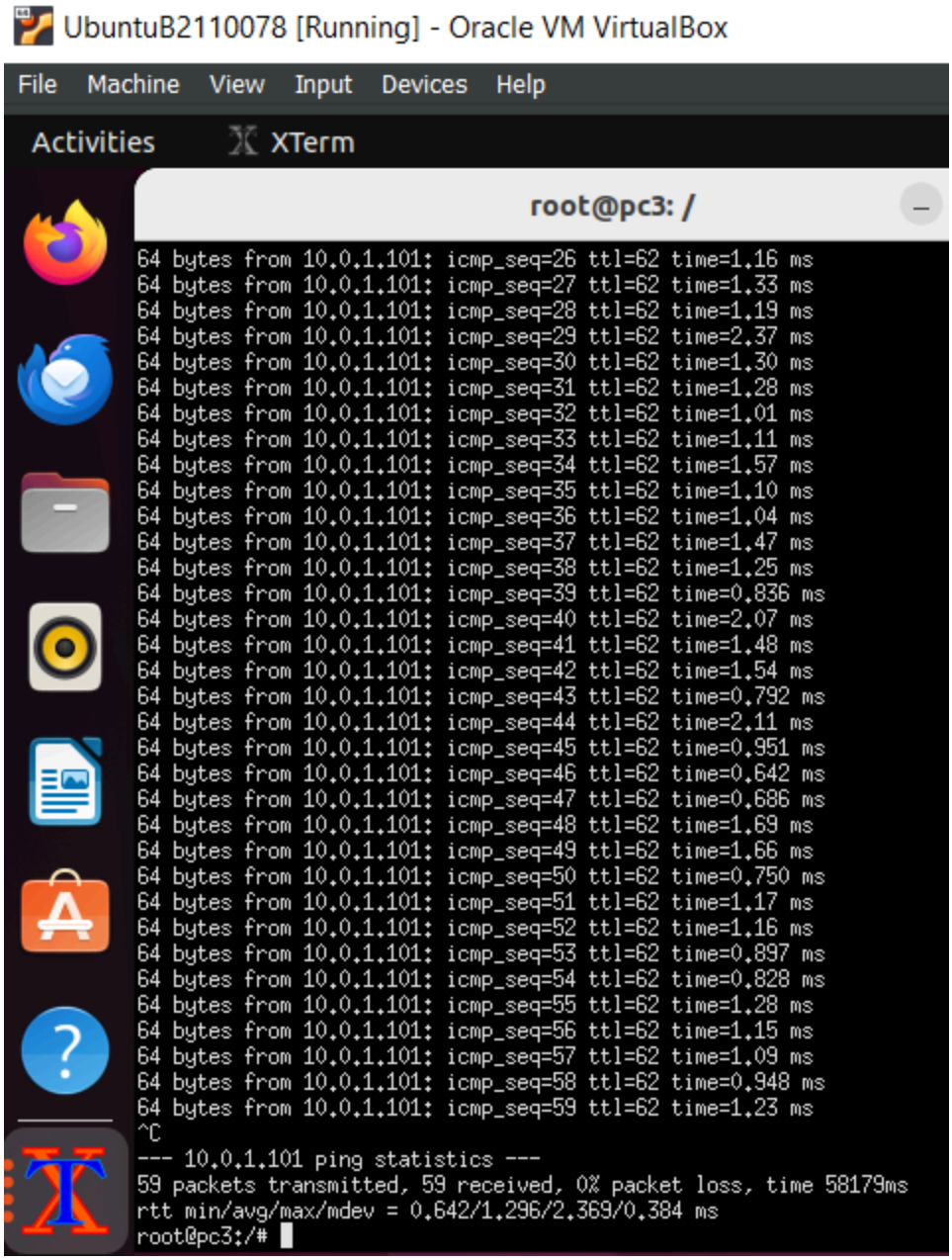
UbuntuB2110078 [Running] - Oracle VM VirtualBox

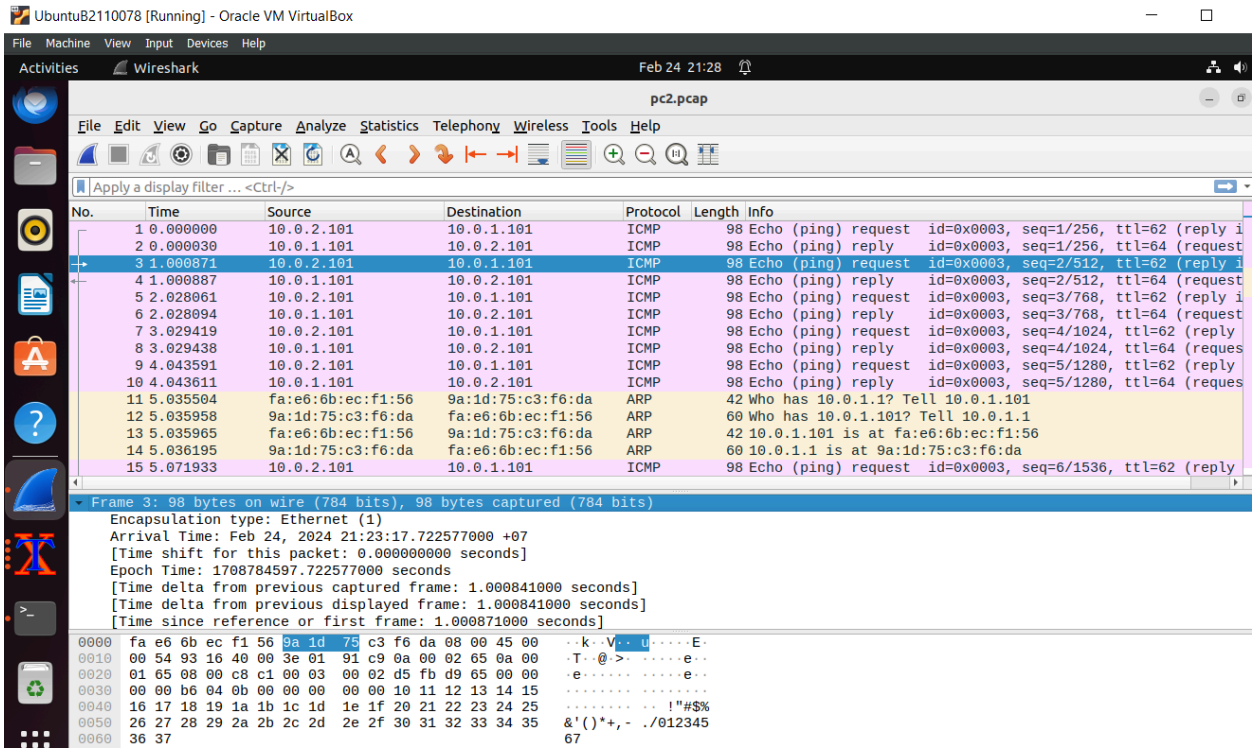



UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities XTerm
root@pc1: /
root@pc1:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
10.0.0.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
10.0.1.0 10.0.0.1 255.255.255.0 UG 0 0 0 eth0
10.0.2.0 10.0.0.2 255.255.255.0 UG 0 0 0 eth0
root@pc1:/#
root@pc2: /
root@pc2:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default 10.0.1.1 0.0.0.0 UG 0 0 0 eth0
10.0.1.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
root@pc2:/#
root@pc3: /
root@pc3:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default 10.0.2.1 0.0.0.0 UG 0 0 0 eth0
10.0.2.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
root@pc3:/#

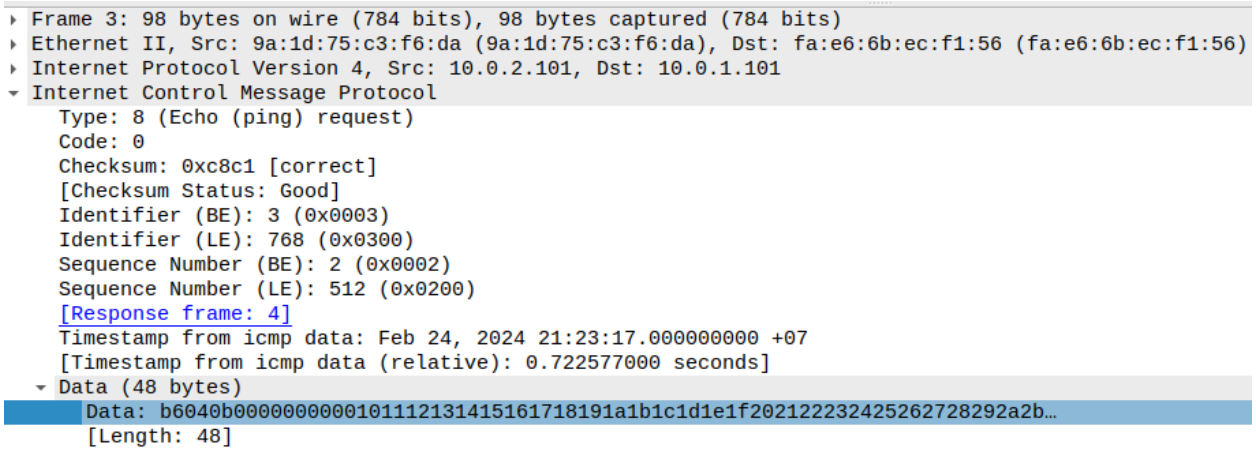

UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities XTerm
root@router1: /
root@router1:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
10.0.0.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
10.0.1.0 0.0.0.0 255.255.255.0 U 0 0 0 eth1
10.0.2.0 10.0.0.2 255.255.255.0 UG 0 0 0 eth0
root@router1:/#
root@router2: /
root@router2:/# 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
10.0.1.0 10.0.0.1 255.255.255.0 UG 0 0 0 eth0
10.0.2.0 0.0.0.0 255.255.255.0 U 0 0 0 eth1
root@router2:/#


UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
XTerm
root@pc2: /
root@pc2:/# tcpdump -s 1536 -w /shared/pc2.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), snapshot length 1536 by
tes
root@router1: /
root@router1:/# tcpdump -s 1536 -w /shared/router1.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), snapshot length 1536 by
tes
root@router2: /
root@router2:/# tcpdump -s 1536 -w /shared/router2.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), snapshot length 1536 by
tes


UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
XTerm
root@pc3: /
64 bytes from 10.0.1.101: icmp_seq=26 ttl=62 time=1.16 ms
64 bytes from 10.0.1.101: icmp_seq=27 ttl=62 time=1.33 ms
64 bytes from 10.0.1.101: icmp_seq=28 ttl=62 time=1.19 ms
64 bytes from 10.0.1.101: icmp_seq=29 ttl=62 time=2.37 ms
64 bytes from 10.0.1.101: icmp_seq=30 ttl=62 time=1.30 ms
64 bytes from 10.0.1.101: icmp_seq=31 ttl=62 time=1.28 ms
64 bytes from 10.0.1.101: icmp_seq=32 ttl=62 time=1.01 ms
64 bytes from 10.0.1.101: icmp_seq=33 ttl=62 time=1.11 ms
64 bytes from 10.0.1.101: icmp_seq=34 ttl=62 time=1.57 ms
64 bytes from 10.0.1.101: icmp_seq=35 ttl=62 time=1.10 ms
64 bytes from 10.0.1.101: icmp_seq=36 ttl=62 time=1.04 ms
64 bytes from 10.0.1.101: icmp_seq=37 ttl=62 time=1.47 ms
64 bytes from 10.0.1.101: icmp_seq=38 ttl=62 time=1.25 ms
64 bytes from 10.0.1.101: icmp_seq=39 ttl=62 time=0.836 ms
64 bytes from 10.0.1.101: icmp_seq=40 ttl=62 time=2.07 ms
64 bytes from 10.0.1.101: icmp_seq=41 ttl=62 time=1.48 ms
64 bytes from 10.0.1.101: icmp_seq=42 ttl=62 time=1.54 ms
64 bytes from 10.0.1.101: icmp_seq=43 ttl=62 time=0.792 ms
64 bytes from 10.0.1.101: icmp_seq=44 ttl=62 time=2.11 ms
64 bytes from 10.0.1.101: icmp_seq=45 ttl=62 time=0.951 ms
64 bytes from 10.0.1.101: icmp_seq=46 ttl=62 time=0.642 ms
64 bytes from 10.0.1.101: icmp_seq=47 ttl=62 time=0.686 ms
64 bytes from 10.0.1.101: icmp_seq=48 ttl=62 time=1.69 ms
64 bytes from 10.0.1.101: icmp_seq=49 ttl=62 time=1.66 ms
64 bytes from 10.0.1.101: icmp_seq=50 ttl=62 time=0.750 ms
64 bytes from 10.0.1.101: icmp_seq=51 ttl=62 time=1.17 ms
64 bytes from 10.0.1.101: icmp_seq=52 ttl=62 time=1.16 ms
64 bytes from 10.0.1.101: icmp_seq=53 ttl=62 time=0.897 ms
64 bytes from 10.0.1.101: icmp_seq=54 ttl=62 time=0.828 ms
64 bytes from 10.0.1.101: icmp_seq=55 ttl=62 time=1.28 ms
64 bytes from 10.0.1.101: icmp_seq=56 ttl=62 time=1.15 ms
64 bytes from 10.0.1.101: icmp_seq=57 ttl=62 time=1.09 ms
64 bytes from 10.0.1.101: icmp_seq=58 ttl=62 time=0.948 ms
64 bytes from 10.0.1.101: icmp_seq=59 ttl=62 time=1.23 ms
^C
--- 10.0.1.101 ping statistics ---
59 packets transmitted, 59 received, 0% packet loss, time 58179ms
rtt min/avg/max/mdev = 0.642/1.296/2.369/0.384 ms
root@pc3:/#

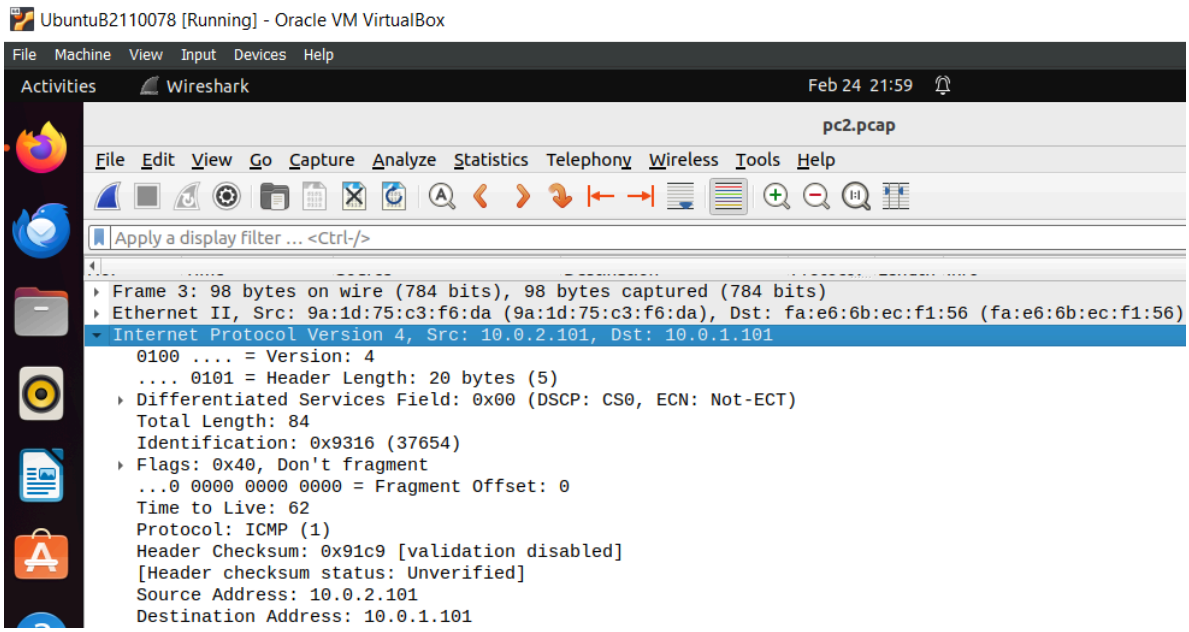


- Frame 3 có kích thước là 98 bytes



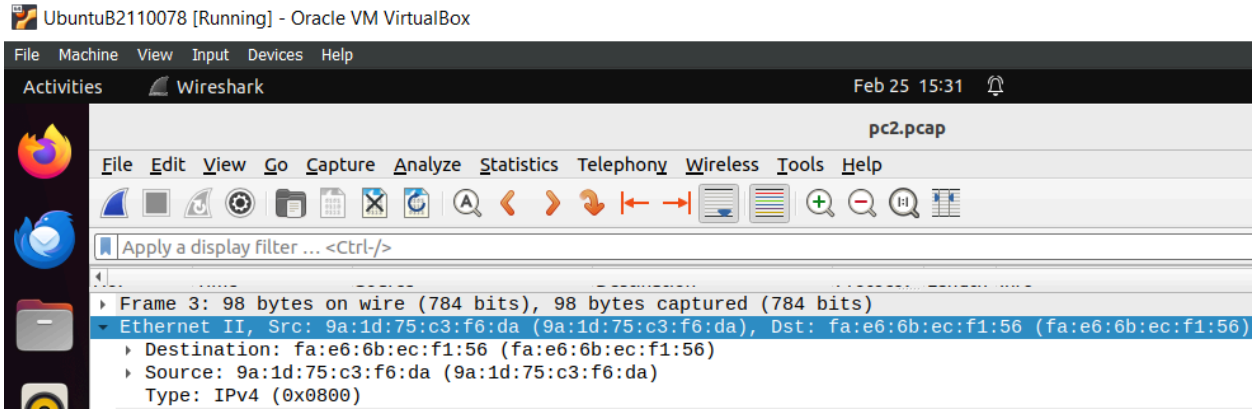
- Header Internet Control Message Protocol:
  - Gói tin sử dụng giao thức ICMP
  - Giao thức này hoạt động trên Network Layer của mô hình OSI
  - Thông điệp có độ dài 48 bytes, nội dung thông điệp là:

```
0000  fa e6 6b ec f1 56 9a 1d  75 c3 f6 da 08 00 45 00   ··k··V·· u·····E·
0010  00 54 93 16 40 00 3e 01  91 c9 0a 00 02 65 0a 00   ·T··@·>· ·····e··
0020  01 65 08 00 c8 c1 00 03  00 02 d5 fb d9 65 00 00   ·e······ ·····e··
0030  00 00 b6 04 0b 00 00 00  00 00 10 11 12 13 14 15   ··b····· ········
0040  16 17 18 19 1a 1b 1c 1d  1e 1f 20 21 22 23 24 25   ········ ·· !"#$%
0050  26 27 28 29 2a 2b 2c 2d  2e 2f 30 31 32 33 34 35   &'()*+,- ./012345
0060  36 37                                             67
```



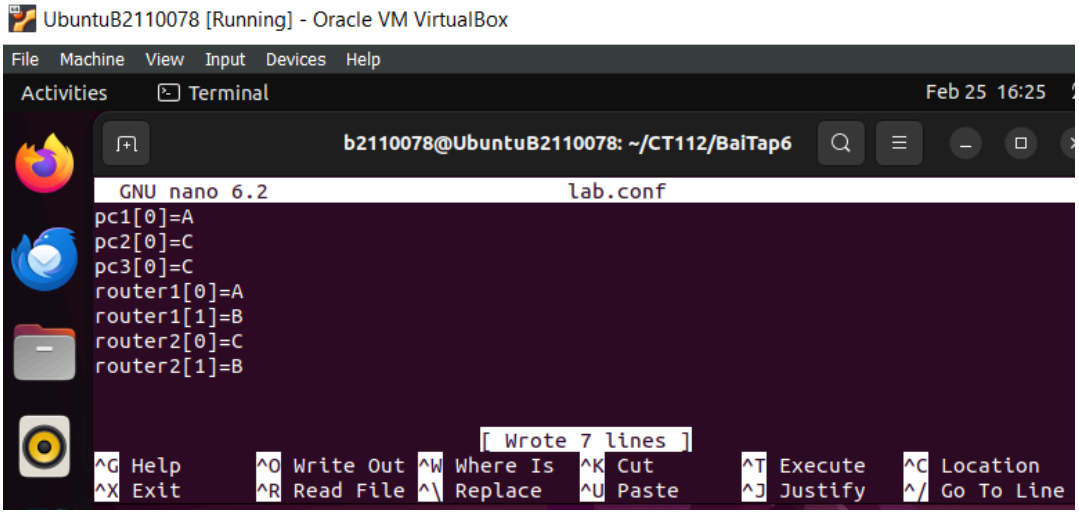
- Header Internet Protocol Version 4:
  - IP của máy gửi dữ liệu là 10.0.2.101 của PC3
  - IP của máy nhận dữ liệu là 10.0.1.101 của PC2
  - Định danh ID của gói tin IP này là 0x91c9. Định danh của 1 gói tin giúp máy nhận dữ liệu có thể xác định từng gói riêng biệt, để ghép chúng lại sau khi tác ra trong quá trình truyền trong mạng
  - Độ dài Header là 20 bytes. Phần Header bao gồm những trường sau:
    - Version (4 bits)
    - Header Length (4 bits)
    - Differentiated Services Field (6 bits)
    - Total Length (16 bits)
    - Identification (16 bits)
    - Flags (3 bits)
    - Time to Live (8 bits)
    - Header Checksum (16 bits)
    - Source Address (32 bits)

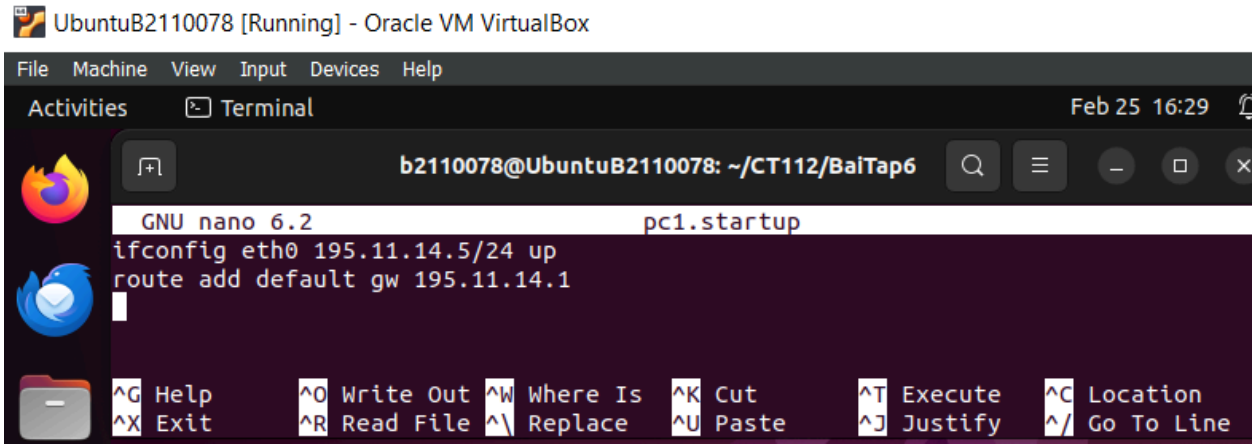
    - Destination Address (32 bits)
- Trường Total Length có độ dài là 84 bytes. Message + Header = 64 + 20 = 84

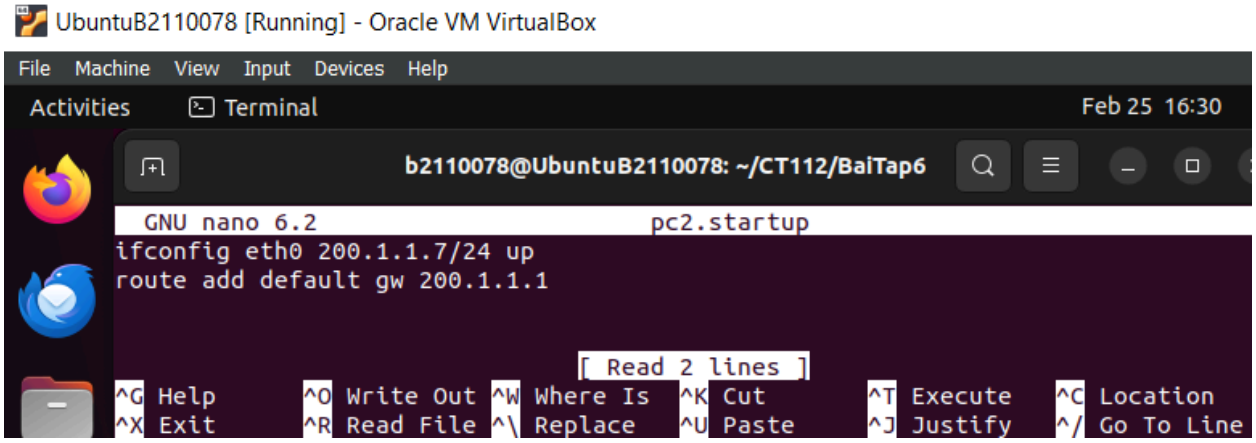


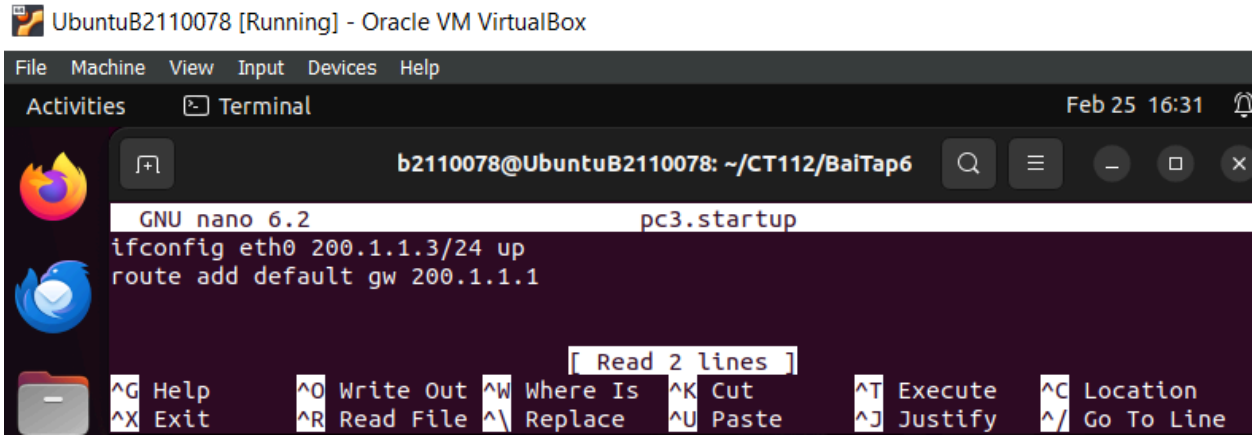
- Header Ethernet II:
    - Địa chỉ MAC của máy gửi dữ liệu là *9a:1d:75:c3:f6:da*, đây là địa chỉ của router1. Vì trong quá trình truyền tải dữ liệu, địa chỉ MAC của tập nguồn tin luôn thay đổi, do mỗi khi qua một router thì sẽ mở gói và đóng gói. Do vậy, địa chỉ MAC nguồn của gói sẽ là địa chỉ MAC cuối cùng mà nó đi qua
    - Địa chỉ MAC của máy nhận dữ liệu là *fa:e6:6b:ec:f1:56*, đây là địa chỉ của pc2
    - Trường type mang giá trị là 0x0800. Thông tin thể hiện là IPv4
    - Payload có chiều dài là 64 bytes

Bài 6:

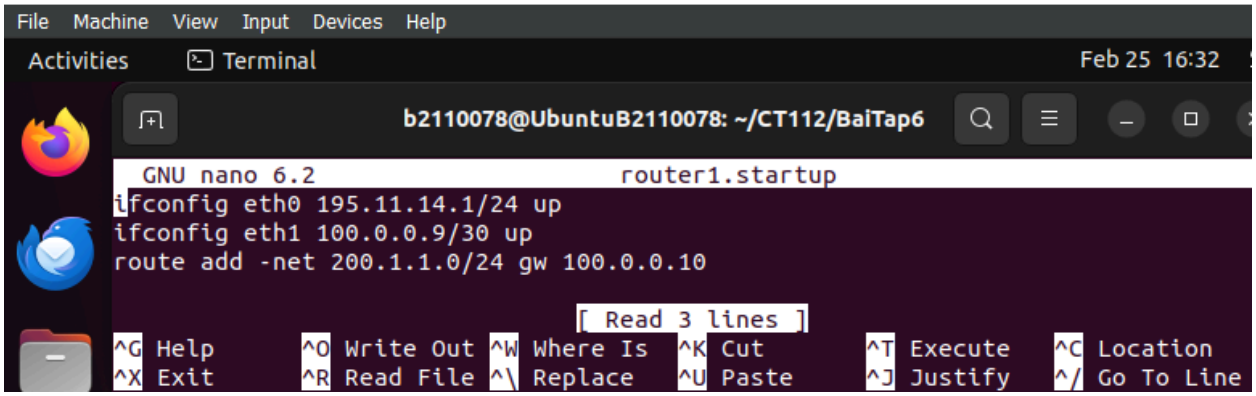



UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 25 16:29
b2110078@UbuntuB2110078: ~/CT112/BaiTap6
GNU nano 6.2 pc1.startup
ifconfig eth0 195.11.14.5/24 up
route add default gw 195.11.14.1
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line

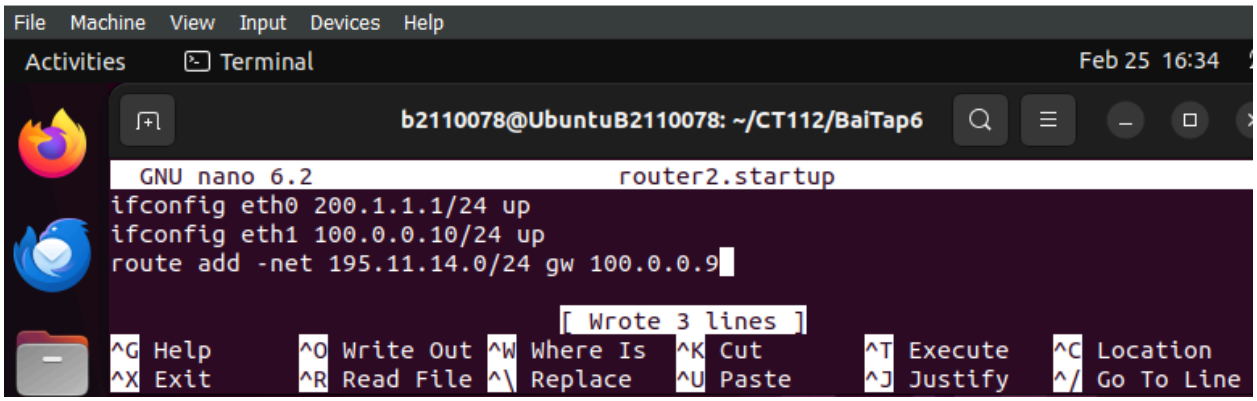

UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 25 16:30
b2110078@UbuntuB2110078: ~/CT112/BaiTap6
GNU nano 6.2 pc2.startup
ifconfig eth0 200.1.1.7/24 up
route add default gw 200.1.1.1
[Read 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line


UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 25 16:31
b2110078@UbuntuB2110078: ~/CT112/BaiTap6
GNU nano 6.2 pc3.startup
ifconfig eth0 200.1.1.3/24 up
route add default gw 200.1.1.1
[Read 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line

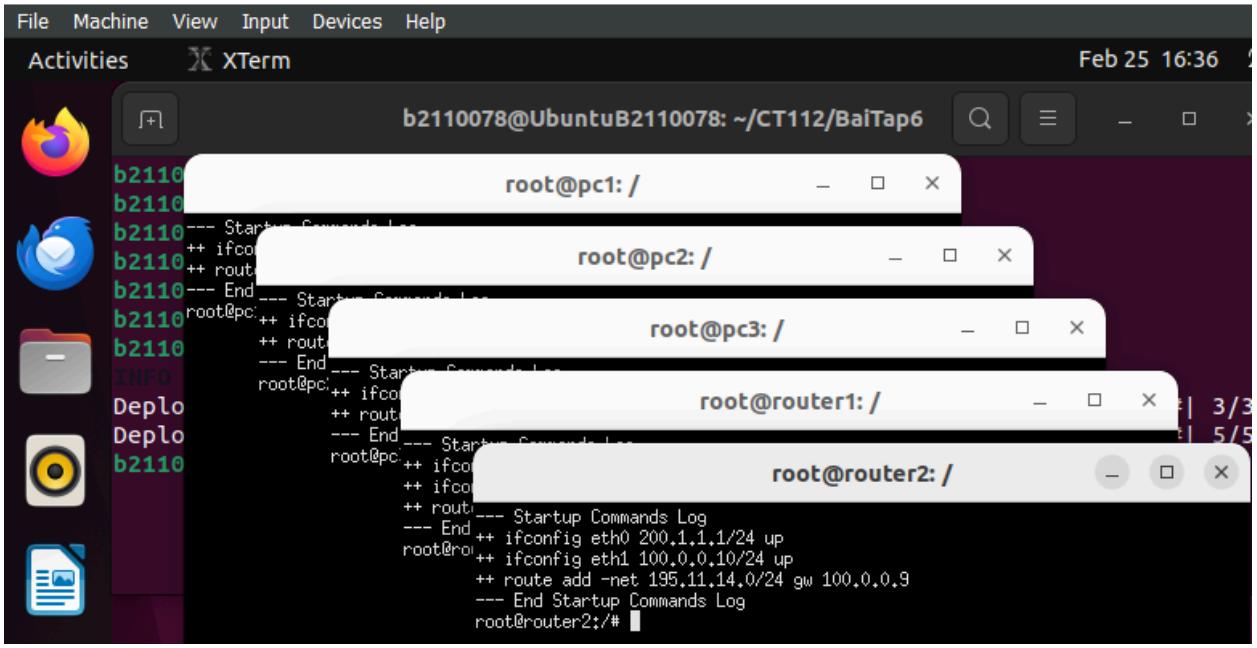
UbuntuB2110078 [Running] - Oracle VM VirtualBox

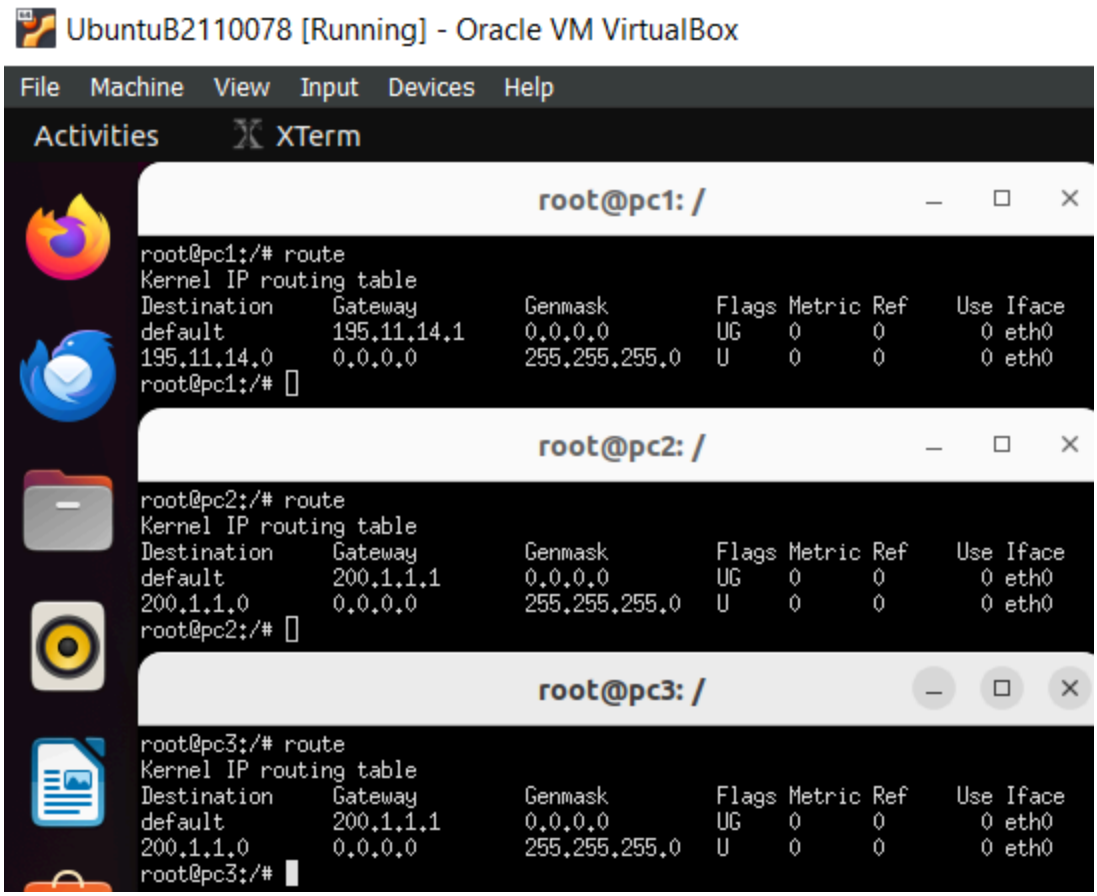


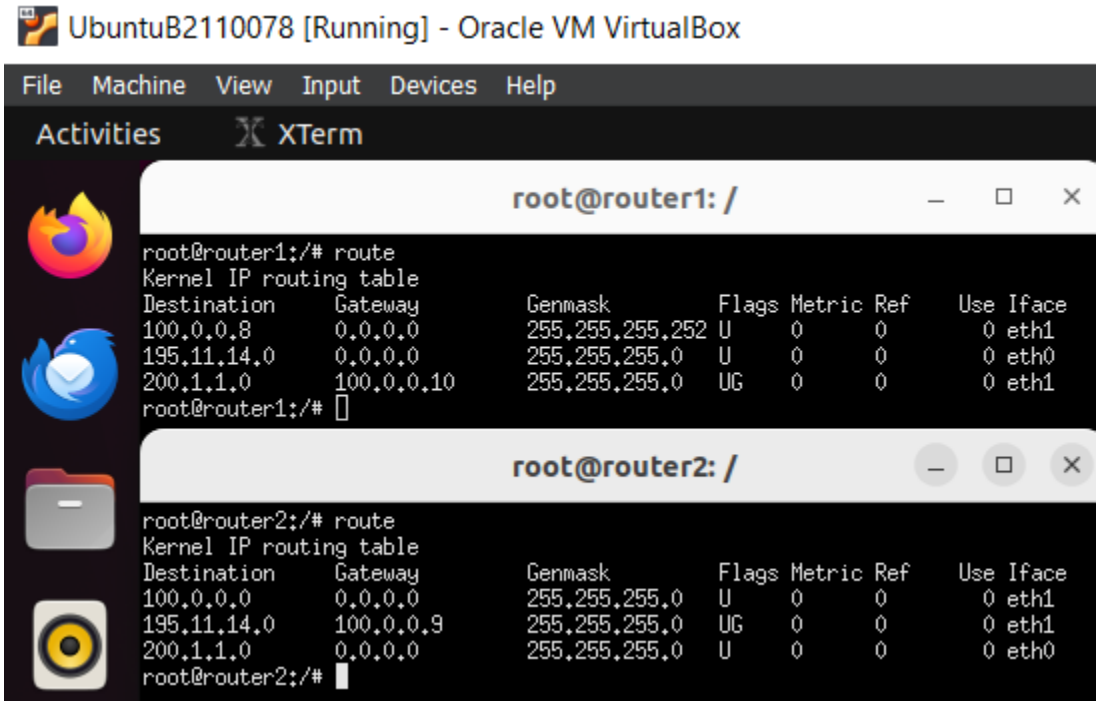
UbuntuB2110078 [Running] - Oracle VM VirtualBox



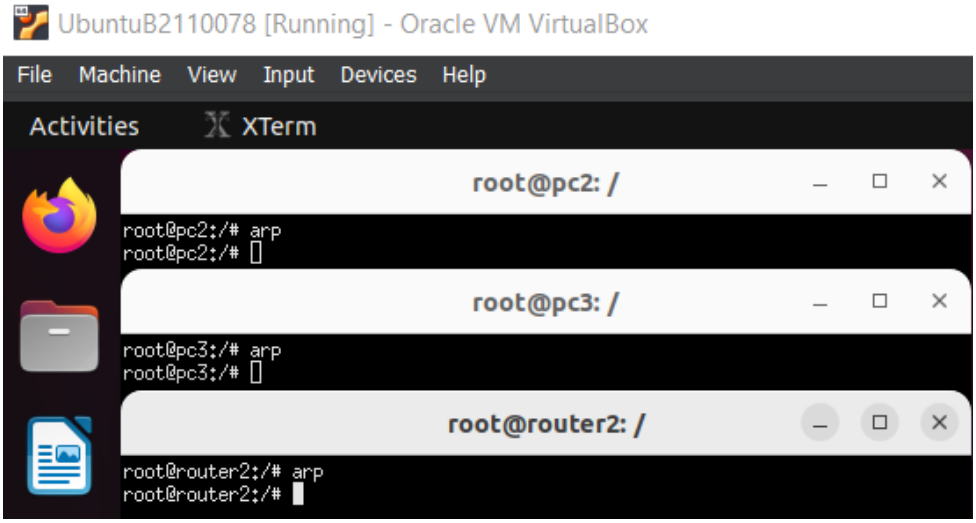
UbuntuB2110078 [Running] - Oracle VM VirtualBox

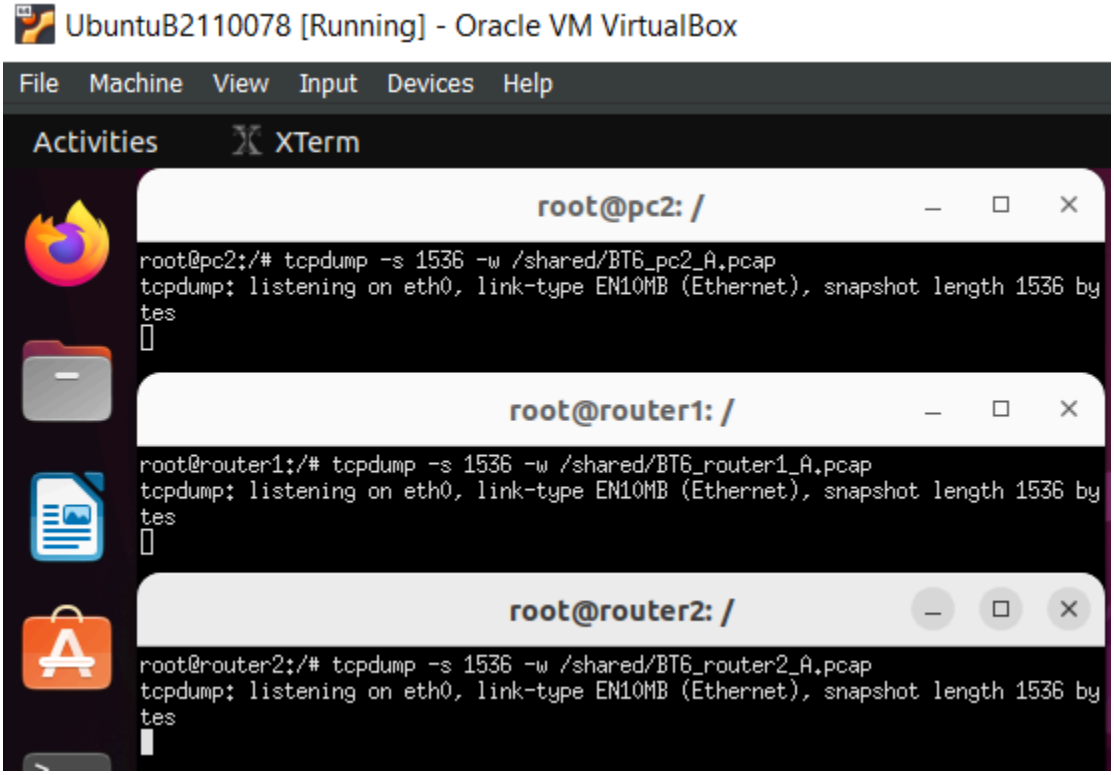


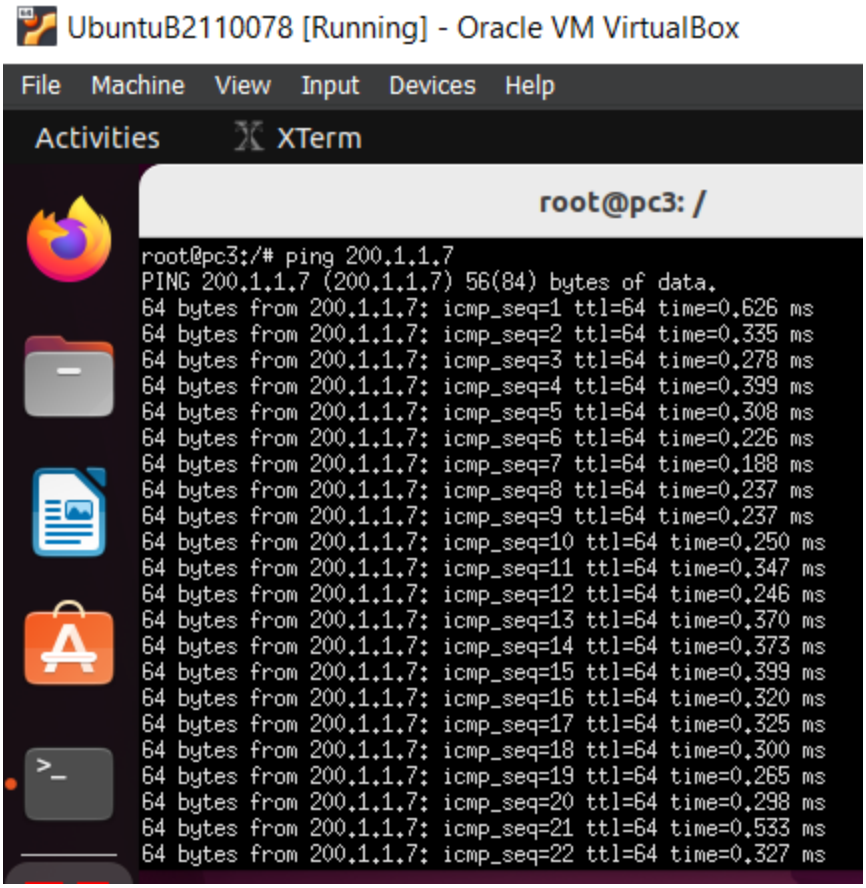

UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities XTerm
root@pc1: /
root@pc1:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default 195.11.14.1 0.0.0.0 UG 0 0 0 eth0
195.11.14.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
root@pc1:/#
root@pc2: /
root@pc2:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default 200.1.1.1 0.0.0.0 UG 0 0 0 eth0
200.1.1.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
root@pc2:/#
root@pc3: /
root@pc3:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default 200.1.1.1 0.0.0.0 UG 0 0 0 eth0
200.1.1.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
root@pc3:/#

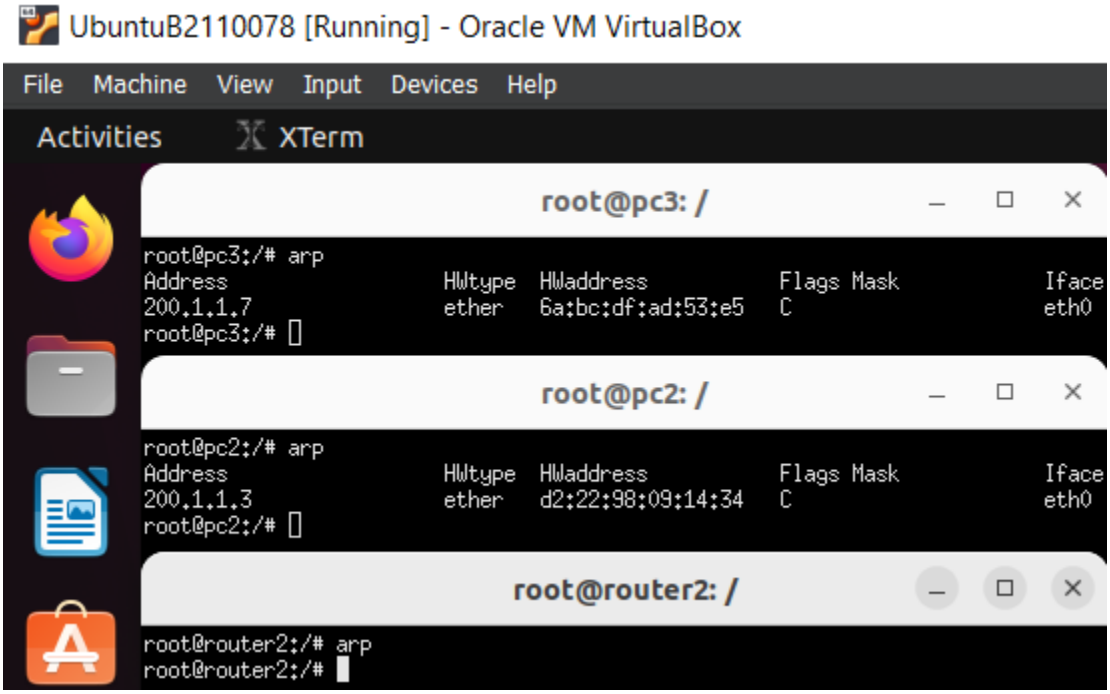

UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities XTerm
root@router1: /
root@router1:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
100.0.0.8 0.0.0.0 255.255.255.252 U 0 0 0 eth1
195.11.14.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
200.1.1.0 100.0.0.10 255.255.255.0 UG 0 0 0 eth1
root@router1:/#
root@router2: /
root@router2:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
100.0.0.0 0.0.0.0 255.255.255.0 U 0 0 0 eth1
195.11.14.0 100.0.0.9 255.255.255.0 UG 0 0 0 eth1
200.1.1.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
root@router2:/#

☐ 2.3.2.1/ Giao thức ARP giữa 2 thiết bị trong cùng nhánh mạng LAN C:

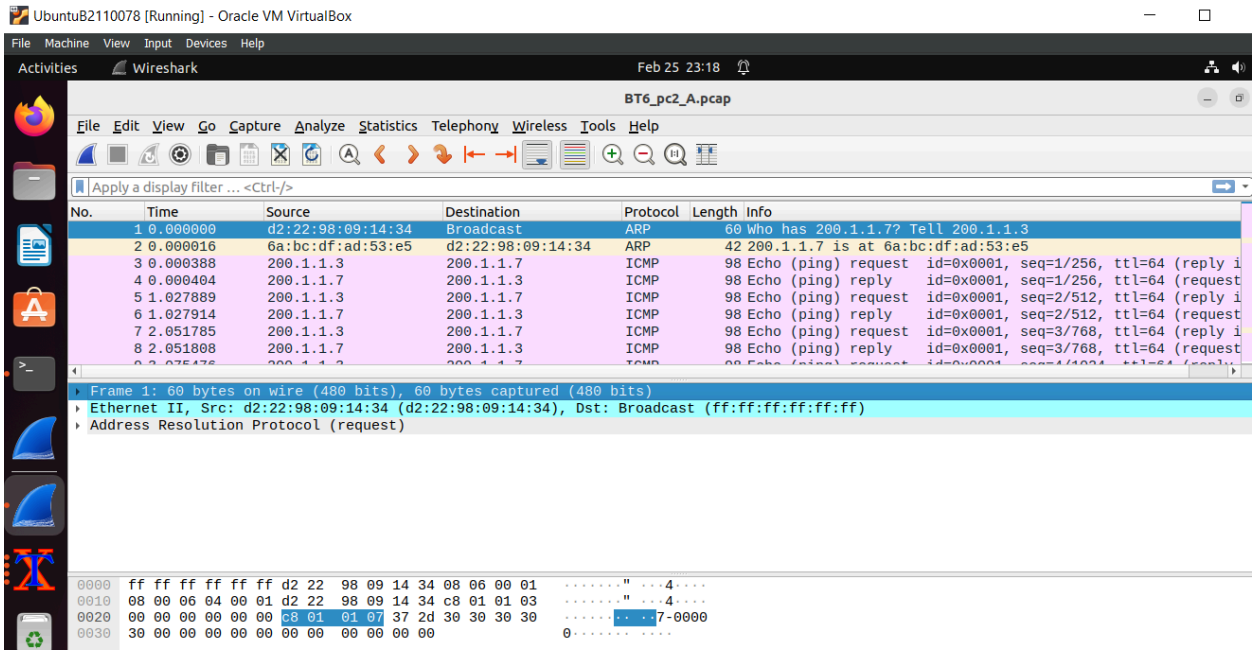




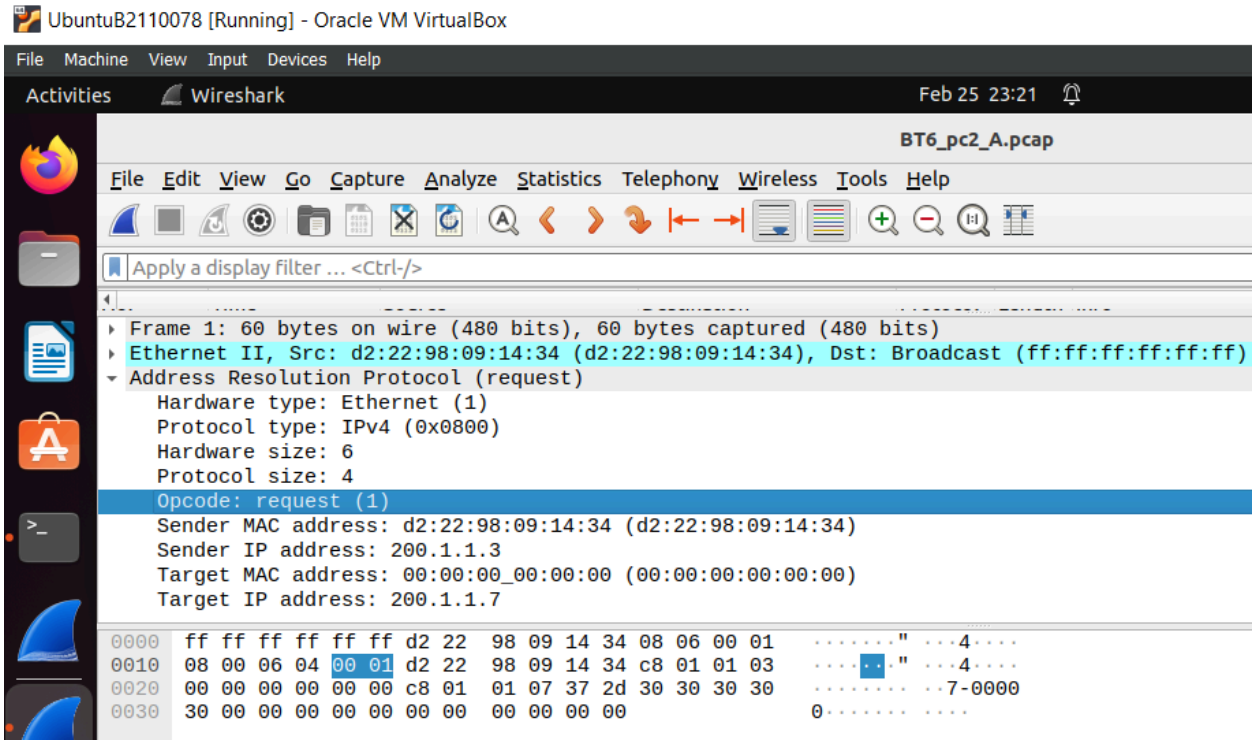




- pc3 có thông tin địa chỉ mạng của pc2 và pc2 có thông tin địa chỉ mạng của pc3, router2 thì không nhận được gì cả

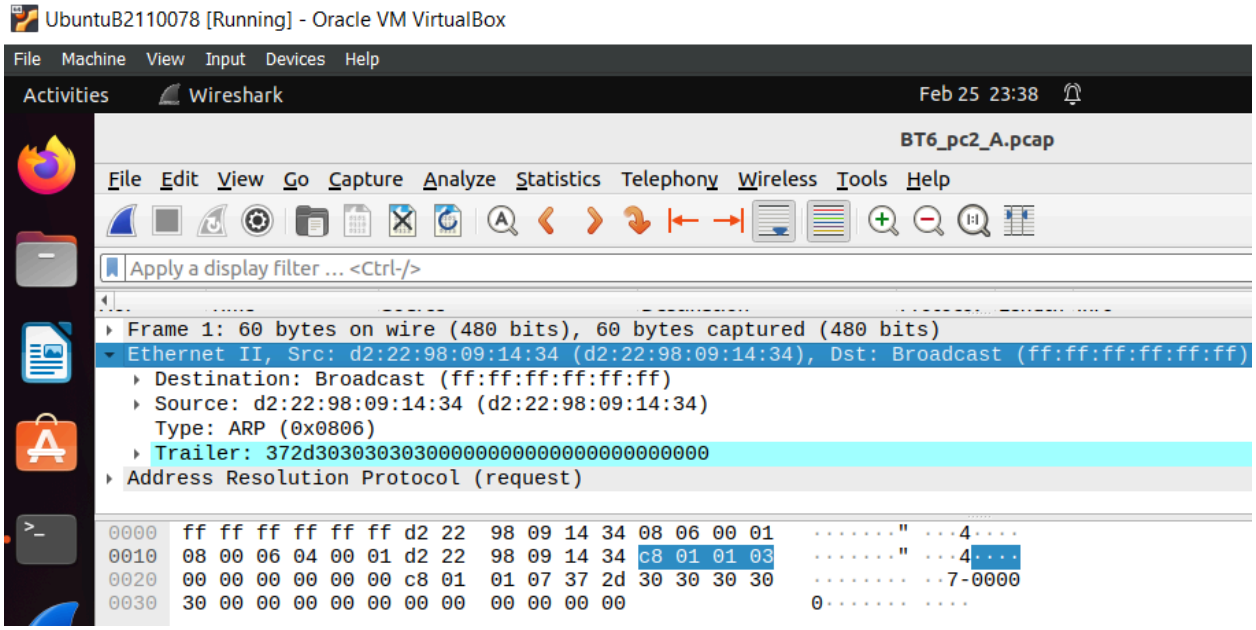


- Frame 1 có kích thước 60 bytes



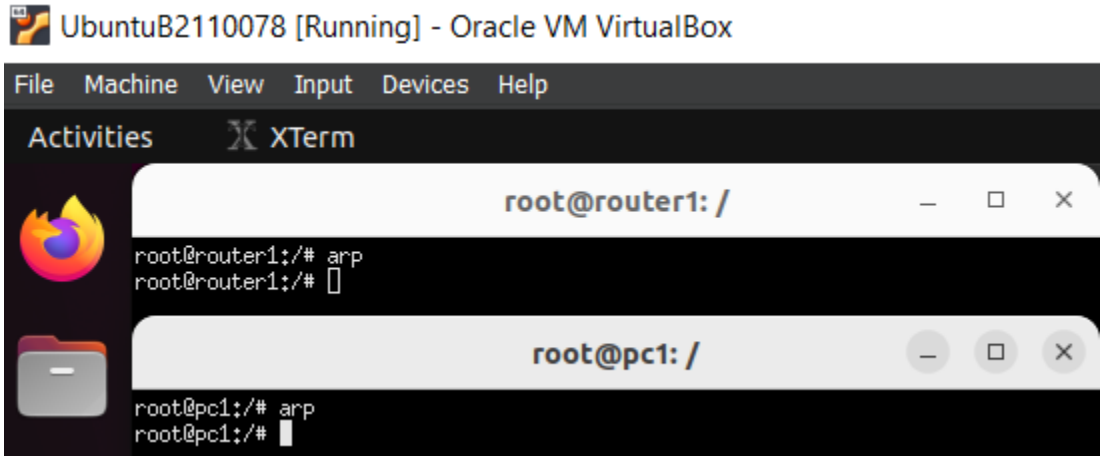
- Header Address Resolution Protocol:
  - Trường Opcode có giá trị là 0x0001 thể hiện thông tin request; Nó còn có thể có giá trị 0x0002 thể hiện thông tin reply
  - Địa chỉ IP của máy gửi dữ liệu là 200.1.1.3 và địa chỉ MAC là d2:22:98:09:14:34

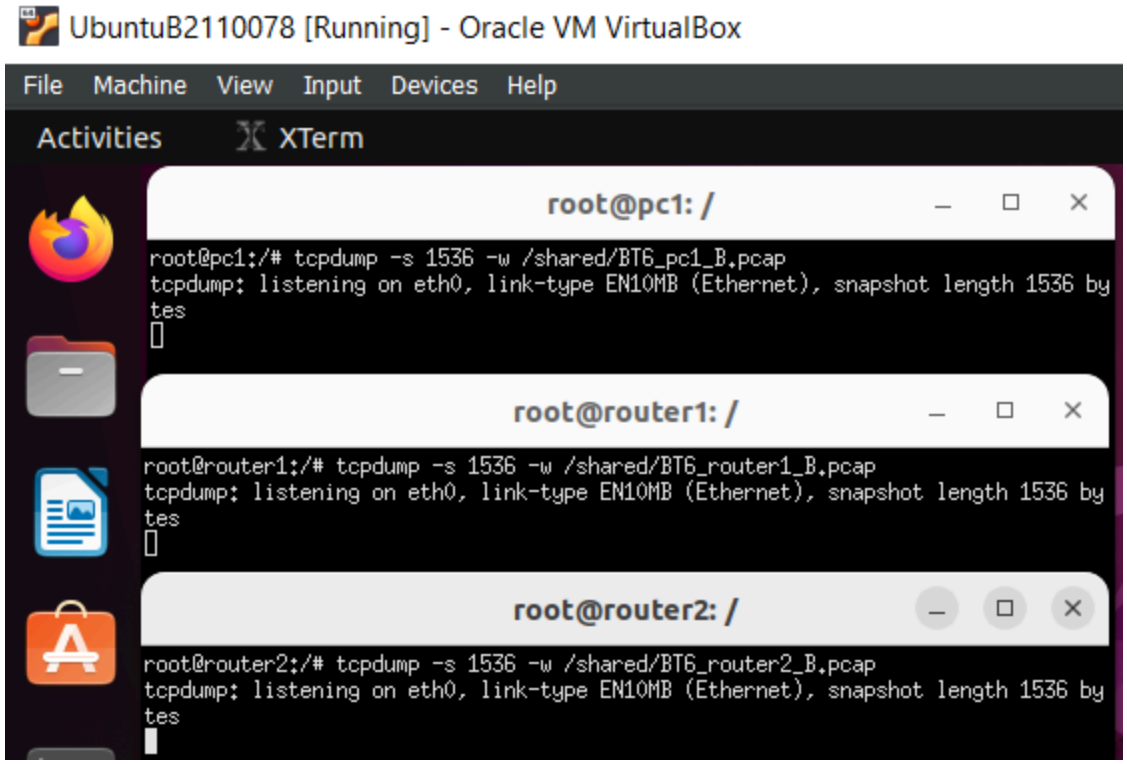
- Địa chỉ IP của máy nhận dữ liệu là 200.1.1.7 và không có địa chỉ MAC

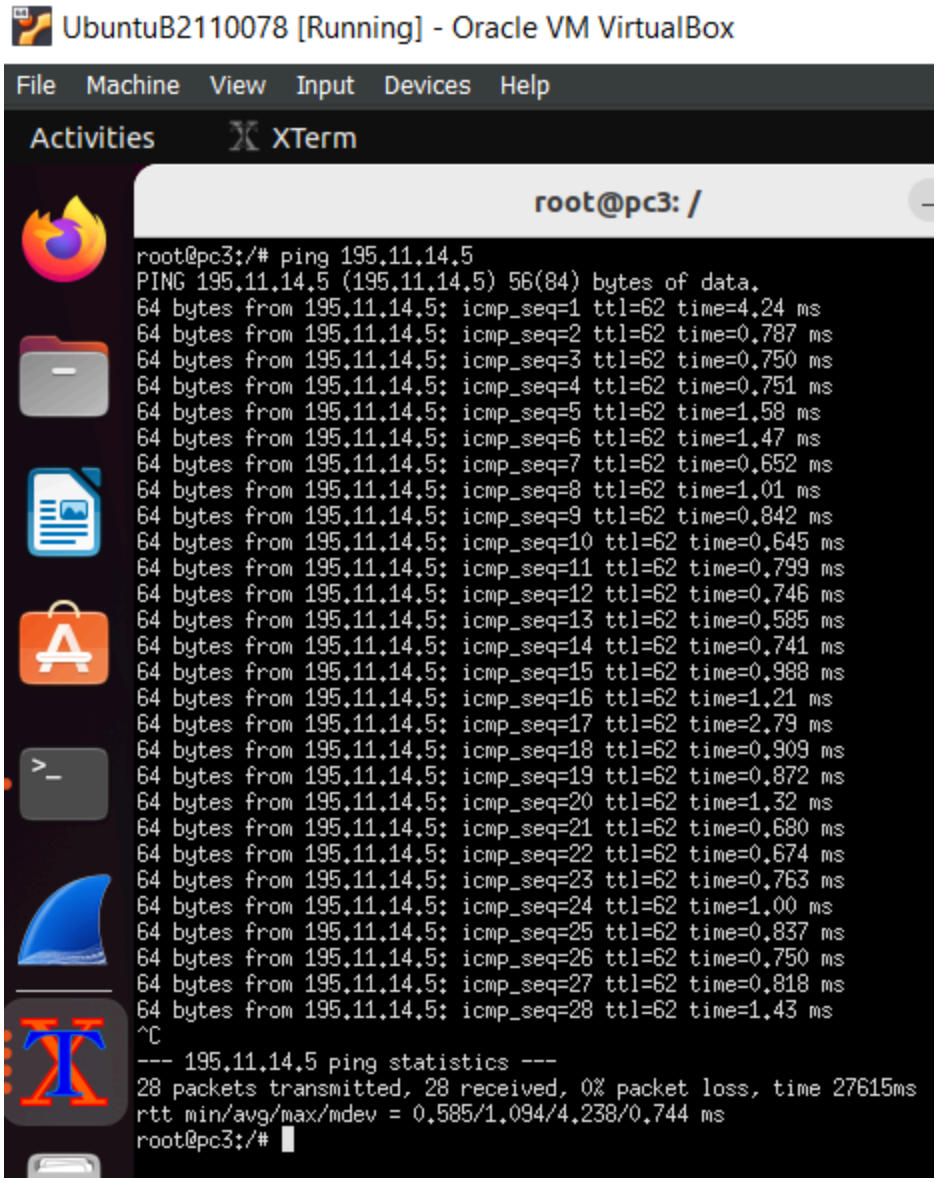


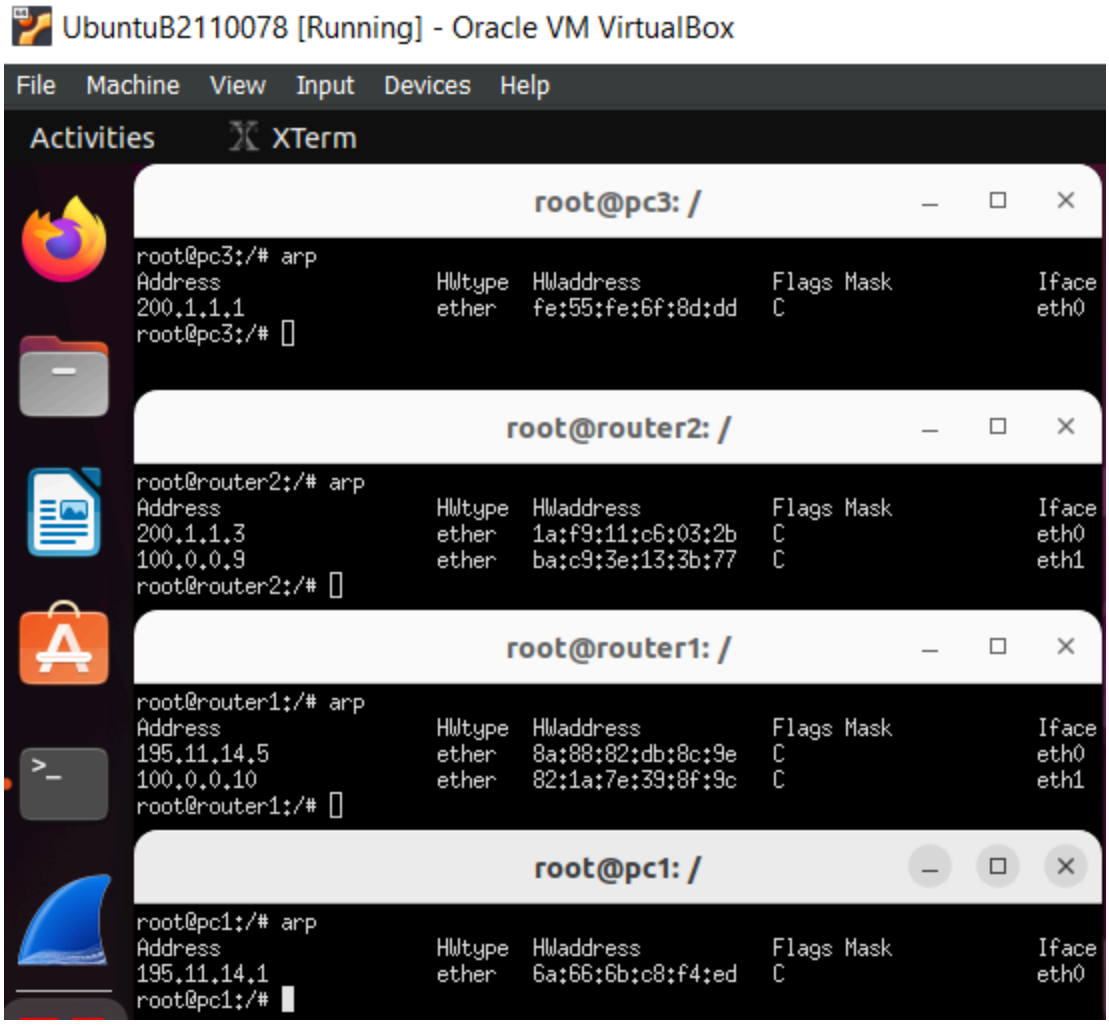
- Header Ethernet II:
  - Địa chỉ MAC của máy gửi dữ liệu là d2:22:98:09:14:34, đây là địa chỉ của pc3
  - Địa chỉ MAC của máy nhận dữ liệu là ff:ff:ff:ff:ff:ff, địa chỉ MAC không là của máy nào; Nó là địa chỉ Broadcast, có nghĩa là tất cả thiết bị trong mạng đó sẽ đều nhận được gói tin
  - Trường Type có giá trị là 0x0806, thể hiện giao thức ARP

☐ 2.3.2.2/ Giao thức ARP giữa 2 thiết bị khác nhánh mạng LAN:

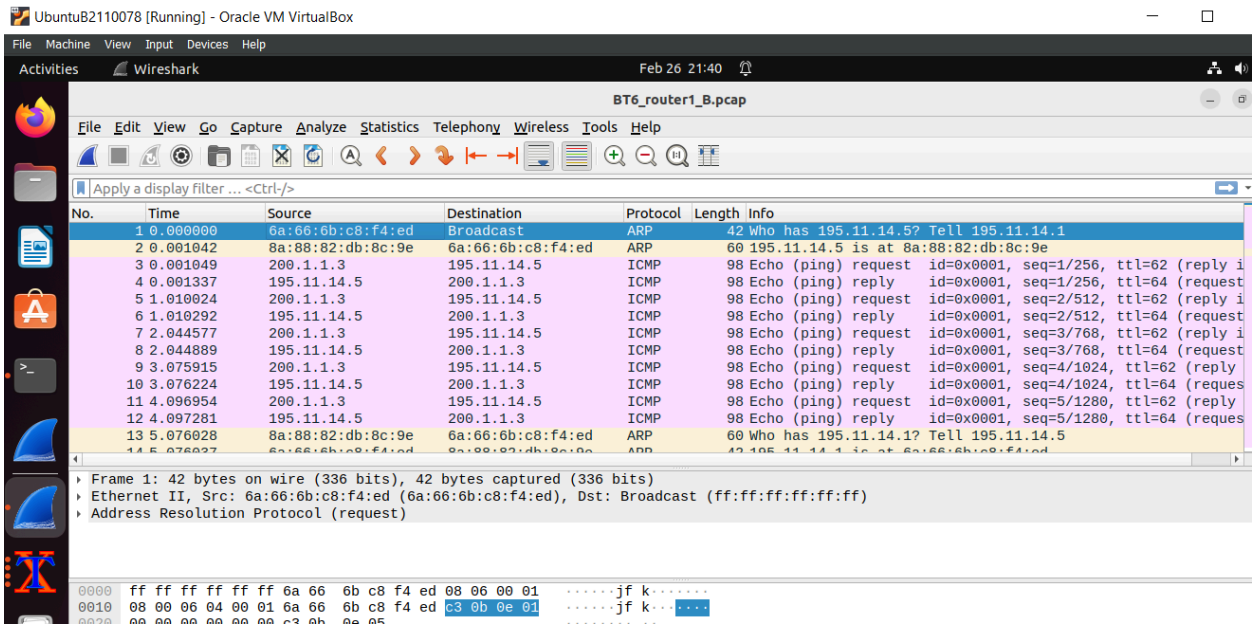



UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
XTerm
root@pc1: /
root@pc1:/# tcpdump -s 1536 -w /shared/BT6_pc1_B.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), snapshot length 1536 by
tes
root@router1: /
root@router1:/# tcpdump -s 1536 -w /shared/BT6_router1_B.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), snapshot length 1536 by
tes
root@router2: /
root@router2:/# tcpdump -s 1536 -w /shared/BT6_router2_B.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), snapshot length 1536 by
tes

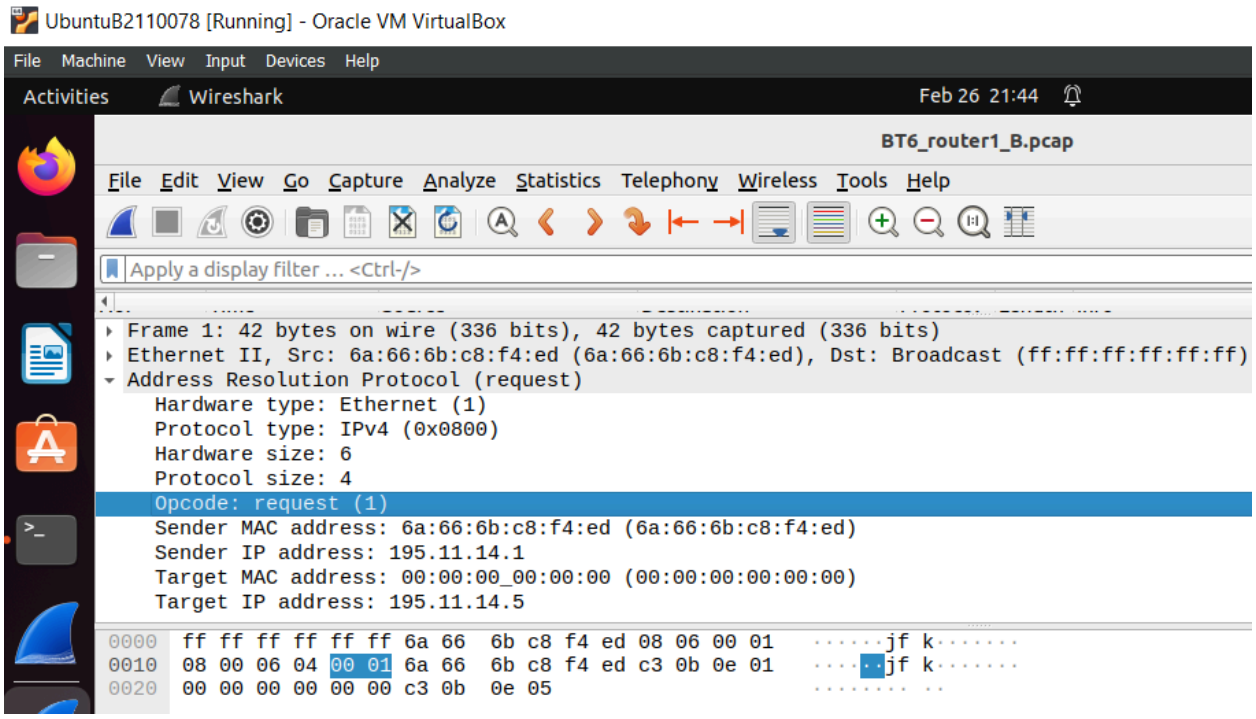

UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
XTerm
root@pc3: /
root@pc3:/# ping 195.11.14.5
PING 195.11.14.5 (195.11.14.5) 56(84) bytes of data.
64 bytes from 195.11.14.5: icmp_seq=1 ttl=62 time=4.24 ms
64 bytes from 195.11.14.5: icmp_seq=2 ttl=62 time=0.787 ms
64 bytes from 195.11.14.5: icmp_seq=3 ttl=62 time=0.750 ms
64 bytes from 195.11.14.5: icmp_seq=4 ttl=62 time=0.751 ms
64 bytes from 195.11.14.5: icmp_seq=5 ttl=62 time=1.58 ms
64 bytes from 195.11.14.5: icmp_seq=6 ttl=62 time=1.47 ms
64 bytes from 195.11.14.5: icmp_seq=7 ttl=62 time=0.652 ms
64 bytes from 195.11.14.5: icmp_seq=8 ttl=62 time=1.01 ms
64 bytes from 195.11.14.5: icmp_seq=9 ttl=62 time=0.842 ms
64 bytes from 195.11.14.5: icmp_seq=10 ttl=62 time=0.645 ms
64 bytes from 195.11.14.5: icmp_seq=11 ttl=62 time=0.799 ms
64 bytes from 195.11.14.5: icmp_seq=12 ttl=62 time=0.746 ms
64 bytes from 195.11.14.5: icmp_seq=13 ttl=62 time=0.585 ms
64 bytes from 195.11.14.5: icmp_seq=14 ttl=62 time=0.741 ms
64 bytes from 195.11.14.5: icmp_seq=15 ttl=62 time=0.988 ms
64 bytes from 195.11.14.5: icmp_seq=16 ttl=62 time=1.21 ms
64 bytes from 195.11.14.5: icmp_seq=17 ttl=62 time=2.79 ms
64 bytes from 195.11.14.5: icmp_seq=18 ttl=62 time=0.909 ms
64 bytes from 195.11.14.5: icmp_seq=19 ttl=62 time=0.872 ms
64 bytes from 195.11.14.5: icmp_seq=20 ttl=62 time=1.32 ms
64 bytes from 195.11.14.5: icmp_seq=21 ttl=62 time=0.680 ms
64 bytes from 195.11.14.5: icmp_seq=22 ttl=62 time=0.674 ms
64 bytes from 195.11.14.5: icmp_seq=23 ttl=62 time=0.763 ms
64 bytes from 195.11.14.5: icmp_seq=24 ttl=62 time=1.00 ms
64 bytes from 195.11.14.5: icmp_seq=25 ttl=62 time=0.837 ms
64 bytes from 195.11.14.5: icmp_seq=26 ttl=62 time=0.750 ms
64 bytes from 195.11.14.5: icmp_seq=27 ttl=62 time=0.818 ms
64 bytes from 195.11.14.5: icmp_seq=28 ttl=62 time=1.43 ms
^C
--- 195.11.14.5 ping statistics ---
28 packets transmitted, 28 received, 0% packet loss, time 27615ms
rtt min/avg/max/mdev = 0.585/1.094/4.238/0.744 ms
root@pc3:/#



- pc3 có thông tin địa chỉ mạng của router2 vì cần đi qua router2 để đến pc1, pc3 trong phần 2.3.2.1 thì có thông tin địa chỉ mạng của pc2
- router2 có thông tin địa chỉ mạng của pc3 và router1, router2 trong phần 2.3.2.1 thì không có thông tin gì
- router1 có thông tin địa chỉ mạng của pc1 và router2
- pc1 thì có thông tin địa chỉ mạng của router1

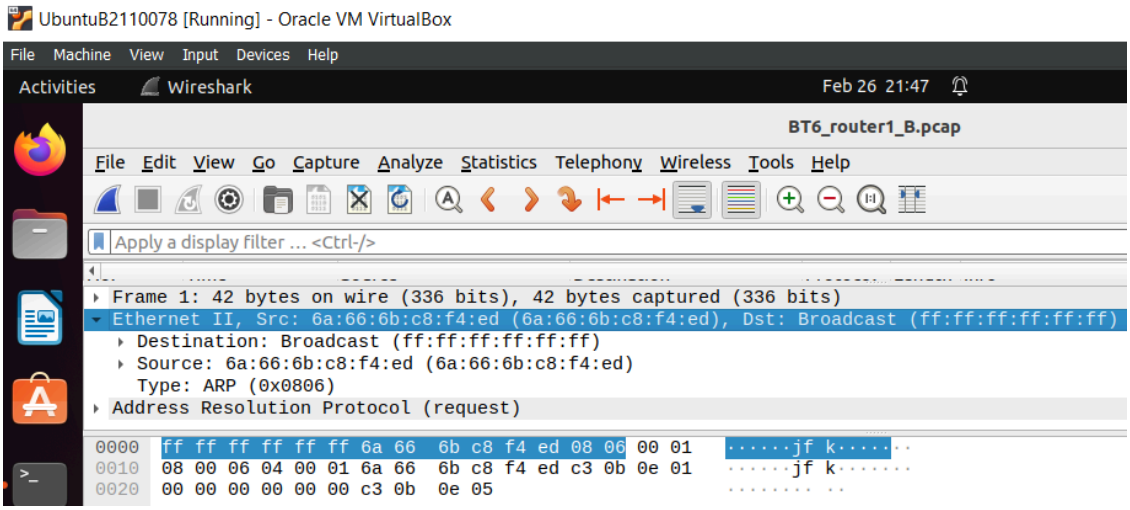


- Frame 1 có kích thước 42 bytes

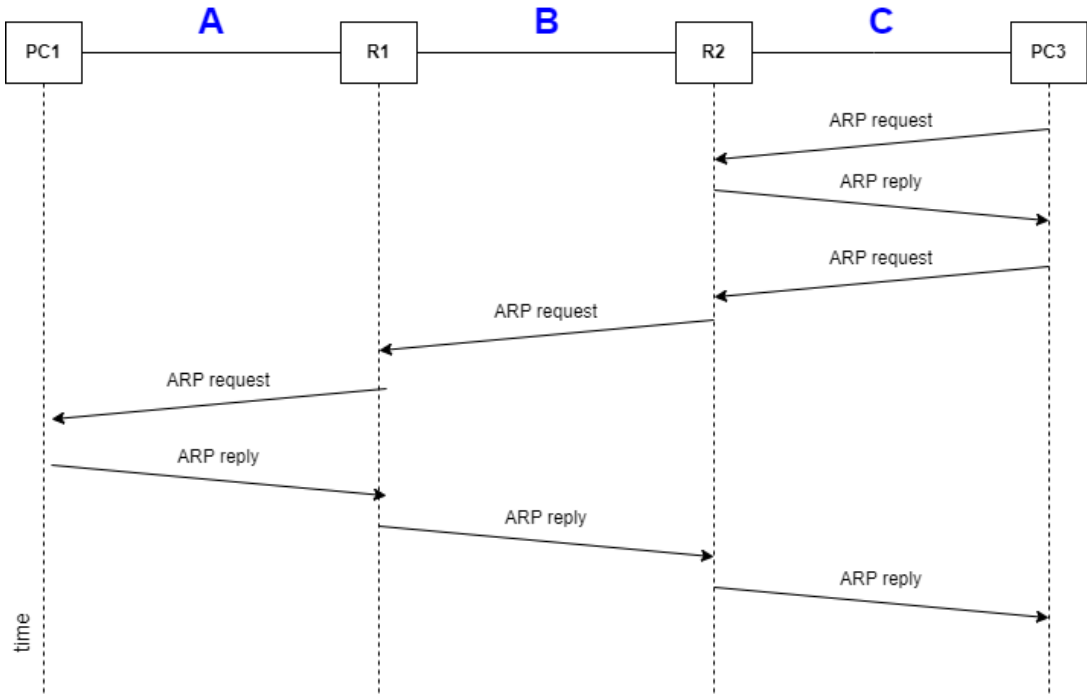


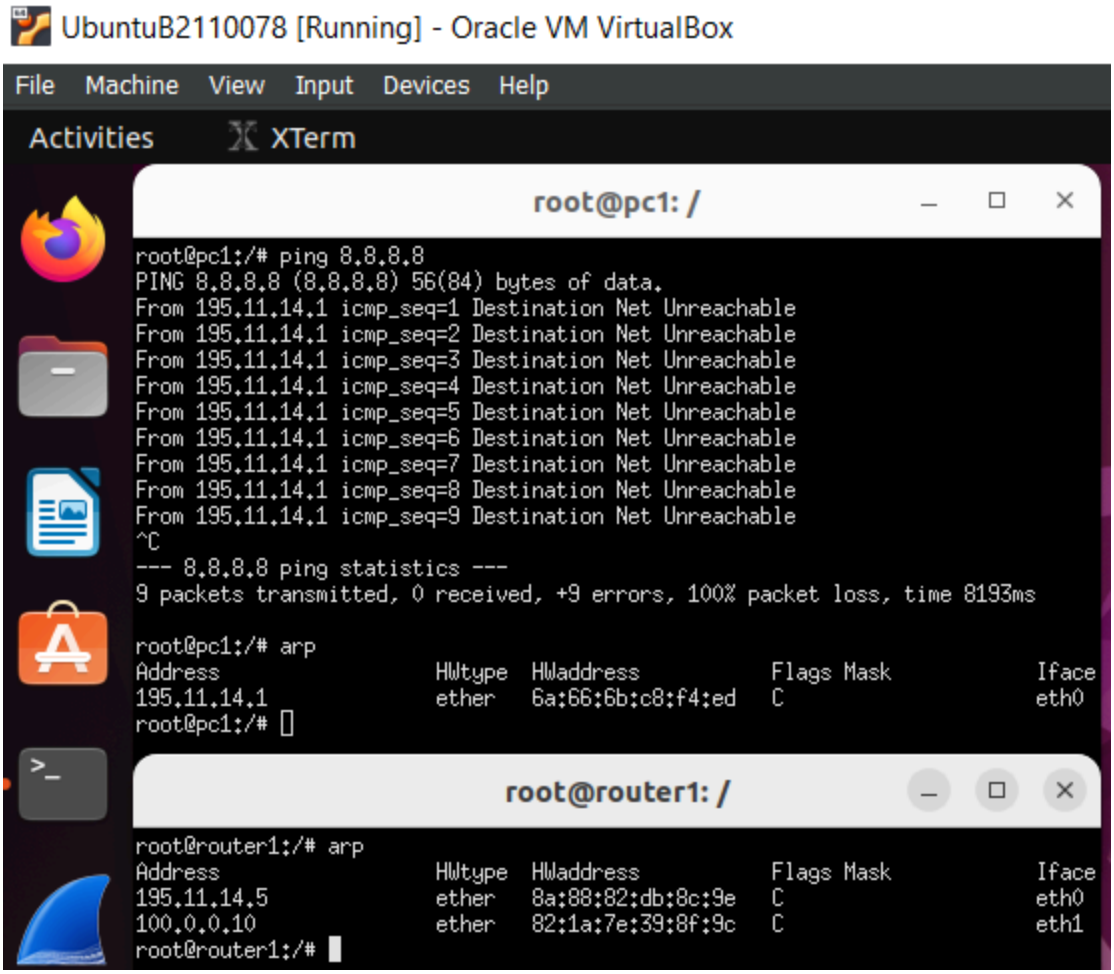
- Header Address Resolution Protocol:
  - Trường Opcode có giá trị là 0x0001 thể hiện thông tin request; Nó còn có thể có giá trị 0x0002 thể hiện thông tin reply
  - Địa chỉ IP của máy gửi dữ liệu là 195.11.14.1 và địa chỉ MAC là 6a:66:6b:c8:f4:ed

- Địa chỉ IP của máy nhận dữ liệu là 195.11.14.5 và không có địa chỉ MAC

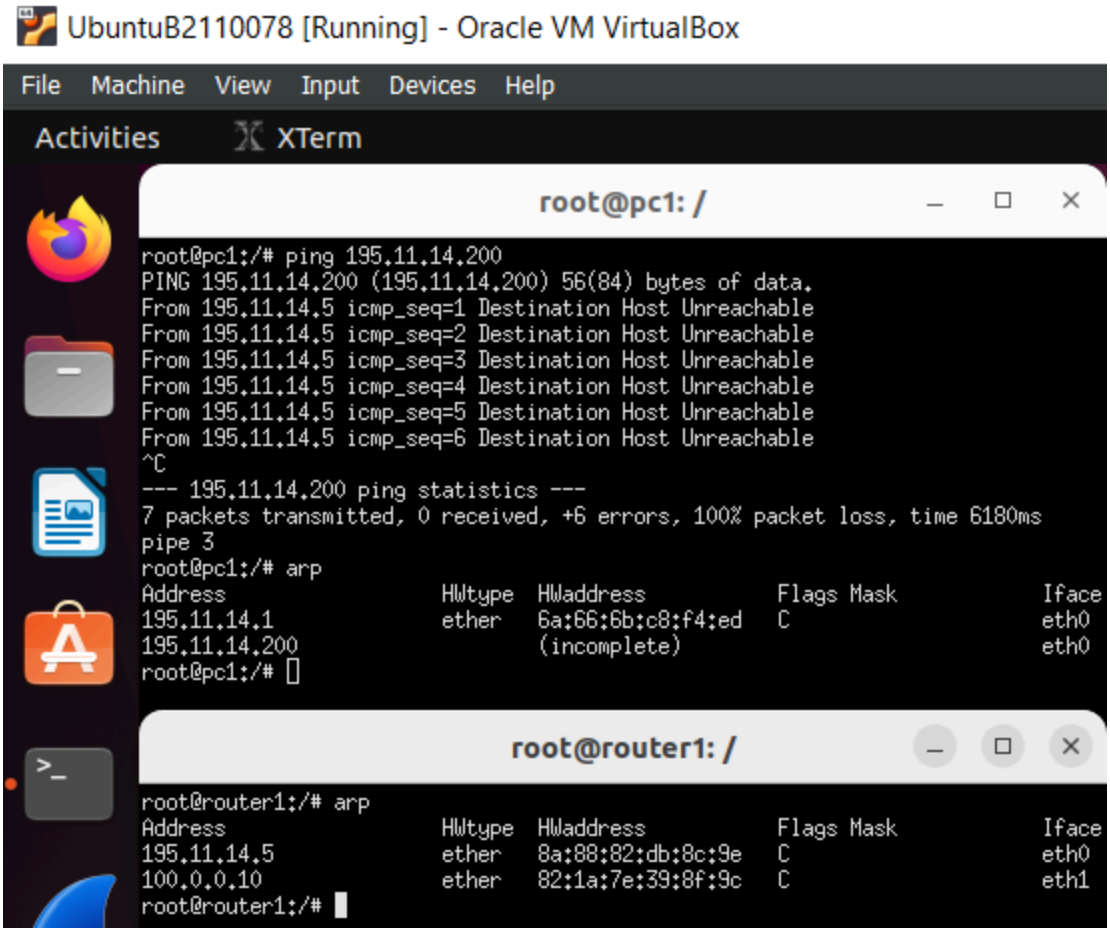


- Header Ethernet II:
  - Địa chỉ MAC của máy gửi dữ liệu là 6a:66:6b:c8:f4:ed, đây là địa chỉ của router1
  - Địa chỉ MAC của máy nhận dữ liệu là ff:ff:ff:ff:ff:ff, địa chỉ MAC không là của máy nào; Nó là địa chỉ Broadcast, có nghĩa là tất cả thiết bị trong mạng đó sẽ đều nhận được gói tin
  - Trường Type có giá trị là 0x0806, thể hiện giao thức ARP



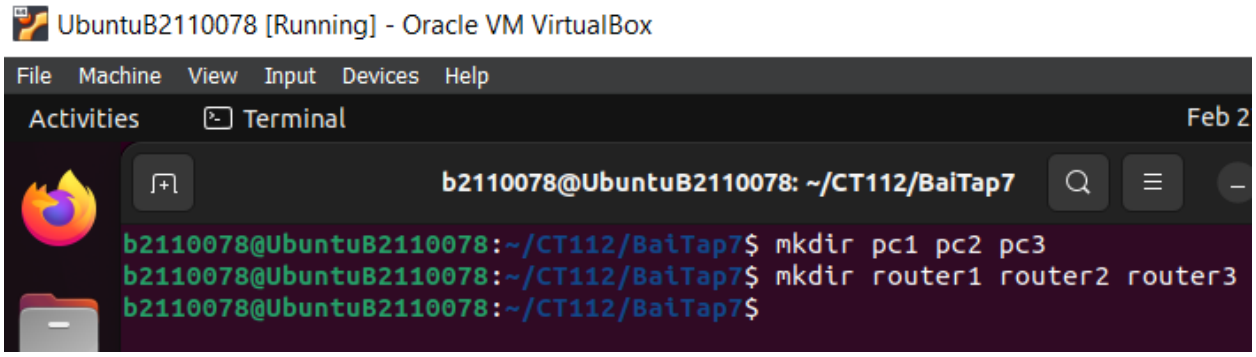


- pc1 không ping được 8.8.8.8

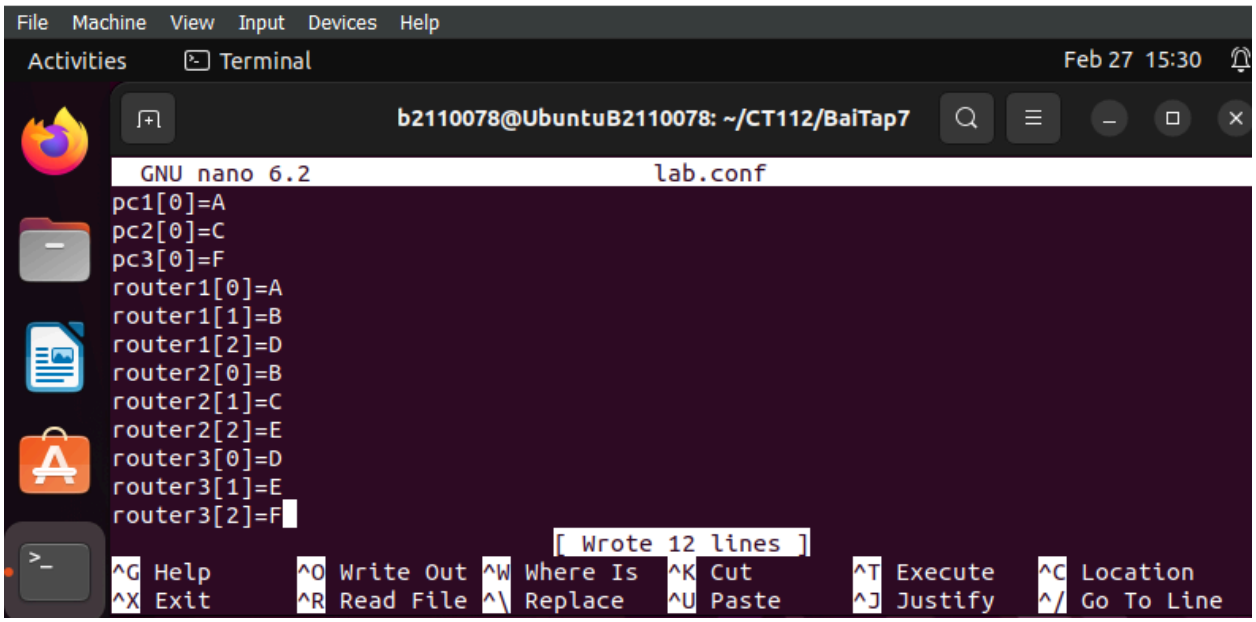


- pc1 không ping được 195.11.14.200 nhưng bảng ARP vẫn hiện 195.11.14.200 (không hoàn thiện)
- router1 không thay đổi

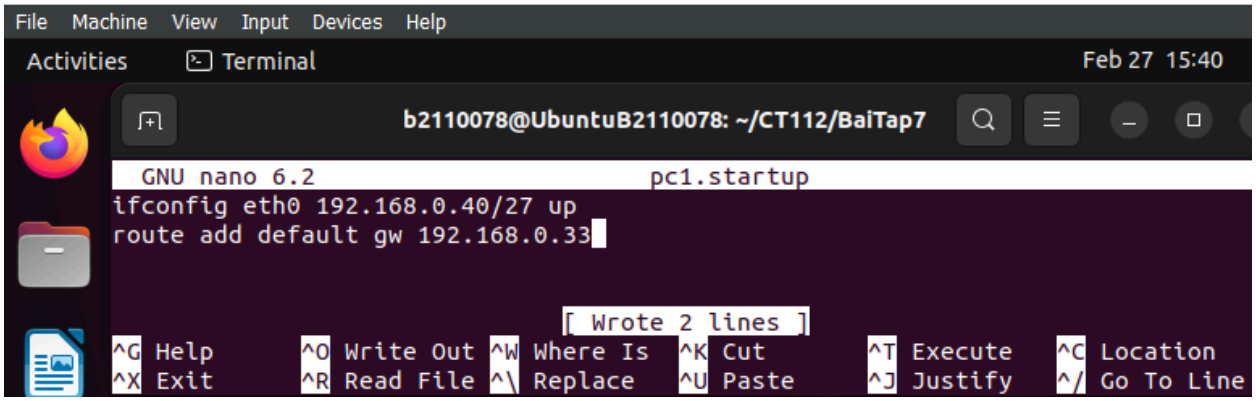
Bài 7:



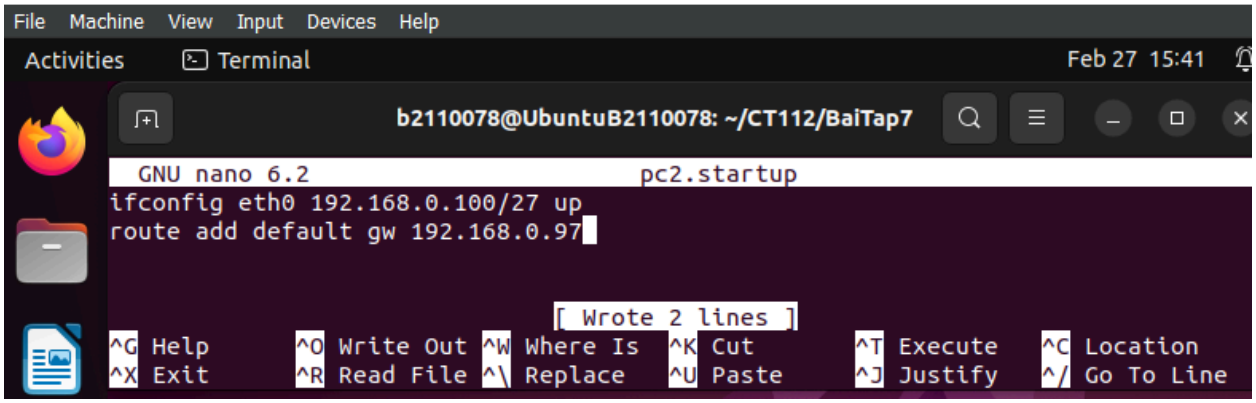
UbuntuB2110078 [Running] - Oracle VM VirtualBox

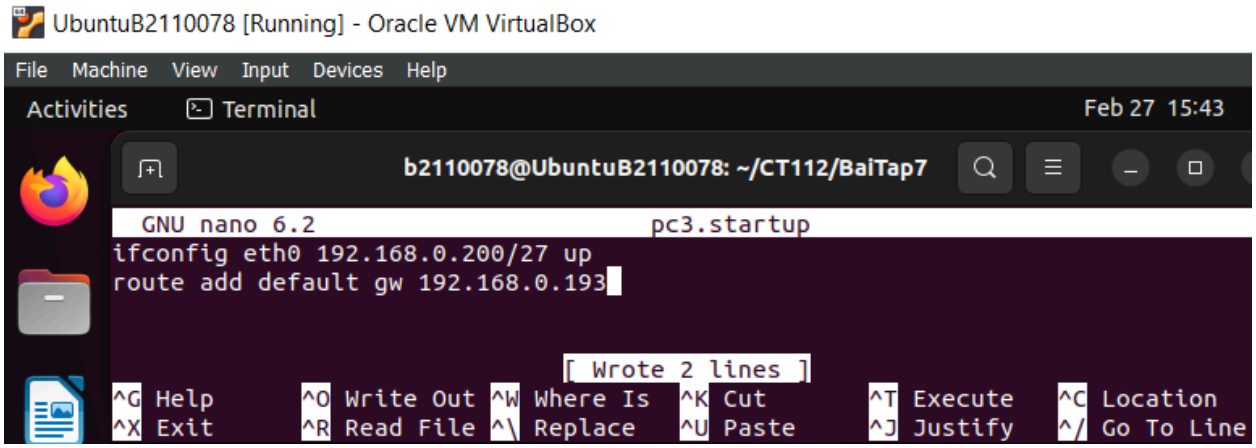


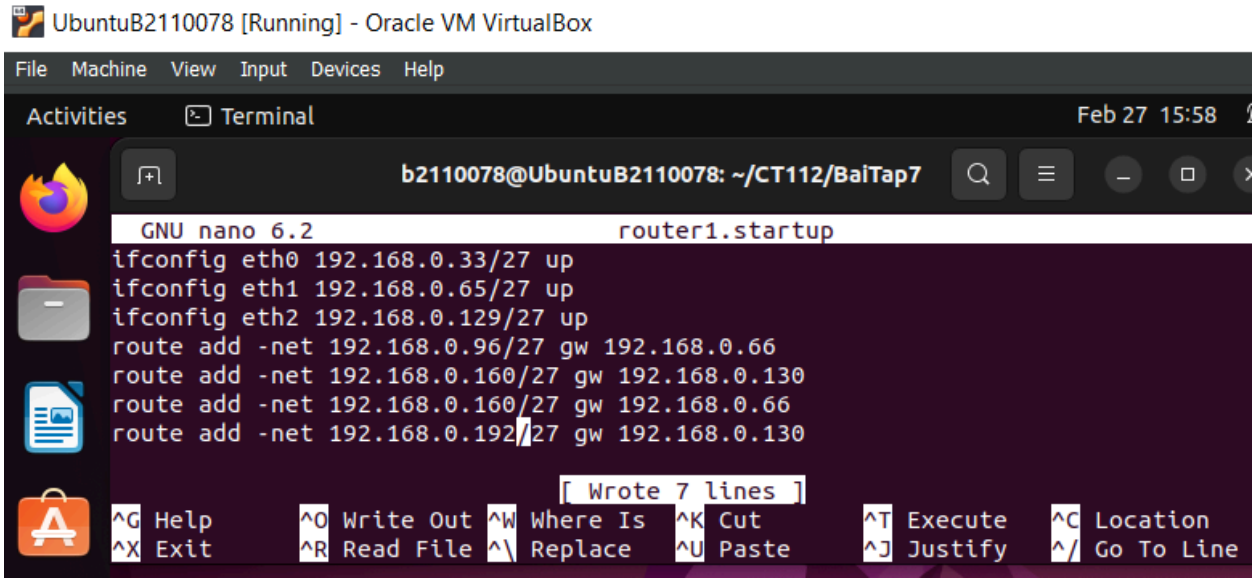
UbuntuB2110078 [Running] - Oracle VM VirtualBox

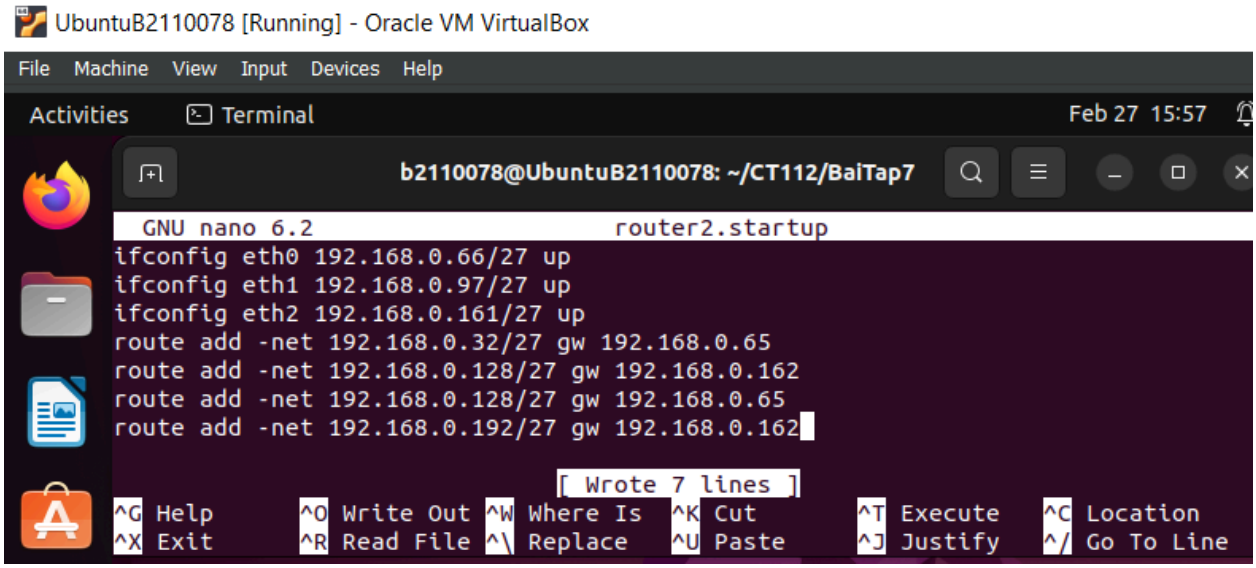


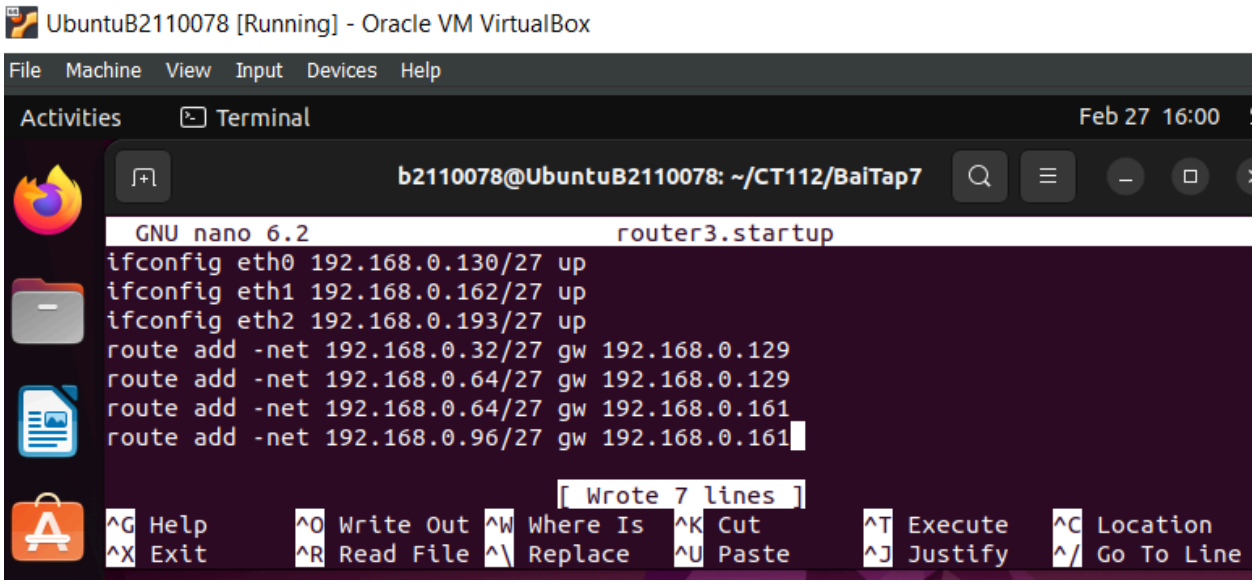
UbuntuB2110078 [Running] - Oracle VM VirtualBox

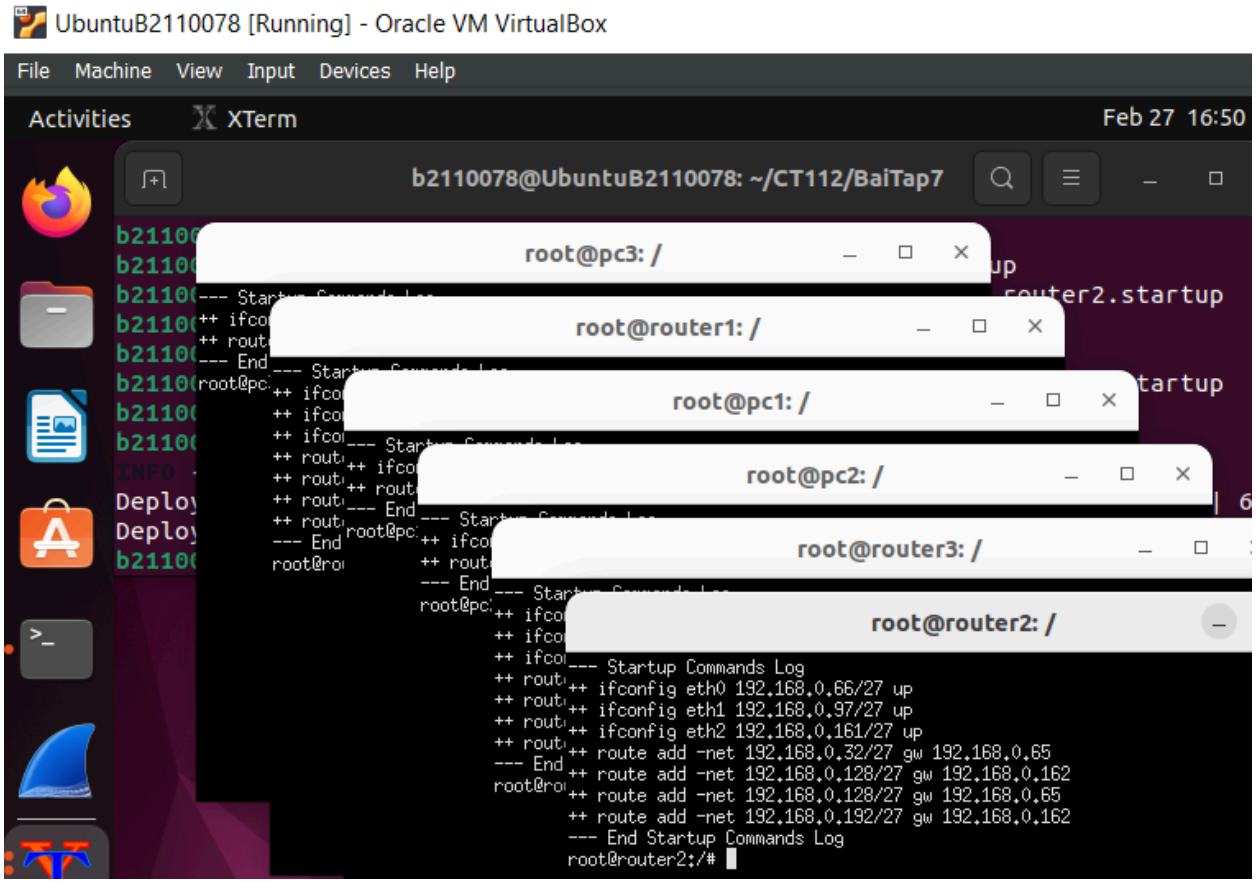



UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 27 15:43
b2110078@UbuntuB2110078: ~/CT112/BaiTap7
GNU nano 6.2 pc3.startup
ifconfig eth0 192.168.0.200/27 up
route add default gw 192.168.0.193
[Wrote 2 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line

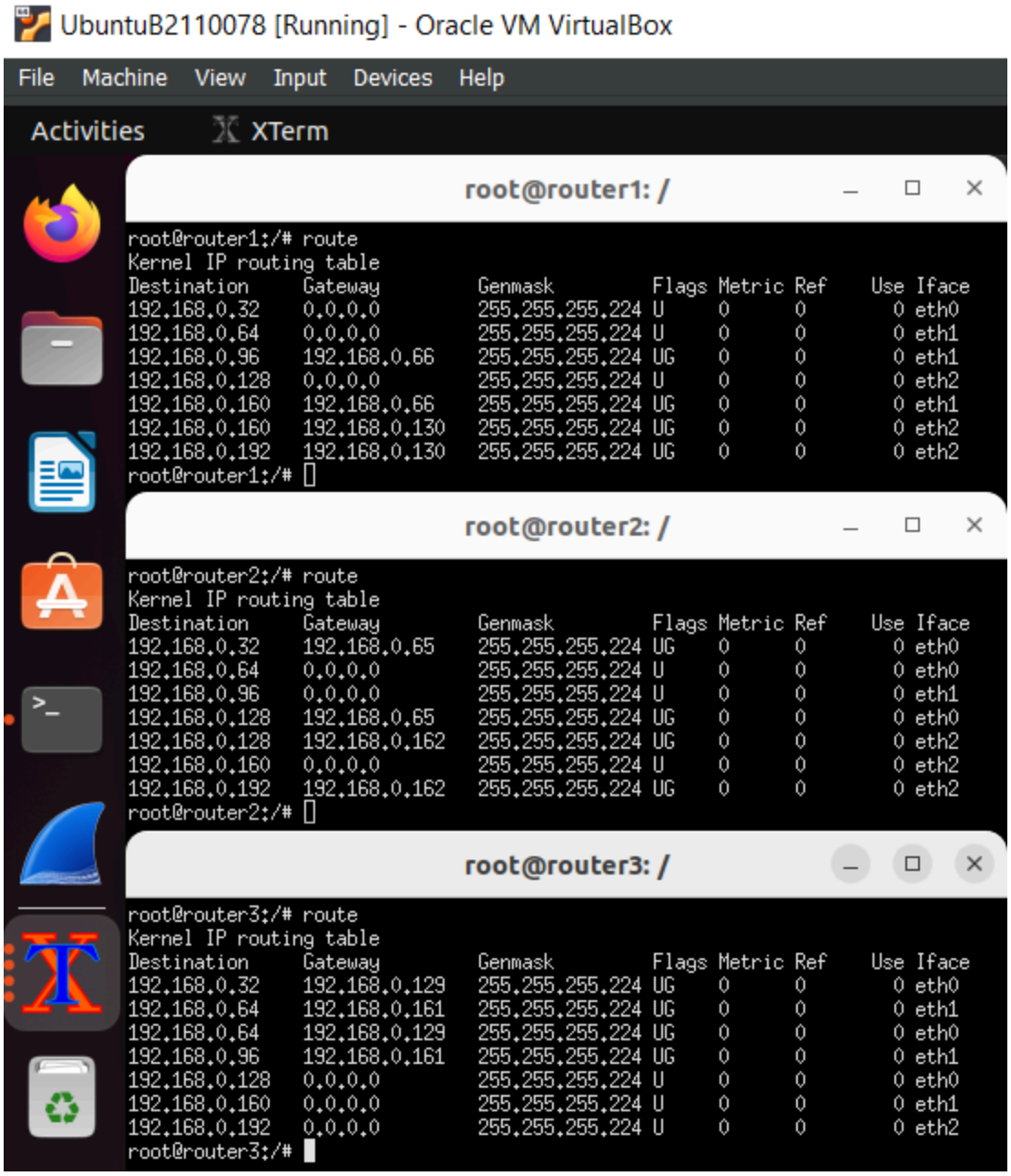

UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 27 15:58
b2110078@UbuntuB2110078: ~/CT112/BaiTap7
GNU nano 6.2 router1.startup
ifconfig eth0 192.168.0.33/27 up
ifconfig eth1 192.168.0.65/27 up
ifconfig eth2 192.168.0.129/27 up
route add -net 192.168.0.96/27 gw 192.168.0.66
route add -net 192.168.0.160/27 gw 192.168.0.130
route add -net 192.168.0.160/27 gw 192.168.0.66
route add -net 192.168.0.192/27 gw 192.168.0.130
[Wrote 7 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line


UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 27 15:57
b2110078@UbuntuB2110078: ~/CT112/BaiTap7
GNU nano 6.2 router2.startup
ifconfig eth0 192.168.0.66/27 up
ifconfig eth1 192.168.0.97/27 up
ifconfig eth2 192.168.0.161/27 up
route add -net 192.168.0.32/27 gw 192.168.0.65
route add -net 192.168.0.128/27 gw 192.168.0.162
route add -net 192.168.0.128/27 gw 192.168.0.65
route add -net 192.168.0.192/27 gw 192.168.0.162
[Wrote 7 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line


UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 27 16:00
b2110078@UbuntuB2110078: ~/CT112/BaiTap7
GNU nano 6.2 router3.startup
ifconfig eth0 192.168.0.130/27 up
ifconfig eth1 192.168.0.162/27 up
ifconfig eth2 192.168.0.193/27 up
route add -net 192.168.0.32/27 gw 192.168.0.129
route add -net 192.168.0.64/27 gw 192.168.0.129
route add -net 192.168.0.64/27 gw 192.168.0.161
route add -net 192.168.0.96/27 gw 192.168.0.161
[Wrote 7 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line


UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities XTerm Feb 27 16:50
b2110078@UbuntuB2110078: ~/CT112/BaiTap7
root@pc3: /
root@router1: /
root@pc1: /
root@pc2: /
root@router3: /
root@router2: /
--- Startup Commands Log
++ ifconfig eth0 192.168.0.66/27 up
++ ifconfig eth1 192.168.0.97/27 up
++ ifconfig eth2 192.168.0.161/27 up
++ route add -net 192.168.0.32/27 gw 192.168.0.65
++ route add -net 192.168.0.128/27 gw 192.168.0.162
++ route add -net 192.168.0.128/27 gw 192.168.0.65
++ route add -net 192.168.0.192/27 gw 192.168.0.162
--- End Startup Commands Log
root@router2:/#


UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
XTerm
root@pc1: /
root@pc1:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default 192.168.0.33 0.0.0.0 UG 0 0 0 eth0
192.168.0.32 0.0.0.0 255.255.255.224 U 0 0 0 eth0
root@pc1:/#
root@pc2: /
root@pc2:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default 192.168.0.97 0.0.0.0 UG 0 0 0 eth0
192.168.0.96 0.0.0.0 255.255.255.224 U 0 0 0 eth0
root@pc2:/#
root@pc3: /
root@pc3:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default 192.168.0.193 0.0.0.0 UG 0 0 0 eth0
192.168.0.192 0.0.0.0 255.255.255.224 U 0 0 0 eth0
root@pc3:/#


UbuntuB2110078 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
XTerm
root@router1: /
root@router1:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
192.168.0.32 0.0.0.0 255.255.255.224 U 0 0 0 eth0
192.168.0.64 0.0.0.0 255.255.255.224 U 0 0 0 eth1
192.168.0.96 192.168.0.66 255.255.255.224 UG 0 0 0 eth1
192.168.0.128 0.0.0.0 255.255.255.224 U 0 0 0 eth2
192.168.0.160 192.168.0.66 255.255.255.224 UG 0 0 0 eth1
192.168.0.160 192.168.0.130 255.255.255.224 UG 0 0 0 eth2
192.168.0.192 192.168.0.130 255.255.255.224 UG 0 0 0 eth2
root@router1:/#
root@router2: /
root@router2:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
192.168.0.32 192.168.0.65 255.255.255.224 UG 0 0 0 eth0
192.168.0.64 0.0.0.0 255.255.255.224 U 0 0 0 eth0
192.168.0.96 0.0.0.0 255.255.255.224 U 0 0 0 eth1
192.168.0.128 192.168.0.65 255.255.255.224 UG 0 0 0 eth0
192.168.0.128 192.168.0.162 255.255.255.224 UG 0 0 0 eth2
192.168.0.160 0.0.0.0 255.255.255.224 U 0 0 0 eth2
192.168.0.192 192.168.0.162 255.255.255.224 UG 0 0 0 eth2
root@router2:/#
root@router3: /
root@router3:/# route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
192.168.0.32 192.168.0.129 255.255.255.224 UG 0 0 0 eth0
192.168.0.64 192.168.0.161 255.255.255.224 UG 0 0 0 eth1
192.168.0.64 192.168.0.129 255.255.255.224 UG 0 0 0 eth0
192.168.0.96 192.168.0.161 255.255.255.224 UG 0 0 0 eth1
192.168.0.128 0.0.0.0 255.255.255.224 U 0 0 0 eth0
192.168.0.160 0.0.0.0 255.255.255.224 U 0 0 0 eth1
192.168.0.192 0.0.0.0 255.255.255.224 U 0 0 0 eth2
root@router3:/#

- Ping pc2 và pc3 bằng pc1: