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THỰC HÀNH BUỔI 1

Bài 1

Câu hỏi 1: Có những giao diện mạng nào đã được tạo ra trong các máy ảo? Địa chỉ IP của các giao diện mạng đó là bao nhiêu?

Có 2 giao diện được tạo ra trong máy ảo

```

root@pc1: /
root@pc1:/# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    ether c2:34:3f:34:ac:ab txqueuelen 1000 (Ethernet)
    RX packets 59 bytes 11386 (11.1 KiB)
    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: /
root@pc2:/# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    ether 82:6d:a8:b4:91:c6 txqueuelen 1000 (Ethernet)
    RX packets 25 bytes 4819 (4.7 KiB)
    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:/#
  
```

Địa chỉ ip của các giao diện này là: 127.0.0.1

Câu hỏi 2: Địa chỉ IP của các giao diện mạng trên pc1 và pc 2 hiện nay là bao nhiêu?

```

root@pc1: /
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 netmask 255.255.255.0 broadcast 10.0.0.255
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 c2:34:3f:34:ac:ab txqueuelen 1000 (Ethernet)
    RX packets 68 bytes 12708 (12.4 KiB)
    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: /
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:/# 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 82:6d:a8:b4:91:c6 txqueuelen 1000 (Ethernet)
    RX packets 40 bytes 7253 (7.0 KiB)
    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:/#
  
```

pc1 10.0.0.1

pc2 10.0.0.2

Câu hỏi 3: Kết quả hiển thị trên màn hình của pc1 là gì? Điều đó có ý nghĩa gì?

```

root@pc1: /
64 bytes from 10.0.0.2: icmp_seq=31 ttl=64 time=0.106 ms
64 bytes from 10.0.0.2: icmp_seq=32 ttl=64 time=0.096 ms
64 bytes from 10.0.0.2: icmp_seq=33 ttl=64 time=0.099 ms
64 bytes from 10.0.0.2: icmp_seq=34 ttl=64 time=0.109 ms
64 bytes from 10.0.0.2: icmp_seq=35 ttl=64 time=0.098 ms
64 bytes from 10.0.0.2: icmp_seq=36 ttl=64 time=0.106 ms
64 bytes from 10.0.0.2: icmp_seq=37 ttl=64 time=0.104 ms
64 bytes from 10.0.0.2: icmp_seq=38 ttl=64 time=0.107 ms
64 bytes from 10.0.0.2: icmp_seq=39 ttl=64 time=0.110 ms
64 bytes from 10.0.0.2: icmp_seq=40 ttl=64 time=0.109 ms
64 bytes from 10.0.0.2: icmp_seq=41 ttl=64 time=0.110 ms
64 bytes from 10.0.0.2: icmp_seq=42 ttl=64 time=0.116 ms
64 bytes from 10.0.0.2: icmp_seq=43 ttl=64 time=0.115 ms
64 bytes from 10.0.0.2: icmp_seq=44 ttl=64 time=0.109 ms
64 bytes from 10.0.0.2: icmp_seq=45 ttl=64 time=0.112 ms
64 bytes from 10.0.0.2: icmp_seq=46 ttl=64 time=0.102 ms
64 bytes from 10.0.0.2: icmp_seq=47 ttl=64 time=0.116 ms
64 bytes from 10.0.0.2: icmp_seq=48 ttl=64 time=0.115 ms
^C
--- 10.0.0.2 ping statistics ---
48 packets transmitted, 48 received, 0% packet loss, time 171ms
rtt min/avg/max/mdev = 0.066/0.116/0.234/0.025 ms
root@pc1: /#

```

Ý nghĩa: Đây là lệnh gửi gói tin từ máy nguồn pc1 đến máy đích pc2, pc2 tồn tại nên đã gửi lại gói tin hồi đáp ngược lại máy nguồn pc1

Câu hỏi 4: Kết quả hiển thị trên màn hình của pc1 là gì? Giải thích các gói tin mà lệnh tcpdump đã bắt được?

root@pc1: /	root@pc2: /
07:09:04.625607 ARP, Request who-has 10.0.0.2 tell 10.0.0.1, length 28	64 bytes from 10.0.0.1: icmp_seq=54 ttl=64 time=0.106 ms
07:09:04.625634 ARP, Reply 10.0.0.2 is-at 82:6d:a8:b4:91:c6 (oui Unknown), length 28	64 bytes from 10.0.0.1: icmp_seq=55 ttl=64 time=0.116 ms
07:09:04.693498 IP 10.0.0.2 > 10.0.0.1: ICMP echo request, id 2, seq 66, length 64	64 bytes from 10.0.0.1: icmp_seq=56 ttl=64 time=0.109 ms
07:09:04.693532 IP 10.0.0.1 > 10.0.0.2: ICMP echo reply, id 2, seq 66, length 64	64 bytes from 10.0.0.1: icmp_seq=57 ttl=64 time=0.109 ms
07:09:05.713690 IP 10.0.0.2 > 10.0.0.1: ICMP echo request, id 2, seq 67, length 64	64 bytes from 10.0.0.1: icmp_seq=58 ttl=64 time=0.099 ms
07:09:05.713730 IP 10.0.0.1 > 10.0.0.2: ICMP echo reply, id 2, seq 67, length 64	64 bytes from 10.0.0.1: icmp_seq=59 ttl=64 time=0.115 ms
07:09:06.737580 IP 10.0.0.2 > 10.0.0.1: ICMP echo request, id 2, seq 68, length 64	64 bytes from 10.0.0.1: icmp_seq=60 ttl=64 time=0.102 ms
07:09:06.737616 IP 10.0.0.1 > 10.0.0.2: ICMP echo reply, id 2, seq 68, length 64	64 bytes from 10.0.0.1: icmp_seq=61 ttl=64 time=0.111 ms
07:09:07.761576 IP 10.0.0.2 > 10.0.0.1: ICMP echo request, id 2, seq 69, length 64	64 bytes from 10.0.0.1: icmp_seq=62 ttl=64 time=0.103 ms
07:09:07.761615 IP 10.0.0.1 > 10.0.0.2: ICMP echo reply, id 2, seq 69, length 64	64 bytes from 10.0.0.1: icmp_seq=63 ttl=64 time=0.108 ms
07:09:08.785710 IP 10.0.0.2 > 10.0.0.1: ICMP echo request, id 2, seq 70, length 64	64 bytes from 10.0.0.1: icmp_seq=64 ttl=64 time=0.115 ms
07:09:08.785750 IP 10.0.0.1 > 10.0.0.2: ICMP echo reply, id 2, seq 70, length 64	64 bytes from 10.0.0.1: icmp_seq=65 ttl=64 time=0.135 ms
^C	64 bytes from 10.0.0.1: icmp_seq=66 ttl=64 time=0.111 ms
14 packets captured	64 bytes from 10.0.0.1: icmp_seq=67 ttl=64 time=0.128 ms
14 packets received by filter	64 bytes from 10.0.0.1: icmp_seq=68 ttl=64 time=0.120 ms
0 packets dropped by kernel	64 bytes from 10.0.0.1: icmp_seq=69 ttl=64 time=0.135 ms
root@pc1: /#	64 bytes from 10.0.0.1: icmp_seq=70 ttl=64 time=0.151 ms
	64 bytes from 10.0.0.1: icmp_seq=71 ttl=64 time=0.113 ms
	64 bytes from 10.0.0.1: icmp_seq=72 ttl=64 time=0.116 ms
	^C
	--- 10.0.0.1 ping statistics ---
	72 packets transmitted, 72 received, 0% packet loss, time 760ms
	rtt min/avg/max/mdev = 0.099/0.113/0.151/0.014 ms
	root@pc2: /#

Giải thích: Các gói tin cho biết địa chỉ IP máy nguồn, IP máy đích và cho biết loại gói tin là reply hay request, id, seq, length, mã số gói tin

Câu hỏi 5: Kết quả hiển thị cho biết gì?

The image shows two terminal windows side-by-side. The left window is titled 'root@pc1: /' and the right window is titled 'root@pc2: /'. Both windows display the output of the 'route' command, showing the kernel IP routing table. The output for both machines is identical, showing a single route for destination 10.0.0.0 with gateway 0.0.0.0, Genmask 255.255.255.0, Flags U, Metric 0, Ref 0, Use 0, and Interface eth0.

```

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:/#

root@pc2:/# 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@pc2:/#

```

Kết quả trên cho biết bảng vạch đường của pc1 và pc2, cho biết đường đi của các gói tin của pc1 và pc2 trong mạng

Câu hỏi 6: Kết quả hiển thị cho biết gì?

The image shows two terminal windows side-by-side. The left window is titled 'root@pc1: /' and the right window is titled 'root@pc2: /'. Both windows display the output of the 'arp' command, showing the ARP table. The output for both machines is identical, showing a single entry for address 10.0.0.2 with HWtype ether, HWaddress 82:6d:a8:b4:91:c6, Flags C, Mask, and Interface eth0.

```

root@pc1:/# arp
Address HWtype HWaddress Flags Mask Iface
10.0.0.2 ether 82:6d:a8:b4:91:c6 C eth0
root@pc1:/#

root@pc2:/# arp
Address HWtype HWaddress Flags Mask Iface
10.0.0.1 ether c2:34:3f:34:ac:ab C eth0
root@pc2:/#

```

Kết quả trên cho biết thông tin bộ nhớ đệm lưu các ánh xạ giữa địa chỉ MAC và địa chỉ IP của máy nhận/gửi gói tin cùng với loại và giao diện mạng

Bài 2

Câu hỏi 1: Có những giao diện mạng nào đã được tạo ra trong các máy ảo? Địa chỉ IP của các giao diện mạng đó là bao nhiêu? Có đúng với địa chỉ IP cần gán mà hình trạng mạng đã miêu tả hay không?

Co 2 giao diện mạng đã được tạo ra:

```

root@pc1: /
--- Startup Commands Log
++ ifconfig eth0 10.0.0.1/24 up
--- End Startup Commands Log

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 52:7d:11:c6:94:39 txqueuelen 1000 (Ethernet)
    RX packets 52 bytes 10204 (9.9 KiB)
    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: /
--- Startup Commands Log
++ ifconfig eth0 10.0.0.2/24 up
--- End Startup Commands Log

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 0a:0d:5a:6b:9f:23 txqueuelen 1000 (Ethernet)
    RX packets 55 bytes 10425 (10.1 KiB)
    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:~#
  
```

Địa chỉ IP của các giao diện này ứng với pc1 và pc2 tương ứng là: 10.0.0.1 và 10.0.0.2 đúng với địa chỉ IP cần gán mà hình trạng mạng đã miêu tả

Câu hỏi 2: Kết quả hiển thị trên màn hình của pc1 là gì?

```

64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.116 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.115 ms
64 bytes from 10.0.0.2: icmp_seq=5 ttl=64 time=0.114 ms
64 bytes from 10.0.0.2: icmp_seq=6 ttl=64 time=0.105 ms
64 bytes from 10.0.0.2: icmp_seq=7 ttl=64 time=0.109 ms
64 bytes from 10.0.0.2: icmp_seq=8 ttl=64 time=0.106 ms
64 bytes from 10.0.0.2: icmp_seq=9 ttl=64 time=0.121 ms
64 bytes from 10.0.0.2: icmp_seq=10 ttl=64 time=0.106 ms
64 bytes from 10.0.0.2: icmp_seq=11 ttl=64 time=0.113 ms
64 bytes from 10.0.0.2: icmp_seq=12 ttl=64 time=0.117 ms
64 bytes from 10.0.0.2: icmp_seq=13 ttl=64 time=0.109 ms
64 bytes from 10.0.0.2: icmp_seq=14 ttl=64 time=0.105 ms
64 bytes from 10.0.0.2: icmp_seq=15 ttl=64 time=0.110 ms
64 bytes from 10.0.0.2: icmp_seq=16 ttl=64 time=0.108 ms
64 bytes from 10.0.0.2: icmp_seq=17 ttl=64 time=0.115 ms
64 bytes from 10.0.0.2: icmp_seq=18 ttl=64 time=0.108 ms
64 bytes from 10.0.0.2: icmp_seq=19 ttl=64 time=0.119 ms
64 bytes from 10.0.0.2: icmp_seq=20 ttl=64 time=0.114 ms
64 bytes from 10.0.0.2: icmp_seq=21 ttl=64 time=0.113 ms
^C
--- 10.0.0.2 ping statistics ---
21 packets transmitted, 21 received, 0% packet loss, time 485ms
rtt min/avg/max/mdev = 0.105/0.115/0.192/0.020 ms
root@pc1:~#
  
```

Bài 3

Câu hỏi 1: Kết quả hiển thị trên màn hình của pc1 là gì?

```
root@pc1: /  
64 bytes from 10.0.1.101: icmp_seq=2 ttl=63 time=0.129 ms  
64 bytes from 10.0.1.101: icmp_seq=3 ttl=63 time=0.086 ms  
64 bytes from 10.0.1.101: icmp_seq=4 ttl=63 time=0.162 ms  
64 bytes from 10.0.1.101: icmp_seq=5 ttl=63 time=0.155 ms  
64 bytes from 10.0.1.101: icmp_seq=6 ttl=63 time=0.150 ms  
64 bytes from 10.0.1.101: icmp_seq=7 ttl=63 time=0.073 ms  
64 bytes from 10.0.1.101: icmp_seq=8 ttl=63 time=0.171 ms  
64 bytes from 10.0.1.101: icmp_seq=9 ttl=63 time=0.150 ms  
64 bytes from 10.0.1.101: icmp_seq=10 ttl=63 time=0.142 ms  
64 bytes from 10.0.1.101: icmp_seq=11 ttl=63 time=0.134 ms  
64 bytes from 10.0.1.101: icmp_seq=12 ttl=63 time=0.134 ms  
64 bytes from 10.0.1.101: icmp_seq=13 ttl=63 time=0.126 ms  
64 bytes from 10.0.1.101: icmp_seq=14 ttl=63 time=0.136 ms  
64 bytes from 10.0.1.101: icmp_seq=15 ttl=63 time=0.123 ms  
64 bytes from 10.0.1.101: icmp_seq=16 ttl=63 time=0.127 ms  
64 bytes from 10.0.1.101: icmp_seq=17 ttl=63 time=0.115 ms  
64 bytes from 10.0.1.101: icmp_seq=18 ttl=63 time=0.126 ms  
64 bytes from 10.0.1.101: icmp_seq=19 ttl=63 time=0.116 ms  
64 bytes from 10.0.1.101: icmp_seq=20 ttl=63 time=0.118 ms  
^C  
--- 10.0.1.101 ping statistics ---  
20 packets transmitted, 20 received, 0% packet loss, time 466ms  
rtt min/avg/max/mdev = 0.073/0.135/0.241/0.035 ms
```

```
root@pc1: /  
--- 10.0.1.101 ping statistics ---  
20 packets transmitted, 20 received, 0% packet loss, time 466ms  
rtt min/avg/max/mdev = 0.073/0.135/0.241/0.035 ms  
root@pc1:/# ping 10.0.0.102  
PING 10.0.0.102 (10.0.0.102) 56(84) bytes of data.  
64 bytes from 10.0.0.102: icmp_seq=1 ttl=64 time=0.213 ms  
64 bytes from 10.0.0.102: icmp_seq=2 ttl=64 time=0.123 ms  
64 bytes from 10.0.0.102: icmp_seq=3 ttl=64 time=0.123 ms  
64 bytes from 10.0.0.102: icmp_seq=4 ttl=64 time=0.123 ms  
64 bytes from 10.0.0.102: icmp_seq=5 ttl=64 time=0.132 ms  
64 bytes from 10.0.0.102: icmp_seq=6 ttl=64 time=0.126 ms  
64 bytes from 10.0.0.102: icmp_seq=7 ttl=64 time=0.142 ms  
64 bytes from 10.0.0.102: icmp_seq=8 ttl=64 time=0.123 ms  
64 bytes from 10.0.0.102: icmp_seq=9 ttl=64 time=0.123 ms  
64 bytes from 10.0.0.102: icmp_seq=10 ttl=64 time=0.123 ms  
64 bytes from 10.0.0.102: icmp_seq=11 ttl=64 time=0.133 ms  
64 bytes from 10.0.0.102: icmp_seq=12 ttl=64 time=0.124 ms  
64 bytes from 10.0.0.102: icmp_seq=13 ttl=64 time=0.124 ms  
64 bytes from 10.0.0.102: icmp_seq=14 ttl=64 time=0.132 ms  
^C  
--- 10.0.0.102 ping statistics ---  
14 packets transmitted, 14 received, 0% packet loss, time 317ms  
rtt min/avg/max/mdev = 0.123/0.133/0.213/0.023 ms  
root@pc1:/#
```

```
root@pc1: /
rtt min/avg/max/mdev = 0.123/0.133/0.213/0.023 ms
root@pc1:/# ping 10.0.1.102
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=0.202 ms
64 bytes from 10.0.1.102: icmp_seq=2 ttl=63 time=0.118 ms
64 bytes from 10.0.1.102: icmp_seq=3 ttl=63 time=0.142 ms
64 bytes from 10.0.1.102: icmp_seq=4 ttl=63 time=0.125 ms
64 bytes from 10.0.1.102: icmp_seq=5 ttl=63 time=0.135 ms
64 bytes from 10.0.1.102: icmp_seq=6 ttl=63 time=0.114 ms
64 bytes from 10.0.1.102: icmp_seq=7 ttl=63 time=0.094 ms
64 bytes from 10.0.1.102: icmp_seq=8 ttl=63 time=0.068 ms
64 bytes from 10.0.1.102: icmp_seq=9 ttl=63 time=0.123 ms
64 bytes from 10.0.1.102: icmp_seq=10 ttl=63 time=0.164 ms
64 bytes from 10.0.1.102: icmp_seq=11 ttl=63 time=0.165 ms
64 bytes from 10.0.1.102: icmp_seq=12 ttl=63 time=0.171 ms
64 bytes from 10.0.1.102: icmp_seq=13 ttl=63 time=0.096 ms
64 bytes from 10.0.1.102: icmp_seq=14 ttl=63 time=0.131 ms
64 bytes from 10.0.1.102: icmp_seq=15 ttl=63 time=0.126 ms
64 bytes from 10.0.1.102: icmp_seq=16 ttl=63 time=0.119 ms
^C
--- 10.0.1.102 ping statistics ---
16 packets transmitted, 16 received, 0% packet loss, time 351ms
rtt min/avg/max/mdev = 0.068/0.130/0.202/0.035 ms
root@pc1:/#
```

```
root@pc1: /
18 packets transmitted, 18 received, 0% packet loss, time 425ms
rtt min/avg/max/mdev = 0.060/0.103/0.137/0.027 ms
root@pc1:/# ping 10.0.0.1
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=0.093 ms
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=0.066 ms
64 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=0.123 ms
64 bytes from 10.0.0.1: icmp_seq=4 ttl=64 time=0.119 ms
64 bytes from 10.0.0.1: icmp_seq=5 ttl=64 time=0.118 ms
64 bytes from 10.0.0.1: icmp_seq=6 ttl=64 time=0.120 ms
64 bytes from 10.0.0.1: icmp_seq=7 ttl=64 time=0.118 ms
64 bytes from 10.0.0.1: icmp_seq=8 ttl=64 time=0.112 ms
64 bytes from 10.0.0.1: icmp_seq=9 ttl=64 time=0.118 ms
64 bytes from 10.0.0.1: icmp_seq=10 ttl=64 time=0.111 ms
64 bytes from 10.0.0.1: icmp_seq=11 ttl=64 time=0.102 ms
64 bytes from 10.0.0.1: icmp_seq=12 ttl=64 time=0.092 ms
64 bytes from 10.0.0.1: icmp_seq=13 ttl=64 time=0.091 ms
64 bytes from 10.0.0.1: icmp_seq=14 ttl=64 time=0.091 ms
64 bytes from 10.0.0.1: icmp_seq=15 ttl=64 time=0.089 ms
^C
--- 10.0.0.1 ping statistics ---
15 packets transmitted, 15 received, 0% packet loss, time 343ms
rtt min/avg/max/mdev = 0.066/0.104/0.123/0.017 ms
root@pc1:/#
```

```

root@pc1: /
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=0.131 ms
64 bytes from 10.0.1.1: icmp_seq=2 ttl=64 time=0.060 ms
64 bytes from 10.0.1.1: icmp_seq=3 ttl=64 time=0.104 ms
64 bytes from 10.0.1.1: icmp_seq=4 ttl=64 time=0.082 ms
64 bytes from 10.0.1.1: icmp_seq=5 ttl=64 time=0.118 ms
64 bytes from 10.0.1.1: icmp_seq=6 ttl=64 time=0.114 ms
64 bytes from 10.0.1.1: icmp_seq=7 ttl=64 time=0.062 ms
64 bytes from 10.0.1.1: icmp_seq=8 ttl=64 time=0.137 ms
64 bytes from 10.0.1.1: icmp_seq=9 ttl=64 time=0.111 ms
64 bytes from 10.0.1.1: icmp_seq=10 ttl=64 time=0.066 ms
64 bytes from 10.0.1.1: icmp_seq=11 ttl=64 time=0.060 ms
64 bytes from 10.0.1.1: icmp_seq=12 ttl=64 time=0.107 ms
64 bytes from 10.0.1.1: icmp_seq=13 ttl=64 time=0.132 ms
64 bytes from 10.0.1.1: icmp_seq=14 ttl=64 time=0.123 ms
64 bytes from 10.0.1.1: icmp_seq=15 ttl=64 time=0.109 ms
64 bytes from 10.0.1.1: icmp_seq=16 ttl=64 time=0.119 ms
64 bytes from 10.0.1.1: icmp_seq=17 ttl=64 time=0.113 ms
64 bytes from 10.0.1.1: icmp_seq=18 ttl=64 time=0.118 ms
^C
--- 10.0.1.1 ping statistics ---
18 packets transmitted, 18 received, 0% packet loss, time 425ms
rtt min/avg/max/mdev = 0.060/0.103/0.137/0.027 ms
root@pc1: /#

```

Câu hỏi 2: Kết quả hiển thị trên màn hình của pc1 là gì?

```

root@pc1: /
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=0.066 ms
64 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=0.123 ms
64 bytes from 10.0.0.1: icmp_seq=4 ttl=64 time=0.119 ms
64 bytes from 10.0.0.1: icmp_seq=5 ttl=64 time=0.118 ms
64 bytes from 10.0.0.1: icmp_seq=6 ttl=64 time=0.120 ms
64 bytes from 10.0.0.1: icmp_seq=7 ttl=64 time=0.118 ms
64 bytes from 10.0.0.1: icmp_seq=8 ttl=64 time=0.112 ms
64 bytes from 10.0.0.1: icmp_seq=9 ttl=64 time=0.118 ms
64 bytes from 10.0.0.1: icmp_seq=10 ttl=64 time=0.111 ms
64 bytes from 10.0.0.1: icmp_seq=11 ttl=64 time=0.102 ms
64 bytes from 10.0.0.1: icmp_seq=12 ttl=64 time=0.092 ms
64 bytes from 10.0.0.1: icmp_seq=13 ttl=64 time=0.091 ms
64 bytes from 10.0.0.1: icmp_seq=14 ttl=64 time=0.091 ms
64 bytes from 10.0.0.1: icmp_seq=15 ttl=64 time=0.089 ms
^C
--- 10.0.0.1 ping statistics ---
15 packets transmitted, 15 received, 0% packet loss, time 343ms
rtt min/avg/max/mdev = 0.066/0.104/0.123/0.017 ms
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: /#

```

Câu hỏi 3: Kết quả hiển thị trên màn hình của pc1 là gì? Bạn có nhận xét gì?

```

root@pc1: /
64 bytes from 10.0.0.1: icmp_seq=13 ttl=64 time=0.091 ms
64 bytes from 10.0.0.1: icmp_seq=14 ttl=64 time=0.091 ms
64 bytes from 10.0.0.1: icmp_seq=15 ttl=64 time=0.089 ms
^C
--- 10.0.0.1 ping statistics ---
15 packets transmitted, 15 received, 0% packet loss, time 343ms
rtt min/avg/max/mdev = 0.066/0.104/0.123/0.017 ms
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 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) 0.129 ms 0.048 ms 0.040 ms
 2 10.0.1.101 (10.0.1.101) 0.088 ms 0.072 ms 0.069 ms
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) 0.163 ms 0.062 ms 0.055 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) 0.175 ms 0.056 ms 0.051 ms
 2 10.0.1.102 (10.0.1.102) 0.101 ms 0.080 ms 0.077 ms
root@pc1:/#

```

Nhận xét: Lệnh traceroute cho truy vết được đường đi của các gói tin chuyển qua các host. Đối với pc3 do cùng mạng A nên có thể trao đổi dữ liệu qua lại với nhau, đối với pc2 và pc4 do khác mạng với pc1 nên các gói tin phải luân chuyển qua trung gian là các route