实验报告 Lab 4

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1. ICMP and Ping

1. The IP address of my host: `192.168.41.102`,ip.dst: `143.89.14.2`

```
Source: 192.168.41.102 (192.168.41.102)
Destination: 143.89.14.2 (143.89.14.2)
[Source GeoIP: Unknown]
[Destination GeoIP: Unknown]
```

2. Because port is in Transport layer,But ICMP is in the ip datagram,So ICMP doesn't have port num.

3. IP type:8,code num:0,checksum:0x00006742,icmp.ident:9428,sequence number:4

```
Internet Control Message Protocol
    Type: 8 (Echo (ping) request)
    Code: 0
    Checksum: 0x6742 [correct]
    Identifier (BE): 9428 (0x24d4)
    Identifier (LE): 54308 (0xd424)
    Sequence number (BE): 0 (0x0000)
    Sequence number (LE): 0 (0x0000)
```

4. IP type:0,code num:0,checksum:0x00002efb,icmp.ident:9428,sequence number:4

```
Internet Control Message Protocol
    Type: 0 (Echo (ping) reply)
    Code: 0
    Checksum: 0x2efb [correct]
    Identifier (BE): 9428 (0x24d4)
    Identifier (LE): 54308 (0xd424)
    Sequence number (BE): 4 (0x0004)
    Sequence number (LE): 1024 (0x0400)
```

2. ICMP and Traceroute

5. The IP address of my host: `192.168.41.102`,ip.dst: `128.93.162.84`

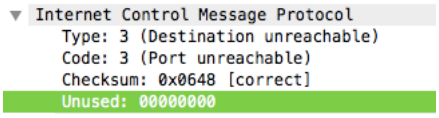
```
▶ Header checksum: 0xd647 [validation disabled]
  Source: 192.168.41.102 (192.168.41.102)
  Destination: 128.93.162.84 (128.93.162.84)
  [Source GeoIP: Unknown]
  [Destination GeoIP: Unknown]
```

6. not 01,Because it above protocol is UDP,so it's protocol num-

ber isn't 01 ,instead 0x11.

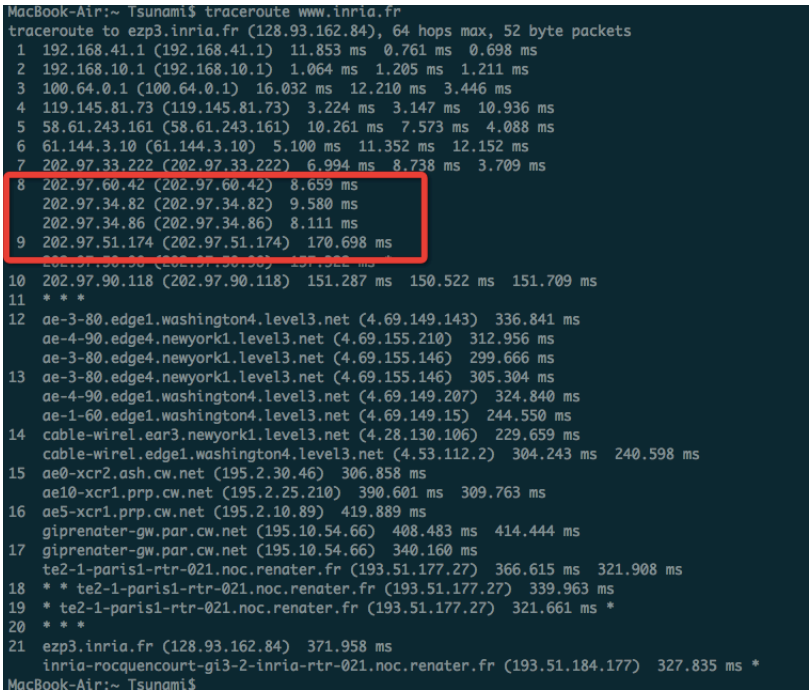
7. The ICMP echo packet has the same fields as the ping query packets.

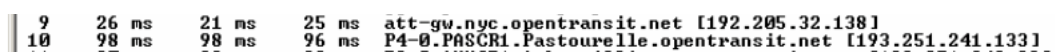
8. The ICMP error packet is not the same as the ping query packets. It contains both the IP header and the first 8 bytes of the original ICMP packet that the error is for.



9. The last three ICMP packets are message type 0 (echo reply) rather than 11 (TTL expired). They are different because the datagrams have made it all the way to the destination host before the TTL expired.

10. Refer below snapshot between steps 8 and 9 is longer delay.In figure 4 from the lab, There is a link between steps 11 and 12 is longer delay and the link is from New York to Pastourelle, France.





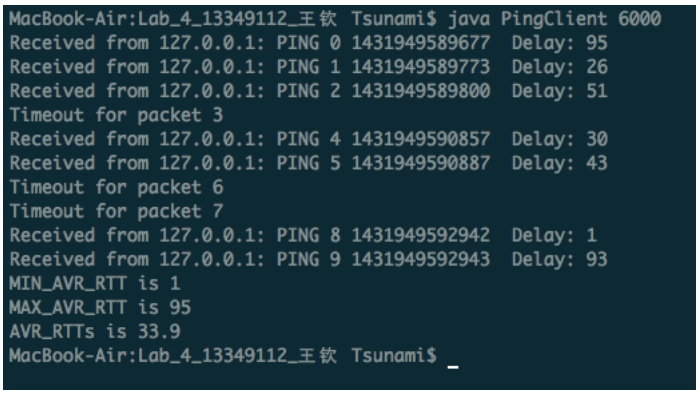
3. UDP Ping Lab

Optional Exercises:

I write the Client ,the source file is `PingClient.java`,And the Server source file is `PingServer.java`,all files are in submit Folder.Client can calculate and print RTT of each packet,at last will print the minimum, maximum, and average RTTs.

How to use:First open terminal and run command `java PingServer 6000`,mean server will listen `localhost:6000`. Second open another terminal run command `java PingClient 6000`,mean client will send ping package to `localhost:6000`,and client run on `localhost:5000`.

Client snapshot:



Server snapshot: