

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

```
Header checksum: 0x1040 [validation disabled]
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 data-gram,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)
[Request frame: 171]
```

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.

```
▼ Internet Control Message Protocol
  Type: 3 (Destination unreachable)
  Code: 3 (Port unreachable)
  Checksum: 0x0648 [correct]
  Unused: 00000000
```

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.

```
MacBook-Air:~ Tsunami$ traceroute www.inria.fr
traceroute to ezp3.inria.fr (128.93.162.84), 64 hops max, 52 byte packets
 1 192.168.41.1 (192.168.41.1) 11.853 ms 0.761 ms 0.698 ms
 2 192.168.10.1 (192.168.10.1) 1.064 ms 1.205 ms 1.211 ms
 3 100.64.0.1 (100.64.0.1) 16.032 ms 12.210 ms 3.446 ms
 4 119.145.81.73 (119.145.81.73) 3.224 ms 3.147 ms 10.936 ms
 5 58.61.243.161 (58.61.243.161) 10.261 ms 7.573 ms 4.088 ms
 6 61.144.3.10 (61.144.3.10) 5.100 ms 11.352 ms 12.152 ms
 7 202.97.33.222 (202.97.33.222) 6.994 ms 8.738 ms 3.709 ms
 8 202.97.60.42 (202.97.60.42) 8.659 ms
 9 202.97.34.82 (202.97.34.82) 9.580 ms
10 202.97.34.86 (202.97.34.86) 8.111 ms
11 202.97.51.174 (202.97.51.174) 170.698 ms
12 202.97.90.118 (202.97.90.118) 151.287 ms 150.522 ms 151.709 ms
13 * * *
14 ae-3-80.edge1.washington4.level3.net (4.69.149.143) 336.841 ms
15 ae-4-90.edge4.newyork1.level3.net (4.69.155.210) 312.956 ms
16 ae-3-80.edge4.newyork1.level3.net (4.69.155.146) 299.666 ms
17 ae-3-80.edge4.newyork1.level3.net (4.69.155.146) 305.304 ms
18 ae-4-90.edge1.washington4.level3.net (4.69.149.207) 324.840 ms
19 ae-1-60.edge1.washington4.level3.net (4.69.149.15) 244.550 ms
20 cable-wirel.edge1.washington4.level3.net (4.28.130.106) 229.659 ms
21 cable-wirel.edge1.washington4.level3.net (4.53.112.2) 304.243 ms 240.598 ms
22 ae0-xcr2.ash.cw.net (195.2.30.46) 306.858 ms
23 ae10-xcr1.prp.cw.net (195.2.25.210) 390.601 ms 309.763 ms
24 ae5-xcr1.prp.cw.net (195.2.10.89) 419.889 ms
25 giprenater-gw.par.cw.net (195.10.54.66) 408.483 ms 414.444 ms
26 giprenater-gw.par.cw.net (195.10.54.66) 340.160 ms
27 te2-1-paris1-rtr-021.noc.renater.fr (193.51.177.27) 366.615 ms 321.908 ms
28 * * te2-1-paris1-rtr-021.noc.renater.fr (193.51.177.27) 339.963 ms
29 * * te2-1-paris1-rtr-021.noc.renater.fr (193.51.177.27) 321.661 ms *
30 * * *
31 ezp3.inria.fr (128.93.162.84) 371.958 ms
32 inria-rocquencourt-gi3-2-inria-rtr-021.noc.renater.fr (193.51.184.177) 327.835 ms *
```

```
9 26 ms 21 ms 25 ms att-gw.nyc.opentransit.net [192.205.32.138]
10 98 ms 98 ms 96 ms P4-0.PASCRI.Pastourelle.opentransit.net [193.251.241.133]
```

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:

```
MacBook-Air:Lab_4_13349112_王钦 Tsunami$ java PingClient 6000
Received from 127.0.0.1: PING 0 1431949589677 Delay: 95
Received from 127.0.0.1: PING 1 1431949589773 Delay: 26
Received from 127.0.0.1: PING 2 1431949589800 Delay: 51
Timeout for packet 3
Received from 127.0.0.1: PING 4 1431949590857 Delay: 30
Received from 127.0.0.1: PING 5 1431949590887 Delay: 43
Timeout for packet 6
Timeout for packet 7
Received from 127.0.0.1: PING 8 1431949592942 Delay: 1
Received from 127.0.0.1: PING 9 1431949592943 Delay: 93
MIN_AVR_RTT is 1
MAX_AVR_RTT is 95
AVR_RTTs is 33.9
MacBook-Air:Lab_4_13349112_王钦 Tsunami$ _
```

Server snapshot:

```
^CMacBook-Air:Lab_4_13349112_王钦 Tsunami$ java PingServer 6000
Received from 127.0.0.1: PING 0 1431949542645
Reply not sent.
Received from 127.0.0.1: PING 1 1431949543649
Reply sent.
Received from 127.0.0.1: PING 2 1431949543744
Reply sent.
Received from 127.0.0.1: PING 3 1431949543803
Reply sent.
Received from 127.0.0.1: PING 4 1431949543858
Reply sent.
Received from 127.0.0.1: PING 5 1431949543912
Reply not sent.
Received from 127.0.0.1: PING 6 1431949544917
Reply sent.
Received from 127.0.0.1: PING 7 1431949544922
Reply sent.
Received from 127.0.0.1: PING 8 1431949544983
Reply not sent.
Received from 127.0.0.1: PING 9 1431949545988
Reply not sent.
```