Computer Networks Lab

ASSIGNMENT – 10

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PART – 1

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PS C:\Users\Rahul\Documents\SEM-6\COMPUTER_NETWORKS\CN lab\lab_10> ping -n 10 www.iitdh.ac.in

Pinging www.iitdh.ac.in [10.195.250.62] with 32 bytes of data:
Reply from 10.195.250.62: bytes=32 time=2ms TTL=62
Reply from 10.195.250.62: bytes=32 time=4ms TTL=62
Reply from 10.195.250.62: bytes=32 time=3ms TTL=62
Reply from 10.195.250.62: bytes=32 time=2ms TTL=62
Reply from 10.195.250.62: bytes=32 time=2ms TTL=62
Reply from 10.195.250.62: bytes=32 time=2ms TTL=62
Reply from 10.195.250.62: bytes=32 time=3ms TTL=62
Reply from 10.195.250.62: bytes=32 time=2ms TTL=62
Reply from 10.195.250.62: bytes=32 time=2ms TTL=62
Reply from 10.195.250.62: bytes=32 time=3ms TTL=62

Ping statistics for 10.195.250.62:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 4ms, Average = 2ms
```

icmp

No.	Time	Source	Destination	Protocol	Length	Info
137	2024-03-14 09:21:37.567597	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=152/38912, ttl=128 (reply in 138)
138	2024-03-14 09:21:37.570084	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=152/38912, ttl=62 (request in 137)
175	2024-03-14 09:21:38.573503	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=153/39168, ttl=128 (reply in 176)
176	2024-03-14 09:21:38.577392	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=153/39168, ttl=62 (request in 175)
180	2024-03-14 09:21:39.581874	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=154/39424, ttl=128 (reply in 181)
181	2024-03-14 09:21:39.584975	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=154/39424, ttl=62 (request in 180)
184	2024-03-14 09:21:40.592061	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=155/39680, ttl=128 (reply in 185)
185	2024-03-14 09:21:40.594247	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=155/39680, ttl=62 (request in 184)
188	2024-03-14 09:21:41.603776	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=156/39936, ttl=128 (reply in 189)
189	2024-03-14 09:21:41.606302	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=156/39936, ttl=62 (request in 188)
190	2024-03-14 09:21:42.616376	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=157/40192, ttl=128 (reply in 191)
191	2024-03-14 09:21:42.619121	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=157/40192, ttl=62 (request in 190)
192	2024-03-14 09:21:43.636931	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=158/40448, ttl=128 (reply in 193)
193	2024-03-14 09:21:43.639874	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=158/40448, ttl=62 (request in 192)
194	2024-03-14 09:21:44.645934	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=159/40704, ttl=128 (reply in 195)
195	2024-03-14 09:21:44.648419	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=159/40704, ttl=62 (request in 194)
196	2024-03-14 09:21:45.656238	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=160/40960, ttl=128 (reply in 197)
197	2024-03-14 09:21:45.658355	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=160/40960, ttl=62 (request in 196)
198	2024-03-14 09:21:46.668384	10.200.181.193	10.195.250.62	ICMP	74	Echo (ping) request id=0x0001, seq=161/41216, ttl=128 (reply in 199)
199	2024-03-14 09:21:46.671579	10.195.250.62	10.200.181.193	ICMP	74	Echo (ping) reply id=0x0001, seq=161/41216, ttl=62 (request in 198)

1. IP address of my host – 10.200.181.193

   IP address of the destination host – 10.195.250.62

```
▸ Frame 137: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) o
▸ Ethernet II, Src: AzureWaveTec_0d:70:4d (48:e7:da:0d:70:4d), Dst: Cisc
▸ Internet Protocol Version 4, Src: 10.200.181.193, Dst: 10.195.250.62
▸ Internet Control Message Protocol
```

2. ICMP packets operate at the network layer and are not associated with transport-layer protocols like TCP or UDP, which use port numbers. Therefore, ICMP packets do not have source and destination port numbers. They are identified and routed based solely on the IP addresses of the source and destination hosts.

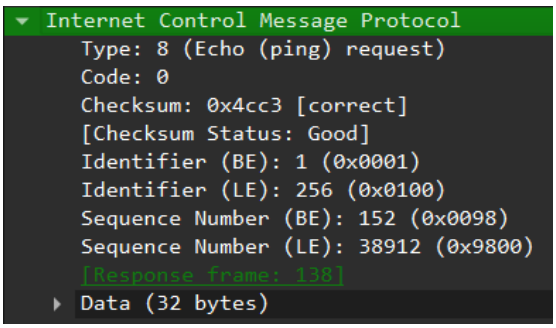
3.

Type: 8 (Echo (ping) request)

Code: 0

Other fields present in the ICMP packet is Checksum, Identifier (BE & LE), Sequence Number (BE & LE) and the Data

All the checksum, identifier and sequence number are of **16 bits**



4.

Type: 0 (Echo (ping) reply)

Code: 0

Other fields present in the ICMP packet is Checksum, Identifier (BE & LE), Sequence Number (BE & LE) and the Data

All the checksum, identifier and sequence number are of **16 bits**

```
Internet Control Message Protocol
    Type: 0 (Echo (ping) reply)
    Code: 0
    Checksum: 0x54c3 [correct]
    [Checksum Status: Good]
    Identifier (BE): 1 (0x0001)
    Identifier (LE): 256 (0x0100)
    Sequence Number (BE): 152 (0x0098)
    Sequence Number (LE): 38912 (0x9800)
    [Request frame: 137]
    [Response time: 2.487 ms]
  ▸ Data (32 bytes)
```

PART – 2

```
PS C:\Users\Rahul\Documents\SEM-6\COMPUTER_NETWORKS\CN lab\lab_10> tracert www.google.com

Tracing route to www.google.com [142.250.66.4]
over a maximum of 30 hops:

  1     2 ms     2 ms     2 ms  10.200.176.2
  2     3 ms     2 ms     2 ms  10.240.0.1
  3     2 ms     2 ms     1 ms  10.240.240.1
  4     4 ms     4 ms     3 ms  117.205.73.161
  5     *        *        *     Request timed out.
  6     *        *        *     Request timed out.
  7    19 ms    19 ms    19 ms  142.250.160.26
  8    80 ms    24 ms    24 ms  216.239.43.137
  9    23 ms    23 ms    67 ms  142.250.208.152
 10    20 ms    20 ms    20 ms  172.253.72.136
 11    49 ms    49 ms    48 ms  142.250.212.4
 12    53 ms    52 ms    52 ms  142.250.208.227
 13   101 ms    62 ms    47 ms  142.251.70.57
 14    43 ms    42 ms    42 ms  bom07s35-in-f4.1e100.net [142.250.66.4]

Trace complete.
```

icmp

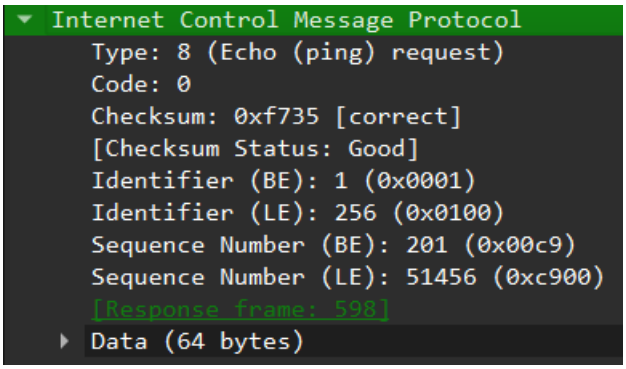
No.	Time	Source	Destination	Protocol	Length	Info
4	2024-03-14 09:45:39.906714	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=162/41472, ttl=1 (no response found!)
5	2024-03-14 09:45:39.909241	10.200.176.2	10.200.181.193	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
6	2024-03-14 09:45:39.910381	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=163/41728, ttl=1 (no response found!)
7	2024-03-14 09:45:39.912556	10.200.176.2	10.200.181.193	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
8	2024-03-14 09:45:39.913508	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=164/41984, ttl=1 (no response found!)
9	2024-03-14 09:45:39.915707	10.200.176.2	10.200.181.193	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
18	2024-03-14 09:45:40.376427	10.200.176.2	10.200.181.193	ICMP	70	Destination unreachable (Port unreachable)
26	2024-03-14 09:45:41.879640	10.200.176.2	10.200.181.193	ICMP	70	Destination unreachable (Port unreachable)
46	2024-03-14 09:45:43.391153	10.200.176.2	10.200.181.193	ICMP	70	Destination unreachable (Port unreachable)
47	2024-03-14 09:45:45.903589	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=165/42240, ttl=2 (no response found!)
48	2024-03-14 09:45:45.906606	10.240.0.1	10.200.181.193	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
49	2024-03-14 09:45:45.908142	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=166/42496, ttl=2 (no response found!)
50	2024-03-14 09:45:45.910099	10.240.0.1	10.200.181.193	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
51	2024-03-14 09:45:45.911234	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=167/42752, ttl=2 (no response found!)
52	2024-03-14 09:45:45.913582	10.240.0.1	10.200.181.193	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
59	2024-03-14 09:45:46.375113	10.240.0.1	10.200.181.193	ICMP	70	Destination unreachable (Port unreachable)
61	2024-03-14 09:45:47.890244	10.240.0.1	10.200.181.193	ICMP	70	Destination unreachable (Port unreachable)
67	2024-03-14 09:45:49.390236	10.240.0.1	10.200.181.193	ICMP	70	Destination unreachable (Port unreachable)
74	2024-03-14 09:45:51.906901	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=168/43008, ttl=3 (no response found!)
75	2024-03-14 09:45:51.909105	10.240.240.1	10.200.181.193	ICMP	106	Time-to-live exceeded (Time to live exceeded in transit)
76	2024-03-14 09:45:51.911055	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=169/43264, ttl=3 (no response found!)
77	2024-03-14 09:45:51.913672	10.240.240.1	10.200.181.193	ICMP	106	Time-to-live exceeded (Time to live exceeded in transit)
78	2024-03-14 09:45:51.914598	10.200.181.193	142.250.66.4	ICMP	106	Echo (ping) request id=0x0001, seq=170/43520, ttl=3 (no response found!)

1. IP address of my host – 10.200.181.193

   IP address of the destination host – 140.250.66.4

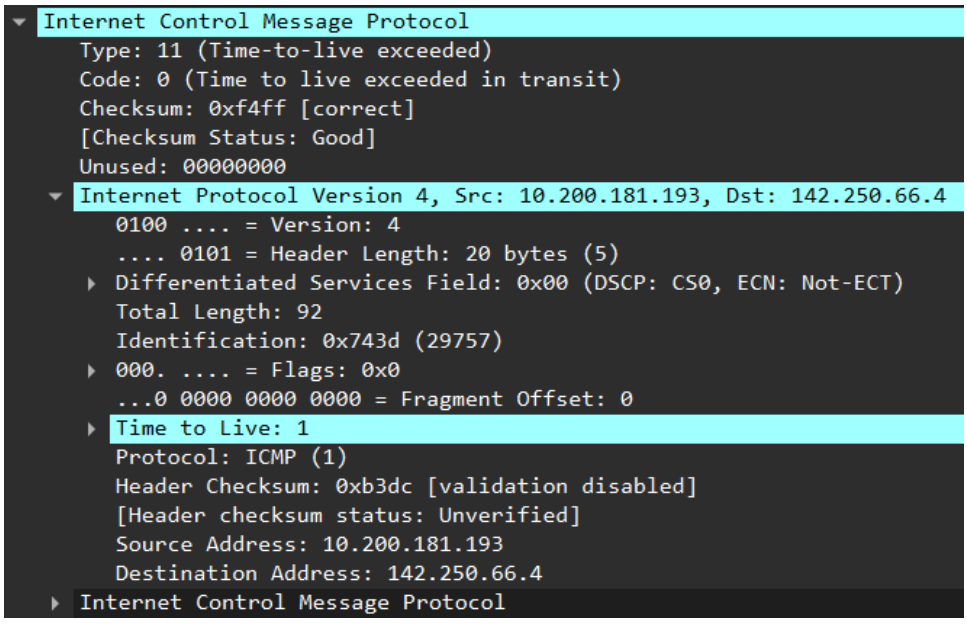
2. If traceroute send the packets by UDP then the IP protocol number would be Protocol: UDP (17)

3. The fields in both seem to be same



4. There are some extra fields in the ICMP error packet i.e., IPv4 and ICMP headers which indeed contains

- Version
- Header length
- Type of version
- Total length
- Identification
- Flags
- Fragment offset
- Time to Live
- Protocol
- Header Checksum
- Source Address
- Destination Address
- Type
- Code
- ICMP checksum
- Identifier
- Sequence Number



5. 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.

In the ICMP error packets we can see more header fields and their specifications but in the ICMP reply packet the headers present are

a. Type
b. Code
c. Checksum
d. Identifier
e. Sequence Number

6. There is a significant increase in delay in from 9^{th} packet to 10^{th} packet

```
PS C:\Users\Rahul\Documents\SEM-6\COMPUTER_NETWORKS\CN lab\lab_10> tracert www.google.com

Tracing route to www.google.com [172.217.160.164]
over a maximum of 30 hops:

  1     2 ms     1 ms     2 ms  10.200.240.2
  2     9 ms     2 ms     2 ms  10.240.0.1
  3     3 ms     3 ms     3 ms  10.240.240.1
  4    12 ms    12 ms    13 ms  103.120.31.121.static-chennai.powertel.in [103.120.31.121]
  5    25 ms    24 ms    24 ms  103.120.29.73.static-delhi.powertel.in [103.120.29.73]
  6    15 ms    14 ms    14 ms  103.120.29.72.static-delhi.powertel.in [103.120.29.72]
  7    16 ms    17 ms    14 ms  72.14.209.113
  8    16 ms    18 ms    21 ms  142.251.230.177
  9    15 ms    15 ms    15 ms  142.251.230.70
 10    39 ms    46 ms    38 ms  142.250.56.38
 11    33 ms    33 ms    33 ms  192.178.110.209
 12    50 ms    36 ms    35 ms  216.239.62.237
 13    37 ms    34 ms    39 ms  bom05s12-in-f4.1e100.net [172.217.160.164]
```

PART – 3

```
C:\Users\Rahul\Documents\SEM-6\COMPUTER_NETWORKS\CN lab\lab_10>python 210010012_client.py
Reply from ('127.0.0.1', 12000): PING 1, RTT = 0.004011 seconds
Request timed out
Request timed out
Reply from ('127.0.0.1', 12000): PING 4, RTT = 0.001004 seconds
Reply from ('127.0.0.1', 12000): PING 5, RTT = 0.001001 seconds
Request timed out
Reply from ('127.0.0.1', 12000): PING 7, RTT = 0.000995 seconds
Reply from ('127.0.0.1', 12000): PING 8, RTT = 0.000000 seconds
Request timed out
Reply from ('127.0.0.1', 12000): PING 10, RTT = 0.000997 seconds
```