

## Lab 7: ICMP

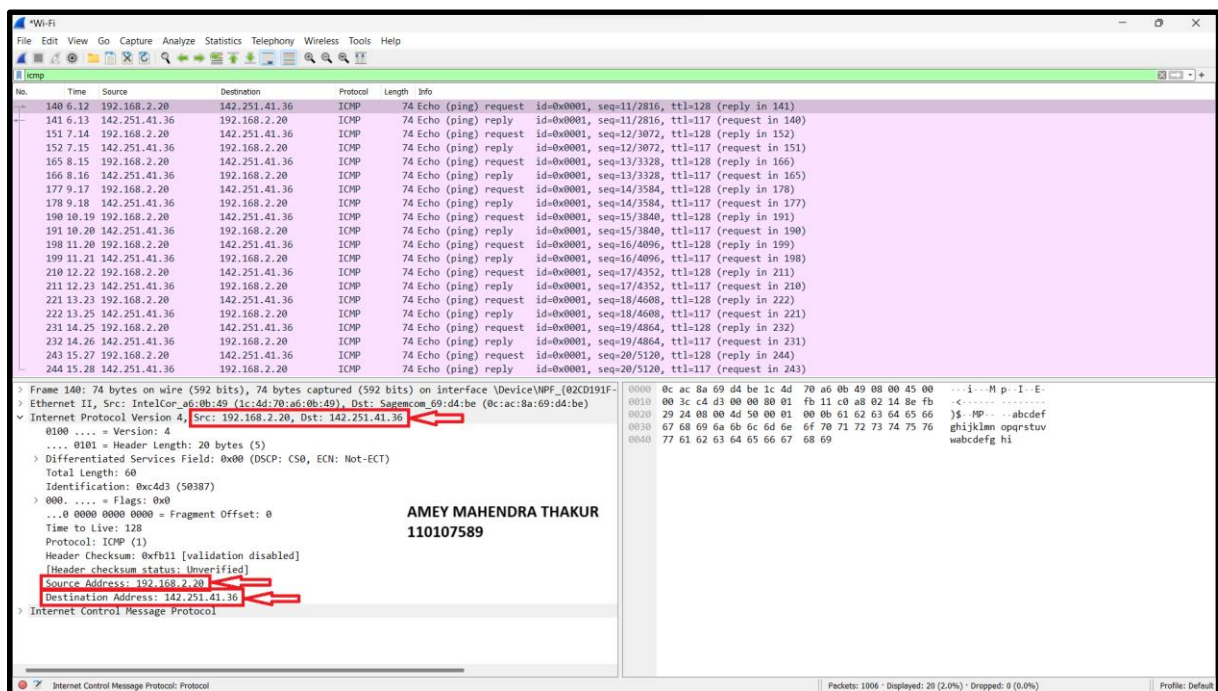
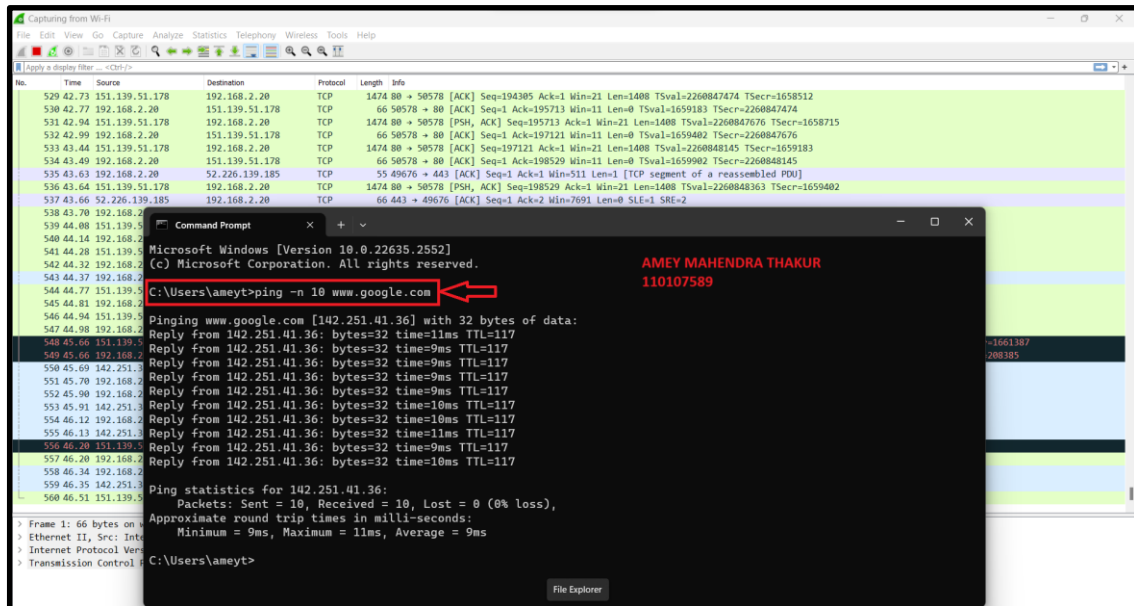
University of Windsor  
Department of Electrical and Computer Engineering  
ELEC 8560 – Computer Networks  
Semester: Fall 2023

Student Name: Amey Mahendra Thakur

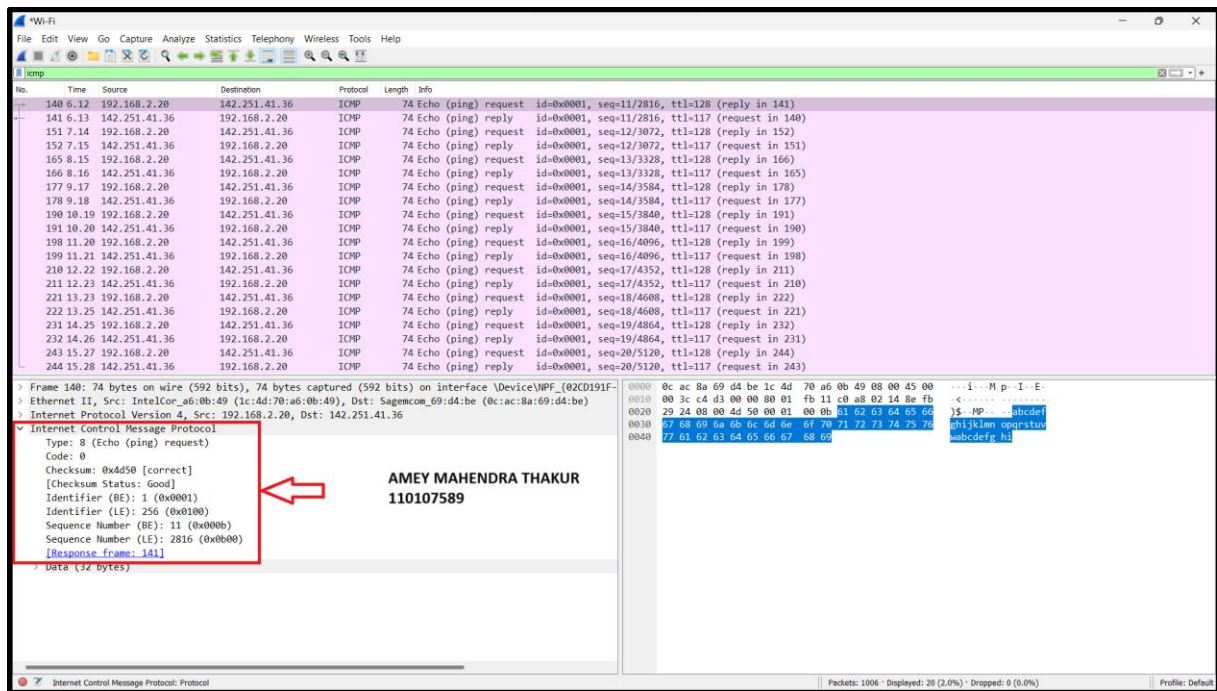
Student number: 110107589

### Answers:

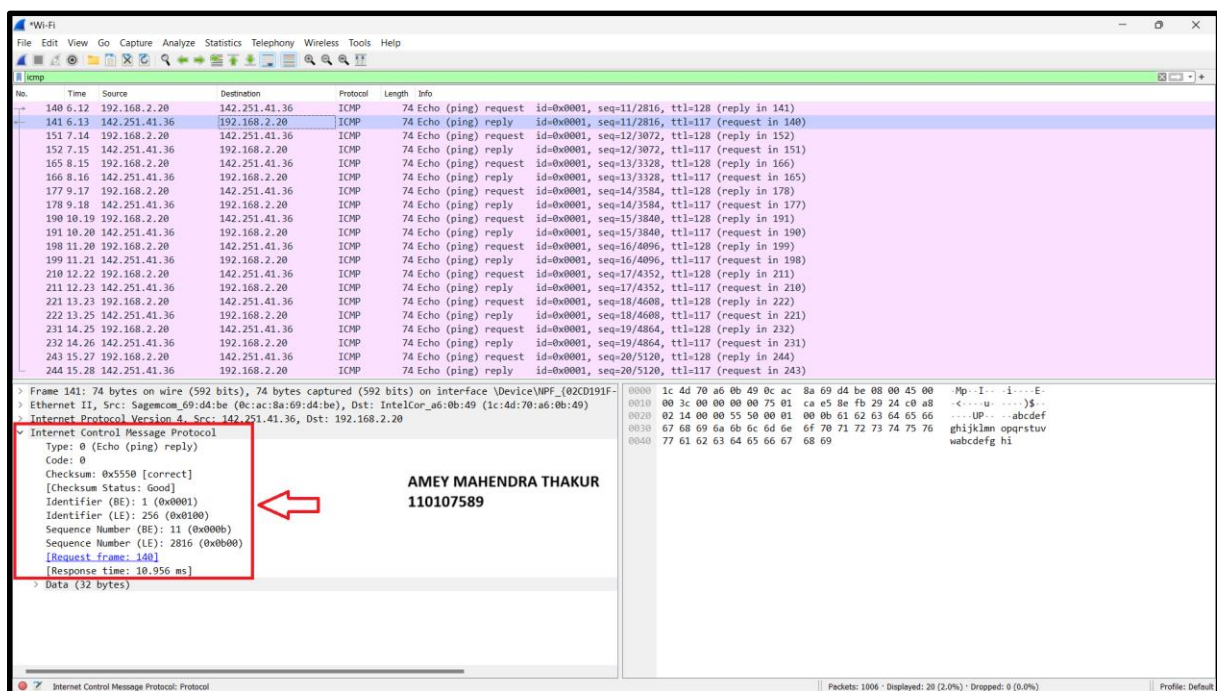
1. The host's IP is **192.168.2.20**, and its destination is **142.251.41.36**.



- The ICMP packet specifies Type 8 and Code 0, accompanied by specific fields for checksum, checksum status, Identifier (BE), Identifier (LE), Sequence number (BE), and Sequence number (LE), with each field occupying 2 bytes.



- The ICMP packet includes Type 0 and Code 0, alongside fields for checksum, checksum status, Identifier (BE), Identifier (LE), Sequence number (BE), and Sequence number (LE), each field being 2 bytes in size.



- My host's IP address is **192.168.2.20**, and the destination host's IP address is **172.217.1.4**.

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Command Prompt

Ping statistics for 142.251.41.36:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 9ms, Maximum = 11ms, Average = 9ms

C:\Users\ameyt>tracert www.google.com

Tracing route to www.google.com [172.217.1.4]
over a maximum of 30 hops:

  1    3 ms    1 ms    <1 ms    mynetwork.home [192.168.2.1]
  2   25 ms   18 ms   13 ms   10.50.44.122
  3    *      *      *      Request timed out.
  4    *      *      *      Request timed out.
  5    *     12 ms   9 ms    cr02-toroonxnhrz-bundle-ether3.net.bell.ca [142.124.127.213]
  6   10 ms   9 ms    9 ms    bx4-torontoxn_ae1.net.bell.ca [64.230.97.179]
  7    9 ms   8 ms    8 ms    72.14.218.134
  8   10 ms  10 ms   9 ms    108.170.250.225
  9   10 ms  10 ms   9 ms    216.239.35.235
 10    9 ms   9 ms   9 ms    yyz10s14-in-f4.1e100.net [172.217.1.4]

Trace complete.

C:\Users\ameyt>

```

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icmp

No. Time Source Destination Protocol Length Info
--
20 4.08 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=51/13056, ttl=1 (no response found!)
21 4.08 192.168.2.1 192.168.2.20 ICMP 134 Time-to-live exceeded (Time to live exceeded in transit)
22 4.08 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=52/13312, ttl=1 (no response found!)
23 4.08 192.168.2.1 192.168.2.20 ICMP 134 Time-to-live exceeded (Time to live exceeded in transit)
24 4.08 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=53/13568, ttl=1 (no response found!)
25 4.08 192.168.2.1 192.168.2.20 ICMP 134 Time-to-live exceeded (Time to live exceeded in transit)
30 5.09 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=54/13824, ttl=2 (no response found!)
31 5.10 10.50.44.122 192.168.2.20 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
32 5.10 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=55/14080, ttl=2 (no response found!)
33 5.10 10.50.44.122 192.168.2.20 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
34 5.10 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=56/14336, ttl=2 (no response found!)
35 5.11 10.50.44.122 192.168.2.20 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
45 11.05 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=57/14592, ttl=3 (no response found!)
50 14.79 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=58/14848, ttl=3 (no response found!)
60 18.79 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=59/15104, ttl=3 (no response found!)
3165 22.79 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=60/15360, ttl=4 (no response found!)
3211 26.79 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=61/15616, ttl=4 (no response found!)
3219 30.79 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=62/15872, ttl=4 (no response found!)
3239 34.79 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=63/16128, ttl=5 (no response found!)
3263 38.78 192.168.2.20 172.217.1.4 ICMP 106 Echo (ping) request id=0x0001, seq=64/16384, ttl=5 (no response found!)

Frame 20: 106 bytes on wire (848 bits), 106 bytes captured (848 bits) on interface \Device\NPF{02CD191F-...}
Ethernet II, Src: IntelCor a6:0b:49 (1c:dd:70:a6:0b:49), Dst: Sagecom 69:d4:be (0c:ac:8a:69:d4:be)
Internet Protocol Version 4, Src: 192.168.2.20, Dst: 172.217.1.4
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
> Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 92
Identification: 0xa8ee (43246)
0000 .... = Flags: 0x0
...0 0000 0000 0000 = Fragment Offset: 0
> Time to Live: 1
Protocol: ICMP (1)
Header checksum: 0xa819 [validation disabled]
[Header checksum status: Unverified]
Source Address: 192.168.2.20
Destination Address: 172.217.1.4
Internet Control Message Protocol

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5. If ICMP were to transmit UDP packets instead, the IP protocol number wouldn't be 01 but 0x11.

6. The ICMP echo packet and the ICMP ping query packet share the same fields.



The screenshot shows a Wireshark packet capture of ICMP Echo (ping) requests. The packet list on the left shows multiple requests from 192.168.2.20 to 172.217.1.4. The packet details pane on the right shows the selected packet (No. 3263) as an Internet Control Message Protocol (ICMP) Echo (ping) request. The packet structure is as follows:

- Type: 8 (Echo (ping) request)
- Code: 0
- Checksum: 0xf7cb [correct]
- [Checksum Status: Good]
- Identifier (BE): 1 (0x0001)
- Identifier (LE): 256 (0x0100)
- Sequence Number (BE): 51 (0x0033)
- Sequence Number (LE): 13056 (0x3300)
- [No response seen]
- Data (64 bytes)

A red arrow points to the sequence number field, which is highlighted in yellow. The packet data is shown in hexadecimal and ASCII on the right.

The screenshot shows a Wireshark packet capture of ICMP Echo (ping) requests. The packet list on the left shows multiple requests from 192.168.2.20 to 142.251.41.36. The packet details pane on the right shows the selected packet (No. 140) as an Internet Control Message Protocol (ICMP) Echo (ping) request. The packet structure is as follows:

- Type: 8 (Echo (ping) request)
- Code: 0
- Checksum: 0xd450 [correct]
- [Checksum Status: Good]
- Identifier (BE): 1 (0x0001)
- Identifier (LE): 256 (0x0100)
- Sequence Number (BE): 11 (0x000b)
- Sequence Number (LE): 2816 (0x0b00)
- [Response frame: 141]
- Data (32 bytes)

A red arrow points to the sequence number field, which is highlighted in yellow. The packet data is shown in hexadecimal and ASCII on the right.

- The ICMP error packet comprises the header and the initial 8 bytes of the ICMP error packet, alongside IPV4 fields within the error packet.

Wireshark packet capture showing ICMP Echo (ping) requests and responses. A red box highlights the details of a packet with Type 11 (Time to live exceeded). The packet details show:

- Type: 11 (Time to live exceeded)
- Code: 0 (Time to live exceeded in transit)
- Checksum: 0xf4ff [correct]
- [Checksum Status: Good]
- Unused: 00000000
- Internet Protocol Version 4, Src: 192.168.2.20, Dst: 172.217.1.4
- Internet Control Message Protocol
  - Type: 8 (Echo (ping) request)
  - Code: 0
  - Checksum: 0xf7cb [unverified] [in ICMP error packet]
  - [Checksum Status: Unverified]
  - Identifier (BE): 1 (0x0001)
  - Identifier (LE): 256 (0x0100)
  - Sequence Number (BE): 51 (0x0033)
  - Sequence Number (LE): 13056 (0x3300)
  - Data (64 bytes)

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Wireshark packet capture showing ICMP Echo (ping) requests and responses. A red box highlights the details of a packet with Type 8 (Echo (ping) request). The packet details show:

- Type: 8 (Echo (ping) request)
- Code: 0
- Checksum: 0xf7ca [correct]
- [Checksum Status: Good]
- Identifier (BE): 1 (0x0001)
- Identifier (LE): 256 (0x0100)
- Sequence Number (BE): 52 (0x0034)
- Sequence Number (LE): 13312 (0x3400)
- [No response seen]
- Data (64 bytes)

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- Error packets have a "type" field of 11, while the last three replies have a "type" field of 0. This distinction arises from the datagrams reaching the destination **before the TTL expiration**.

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icmp

No.	Time	Source	Destination	Protocol	Length	Info
20	4.08	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=51/13056, ttl=1 (no response found!)
21	4.08	192.168.2.20	172.217.1.4	ICMP	106	Time-to-live exceeded (Time to live exceeded in transit)
22	4.08	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=52/13112, ttl=1 (no response found!)
23	4.08	192.168.2.1	192.168.2.20	ICMP	134	Time-to-live exceeded (Time to live exceeded in transit)
24	4.08	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=53/13568, ttl=1 (no response found!)
25	4.08	192.168.2.1	192.168.2.20	ICMP	134	Time-to-live exceeded (Time to live exceeded in transit)
30	5.09	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=54/13824, ttl=2 (no response found!)
31	5.10	10.50.44.122	192.168.2.20	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
32	5.10	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=55/14080, ttl=2 (no response found!)
33	5.10	10.50.44.122	192.168.2.20	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
34	5.10	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=56/14336, ttl=2 (no response found!)
35	5.14	10.50.44.122	192.168.2.20	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
45	11.05	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=57/14592, ttl=3 (no response found!)
50	14.79	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=58/14848, ttl=3 (no response found!)
60	18.79	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=59/15104, ttl=3 (no response found!)
3165	22.79	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=60/15360, ttl=4 (no response found!)
3211	26.79	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=61/15616, ttl=4 (no response found!)
3219	30.79	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=62/15872, ttl=4 (no response found!)
3239	34.79	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=63/16128, ttl=5 (no response found!)
3263	38.78	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=64/16384, ttl=5 (no response found!)

Frame 35: 70 bytes on wire (560 bits), 70 bytes captured (560 bits) on interface \Device\NPF{02CD191F-8...}

Ethernet II, Src: Sagemcom\_69:d4:be (08:ac:8a:69:d4:be), Dst: IntelCor\_a6:0b:49 (1c:4d:70:a6:0b:49)

Internet Protocol Version 4, Src: 10.50.44.122, Dst: 192.168.2.20

Internet Control Message Protocol

Type: 11 (Time-to-live exceeded)

Code: 0 (Time to live exceeded in transit)

Checksum: 0xf4ff [correct]

[Checksum Status: Good]

Unused: 00000000

Internet Protocol Version 4, Src: 192.168.2.20, Dst: 172.217.1.4

Internet Control Message Protocol

Type: 8 (Echo (ping) request)

Code: 0

Checksum: 0xf7c6 [unverified] [in ICMP error packet]

[Checksum Status: Unverified]

Identifier (BE): 1 (0x0001)

Identifier (LE): 256 (0x0100)

Sequence Number (BE): 56 (0x0038)

Sequence Number (LE): 14336 (0x3800)

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Packets: 3495 · Displayed: 51 (1.3%)

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No.	Time	Source	Destination	Protocol	Length	Info
3135	59.80	192.168.2.20	172.217.1.4	ICMP	106	Time-to-live exceeded (Time to live exceeded in transit)
3445	59.84	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=75/19200, ttl=9 (no response found!)
3446	59.85	216.239.35.235	192.168.2.20	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
3447	59.85	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=76/19456, ttl=9 (no response found!)
3448	59.86	216.239.35.235	192.168.2.20	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
3449	59.87	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=77/19712, ttl=9 (no response found!)
3450	59.88	216.239.35.235	192.168.2.20	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
3470	65.83	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=78/19968, ttl=10 (reply in 3471)
3471	65.84	172.217.1.4	192.168.2.20	ICMP	106	Echo (ping) reply id=0x0001, seq=78/19968, ttl=10 (request in 3470)
3472	65.85	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=79/20224, ttl=10 (reply in 3473)
3473	65.85	172.217.1.4	192.168.2.20	ICMP	106	Echo (ping) reply id=0x0001, seq=79/20224, ttl=10 (request in 3472)
3474	65.86	192.168.2.20	172.217.1.4	ICMP	106	Echo (ping) request id=0x0001, seq=80/20480, ttl=10 (reply in 3475)
3475	65.87	172.217.1.4	192.168.2.20	ICMP	106	Echo (ping) reply id=0x0001, seq=80/20480, ttl=10 (request in 3474)

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Wireshark - Packet 3471 - Wi-Fi

Frame 3471: 106 bytes on wire (848 bits), 106 bytes captured (848 bits) on interface \Device\NPF{02CD191F-8...}

Ethernet II, Src: Sagemcom\_69:d4:be (08:ac:8a:69:d4:be), Dst: IntelCor\_a6:0b:49 (1c:4d:70:a6:0b:49)

Internet Protocol Version 4, Src: 172.217.1.4, Dst: 192.168.2.20

Internet Control Message Protocol

Type: 0 (Echo (ping) reply)

Code: 0

Checksum: 0xffb0 [correct]

[Checksum Status: Good]

Identifier (BE): 1 (0x0001)

Identifier (LE): 256 (0x0100)

Sequence Number (BE): 78 (0x004e)

Sequence Number (LE): 19968 (0x4e00)

[Request frame: 3470]

[Response time: 9.137 ms]

Data (64 bytes)

Wireshark - Packet 3473 - Wi-Fi

Frame 3473: 106 bytes on wire (848 bits), 106 bytes captured (848 bits) on interface \Device\NPF{02CD191F-8...}

Ethernet II, Src: Sagemcom\_69:d4:be (08:ac:8a:69:d4:be), Dst: IntelCor\_a6:0b:49 (1c:4d:70:a6:0b:49)

Internet Protocol Version 4, Src: 172.217.1.4, Dst: 192.168.2.20

Internet Control Message Protocol

Type: 0 (Echo (ping) reply)

Code: 0

Checksum: 0xffaf [correct]

[Checksum Status: Good]

Identifier (BE): 1 (0x0001)

Identifier (LE): 256 (0x0100)

Sequence Number (BE): 79 (0x004f)

Sequence Number (LE): 20224 (0x4f00)

[Request frame: 3472]

[Response time: 9.570 ms]

Data (64 bytes)

Wireshark - Packet 3475 - Wi-Fi

Frame 3475: 106 bytes on wire (848 bits), 106 bytes captured (848 bits) on interface \Device\NPF{02CD191F-8...}

Ethernet II, Src: Sagemcom\_69:d4:be (08:ac:8a:69:d4:be), Dst: IntelCor\_a6:0b:49 (1c:4d:70:a6:0b:49)

Internet Protocol Version 4, Src: 172.217.1.4, Dst: 192.168.2.20

Internet Control Message Protocol

Type: 0 (Echo (ping) reply)

Code: 0

Checksum: 0xffae [correct]

[Checksum Status: Good]

Identifier (BE): 1 (0x0001)

Identifier (LE): 256 (0x0100)

Sequence Number (BE): 80 (0x0050)

Sequence Number (LE): 20480 (0x5000)

[Request frame: 3474]

[Response time: 9.568 ms]

Data (64 bytes)

Packets: 3495 · Displayed: 51 (1.3%)