Wireshark Networking Lab

IP v8.0

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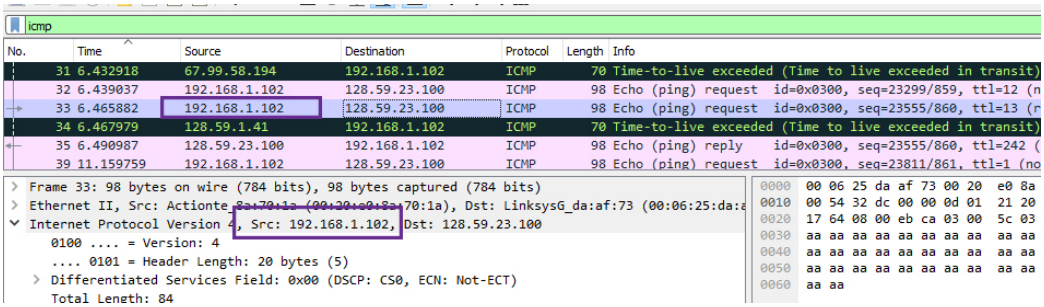
December 20, 2022

Overview

1. Select the first ICMP Echo Request message sent by your computer.....What is the IP address of your computer?

Answer

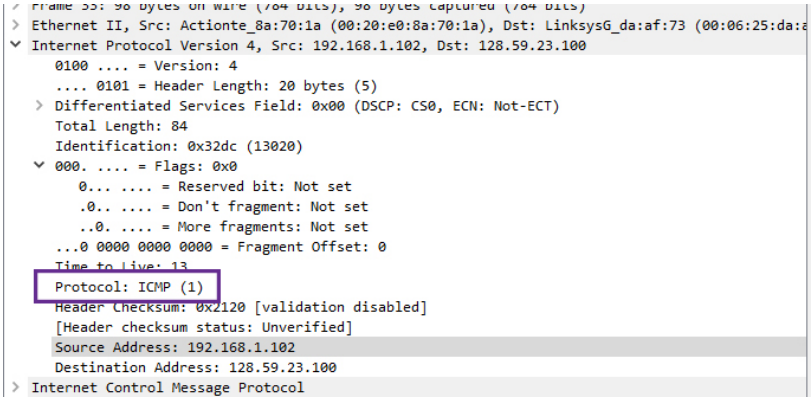
IP address of my computer is : 192.168.1.102



2. What is the value in the upper layer protocol field?

Answer

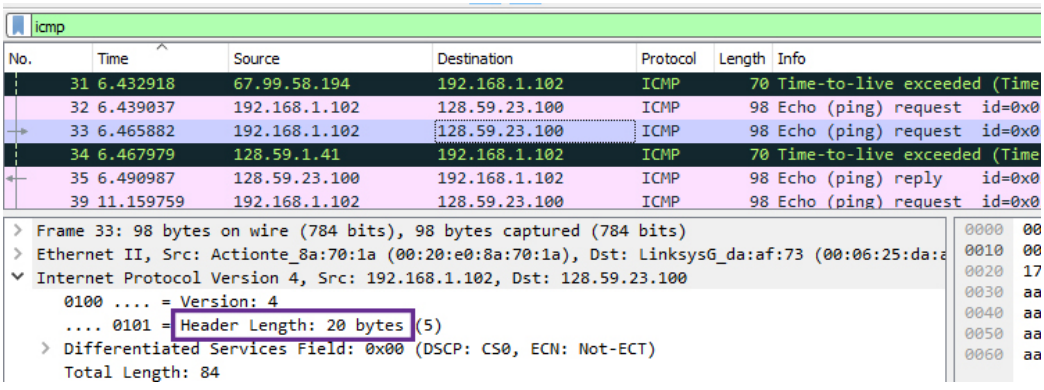
The value is : ICMP(1)



3. How many bytes are in the IP header?

Answer

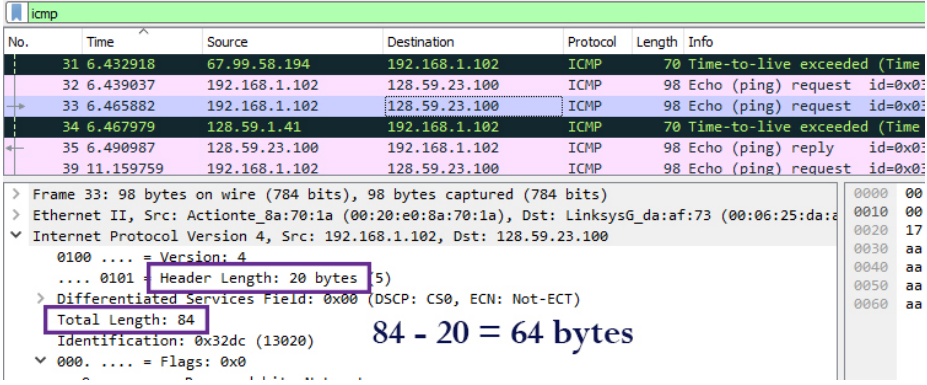
20 bytes



3.1 How many bytes are in the payload of the IP datagram? Explain how you determined the number of payload bytes.

Answer

Total length - Header length = 64 bytes



4. Has this IP datagram been fragmented? Explain how you determined whether or not the datagram has been fragmented.

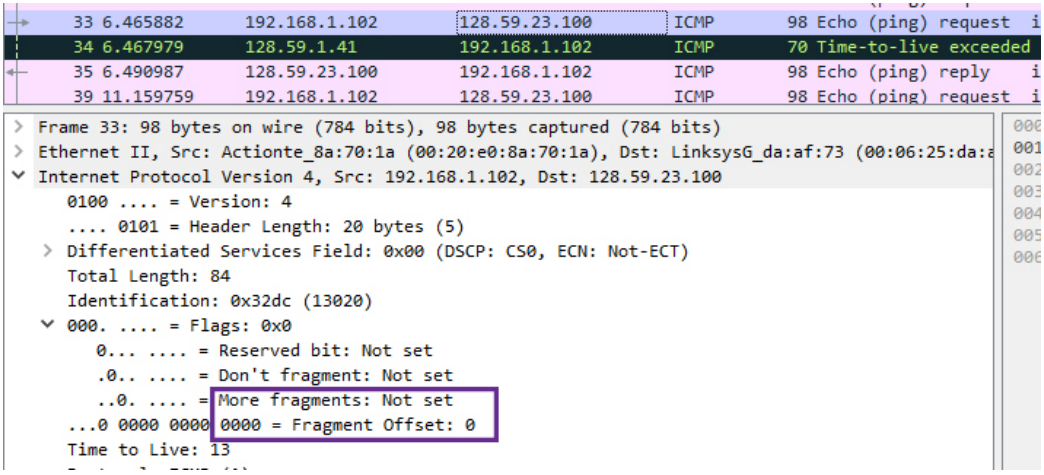
Answer

This IP datagram is not fragmented.

If fragment flag is not set then datagram is not fragmented.

If fragment flag is set then datagram is fragmented.

Continue.....


33 6.465882 192.168.1.102 128.59.23.100 ICMP 98 Echo (ping) request i
34 6.467979 128.59.1.41 192.168.1.102 ICMP 70 Time-to-live exceeded
35 6.490987 128.59.23.100 192.168.1.102 ICMP 98 Echo (ping) reply i
39 11.159759 192.168.1.102 128.59.23.100 ICMP 98 Echo (ping) request i
Frame 33: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:a
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 84
Identification: 0x32dc (13020)
000. .... = Flags: 0x0
0... .... = Reserved bit: Not set
.0.. .... = Don't fragment: Not set
..0. .... = More fragments: Not set
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 13

5. Which fields in the IP datagram always change from one datagram to the next within this series of ICMP messages sent by your computer?

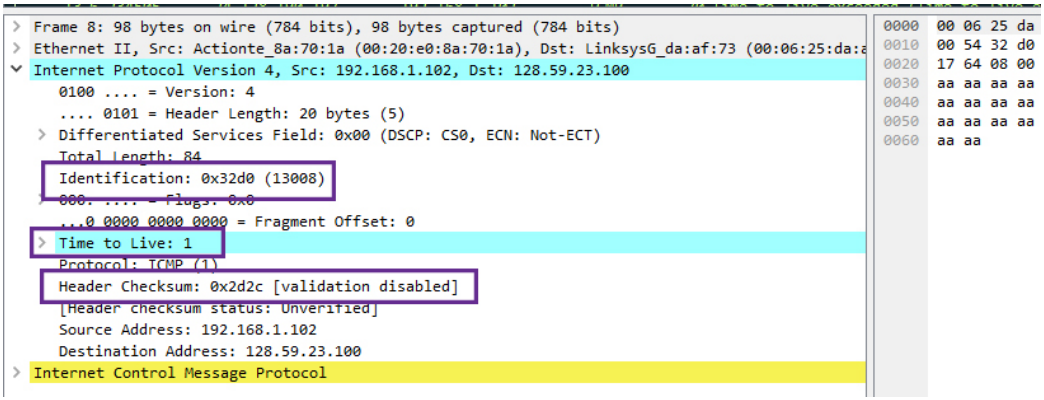
Answer

The Identification field.

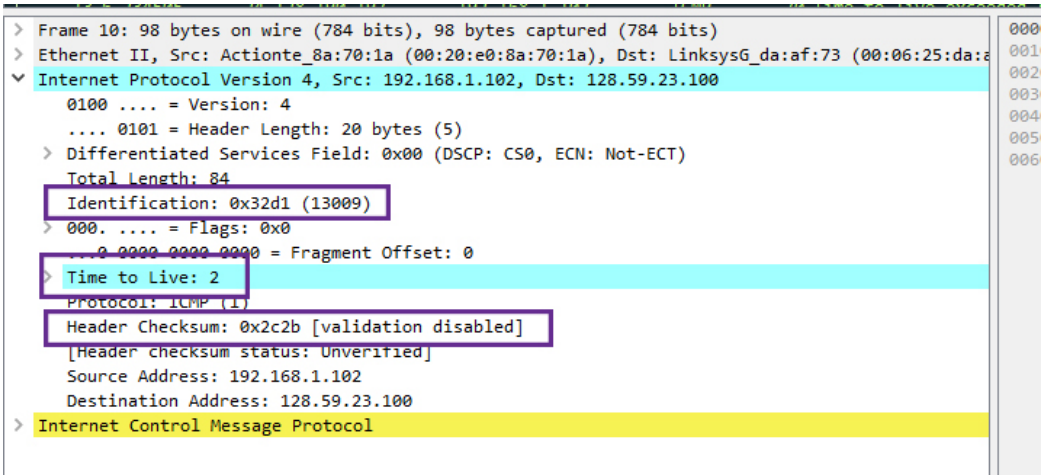
TTL or Time to live field.

Header checksum field.

Continue....


Frame 8: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:a
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 84
Identification: 0x32d0 (13008)
000. .... = Flags: 0x0
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 1
Protocol: ICMP (1)
Header Checksum: 0x2d2c [validation disabled]
[Header checksum status: Unverified]
Source Address: 192.168.1.102
Destination Address: 128.59.23.100
Internet Control Message Protocol
0000 00 06 25 da
0010 00 54 32 d0
0020 17 64 08 00
0030 aa aa aa aa
0040 aa aa aa aa
0050 aa aa aa aa
0060 aa aa

Continue....


Frame 10: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:a
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 84
Identification: 0x32d1 (13009)
000. .... = Flags: 0x0
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 2
Protocol: ICMP (1)
Header Checksum: 0x2c2b [validation disabled]
[Header checksum status: Unverified]
Source Address: 192.168.1.102
Destination Address: 128.59.23.100
Internet Control Message Protocol

6.Which fields stay constant? Which of the fields must stay constant?

Answer

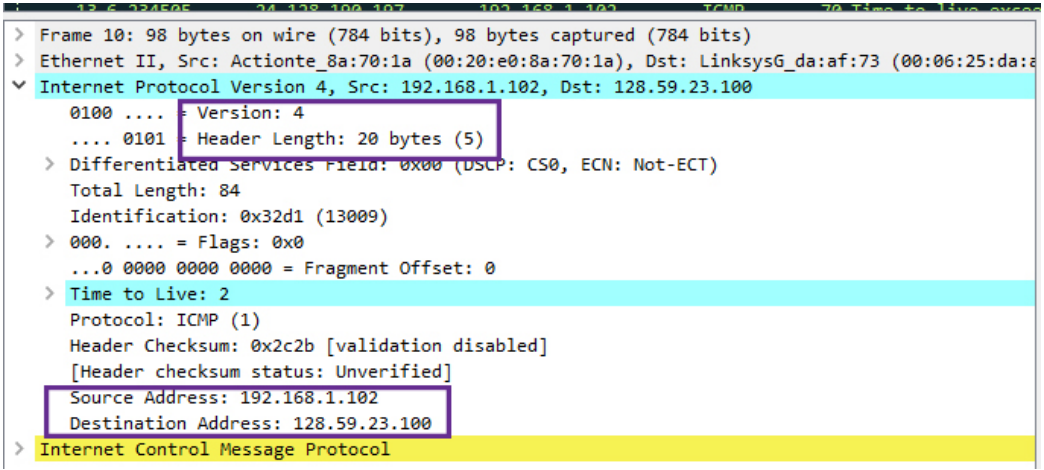
Source address

Destination address

Header length

IP version

Continue...


Frame 10: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:a
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 84
Identification: 0x32d1 (13009)
000. .... = Flags: 0x0
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 2
Protocol: ICMP (1)
Header Checksum: 0x2c2b [validation disabled]
[Header checksum status: Unverified]
Source Address: 192.168.1.102
Destination Address: 128.59.23.100
Internet Control Message Protocol

6.1 Which fields must change?

Answer

The Identification field.

TTL or Time to live field.

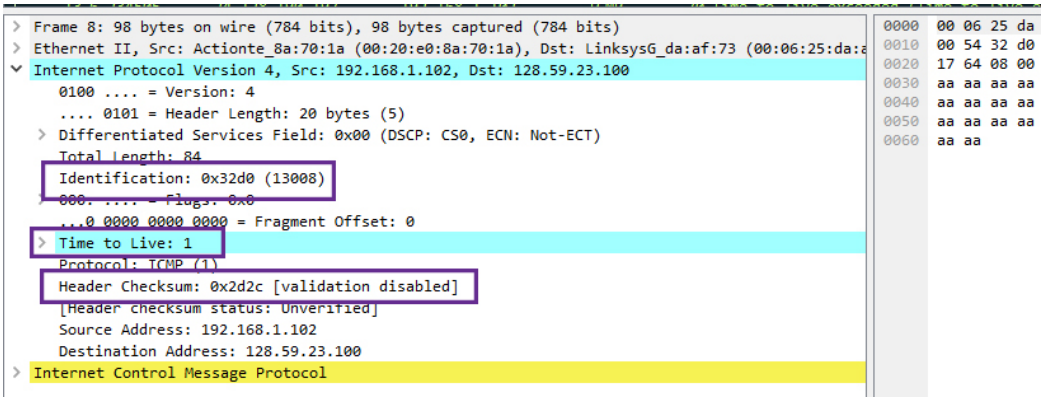
Header checksum field.

7. Describe the pattern you see in the values in the Identification field of the IP datagram

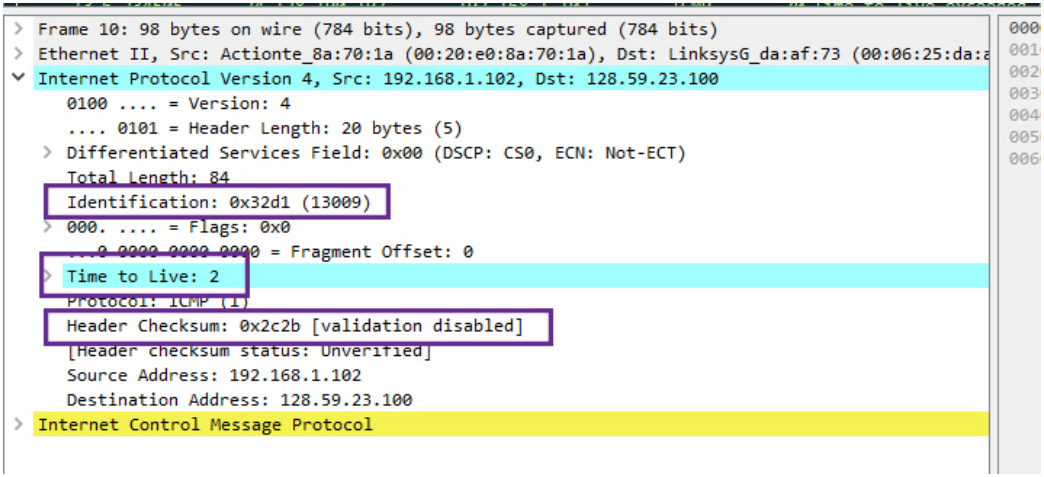
Answer

I see that the value of this field is increased by 1.

Continue....


Frame 8: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:a
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 84
Identification: 0x32d0 (13008)
000. .... = Flags: 0x0
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 1
Protocol: ICMP (1)
Header Checksum: 0x2d2c [validation disabled]
[Header checksum status: Unverified]
Source Address: 192.168.1.102
Destination Address: 128.59.23.100
Internet Control Message Protocol
0000 00 06 25 da
0010 00 54 32 d0
0020 17 64 08 00
0030 aa aa aa aa
0040 aa aa aa aa
0050 aa aa aa aa
0060 aa aa

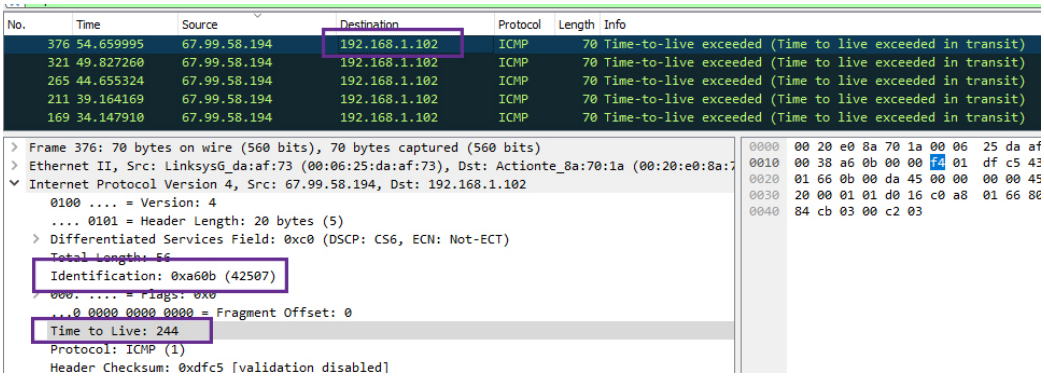
Continue....


Frame 10: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:a
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 84
Identification: 0x32d1 (13009)
000. .... = Flags: 0x0
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 2
Protocol: ICMP (1)
Header Checksum: 0x2c2b [validation disabled]
[Header checksum status: Unverified]
Source Address: 192.168.1.102
Destination Address: 128.59.23.100
Internet Control Message Protocol

8. What is the value in the Identification field and the TTL field?

Answer

0xa60b and 244

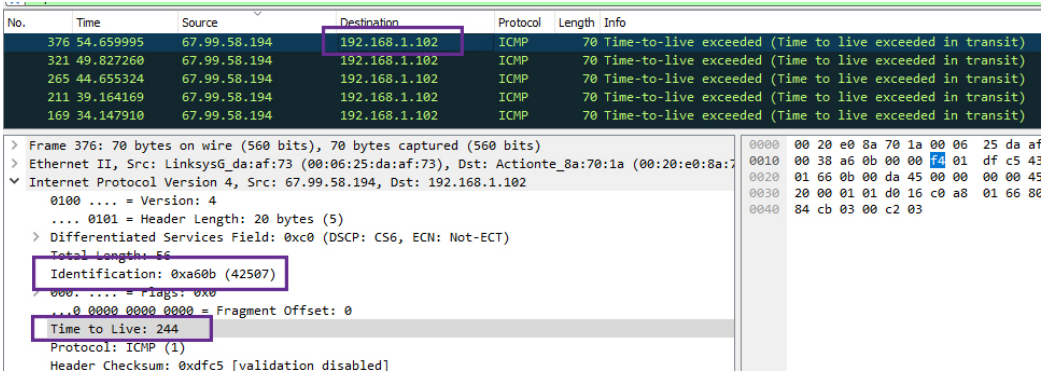


9. Do these values remain unchanged for all of the ICMP TTL-exceeded replies sent to your computer by the nearest (first hop) router? Why?

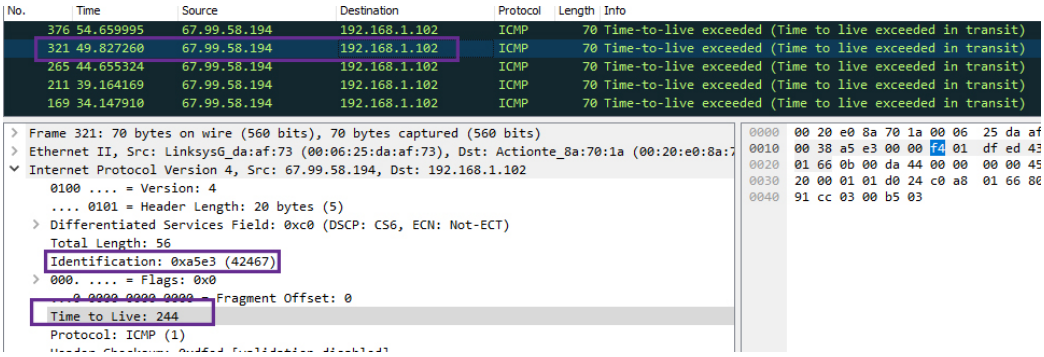
Answer

The Identification field value is changed but TTL remain unchanged

Continue....


No. Time Source Destination Protocol Length Info
376 54.659995 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
321 49.827260 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
265 44.655324 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
211 39.164169 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
169 34.147910 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
Frame 376: 70 bytes on wire (560 bits), 70 bytes captured (560 bits)
Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:7
Internet Protocol Version 4, Src: 67.99.58.194, Dst: 192.168.1.102
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0xc0 (DSCP: CS6, ECN: Not-ECT)
Total Length: 56
Identification: 0xa60b (42507)
000. .... = Flags: 0x0
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 244
Protocol: ICMP (1)
Header Checksum: 0xdfc5 [validation disabled]
0000 00 20 e0 8a 70 1a 00 06 25 da af
0010 00 38 a6 0b 00 00 f4 01 df c5 43
0020 01 66 0b 00 da 45 00 00 00 00 45
0030 20 00 01 01 d0 16 c0 a8 01 66 80
0040 84 cb 03 00 c2 03

Continue....

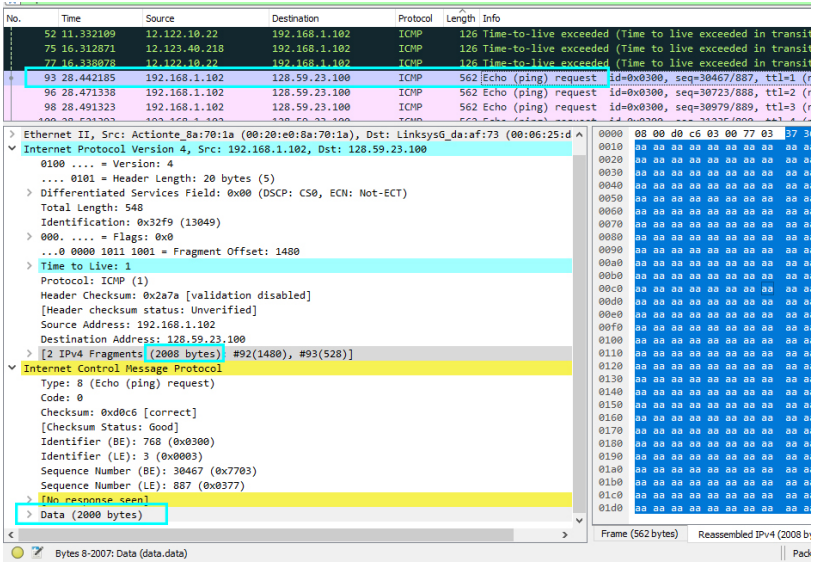

No. Time Source Destination Protocol Length Info
376 54.659995 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
321 49.827260 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
265 44.655324 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
211 39.164169 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
169 34.147910 67.99.58.194 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in transit)
Frame 321: 70 bytes on wire (560 bits), 70 bytes captured (560 bits)
Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a:7
Internet Protocol Version 4, Src: 67.99.58.194, Dst: 192.168.1.102
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0xc0 (DSCP: CS6, ECN: Not-ECT)
Total Length: 56
Identification: 0xa5e3 (42467)
000. .... = Flags: 0x0
Fragment Offset: 0
Time to Live: 244
Protocol: ICMP (1)
0000 00 20 e0 8a 70 1a 00 06 25 da af
0010 00 38 a5 e3 00 00 f4 01 df ed 43
0020 01 66 0b 00 da 44 00 00 00 00 45
0030 20 00 01 01 d0 24 c0 a8 01 66 80
0040 91 cc 03 00 b5 03

10. Find the first ICMP Echo Request message that was sent by your computer after you changed the Packet Size in pingplotter to be 2000.Has that message been fragmented across more than one IP datagram?

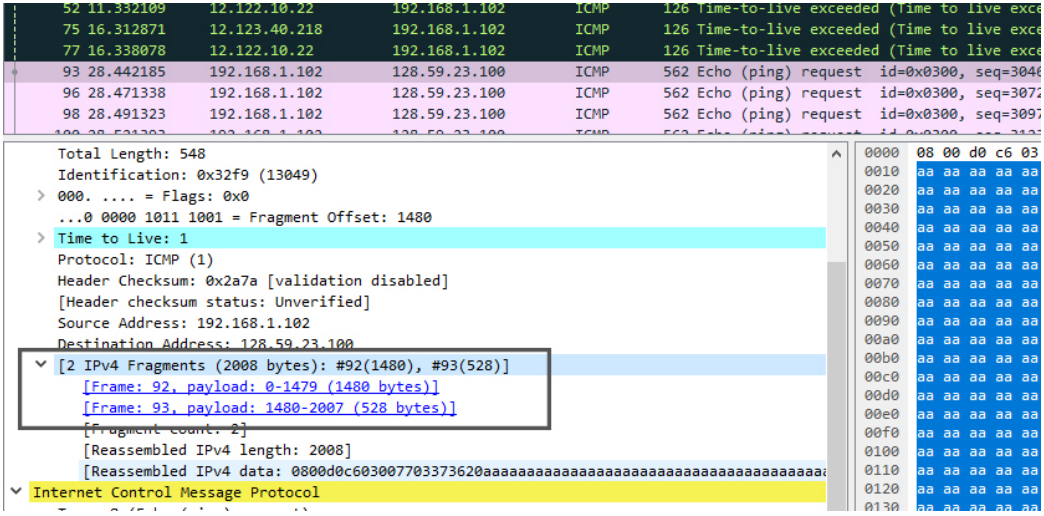
Answer

Yes , it has 2 fragment.

Continue....


No. Time Source Destination Protocol Length Info
52 11.332109 12.122.10.22 192.168.1.102 ICMP 126 Time-to-live exceeded (Time to live exceeded in transit
75 16.312871 12.123.40.218 192.168.1.102 ICMP 126 Time-to-live exceeded (Time to live exceeded in transit
77 16.338878 12.122.10.22 192.168.1.102 ICMP 126 Time-to-live exceeded (Time to live exceeded in transit
93 28.442185 192.168.1.102 128.59.23.100 ICMP 562 Echo (ping) request id=0x0300, seq=30467/887, ttl=1 (r
96 28.471338 192.168.1.102 128.59.23.100 ICMP 562 Echo (ping) request id=0x0300, seq=30723/888, ttl=2 (r
98 28.491323 192.168.1.102 128.59.23.100 ICMP 562 Echo (ping) request id=0x0300, seq=30979/889, ttl=3 (r
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:d
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 548
Identification: 0x32f9 (13049)
000. .... = Flags: 0x0
...0 0000 1011 1001 = Fragment Offset: 1480
Time to Live: 1
Protocol: ICMP (1)
Header Checksum: 0x2a7a [validation disabled]
[Header checksum status: Unverified]
Source Address: 192.168.1.102
Destination Address: 128.59.23.100
[2 IPv4 Fragments (2008 bytes) #92(1480), #93(528)]
Internet Control Message Protocol
Type: 8 (Echo (ping) request)
Code: 0
Checksum: 0xd0c6 [correct]
[Checksum Status: Good]
Identifier (BE): 768 (0x0300)
Identifier (LE): 3 (0x0003)
Sequence Number (BE): 30467 (0x7703)
Sequence Number (LE): 887 (0x0377)
[No response seen]
Data (2000 bytes)
0000 08 00 d0 c6 03 00 77 03
0010 aa aa aa aa aa aa aa aa
0020 aa aa aa aa aa aa aa aa
0030 aa aa aa aa aa aa aa aa
0040 aa aa aa aa aa aa aa aa
0050 aa aa aa aa aa aa aa aa
0060 aa aa aa aa aa aa aa aa
0070 aa aa aa aa aa aa aa aa
0080 aa aa aa aa aa aa aa aa
0090 aa aa aa aa aa aa aa aa
00a0 aa aa aa aa aa aa aa aa
00b0 aa aa aa aa aa aa aa aa
00c0 aa aa aa aa aa aa aa aa
00d0 aa aa aa aa aa aa aa aa
00e0 aa aa aa aa aa aa aa aa
00f0 aa aa aa aa aa aa aa aa
0100 aa aa aa aa aa aa aa aa
0110 aa aa aa aa aa aa aa aa
0120 aa aa aa aa aa aa aa aa
0130 aa aa aa aa aa aa aa aa
0140 aa aa aa aa aa aa aa aa
0150 aa aa aa aa aa aa aa aa
0160 aa aa aa aa aa aa aa aa
0170 aa aa aa aa aa aa aa aa
0180 aa aa aa aa aa aa aa aa
0190 aa aa aa aa aa aa aa aa
01a0 aa aa aa aa aa aa aa aa
01b0 aa aa aa aa aa aa aa aa
01c0 aa aa aa aa aa aa aa aa
01d0 aa aa aa aa aa aa aa aa
Frame (562 bytes)
Reassembled IPv4 (2008 by
Bytes 8-2007: Data (data.data)
Pack

Continue....

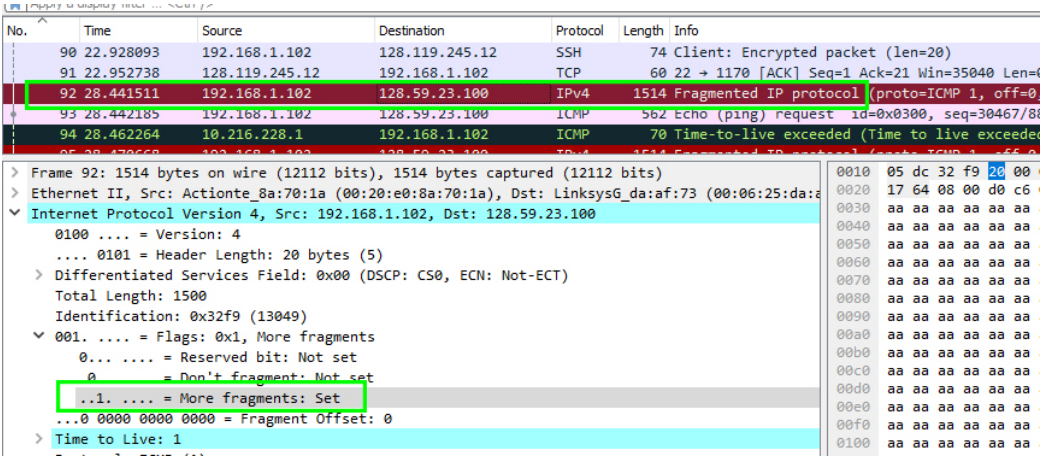

52 11.332109 12.122.10.22 192.168.1.102 ICMP 126 Time-to-live exceeded (Time to live exce
75 16.312871 12.123.40.218 192.168.1.102 ICMP 126 Time-to-live exceeded (Time to live exce
77 16.338078 12.122.10.22 192.168.1.102 ICMP 126 Time-to-live exceeded (Time to live exce
93 28.442185 192.168.1.102 128.59.23.100 ICMP 562 Echo (ping) request id=0x0300, seq=3046
96 28.471338 192.168.1.102 128.59.23.100 ICMP 562 Echo (ping) request id=0x0300, seq=3072
98 28.491323 192.168.1.102 128.59.23.100 ICMP 562 Echo (ping) request id=0x0300, seq=3097
Total Length: 548
Identification: 0x32f9 (13049)
000. .... = Flags: 0x0
...0 0000 1011 1001 = Fragment Offset: 1480
Time to Live: 1
Protocol: ICMP (1)
Header Checksum: 0x2a7a [validation disabled]
[Header checksum status: Unverified]
Source Address: 192.168.1.102
Destination Address: 128.59.23.100
[2 IPv4 Fragments (2008 bytes): #92(1480), #93(528)]
[Frame: 92, payload: 0-1479 (1480 bytes)]
[Frame: 93, payload: 1480-2007 (528 bytes)]
[Reassembled IPv4 length: 2008]
[Reassembled IPv4 data: 0800d0c603007703373620aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
Internet Control Message Protocol
0000 08 00 d0 c6 03
0010 aa aa aa aa aa
0020 aa aa aa aa aa
0030 aa aa aa aa aa
0040 aa aa aa aa aa
0050 aa aa aa aa aa
0060 aa aa aa aa aa
0070 aa aa aa aa aa
0080 aa aa aa aa aa
0090 aa aa aa aa aa
00a0 aa aa aa aa aa
00b0 aa aa aa aa aa
00c0 aa aa aa aa aa
00d0 aa aa aa aa aa
00e0 aa aa aa aa aa
00f0 aa aa aa aa aa
0100 aa aa aa aa aa
0110 aa aa aa aa aa
0120 aa aa aa aa aa
0130 aa aa aa aa aa

11. Print out the first fragment of the fragmented IP datagram. What information in the IP header indicates that the datagram been fragmented?

Answer

In the IP header of the first fragment the more fragment flag was set. It indicates that it has another fragment.

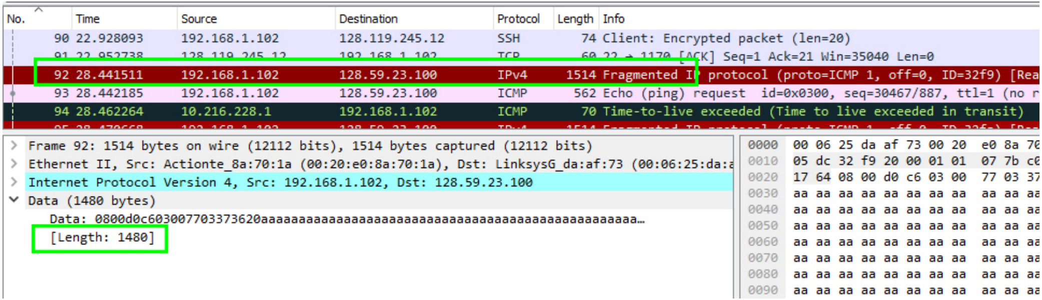
Continue....


No. Time Source Destination Protocol Length Info
90 22.928093 192.168.1.102 128.119.245.12 SSH 74 Client: Encrypted packet (len=20)
91 22.952738 128.119.245.12 192.168.1.102 TCP 60 22 → 1170 [ACK] Seq=1 Ack=21 Win=35040 Len=0
92 28.441511 192.168.1.102 128.59.23.100 IPv4 1514 Fragmented IP protocol (proto=ICMP 1, off=0
93 28.442185 192.168.1.102 128.59.23.100 ICMP 562 Echo (ping) request id=0x0300, seq=30467/88
94 28.462264 10.216.228.1 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded
Frame 92: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:a
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 1500
Identification: 0x32f9 (13049)
001. .... = Flags: 0x1, More fragments
0... .... = Reserved bit: Not set
.0.. .... = Don't fragment: Not set
..1. .... = More fragments: Set
...0 0000 0000 0000 = Fragment Offset: 0
Time to Live: 1
0010 05 dc 32 f9 20 00
0020 17 64 08 00 d0 c6
0030 aa aa aa aa aa aa
0040 aa aa aa aa aa aa
0050 aa aa aa aa aa aa
0060 aa aa aa aa aa aa
0070 aa aa aa aa aa aa
0080 aa aa aa aa aa aa
0090 aa aa aa aa aa aa
00a0 aa aa aa aa aa aa
00b0 aa aa aa aa aa aa
00c0 aa aa aa aa aa aa
00d0 aa aa aa aa aa aa
00e0 aa aa aa aa aa aa
00f0 aa aa aa aa aa aa
0100 aa aa aa aa aa aa

11.1 How long is this IP datagram?

Answer

The IP datagram is 1480 bytes long.

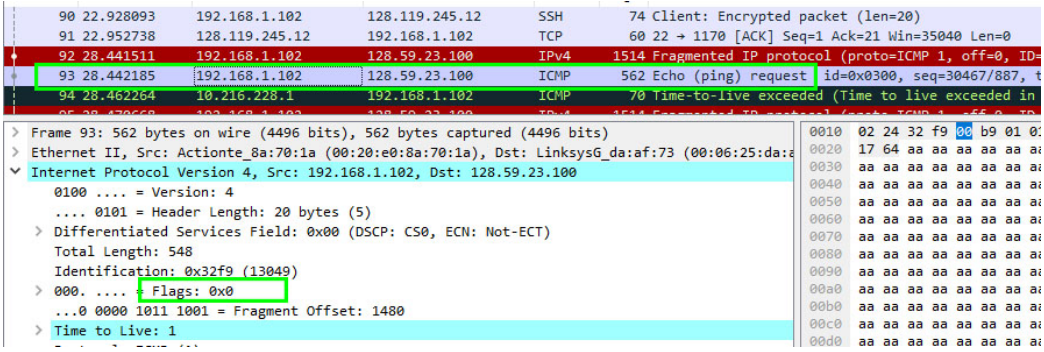


12. Print out the second fragment of the fragmented IP datagram. What information in the IP header indicates that this is not the first datagram fragment?

Answer

The flag is 0x0. That means it has not any fragment.Therefore it is the last fragment but not first fragment.

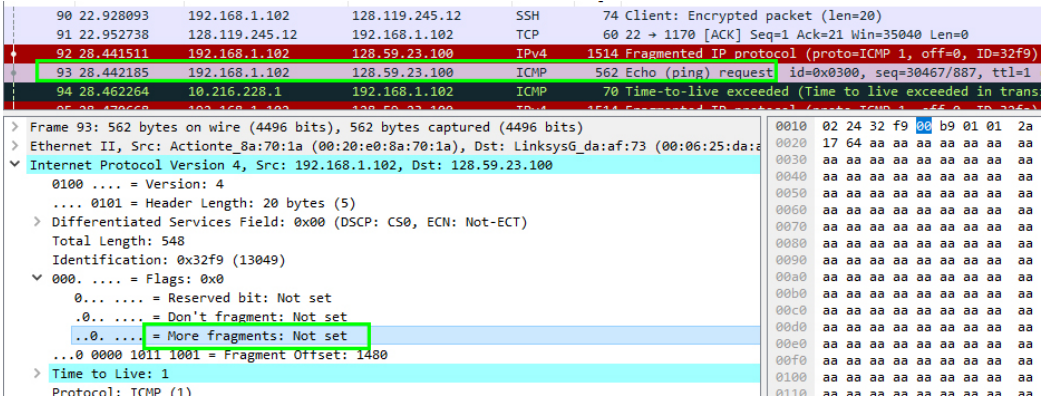
Continue....


90 22.928093 192.168.1.102 128.119.245.12 SSH 74 Client: Encrypted packet (len=20)
91 22.952738 128.119.245.12 192.168.1.102 TCP 60 22 → 1170 [ACK] Seq=1 Ack=21 Win=35040 Len=0
92 28.441511 192.168.1.102 128.59.23.100 IPv4 1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=
93 28.442185 192.168.1.102 128.59.23.100 ICMP 562 Echo (ping) request id=0x0300, seq=30467/887, t
94 28.462264 10.216.228.1 192.168.1.102 ICMP 70 Time-to-live exceeded (Time to live exceeded in
Frame 93: 562 bytes on wire (4496 bits), 562 bytes captured (4496 bits)
Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da:a
Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 548
Identification: 0x32f9 (13049)
000. .... = Flags: 0x0
...0 0000 1011 1001 = Fragment Offset: 1480
Time to Live: 1
0010 02 24 32 f9 00 b9 01 01
0020 17 64 aa aa aa aa aa aa
0030 aa aa aa aa aa aa aa aa
0040 aa aa aa aa aa aa aa aa
0050 aa aa aa aa aa aa aa aa
0060 aa aa aa aa aa aa aa aa
0070 aa aa aa aa aa aa aa aa
0080 aa aa aa aa aa aa aa aa
0090 aa aa aa aa aa aa aa aa
00a0 aa aa aa aa aa aa aa aa
00b0 aa aa aa aa aa aa aa aa
00c0 aa aa aa aa aa aa aa aa
00d0 aa aa aa aa aa aa aa aa

12.1 Are the more fragments? How can you tell?

Answer

If more fragment flag is set then it has more fragment.But if flag is not set, then this is the last fragment.



13. What fields change in the IP header between the first and second fragment?

Answer

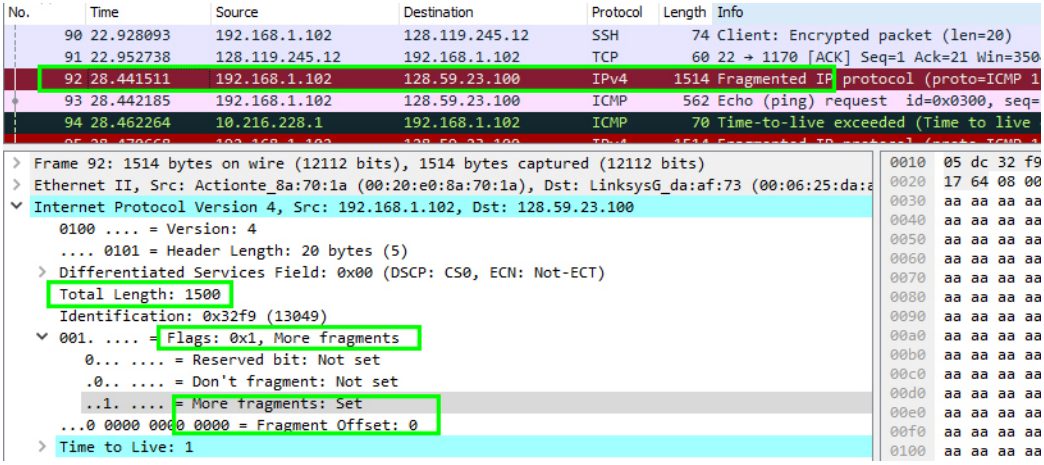
Total Length

Flags

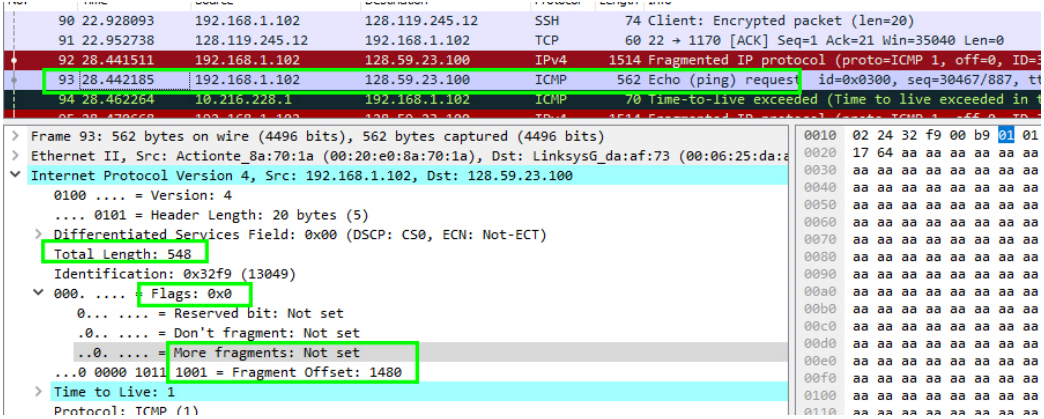
More Fragments

Fragment Offset

First Fragment



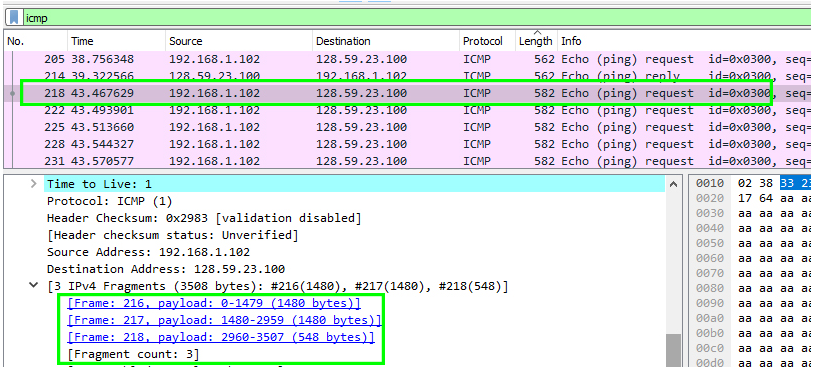
Second Fragment



14. How many fragments were created from the original datagram?

Answer

3 Fragment



15. What fields change in the IP header among the fragments?

Answer

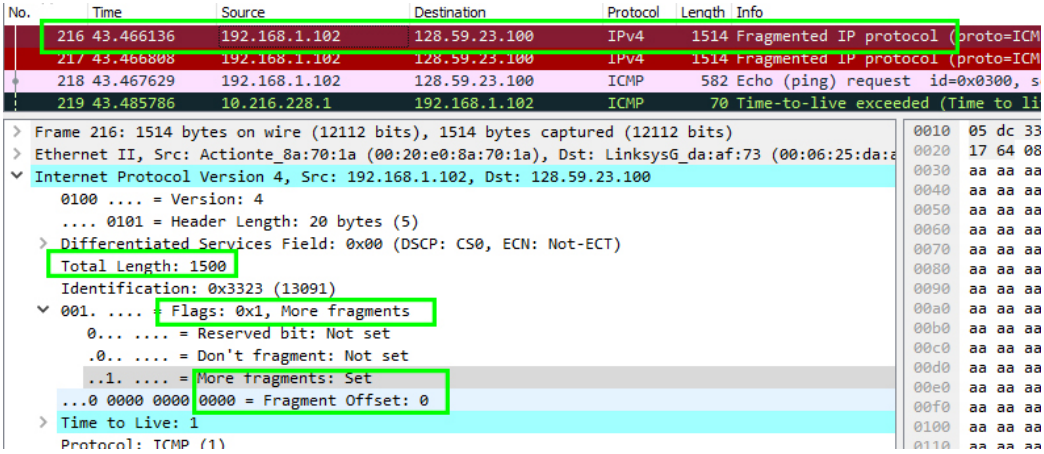
Total Length

Flags

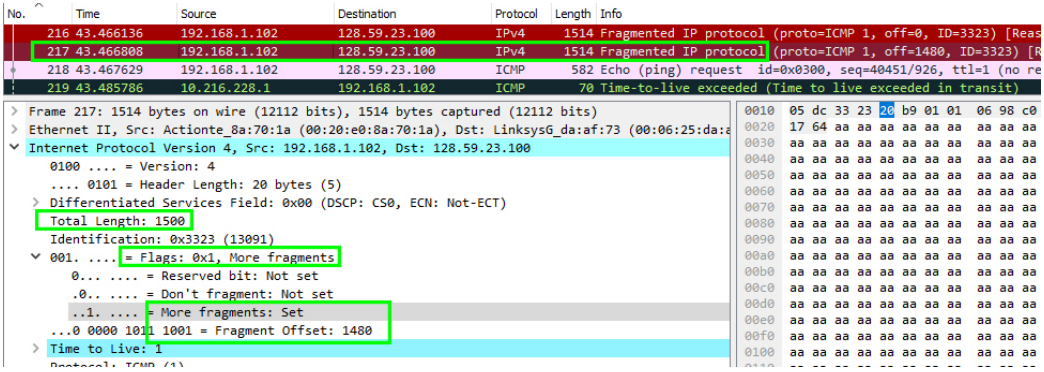
More Fragments

Fragment Offset

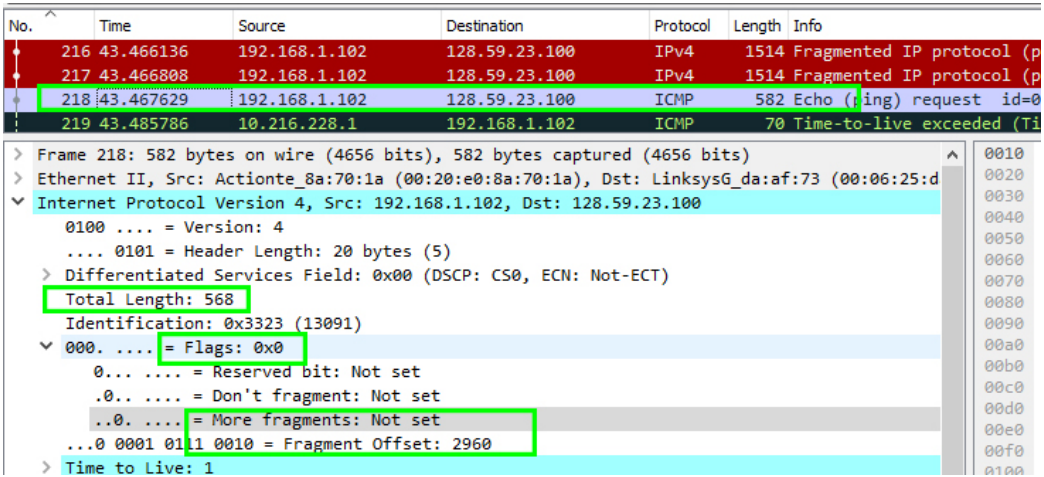
First Fragment



Second Fragment



Third Fragment



The End