Wireshark Lab 1: IP

Group Details:
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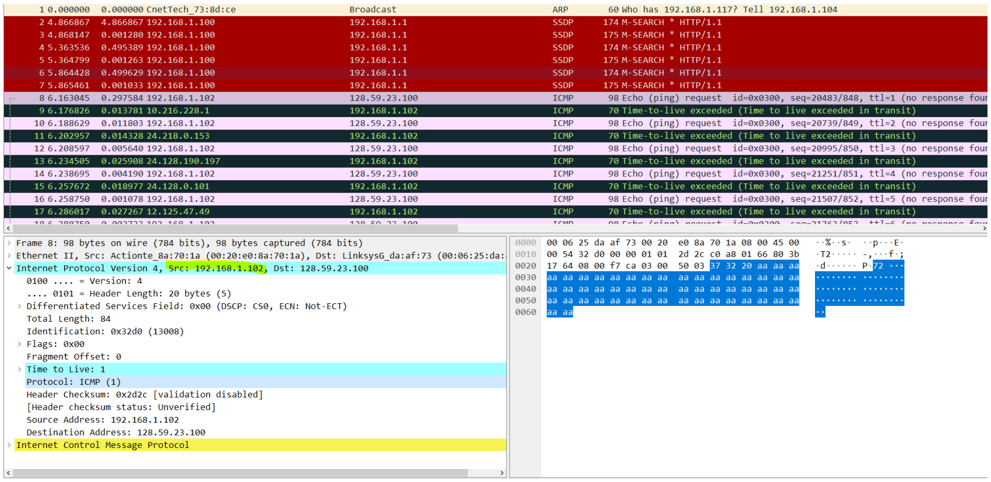
Shaoyang Zhang 1005751660

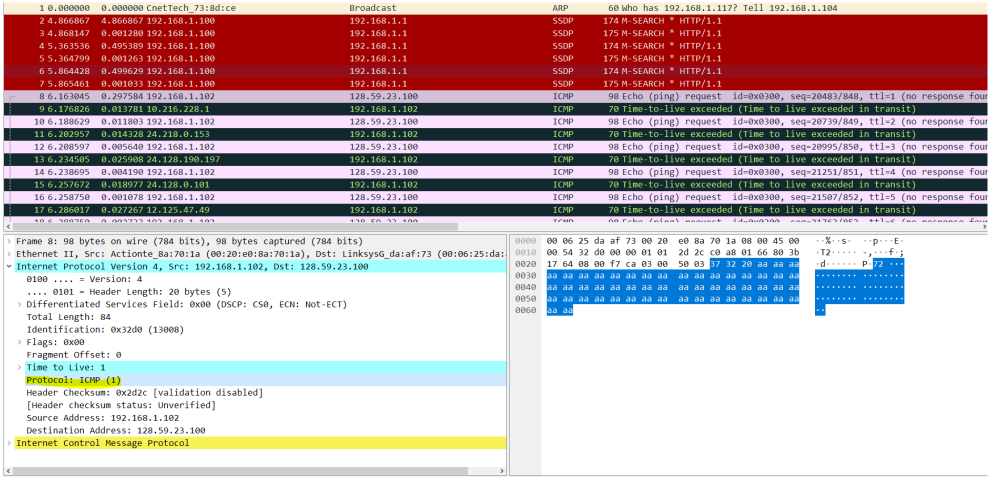
Mark: 9999999

	Question	Answer
1	Select the first ICMP Echo Request message sent by your computer, and expand the Internet Protocol part of the packet in the packet details window. What is the IP address of your computer?	192.168.1.102
Annotated Screenshot (if needed)		
2	Within the IP packet header, what is the value in the upper layer protocol field?	ICMP

```
      1 0.000000   0.000000 CnetTech_73:8d:ce      Broadcast        ARP     60 Who has 192.168.1.117? Tell 192.168.1.104
      2 4.866867   4.866867 192.168.1.100          192.168.1.1      SSDP   174 M-SEARCH * HTTP/1.1
      3 4.868147   0.001280 192.168.1.100          192.168.1.1      SSDP   175 M-SEARCH * HTTP/1.1
      4 5.363536   0.495389 192.168.1.100          192.168.1.1      SSDP   174 M-SEARCH * HTTP/1.1
      5 5.364799   0.001263 192.168.1.100          192.168.1.1      SSDP   175 M-SEARCH * HTTP/1.1
      6 5.864428   0.499629 192.168.1.100          192.168.1.1      SSDP   174 M-SEARCH * HTTP/1.1
      7 5.865461   0.001033 192.168.1.100          192.168.1.1      SSDP   175 M-SEARCH * HTTP/1.1
      8 6.163045   0.297584 192.168.1.102          128.59.23.100    ICMP    98 Echo (ping) request  id=0x0300, seq=20483/848, ttl=1 (no response four
      9 6.176826   0.013781 10.216.228.1           192.168.1.102    ICMP    70 Time-to-live exceeded (Time to live exceeded in transit)
     10 6.188629   0.011803 192.168.1.102          128.59.23.100    ICMP    98 Echo (ping) request  id=0x0300, seq=20739/849, ttl=2 (no response four
     11 6.202957   0.014328 24.218.0.153           192.168.1.102    ICMP    70 Time-to-live exceeded (Time to live exceeded in transit)
     12 6.208597   0.005640 192.168.1.102          128.59.23.100    ICMP    98 Echo (ping) request  id=0x0300, seq=20995/850, ttl=3 (no response four
     13 6.234505   0.025908 24.128.190.197         192.168.1.102    ICMP    70 Time-to-live exceeded (Time to live exceeded in transit)
     14 6.238695   0.004190 192.168.1.102          128.59.23.100    ICMP    98 Echo (ping) request  id=0x0300, seq=21251/851, ttl=4 (no response four
     15 6.257672   0.018977 24.128.0.101           192.168.1.102    ICMP    70 Time-to-live exceeded (Time to live exceeded in transit)
     16 6.258750   0.001078 192.168.1.102          128.59.23.100    ICMP    98 Echo (ping) request  id=0x0300, seq=21507/852, ttl=5 (no response four
     17 6.286017   0.027267 12.125.47.49           192.168.1.102    ICMP    70 Time-to-live exceeded (Time to live exceeded in transit)
     18 6.288750   0.002723 192.168.1.102          128.59.23.100    ICMP    98 Echo (ping) request  id=0x0300, seq=21763/853, ttl=6 (no response four

> 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:
v 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)
  > Flags: 0x00
    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 af 73 00 20  e0 8a 70 1a 08 00 45 00   ··%··s·  ··p···E·
0010  00 54 32 d0 00 00 01 01  2d 2c c0 a8 01 66 80 3b   ·T2·····  -,···f·;
0020  17 64 08 00 f7 ca 03 00  50 03 37 32 20 aa aa aa   ·d······  P·72 ···
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········  ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········  ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········  ········
0060  aa aa                                              ··
```

Annotated Screenshot (if needed)		

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  1 0.000000   0.000000 CnetTech_73:8d:ce          Broadcast        ARP    60 Who has 192.168.1.117? Tell 192.168.1.104
  2 4.866867   4.866867 192.168.1.100              192.168.1.1      SSDP  174 M-SEARCH * HTTP/1.1
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  5 5.364799   0.001263 192.168.1.100              192.168.1.1      SSDP  175 M-SEARCH * HTTP/1.1
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 17 6.286017   0.027267 12.125.47.49               192.168.1.102    ICMP   70 Time-to-live exceeded (Time to live exceeded in transit)

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    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 84
    Identification: 0x32d0 (13008)
  > Flags: 0x00
    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
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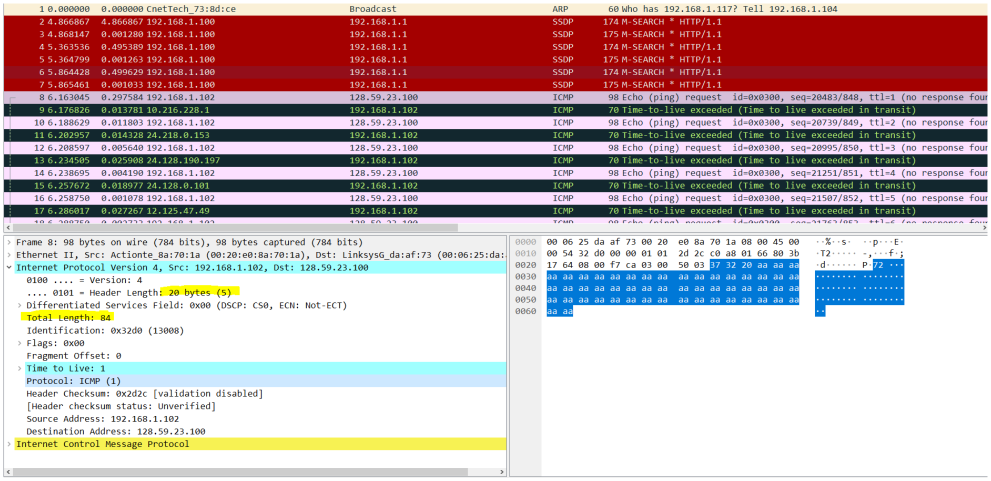
0000  00 06 25 da af 73 00 20  e0 8a 70 1a 08 00 45 00   ··%··s·  ··p···E·
0010  00 54 32 d0 00 00 01 01  2d 2c c0 a8 01 66 80 3b   ·T2·····  -,···f·;
0020  17 64 08 00 f7 ca 03 00  50 03 37 32 20 aa aa aa   ·d······  P·72 ···
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0060  aa aa                                              ··
```

3	How many bytes are in the IP header? How many bytes are in the payload of the IP datagram? Explain how you determined the number of payload bytes.	20 bytes in the header; 64Bytes in the payload. the number of payload is calculated by the total length 86 minus 20 bytes of head.
Annotated Screenshot (if needed)		

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  > Flags: 0x00
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    Protocol: ICMP (1)
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    [Header checksum status: Unverified]
    Source Address: 192.168.1.102
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0020  17 64 08 00 f7 ca 03 00  50 03 37 32 20 aa aa aa   ·d······  P·72 ···
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0060  aa aa                                              ··
```
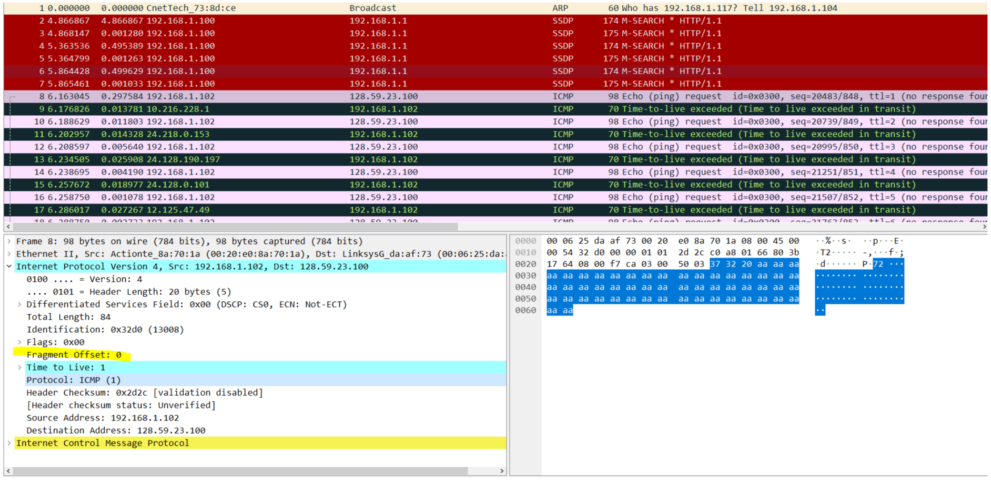

4	Has this IP datagram been fragmented? Explain how you determined whether or not the datagram has been fragmented.	No, since the fragment offset is 0

Annotated Screenshot (if needed)		

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  6 5.864428  0.499629 192.168.1.100        192.168.1.1     SSDP  174 M-SEARCH * HTTP/1.1
  7 5.865461  0.001033 192.168.1.100        192.168.1.1     SSDP  175 M-SEARCH * HTTP/1.1
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> Frame 8: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)
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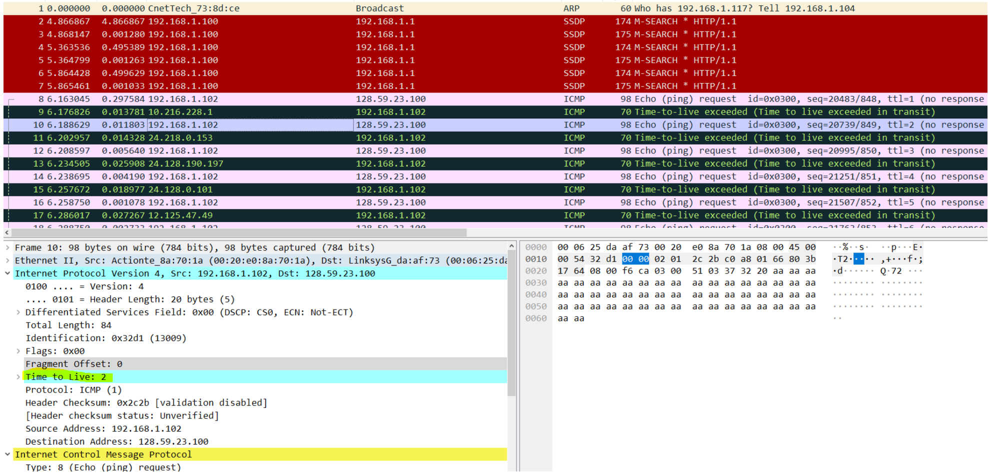
v Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.59.23.100
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 84
    Identification: 0x32d0 (13008)
  > Flags: 0x00
    Fragment Offset: 0
  > 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 af 73 00 20  e0 8a 70 1a 08 00 45 00   ··%··s·  ··p···E·
0010  00 54 32 d0 00 00 01 01  2d 2c c0 a8 01 66 80 3b   ·T2·····  -,···f·;
0020  17 64 08 00 f7 ca 03 00  50 03 37 32 20 aa aa aa   ·d······  P·72 ···
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0060  aa aa                                              ··
```

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?	TTL
Annotated Screenshot (if needed)		

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    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 84
    Identification: 0x32d1 (13009)
  > Flags: 0x00
    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
v Internet Control Message Protocol
    Type: 8 (Echo (ping) request)

0000  00 06 25 da af 73 00 20  e0 8a 70 1a 08 00 45 00   ··%··s·  ··p···E·
0010  00 54 32 d1 00 00 02 01  2c 2b c0 a8 01 66 80 3b   ·T2·····  ,+···f·;
0020  17 64 08 00 f6 ca 03 00  51 03 37 32 20 aa aa aa   ·d······  Q·72 ···
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0060  aa aa                                              ··
```
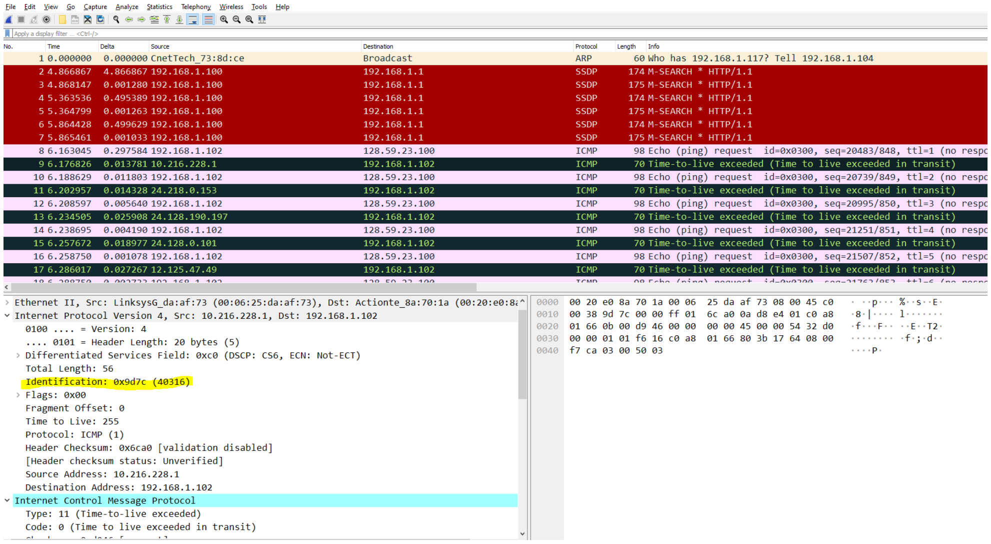

6	Which fields stay constant? Which of the fields must stay constant? Which fields must change? Why?	Header length stays constant since it is always 20 bytes; Destination must stay constant, since we are sending data to specific destination; Identification must be changed because new IP datagrams need new identification numbers.
Annotated Screenshot (if needed)		
7	Describe the pattern you see in the values in the Identification field of	identification increase by one every time a new IP datagram is sent

<table>
<tr><td></td><td>the IP datagram</td><td></td></tr>
<tr><td>Annotated Screenshot (if needed)</td><td colspan="2"></td></tr>
<tr><td>8</td><td>What is the value in the Identification field and the TTL field?</td><td>40316</td></tr>
<tr><td>Annotated Screenshot (if needed)</td><td colspan="2">



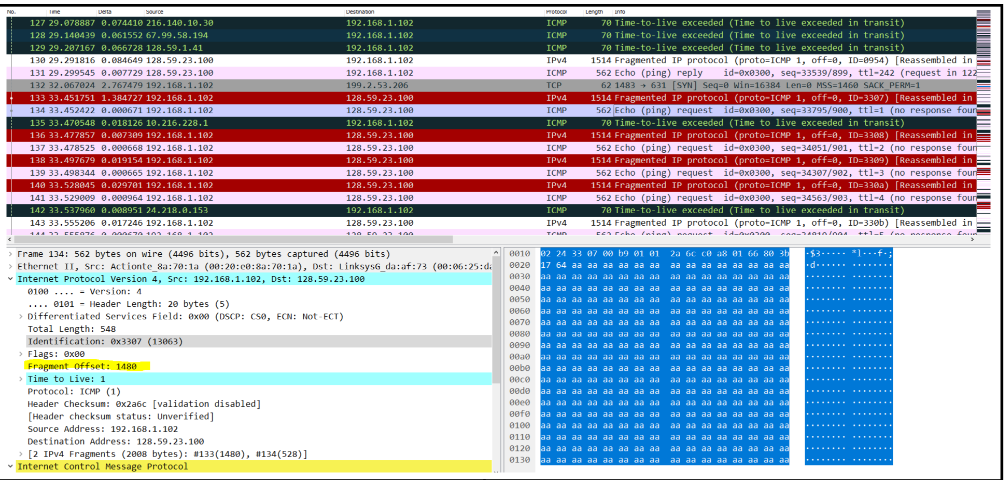
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>

```
No.  Time      Delta    Source            Destination    Protocol Length Info
   1 0.000000  0.000000 CnetTech_73:8d:ce Broadcast      ARP       60 Who has 192.168.1.117? Tell 192.168.1.104
   2 4.866867  4.866867 192.168.1.100     192.168.1.1    SSDP     174 M-SEARCH * HTTP/1.1
   3 4.868147  0.001280 192.168.1.100     192.168.1.1    SSDP     175 M-SEARCH * HTTP/1.1
   4 5.363536  0.495389 192.168.1.100     192.168.1.1    SSDP     174 M-SEARCH * HTTP/1.1
   5 5.364799  0.001263 192.168.1.100     192.168.1.1    SSDP     175 M-SEARCH * HTTP/1.1
   6 5.864428  0.499629 192.168.1.100     192.168.1.1    SSDP     174 M-SEARCH * HTTP/1.1
   7 5.865461  0.001033 192.168.1.100     192.168.1.1    SSDP     175 M-SEARCH * HTTP/1.1
   8 6.163045  0.297584 192.168.1.102     128.59.23.100  ICMP      98 Echo (ping) request  id=0x0300, seq=20483/848, ttl=1 (no respo
   9 6.176826  0.013781 10.216.228.1      192.168.1.102  ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
  10 6.188629  0.011803 192.168.1.102     128.59.23.100  ICMP      98 Echo (ping) request  id=0x0300, seq=20739/849, ttl=2 (no respo
  11 6.202957  0.014328 24.218.0.153      192.168.1.102  ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
  12 6.208597  0.005640 192.168.1.102     128.59.23.100  ICMP      98 Echo (ping) request  id=0x0300, seq=20995/850, ttl=3 (no respo
  13 6.234505  0.025908 24.128.190.197    192.168.1.102  ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
  14 6.238695  0.004190 192.168.1.102     128.59.23.100  ICMP      98 Echo (ping) request  id=0x0300, seq=21251/851, ttl=4 (no respo
  15 6.257672  0.018977 24.128.0.101      192.168.1.102  ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
  16 6.258750  0.001078 192.168.1.102     128.59.23.100  ICMP      98 Echo (ping) request  id=0x0300, seq=21507/852, ttl=5 (no respo
  17 6.286017  0.027267 12.125.47.49      192.168.1.102  ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
  18 6.288750  0.002733 192.168.1.102     128.59.23.100  ICMP      98 Echo (ping) request  id=0x0300, seq=21763/853, ttl=6 (no respo
```

```
> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Actionte_8a:70:1a (00:20:e0:8a
v Internet Protocol Version 4, Src: 10.216.228.1, 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: 0x9d7c (40316)
  > Flags: 0x00
    Fragment Offset: 0
    Time to Live: 255
    Protocol: ICMP (1)
    Header Checksum: 0x6ca0 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 10.216.228.1
    Destination Address: 192.168.1.102
v Internet Control Message Protocol
    Type: 11 (Time-to-live exceeded)
    Code: 0 (Time to live exceeded in transit)
```

```
0000  00 20 e0 8a 70 1a 00 06  25 da af 73 08 00 45 c0   · ··p··· %··s··E·
0010  00 38 9d 7c 00 00 ff 01  6c a0 0a d8 e4 01 c0 a8   ·8·|···· l·······
0020  01 66 0b 00 d9 46 00 00  00 00 45 00 00 54 32 d0   ·f···F·· ··E··T2·
0030  00 00 01 01 f6 16 c0 a8  01 66 80 3b 17 64 08 00   ········ ·f·;·d··
0040  f7 ca 03 00 50 03                                  ····P·
```

</td></tr>
<tr><td>9</td><td>Do these values remain unchanged for all of the ICMP TTL-exceeded replies sent to your computer by the nearest (first hop) router? Why?</td><td>No, it will change since the identification number is different</td></tr>
<tr><td>Annotated Screenshot (if needed)</td><td colspan="2"></td></tr>
<tr><td>10</td><td>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?</td><td>yes, the MF is set to 1</td></tr>
</table>

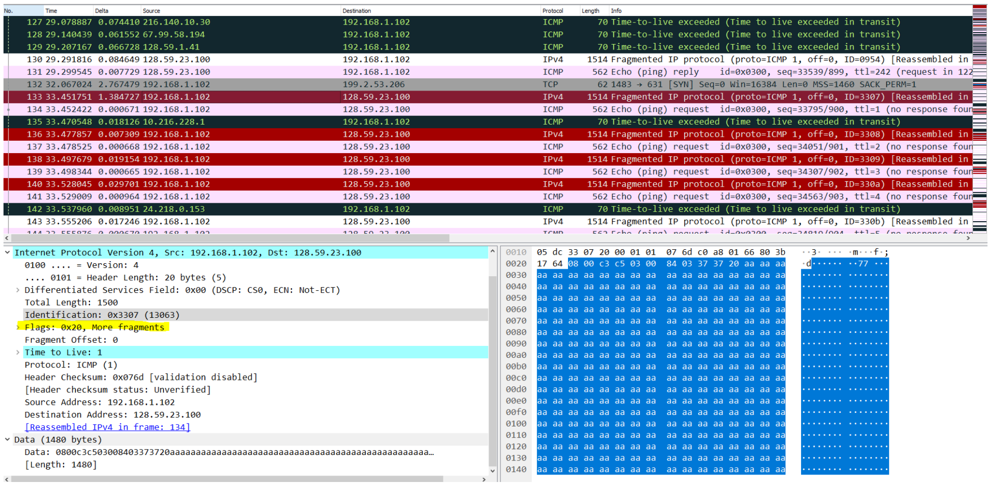
Annotated Screenshot (if needed)	

```
No.  Time      Delta    Source        Destination   Protocol Length Info
 127 29.078887 0.074410 216.140.10.30 192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 128 29.140439 0.061552 67.99.58.194  192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 129 29.207167 0.066728 128.59.1.41   192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 130 29.291816 0.084649 128.59.23.100 192.168.1.102 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=0954) [Reassembled in
 131 29.299545 0.007729 128.59.23.100 192.168.1.102 ICMP      562 Echo (ping) reply    id=0x0300, seq=33539/899, ttl=242 (request in 122
 132 32.067024 2.767479 192.168.1.102 199.2.53.206  TCP        62 1483 → 631 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
 133 33.451751 1.384727 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3307) [Reassembled in
 134 33.452422 0.000671 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=33795/900, ttl=1 (no response foun
 135 33.470548 0.018126 10.216.228.1  192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 136 33.477857 0.007309 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3308) [Reassembled in
 137 33.478525 0.000668 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=34051/901, ttl=2 (no response foun
 138 33.497679 0.019154 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3309) [Reassembled in
 139 33.498344 0.000665 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=34307/902, ttl=3 (no response foun
 140 33.528045 0.029701 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=330a) [Reassembled in
 141 33.529009 0.000964 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=34563/903, ttl=4 (no response foun
 142 33.537960 0.008951 24.218.0.153  192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 143 33.555206 0.017246 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=330b) [Reassembled in
 144 33.555876 0.000670 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=34819/904, ttl=5 (no response foun
```

```
> Frame 134: 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
v 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: 0x3307 (13063)
  > Flags: 0x00
    Fragment Offset: 1480
  > Time to Live: 1
    Protocol: ICMP (1)
    Header Checksum: 0x2a6c [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 192.168.1.102
    Destination Address: 128.59.23.100
  > [2 IPv4 Fragments (2008 bytes): #133(1480), #134(528)]
v Internet Control Message Protocol
```

```
0010  02 24 33 07 00 b9 01 01  2a 6c c0 a8 01 66 80 3b   ·$3····· *l···f·;
0020  17 64 aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ·d······ ········
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0060  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0070  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0080  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0090  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00a0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00b0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00c0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00d0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00e0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00f0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0100  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0110  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0120  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0130  aa aa aa aa aa aa aa aa  aa aa aa 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 has been fragmented? What information in the IP header indicates whether this is the first fragment versus a latter fragment?
	How long is this IP datagram?
		MF is set to 1;
		Fragment offset;
		1480;

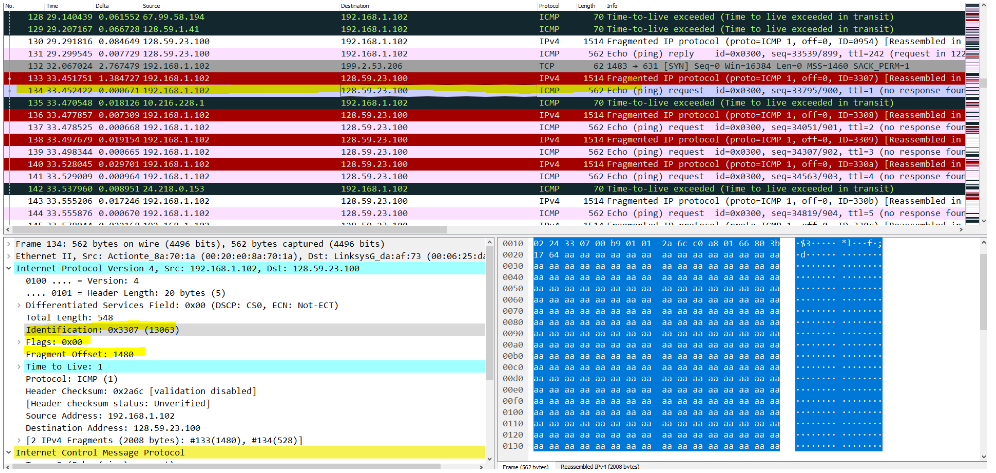
Annotated Screenshot (if needed)	

```
No.  Time      Delta    Source        Destination   Protocol Length Info
 127 29.078887 0.074410 216.140.10.30 192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 128 29.140439 0.061552 67.99.58.194  192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 129 29.207167 0.066728 128.59.1.41   192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 130 29.291816 0.084649 128.59.23.100 192.168.1.102 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=0954) [Reassembled in
 131 29.299545 0.007729 128.59.23.100 192.168.1.102 ICMP      562 Echo (ping) reply    id=0x0300, seq=33539/899, ttl=242 (request in 122
 132 32.067024 2.767479 192.168.1.102 199.2.53.206  TCP        62 1483 → 631 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
 133 33.451751 1.384727 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3307) [Reassembled in
 134 33.452422 0.000671 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=33795/900, ttl=1 (no response foun
 135 33.470548 0.018126 10.216.228.1  192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 136 33.477857 0.007309 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3308) [Reassembled in
 137 33.478525 0.000668 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=34051/901, ttl=2 (no response foun
 138 33.497679 0.019154 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3309) [Reassembled in
 139 33.498344 0.000665 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=34307/902, ttl=3 (no response foun
 140 33.528045 0.029701 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=330a) [Reassembled in
 141 33.529009 0.000964 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=34563/903, ttl=4 (no response foun
 142 33.537960 0.008951 24.218.0.153  192.168.1.102 ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 143 33.555206 0.017246 192.168.1.102 128.59.23.100 IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=330b) [Reassembled in
 144 33.555876 0.000670 192.168.1.102 128.59.23.100 ICMP      562 Echo (ping) request  id=0x0300, seq=34819/904, ttl=5 (no response foun
```

```
v 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: 0x3307 (13063)
  > Flags: 0x20, More fragments
    Fragment Offset: 0
  > Time to Live: 1
    Protocol: ICMP (1)
    Header Checksum: 0x076d [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 192.168.1.102
    Destination Address: 128.59.23.100
    [Reassembled IPv4 in frame: 134]
v Data (1480 bytes)
    Data: 0800c3c503008403373720aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa…
    [Length: 1480]
```

```
0010  05 dc 33 07 20 00 01 01  07 6d c0 a8 01 66 80 3b   ··3· ··· ·m···f·;
0020  17 64 08 00 c3 c5 03 00  84 03 37 37 20 aa aa aa   ·d······ ··77 ···
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0060  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0070  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0080  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0090  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00a0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00b0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00c0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00d0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00e0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00f0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0100  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0110  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0120  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0130  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0140  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
```

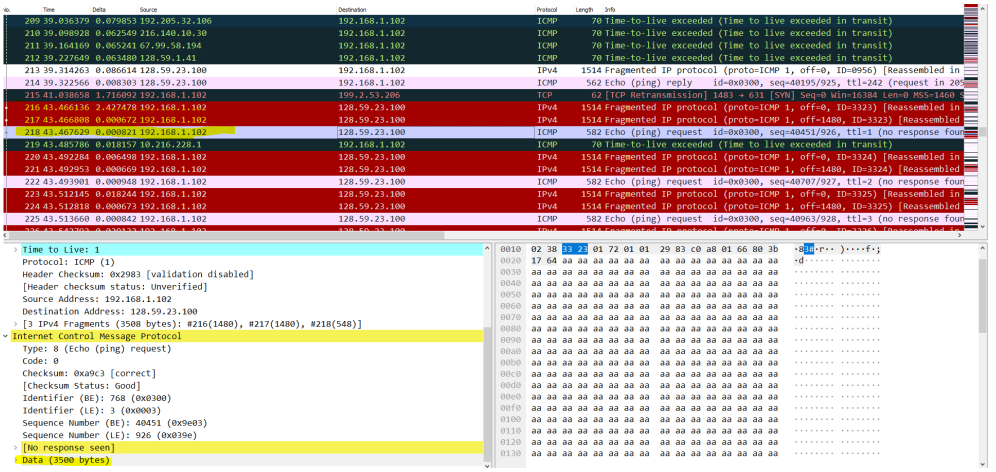
12	Print out the second fragment of the fragmented IP datagram. What information in the IP header indicates that this is not the first datagram fragment? Are the more fragments? How can you tell?	It is the ICMP Protocol. There are no fragments because more fragment flag is not raised

Annotated Screenshot (if needed)	

```
No.  Time      Delta    Source          Destination     Protocol Length Info
 128 29.140439 0.061552 67.99.58.194    192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 129 29.207167 0.066728 128.59.1.41     192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 130 29.291816 0.084649 128.59.23.100   192.168.1.102   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=0954) [Reassembled in
 131 29.299545 0.007729 128.59.23.100   192.168.1.102   ICMP      562 Echo (ping) reply    id=0x0300, seq=33539/899, ttl=242 (request in 122
 132 32.067024 2.767479 192.168.1.102   199.2.53.206    TCP        62 1483 → 631 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 SACK_PERM=1
 133 33.451751 1.384727 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3307) [Reassembled in
 134 33.452422 0.000671 192.168.1.102   128.59.23.100   ICMP      562 Echo (ping) request  id=0x0300, seq=33795/900, ttl=1 (no response foun
 135 33.470548 0.018126 10.216.228.1    192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 136 33.477857 0.007309 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3308) [Reassembled in
 137 33.478525 0.000668 192.168.1.102   128.59.23.100   ICMP      562 Echo (ping) request  id=0x0300, seq=34051/901, ttl=2 (no response foun
 138 33.497679 0.019154 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3309) [Reassembled in
 139 33.498344 0.000665 192.168.1.102   128.59.23.100   ICMP      562 Echo (ping) request  id=0x0300, seq=34307/902, ttl=3 (no response foun
 140 33.528045 0.029701 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=330a) [Reassembled in
 141 33.529009 0.000964 192.168.1.102   128.59.23.100   ICMP      562 Echo (ping) request  id=0x0300, seq=34563/903, ttl=4 (no response foun
 142 33.537960 0.008951 24.218.0.153    192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 143 33.555206 0.017246 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=330b) [Reassembled in
 144 33.555876 0.000670 192.168.1.102   128.59.23.100   ICMP      562 Echo (ping) request  id=0x0300, seq=34819/904, ttl=5 (no response foun
 145 33.578044 0.022168 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=330c) [Reassembled in
```

```
> Frame 134: 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
v 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: 0x3307 (13063)
  > Flags: 0x00
    Fragment Offset: 1480
  > Time to Live: 1
    Protocol: ICMP (1)
    Header Checksum: 0x2a6c [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 192.168.1.102
    Destination Address: 128.59.23.100
  > [2 IPv4 Fragments (2008 bytes): #133(1480), #134(528)]
v Internet Control Message Protocol
    Type: 8 (Echo (ping) request)
```

```
0010  02 24 33 07 00 b9 01 01  2a 6c c0 a8 01 66 80 3b   ·$3····· *l···f·;
0020  17 64 aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ·d······ ········
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0060  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0070  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0080  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0090  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00a0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00b0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00c0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00d0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00e0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00f0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0100  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0110  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0120  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0130  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
Frame (562 bytes)   Reassembled IPv4 (2008 bytes)
```

13	What fields change in the IP header between the first and second fragment?	total length, MF, Fragment offset, header checksum
Annotated Screenshot (if needed)	refer to above two questions	
14	How many fragments were created from the original datagram?	3
Annotated Screenshot (if needed)		

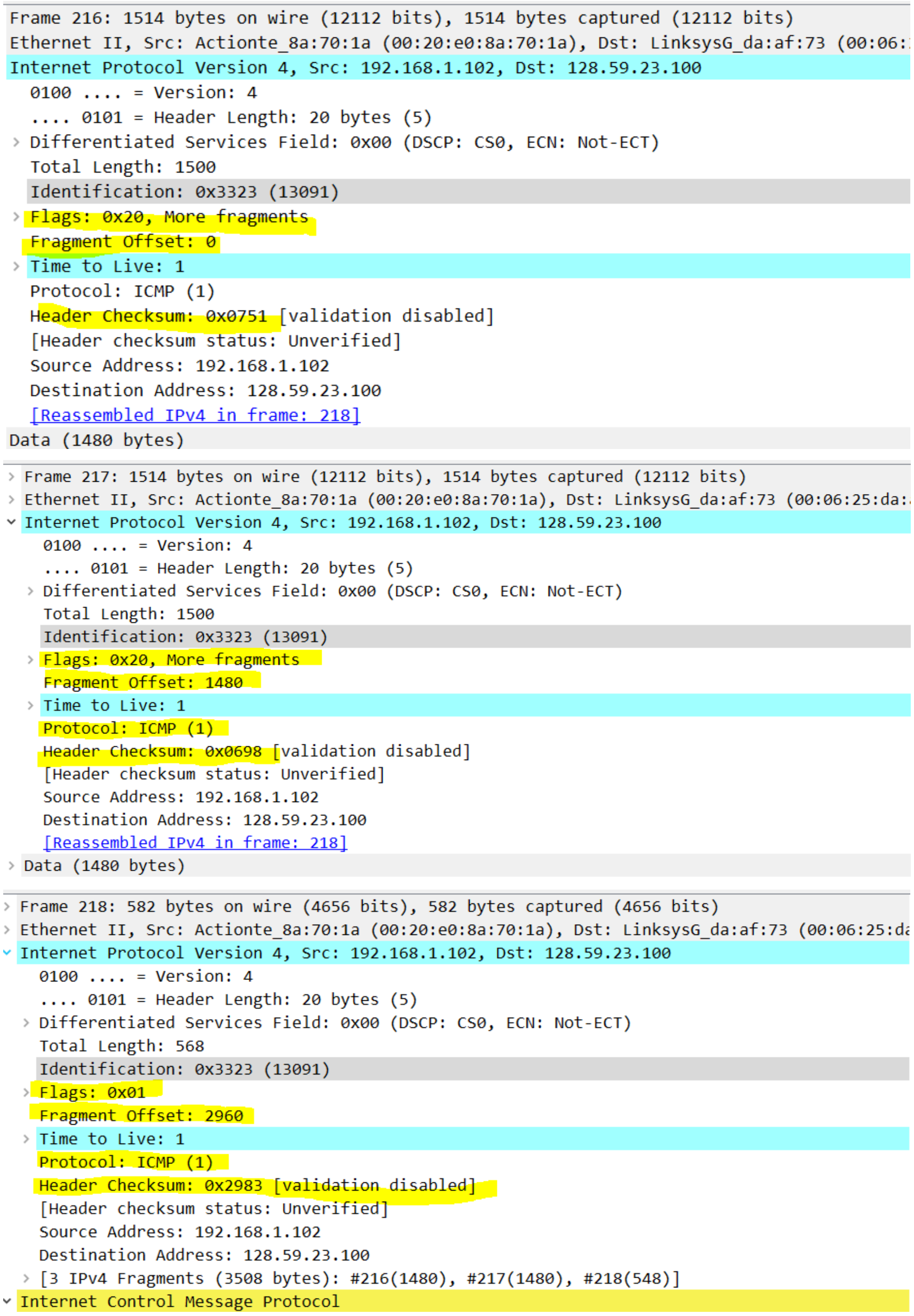
```
No.  Time      Delta    Source          Destination     Protocol Length Info
 209 39.036379 0.079853 192.205.32.106  192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 210 39.098928 0.062549 216.140.10.30   192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 211 39.164169 0.065241 67.99.58.194    192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 212 39.227649 0.063480 128.59.1.41     192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 213 39.314263 0.086614 128.59.23.100   192.168.1.102   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=0956) [Reassembled in
 214 39.322566 0.008303 128.59.23.100   192.168.1.102   ICMP      562 Echo (ping) reply    id=0x0300, seq=40195/925, ttl=242 (request in 205
 215 41.038658 1.716092 192.168.1.102   199.2.53.206    TCP        62 [TCP Retransmission] 1483 → 631 [SYN] Seq=0 Win=16384 Len=0 MSS=1460 S
 216 43.466136 2.427478 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3323) [Reassembled in
 217 43.466808 0.000672 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=1480, ID=3323) [Reassembled
 218 43.467629 0.000821 192.168.1.102   128.59.23.100   ICMP      582 Echo (ping) request  id=0x0300, seq=40451/926, ttl=1 (no response foun
 219 43.485786 0.018157 10.216.228.1    192.168.1.102   ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
 220 43.492284 0.006498 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3324) [Reassembled in
 221 43.492953 0.000669 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=1480, ID=3324) [Reassembled
 222 43.493901 0.000948 192.168.1.102   128.59.23.100   ICMP      582 Echo (ping) request  id=0x0300, seq=40707/927, ttl=2 (no response foun
 223 43.512145 0.018244 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=0, ID=3325) [Reassembled in
 224 43.512818 0.000673 192.168.1.102   128.59.23.100   IPv4     1514 Fragmented IP protocol (proto=ICMP 1, off=1480, ID=3325) [Reassembled
 225 43.513660 0.000842 192.168.1.102   128.59.23.100   ICMP      582 Echo (ping) request  id=0x0300, seq=40963/928, ttl=3 (no response foun
```

```
  > Time to Live: 1
    Protocol: ICMP (1)
    Header Checksum: 0x2983 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 192.168.1.102
    Destination Address: 128.59.23.100
  > [3 IPv4 Fragments (3508 bytes): #216(1480), #217(1480), #218(548)]
v Internet Control Message Protocol
    Type: 8 (Echo (ping) request)
    Code: 0
    Checksum: 0xa9c3 [correct]
    [Checksum Status: Good]
    Identifier (BE): 768 (0x0300)
    Identifier (LE): 3 (0x0003)
    Sequence Number (BE): 40451 (0x9e03)
    Sequence Number (LE): 926 (0x039e)
  > [No response seen]
  > Data (3500 bytes)
```

```
0010  02 38 33 23 01 72 01 01  29 83 c0 a8 01 66 80 3b   ·83#·r·· )····f·;
0020  17 64 aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ·d······ ········
0030  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0040  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0050  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0060  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0070  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0080  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0090  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00a0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00b0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00c0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00d0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00e0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
00f0  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0100  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0110  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0120  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
0130  aa aa aa aa aa aa aa aa  aa aa aa aa aa aa aa aa   ········ ········
```

15	What fields change in the IP header among the fragments?	Fragment Offset, Header Checksum changes. For the last fragment the flag, protocal changes

Annotated Screenshot (if needed)



```
Frame 216: 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:
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: 0x3323 (13091)
> Flags: 0x20, More fragments
  Fragment Offset: 0
> Time to Live: 1
  Protocol: ICMP (1)
  Header Checksum: 0x0751 [validation disabled]
  [Header checksum status: Unverified]
  Source Address: 192.168.1.102
  Destination Address: 128.59.23.100
  [Reassembled IPv4 in frame: 218]
Data (1480 bytes)

> Frame 217: 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:
v 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: 0x3323 (13091)
  > Flags: 0x20, More fragments
    Fragment Offset: 1480
  > Time to Live: 1
    Protocol: ICMP (1)
    Header Checksum: 0x0698 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 192.168.1.102
    Destination Address: 128.59.23.100
    [Reassembled IPv4 in frame: 218]
> Data (1480 bytes)

> Frame 218: 582 bytes on wire (4656 bits), 582 bytes captured (4656 bits)
> Ethernet II, Src: Actionte_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG_da:af:73 (00:06:25:da
v 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: 568
    Identification: 0x3323 (13091)
  > Flags: 0x01
    Fragment Offset: 2960
  > Time to Live: 1
    Protocol: ICMP (1)
    Header Checksum: 0x2983 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 192.168.1.102
    Destination Address: 128.59.23.100
  > [3 IPv4 Fragments (3508 bytes): #216(1480), #217(1480), #218(548)]
v Internet Control Message Protocol
```