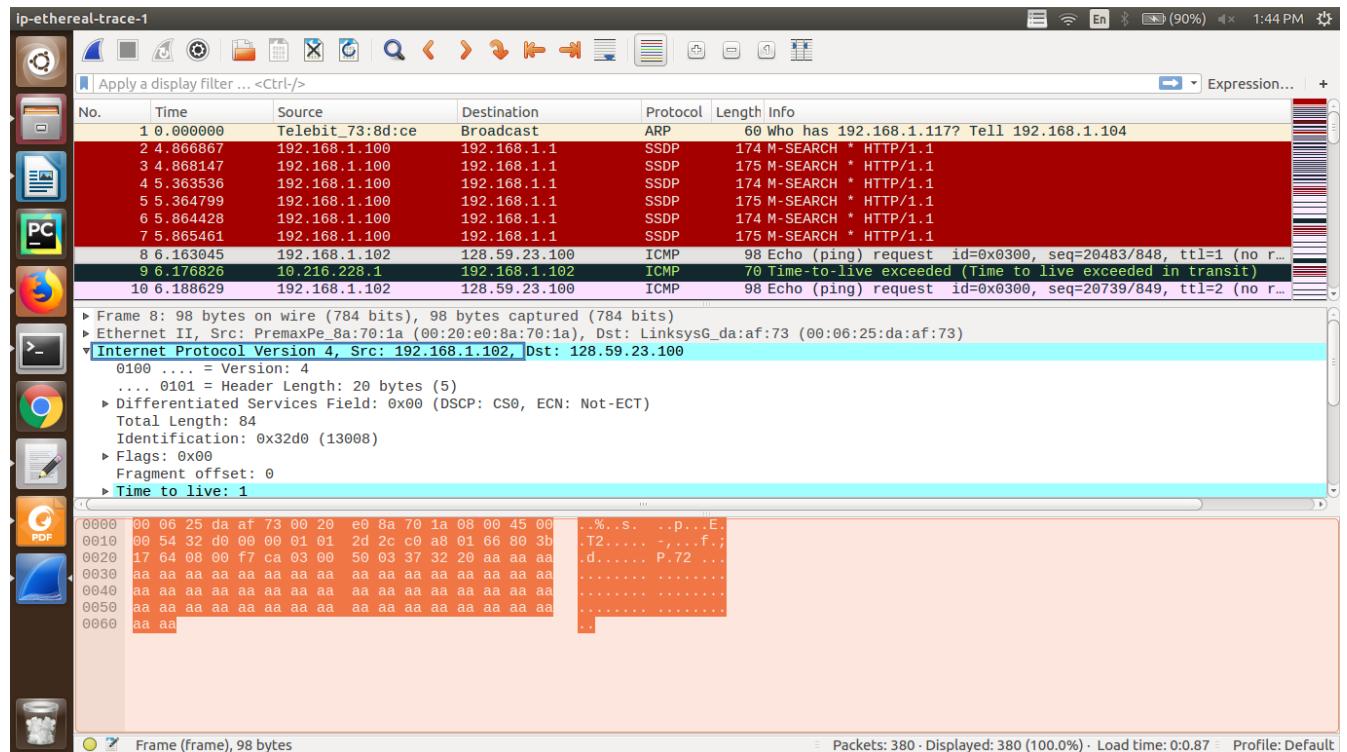
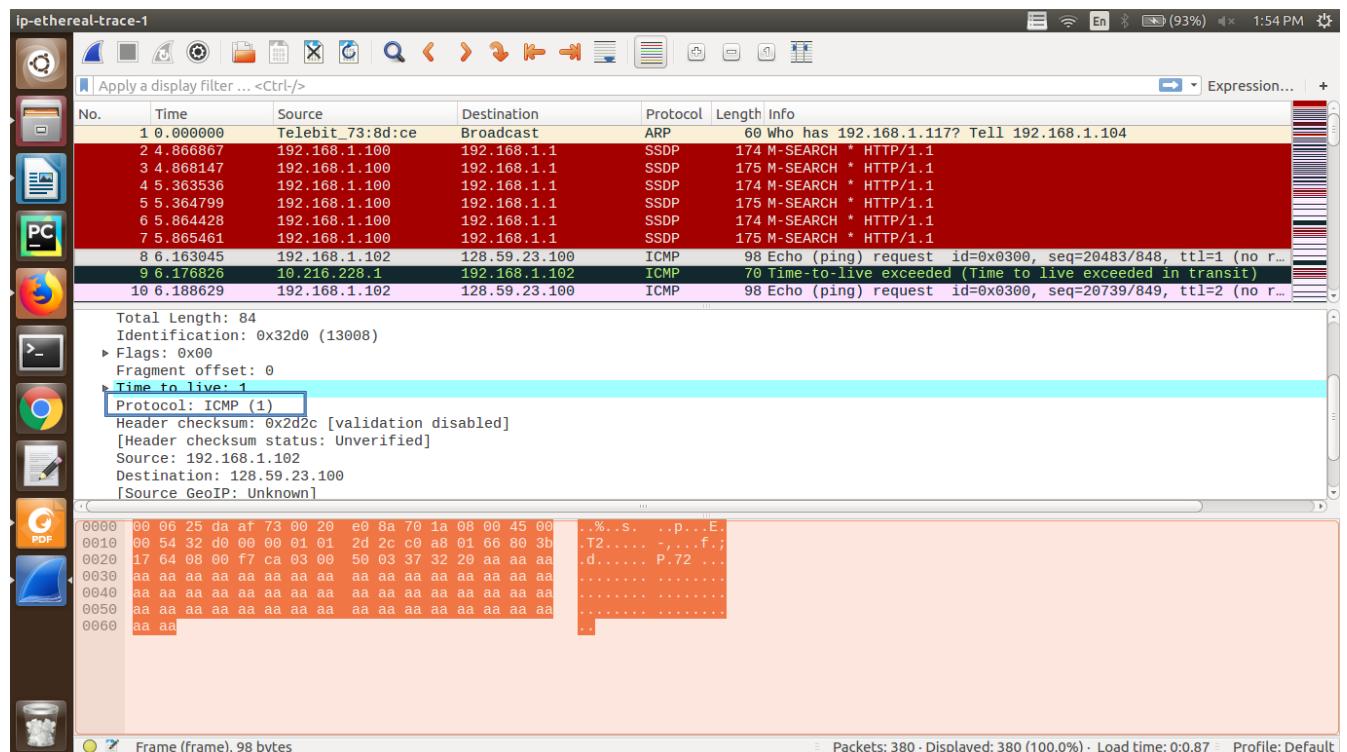


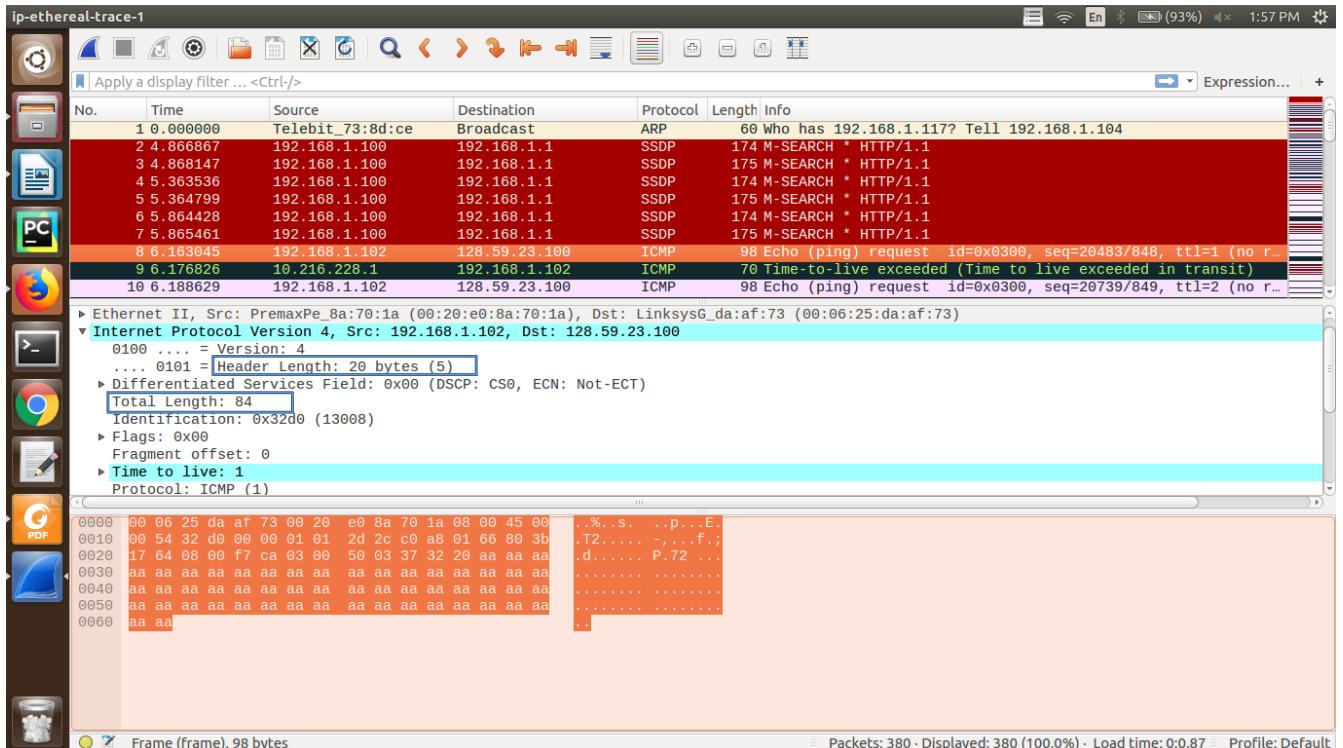
Q1 – IP address for my computer is :- 192.168.1.102



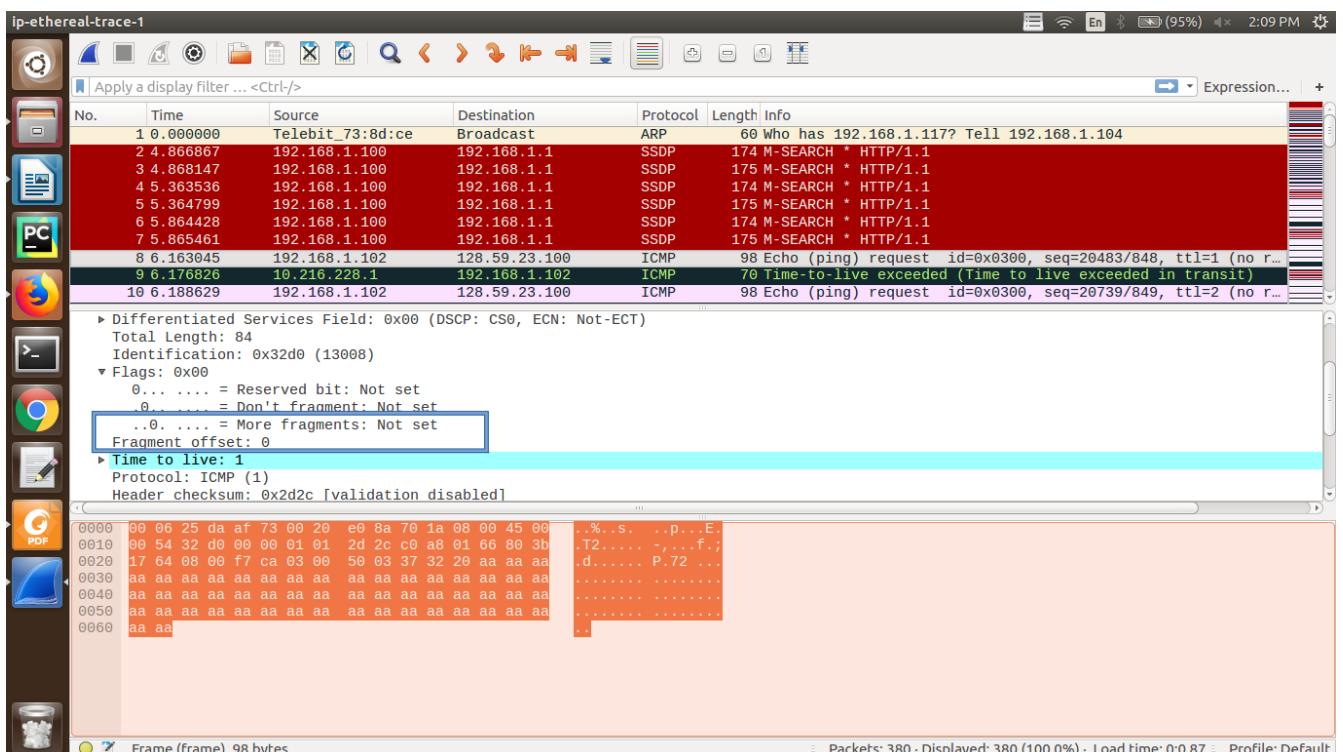
Q2- The value of the upper layer protocol field in the IP Packet header is “1” i.e. ICMP



Q3- The length of header is 20 bytes and the length of payload is 64 bytes. As it can be seen from below attached screen shot that the total length is 84 bytes and header length is 20 bytes. Hence payload is 64 bytes.



Q4- The IP datagram is not fragmented which can be verified from the More fragments flag being set to zero and the fragment offset being clear and set to zero.



Q5 – The fields which keep on changing from one datagram to another are:

- a) Identification
- b) Time to Live
- c) Header Checksum

ip-ethereal-trace-1

icmp

No.	Time	Source	Destination	Protocol	Length	Info
212	39.227649	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
266	44.763963	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
320	49.770176	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
377	54.774816	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
35	6.490987	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=23555/860, ttl=242 (re...
63	11.480063	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=26883/873, ttl=242 (re...
89	16.499919	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=30211/886, ttl=242 (re...
131	29.299545	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=33539/899, ttl=242 (re...
172	34.305470	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=36867/912, ttl=242 (re...
214	39.322566	128.59.23.100	192.168.1.102	TCMP	562	Echo (ping) reply id=0x0300, seq=40195/925, ttl=242 (re...

0100 .... = Version: 4  
.... 0101 = Header Length: 20 bytes (5)  
▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)  
Total Length: 84  
Identification: 0x0951 (2385)  
▶ Flags: 0x02 (Don't Fragment)  
Fragment offset: 0  
Time to live: 242  
Protocol: ICMP (1)  
Header checksum: 0x25aa [validation disabled]

Frame (frame), 98 bytes

Packets: 380 · Displayed: 221 (58.2%) · Load time: 0:0.5 · Profile: Default

ip-ethereal-trace-1

icmp

No.	Time	Source	Destination	Protocol	Length	Info
212	39.227649	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
266	44.763963	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
320	49.770176	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
377	54.774816	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
35	6.490987	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=23555/860, ttl=242 (re...
63	11.480063	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=26883/873, ttl=242 (re...
89	16.499919	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=30211/886, ttl=242 (re...
131	29.299545	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=33539/899, ttl=242 (re...
172	34.305470	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=36867/912, ttl=242 (re...
214	39.322566	128.59.23.100	192.168.1.102	TCMP	562	Echo (ping) reply id=0x0300, seq=40195/925, ttl=242 (re...

0100 .... = Version: 4  
.... 0101 = Header Length: 20 bytes (5)  
▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)  
Total Length: 84  
Identification: 0x0952 (2386)  
▶ Flags: 0x02 (Don't Fragment)  
Fragment offset: 0  
Time to live: 242  
Protocol: ICMP (1)  
Header checksum: 0x25a9 [validation disabled]

Frame (frame), 98 bytes

Packets: 380 · Displayed: 221 (58.2%) · Load time: 0:0.5 · Profile: Default

Q6- i) Fields that stay constant are as follows

- a) **Header Length** – (Header length for all the IPv4 packets remain the same)
- b) **Version** – Version will always be ipv4 as we are using that for all packets
- c) **Source IP** – (Sender IP doesn't change)
- d) **Destination IP** – (Destination IP of gaia.cs.umass.edu doesn't change)
- e) **Upper Layer protocol** – (we are using the same protocol every time).
- f) **Differentiated services** – as all the packets are using ICMP they use the same type of service class.

### **ii) Fields that must stay constant are as follows**

- a) **Header Length** – (Header length for all the IPv4 packets remain the same)
- b) **Version** – Version will always be ipv4 as we are using that for all packets
- c) **Source IP** – (Sender IP doesn't change)
- d) **Destination IP** – (Destination IP of gaia.cs.umass.edu doesn't change)
- e) **Upper Layer protocol** – (we are using the same protocol every time).
- f) **Differentiated services** – as all the packets are using ICMP they use the same type of service class.

### **iii) Fields that must changes are as follows**

- a) **Identification:** Each IP packet has a different id (unique id is required to identify each IP datagram).
- b) **Time to Live:** (Traceroute increases time to live subsequently for each packet sent)
- c) **Header checksum:** As header is changing the checksum for each header also changes with it.

Q7- The Identification field of each IP datagram is changing and is incrementing sequentially for each subsequent datagram being sent.

ip-ethereal-trace-1

icmp

No.	Time	Source	Destination	Protocol	Length	Info
212	39.227649	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
266	44.763963	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
320	49.770176	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
377	54.774816	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
← 35	6.490987	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=23555/860, ttl=242 (re...
63	11.480063	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=26883/873, ttl=242 (re...
89	16.499919	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=30211/886, ttl=242 (re...
131	29.299545	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=33539/899, ttl=242 (re...
172	34.305470	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=36867/912, ttl=242 (re...
214	39.322566	128.59.23.100	192.168.1.102	TCMP	562	Echo (ping) reply id=0x0300, seq=40195/925, ttl=242 (re...

Frame 35: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)  
 ▶ Ethernet II, Src: LinksysG\_da:af:73 (00:06:25:da:af:73), Dst: PremaxPe\_8a:70:1a (00:20:e0:8a:70:1a)  
 ▶ Internet Protocol Version 4, Src: 128.59.23.100, Dst: 192.168.1.102  
 0100 .... = Version: 4  
 .... 0101 = Header Length: 20 bytes (5)  
 ▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)  
 Total Length: 84  
 Identification: 0x0951 (2385)  
 ▶ Flags: 0x02 (Don't Fragment)  
 Fragment offset: 0

0000	00 20 e0 8a 70 1a 00 06 25 da af 73 08 00 45 00	. . . p . . % . s . E .
0010	00 54 09 51 40 00 f2 01 25 aa 80 3b 17 64 c0 a8	. T . Q 0 . . % . ; . d .
0020	01 66 00 00 f3 ca 03 00 5c 03 37 32 20 aa aa aa	. f . . . . \ . 72 . .
0030	aa	..... . . . . . . . .
0040	aa	..... . . . . . . . .
0050	aa	..... . . . . . . . .
0060	aa aa	..... . . . .

Frame (frame), 98 bytes

Packets: 380 · Displayed: 221 (58.2%) · Load time: 0:0.5 · Profile: Default

ip-ethereal-trace-1

icmp

No.	Time	Source	Destination	Protocol	Length	Info
212	39.227649	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
266	44.763963	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
320	49.770176	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
377	54.774816	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
35	6.490987	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=23555/860, ttl=242 (re...
63	11.480063	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=26883/873, ttl=242 (re...
89	16.499919	128.59.23.100	192.168.1.102	ICMP	98	Echo (ping) reply id=0x0300, seq=30211/886, ttl=242 (re...
131	29.299545	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=33539/899, ttl=242 (re...
172	34.305470	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=36867/912, ttl=242 (re...
214	39.322566	128.59.23.100	192.168.1.102	TCP	562	Echo (ping) reply id=0x0300, seq=40195/925, ttl=242 (re...

Frame 63: 98 bytes on wire (784 bits), 98 bytes captured (784 bits)  
 ▶ Ethernet II, Src: LinksysG\_da:af:73 (00:06:25:da:af:73), Dst: PremaxPe\_8a:70:1a (00:20:e0:8a:70:1a)  
 ▶ Internet Protocol Version 4, Src: 128.59.23.100, Dst: 192.168.1.102  
 0100 .... = Version: 4  
 .... 0101 = Header Length: 20 bytes (5)  
 ▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)  
 Total Length: 84  
 Identification: 0x0952 (2386)  
 ▶ Flags: 0x02 (Don't Fragment)  
 Fragment offset: 0

0000	00 20 e0 8a 70 1a 00 06 25 da af 73 08 00 45 00	. . . p . % . s . E .
0010	00 54 09 52 40 00 f2 01 25 a9 80 3b 17 64 c0 a8	. T.R0 . . % . ; . d .
0020	01 66 00 00 e6 c9 03 00 69 03 37 33 20 aa aa aa	. f . . . . 1.73 . . .
0030	aa	..... . . . . . . . .
0040	aa	..... . . . . . . . .
0050	aa	..... . . . . . . . .
0060	aa	..... . . . . . . . .

Frame (frame), 98 bytes

Packets: 380 · Displayed: 221 (58.2%) · Load time: 0:0.5 · Profile: Default

Q8-

ip-ethereal-trace-1

icmp

No.	Time	Source	Destination	Protocol	Length	Info
9	6.176826	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
40	11.174495	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
65	16.179649	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
94	28.462264	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
135	33.470548	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
179	38.491817	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
219	43.485786	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
274	48.493073	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
330	53.501082	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
21	6.334320	12.122.10.22	192.168.1.102	ICMP	126	Time-to-live exceeded (Time to live exceeded in transit)

Frame 9: 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: PremaxPe\_8a:70:1a (00:20:e0:8a:70:1a)  
 ▶ 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: 0xd7c (40316)  
 ▶ Flags: 0x00  
 Fragment offset: 0  
 Time to live: 255

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 a9 0a d8 e4 01 c0 a8	. 8 . ! . . . 1 . . . .
0020	01 66 0b 00 d9 46 00 00 00 04 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 .

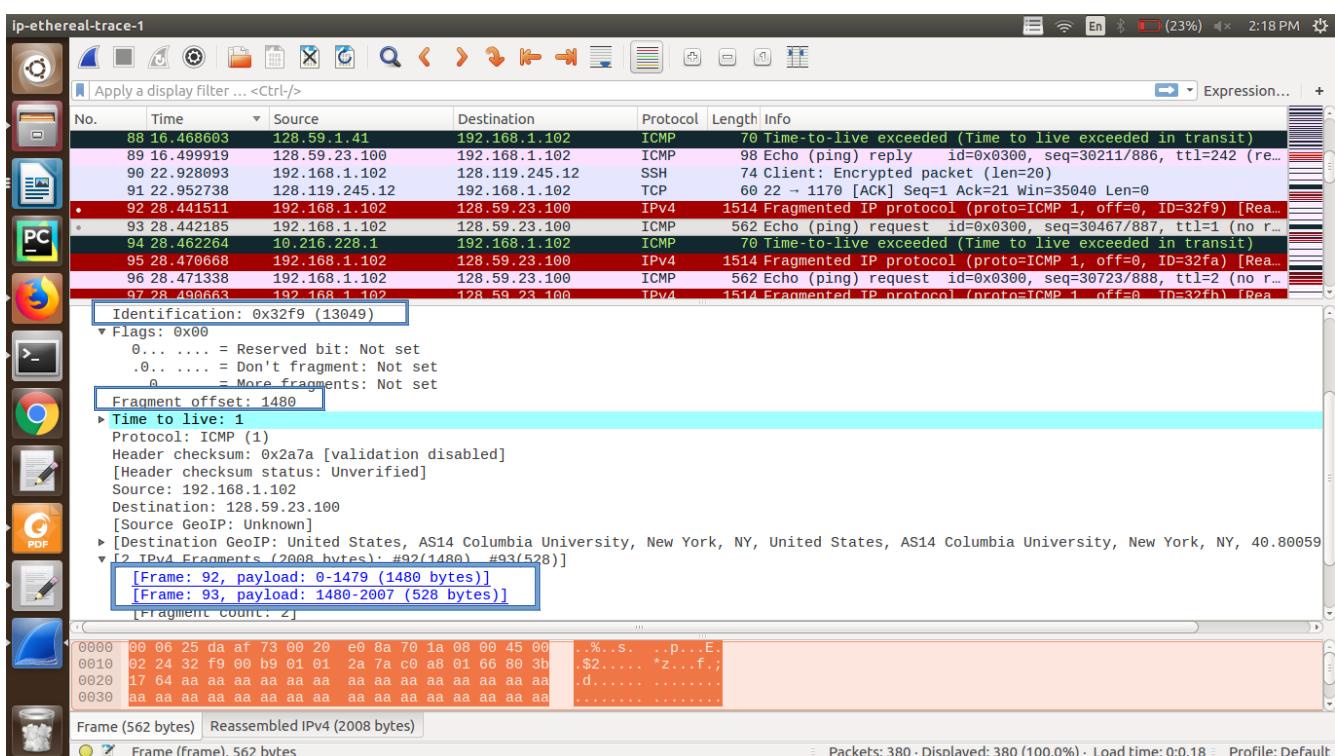
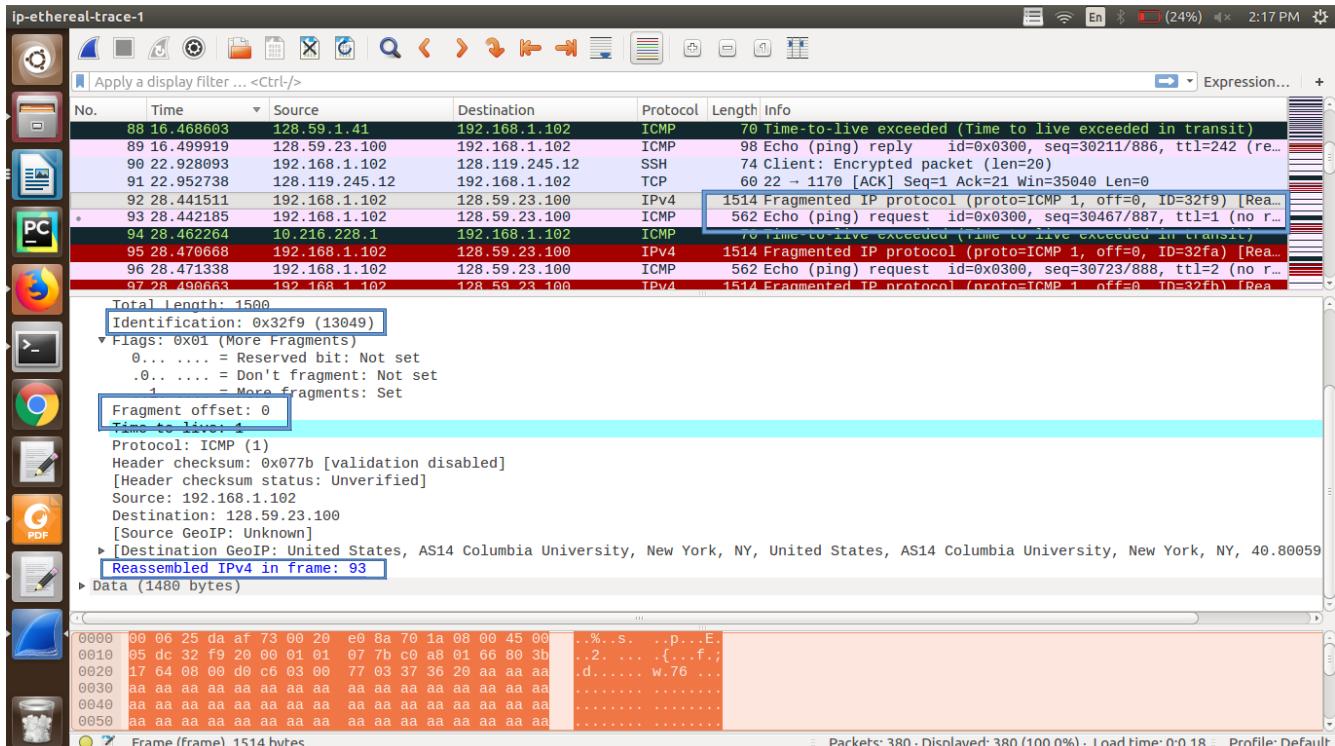
Frame (frame), 70 bytes

Packets: 380 · Displayed: 221 (58.2%) · Load time: 0:0.5 · Profile: Default

Q9 - Yes, TTL and the identification field remain unchanged for all the ICMP TTL-exceeded replies sent to computer sent by the nearest first hop router.  
 TTL Field doesn't change because TTL for first hop router remains the same.

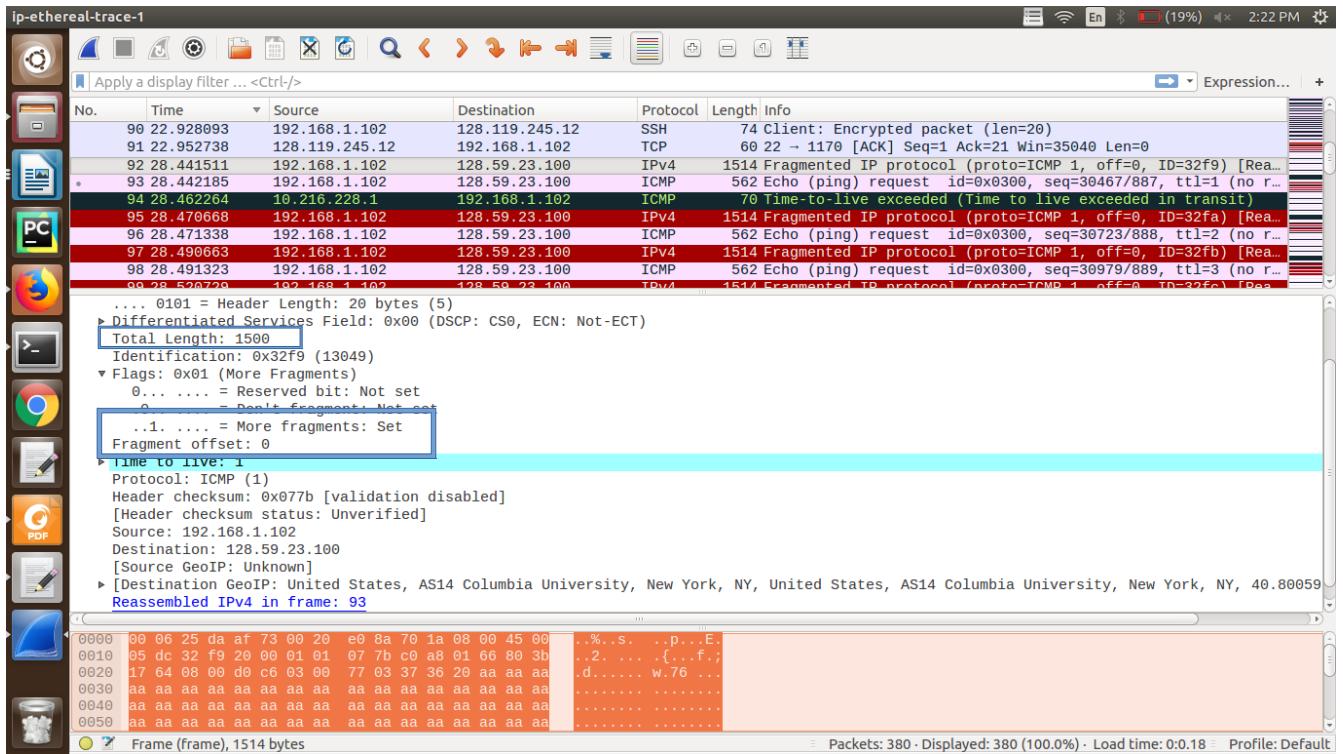
Identification field doesn't change because of the gateway routing loop.

Q10- Yes, message has been fragmented across more than one IP datagram



Q11 - a) The More Fragments bit in flags section in the IP header indicates that the datagram has been fragmented.

- b) The Fragment Offset being set to zero indicates that the given fragment is the first fragment
- c) This given IP Datagram (i.e. the First Fragment of the original message) is 1500 bytes long (20 bytes header + 1480 bytes of payload).



Q12 - a) The Fragment Offset field being set to 1480 indicates that this is not the first fragment of an IP datagram.

b) No, there are no more fragments of the given IP datagram after this as the more fragments bit is clear in the flags field of the IP datagram header.

ip-ethereal-trace-1

Apply a display filter ... <Ctrl-/>

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	68	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=32f9) [Reassembly needed]
93	28.442185	192.168.1.102	128.59.23.100	ICMP	562	Echo (ping) request id=0x0300, seq=30467/887, ttl=1 (no r...)
94	28.462264	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
95	28.470668	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=32fa) [Reassembly needed]
96	28.471338	192.168.1.102	128.59.23.100	ICMP	562	Echo (ping) request id=0x0300, seq=30723/888, ttl=2 (no r...)
97	28.490663	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=32fb) [Reassembly needed]
98	28.491323	192.168.1.102	128.59.23.100	ICMP	562	Echo (ping) request id=0x0300, seq=30979/889, ttl=3 (no r...)
99	28.520729	192.168.1.102	128.59.23.100	TCP	4	1514 Fragmented IP protocol (proto=TCP 1, off=0, ID=32fc) [Reassembly needed]

Frame 93: 562 bytes on wire (4496 bits), 562 bytes captured (4496 bits)

Ethernet II, Src: PremaxPe\_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG\_da:af:73 (00:06:25:da:af:73)

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)  
Flags: 0x00  
0.... .... = Reserved bit: Not set  
0.... .... = Don't fragment: Not set  
0.... .... = More fragments: Not set  
Fragment offset: 1480  
Time to live: 1  
Protocol: ICMP (1)  
Header checksum: 0x2a7a [validation disabled]  
[Header checksum status: Unverified]  
Source: 192.168.1.102

Frame (562 bytes) Reassembled IPv4 (2008 bytes)

Frame (frame), 562 bytes

Packets: 380 · Displayed: 380 (100.0%) · Load time: 0:0.18 · Profile: Default

Q13 - The fields in the IP Header that change between the first and second fragment are:

- Fragment Offset.
- The Total Length field of IP header.
- The More Fragments bit of the Flags field.
- Checksum

ip-ethereal-trace-1

Apply a display filter ... <Ctrl-/>

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	68	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=32f9) [Reassembly needed]
93	28.442185	192.168.1.102	128.59.23.100	ICMP	562	Echo (ping) request id=0x0300, seq=30467/887, ttl=1 (no r...)
94	28.462264	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
95	28.470668	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=32fa) [Reassembly needed]
96	28.471338	192.168.1.102	128.59.23.100	ICMP	562	Echo (ping) request id=0x0300, seq=30723/888, ttl=2 (no r...)
97	28.490663	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=32fb) [Reassembly needed]
98	28.491323	192.168.1.102	128.59.23.100	ICMP	562	Echo (ping) request id=0x0300, seq=30979/889, ttl=3 (no r...)
99	28.520729	192.168.1.102	128.59.23.100	TCP	4	1514 Fragmented IP protocol (proto=TCP 1, off=0, ID=32fc) [Reassembly needed]

Frame 92: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)

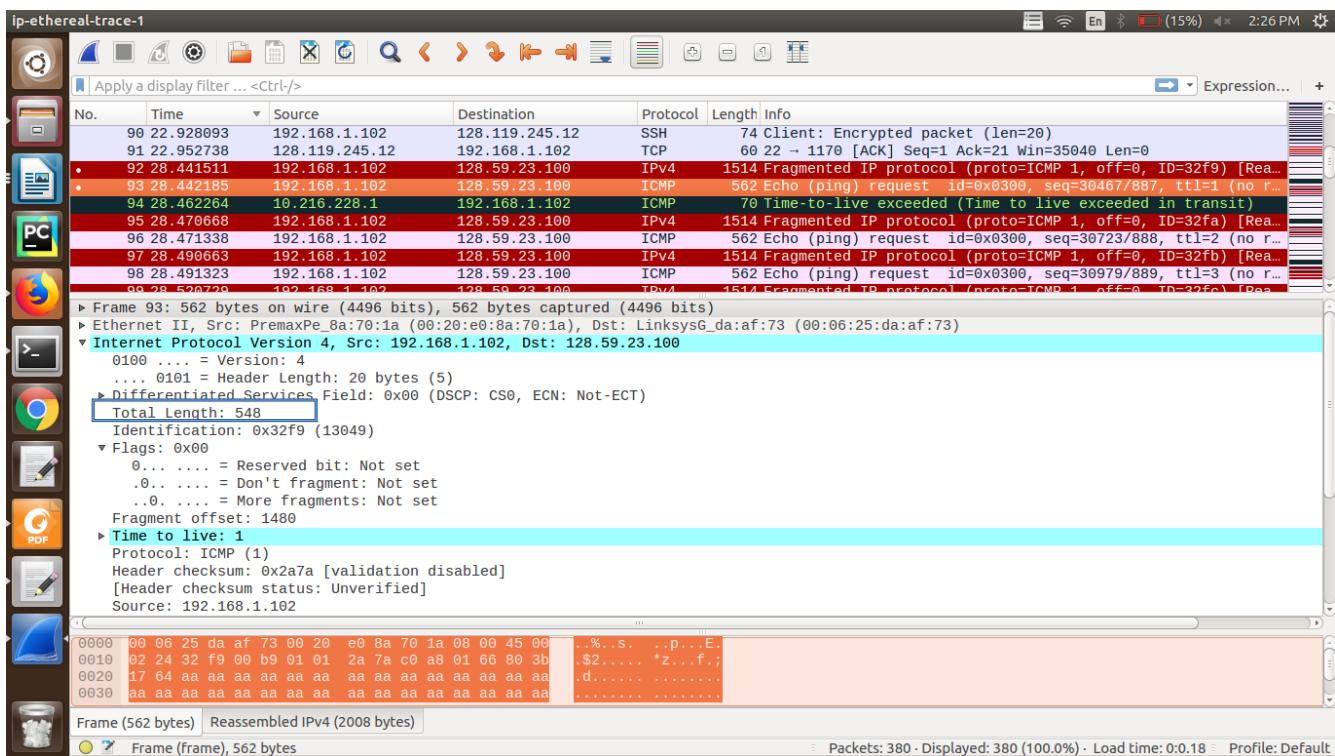
Ethernet II, Src: PremaxPe\_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG\_da:af:73 (00:06:25:da:af:73)

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)  
Flags: 0x01 (More Fragments)  
0.... .... = Reserved bit: Not set  
0.... .... = Don't fragment: Not set  
1.... .... = More fragments: Set  
Fragment offset: 0  
Time to live: 1  
Protocol: ICMP (1)  
Header checksum: 0x077b [validation disabled]  
[Header checksum status: Unverified]  
Source: 192.168.1.102

Frame (frame), 1514 bytes

Packets: 380 · Displayed: 380 (100.0%) · Load time: 0:0.18 · Profile: Default



Q 14 - There are 3 fragments created from the original datagram after switching the packet size to 3500 bytes.

ip-ethereal-trace-1

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
212	39.227649	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
213	39.314263	128.59.23.100	192.168.1.102	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=0956) [Rea...
214	39.322566	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=40195/925, ttl=242 (re...
215	41.038658	192.168.1.102	199.2.53.206	TCP	62	[TCP Retransmission] 1483 ~ 631 [SYN] Seq=0 Win=16384 Len=...
216	43.466136	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=3323) [Rea...
217	43.466808	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=1480, ID=3323) [...]
218	43.467629	192.168.1.102	128.59.23.100	ICMP	582	Echo (ping) request id=0x0300, seq=40451/926, ttl=1 (no r...
219	43.485786	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
220	43.492284	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=3324) [Rea...
221	43.492953	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=1480, ID=3324) [...]

Frame 216: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)

Ethernet II, Src: PremaxPe\_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG\_da:af:73 (00:06:25:da:af:73)

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: 0x01 (More Fragments)  
0... .... = Reserved bit: Not set  
.0... .... = Don't fragment: Not set  
1... .... = More fragments: Set  
Fragment offset: 0  
Time to live: 1  
Protocol: ICMP (1)  
Header checksum: 0x0751 [validation disabled]  
[Header checksum status: Unverified]  
Source: 192.168.1.102

Frame (frame), 1514 bytes

ip-ethereal-trace-1

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
212	39.227649	128.59.1.41	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
213	39.314263	128.59.23.100	192.168.1.102	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=0956) [Rea...
214	39.322566	128.59.23.100	192.168.1.102	ICMP	562	Echo (ping) reply id=0x0300, seq=40195/925, ttl=242 (re...
215	41.038658	192.168.1.102	199.2.53.206	TCP	62	[TCP Retransmission] 1483 ~ 631 [SYN] Seq=0 Win=16384 Len=...
216	43.466136	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=3323) [Rea...
217	43.466808	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=1480, ID=3323) [...]
218	43.467629	192.168.1.102	128.59.23.100	ICMP	582	Echo (ping) request id=0x0300, seq=40451/926, ttl=1 (no r...
219	43.485786	10.216.228.1	192.168.1.102	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
220	43.492284	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=0, ID=3324) [Rea...
221	43.492953	192.168.1.102	128.59.23.100	IPv4	1514	Fragmented IP protocol (proto=ICMP 1, off=1480, ID=3324) [...]

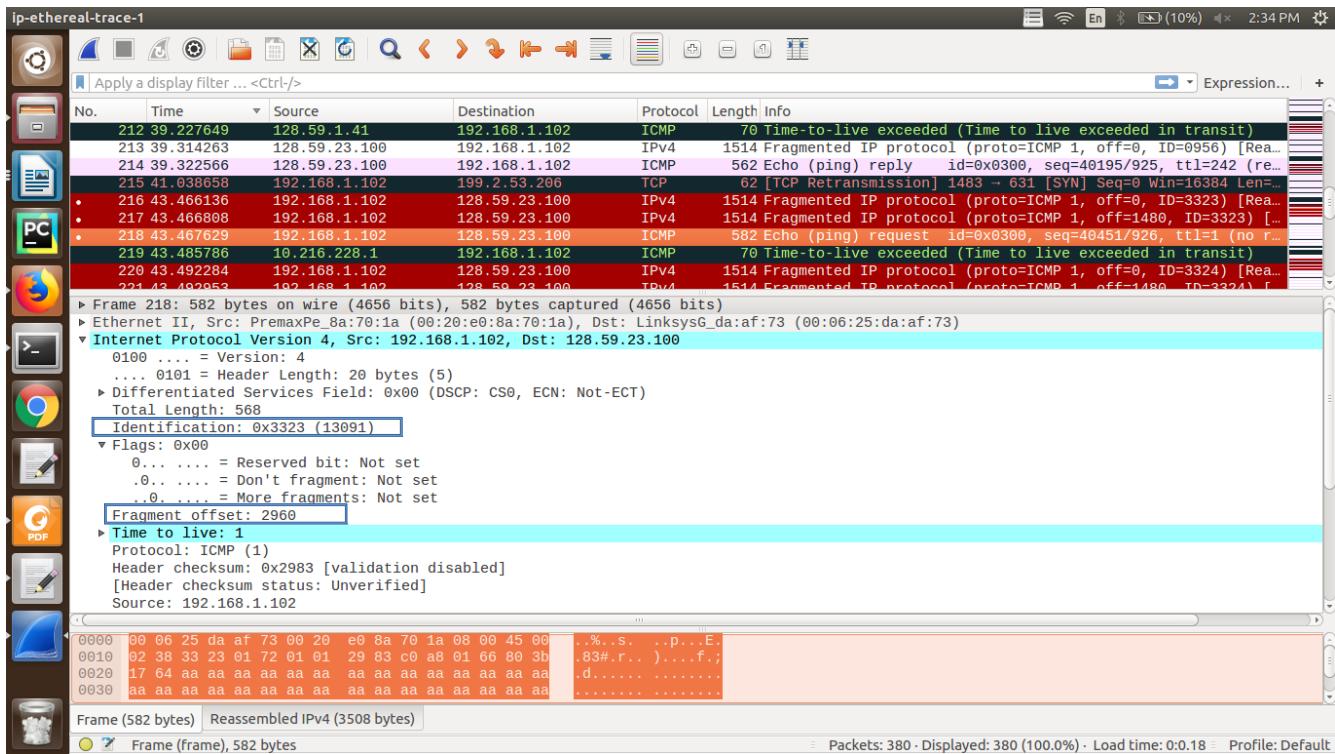
Frame 217: 1514 bytes on wire (12112 bits), 1514 bytes captured (12112 bits)

Ethernet II, Src: PremaxPe\_8a:70:1a (00:20:e0:8a:70:1a), Dst: LinksysG\_da:af:73 (00:06:25:da:af:73)

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: 0x01 (More Fragments)  
0... .... = Reserved bit: Not set  
.0... .... = Don't fragment: Not set  
1... .... = More fragments: Set  
Fragment offset: 1480  
Time to live: 1  
Protocol: ICMP (1)  
Header checksum: 0x0698 [validation disabled]  
[Header checksum status: Unverified]  
Source: 192.168.1.102

Frame (frame), 1514 bytes



## Q15 -

The fields that change between all fragments are

- a) Fragment Offset
- b) Header Checksum

The Fields that change within some datagrams are

- a) The More fragment bit is set for the first and second datagram, whereas it is clear for the third datagram
- b) The Total Length field is set to 1500 bytes for the first and second datagram, whereas for the third datagram it is 540 bytes.

