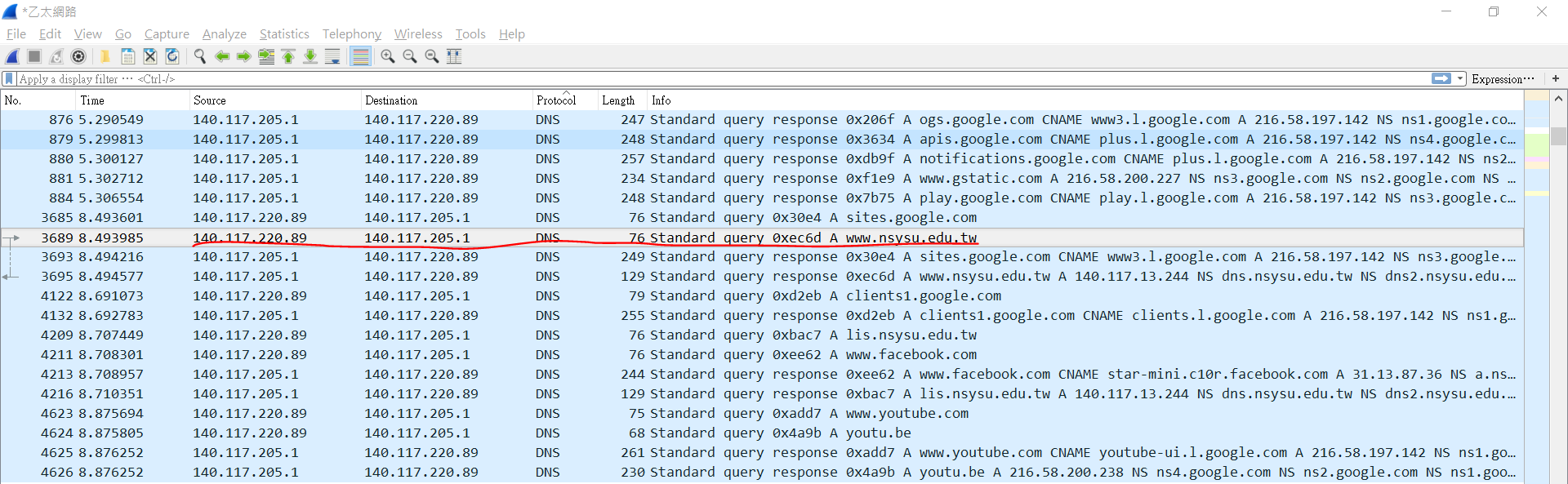
2017 Advanced Computer Networks Homework 1

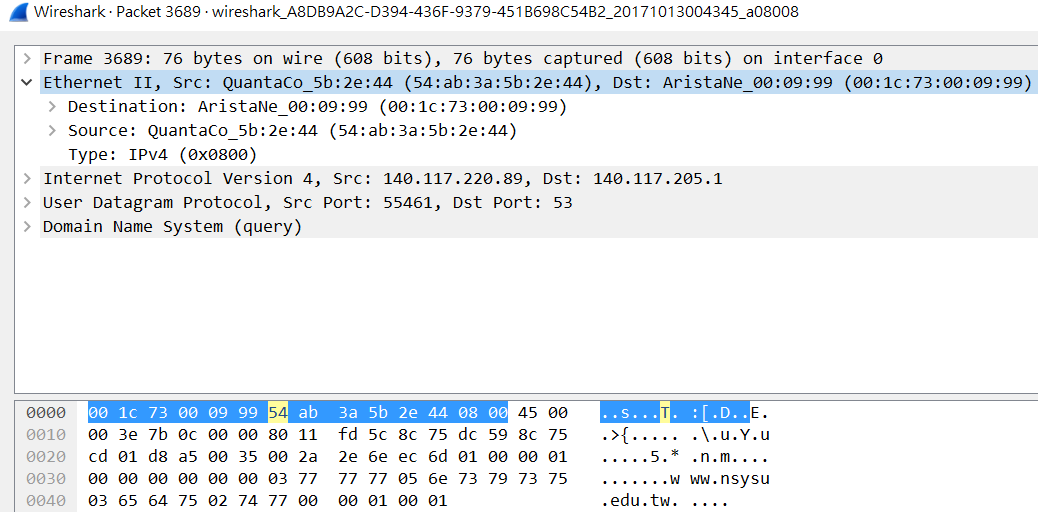
M063040050 曾國維

**Part 1: Web Browsing (DNS, TCP)**

1. Find the first DNS request packet sent by the client. (Request for <cse.nsysu.edu.tw>)



* 1. Examine the Ethernet



* + 1. What is the Ethernet address of the source and destination?

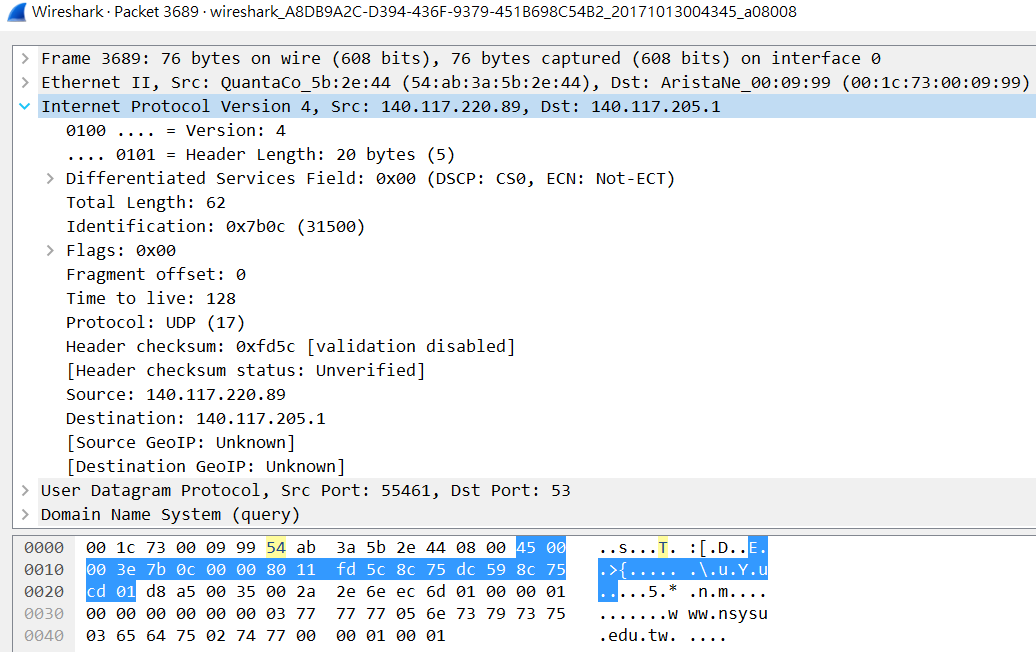
Ans: Source: 54:ab:3a:5b:2e:44

Destination: 00:1c:73:00:09:99

* + 1. What is the content of the type field in the Ethernet frame?

Ans: IPv4(0x0800)

* 1. Examine the Internet Protocol



* + 1. What is the IP address of the source and destination?

Ans: Source: 140.117.220.89

Destination: 140.117.205.1

* + 1. What is the header length? What is the total packet length?

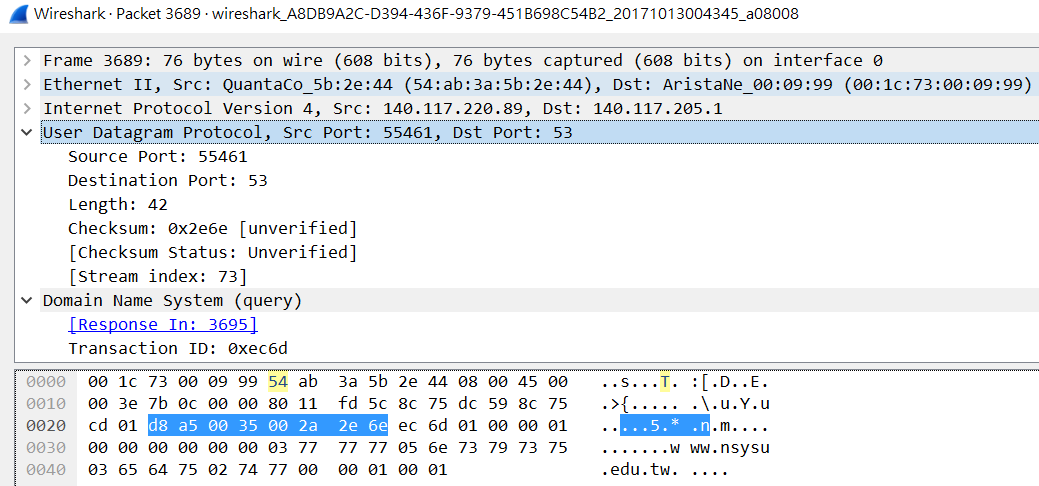
Ans: Header length: 20bytes

Packet length: 62bytes

* + 1. Identify the protocol type field. What is the number and type of the protocol in the payload?

Ans: UDP(17)

* 1. Examine the User Datagram Protocol



* + 1. Identify the client ephemeral port number and the server well-known port number.

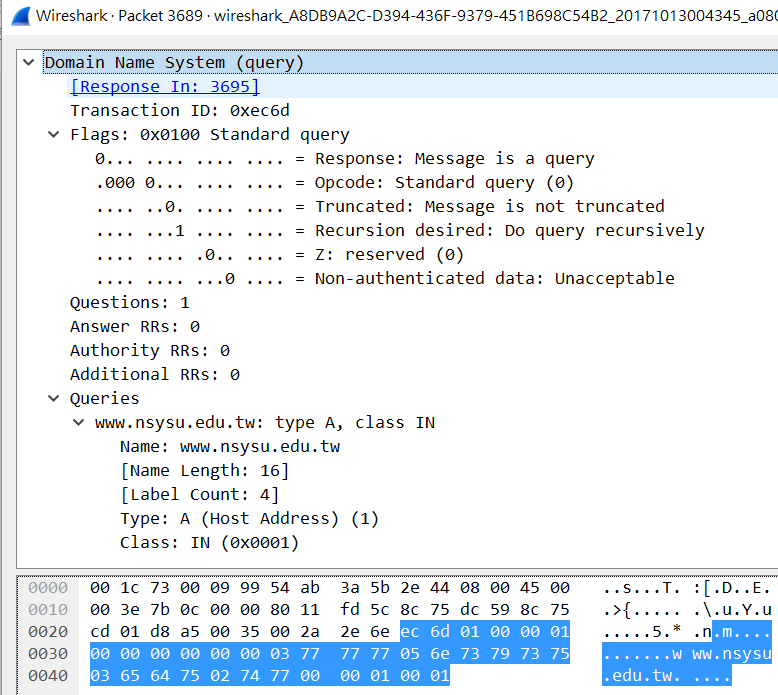
Ans: client ephemeral port number:55461

server well-known port number:17

* + 1. What type of application layer protocol is in the payload?

Ans:由UDP port53可知，協定為DNS

* 1. Examine the Domain Name System (query)



* + 1. What field indicates whether the message is a query or a response?

Ans:由Flags第1個bit為0可以知道message is a query

* + 1. What is the query transaction ID?

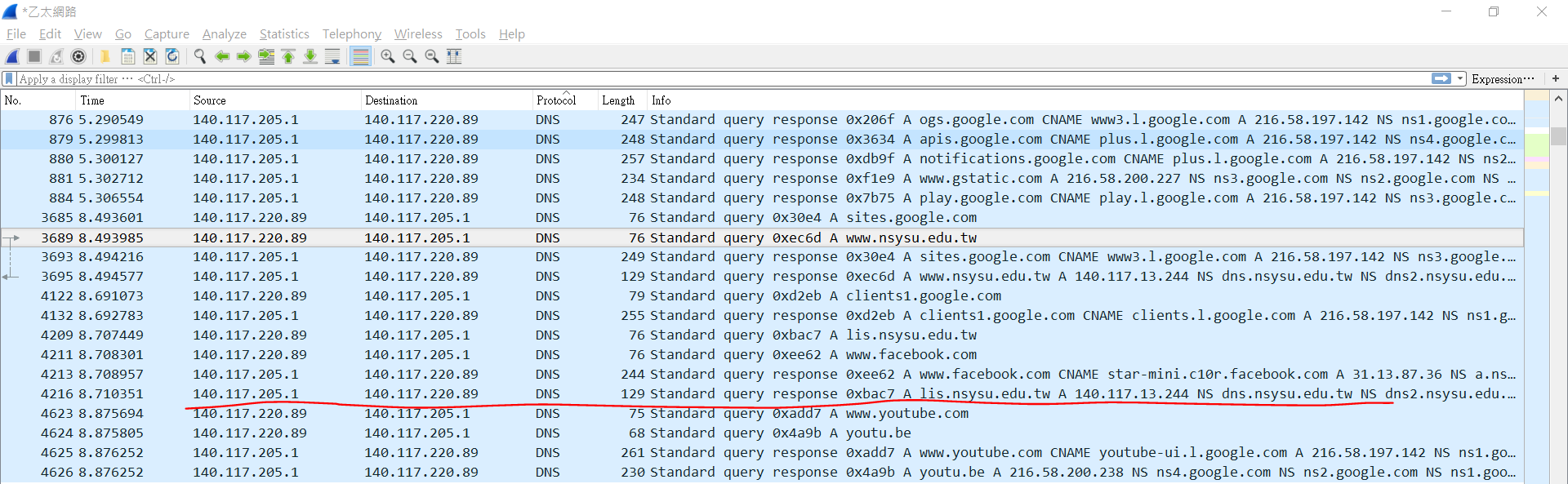
Ans: 0xec6d = 60525(10)

* + 1. Identify the fields that carry the type and class of the query.

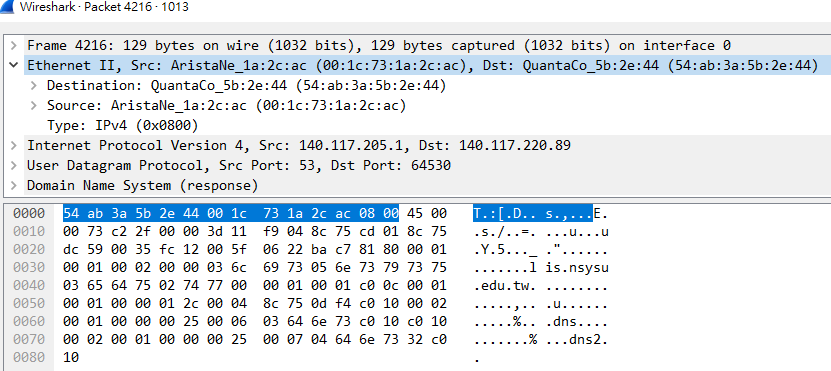
And: Type:A

Class:IN

1. Find the DNS response packet which is response to the DNS request packet from the above question.



* 1. Examine the Ethernet



* + 1. What is the Ethernet address of the source and destination?

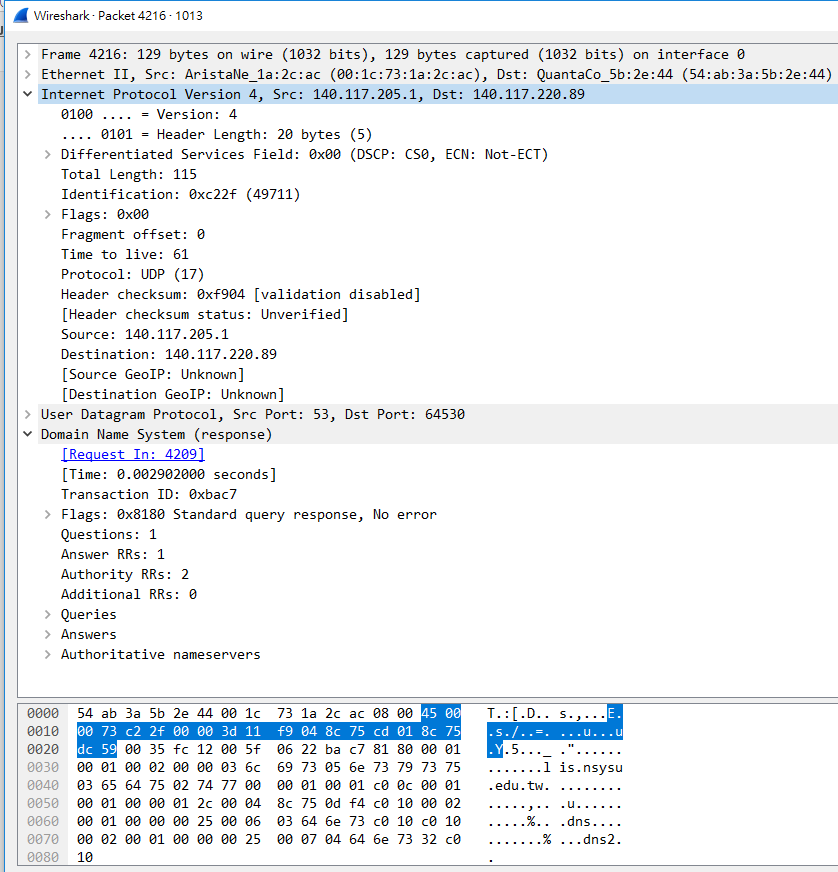
Ans: Source: 00:1c:73:1a:2c:ac

Destination: 54:ab:3a:5b:2e:44

* + 1. What is the content of the type field in the Ethernet frame?

Ans:IPv4(0x0800)

* 1. Examine the Internet Protocol & Domain Name System (response)



* + 1. What is the IP address of the source and destination?

Ans: Source:140.117.205.1

Destionation:140.117.220.89

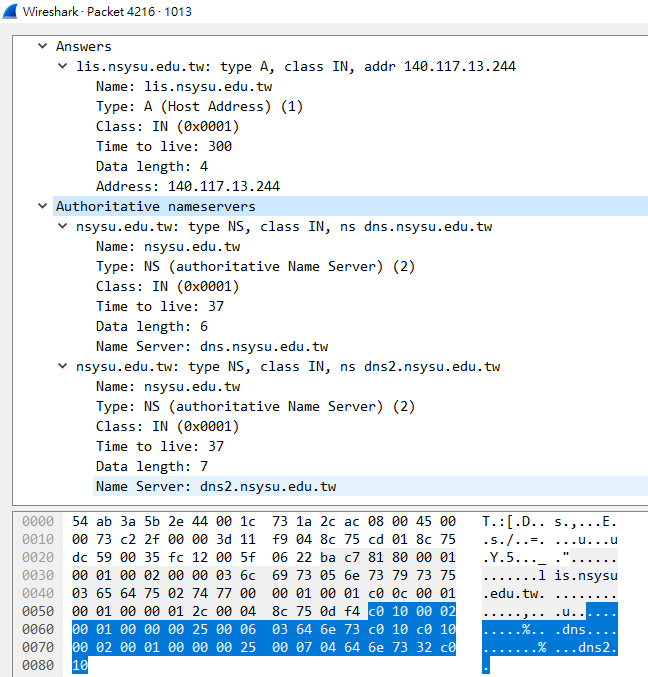
* + 1. What is the header length? What is the total packet length? Is it longer than the query?

Ans: Header length:20bytes

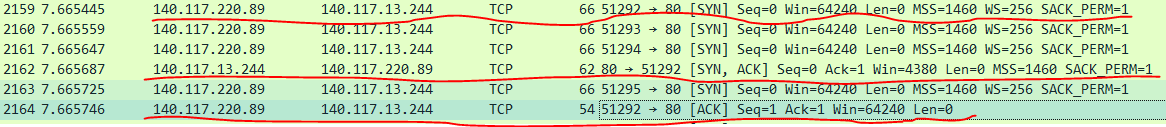
Packet length:115bytes，Query的長度是包含在packet當中，所以packet length較長

* + 1. How many answers are provided in the response message? Compare the answers and their time-to-live values.

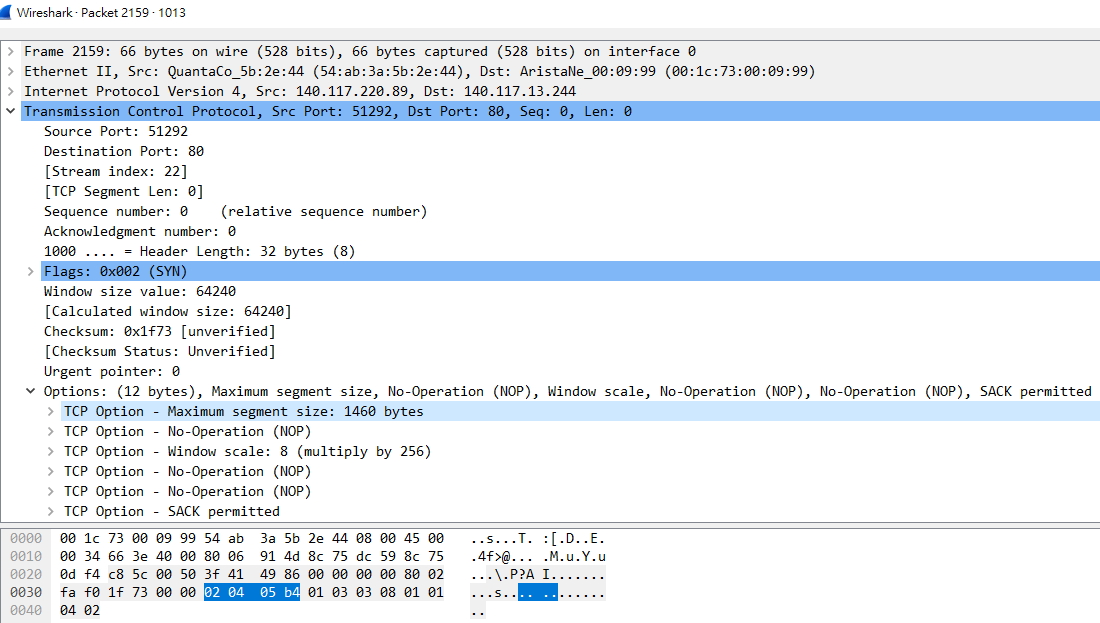
Ans: RR type不同，A為查詢主機位址紀錄，NS為定義有管轄權的名稱伺服器，TTL分別為:300,37,37



1. Find the first TCP packet sent by client. (The destination IP address is response from above question.)



* 1. Examine the Transmission Control Protocol



* + 1. What are the ephemeral port number used by the client and the well-known port number used by the server?

Ans: ephemeral port number:51292

well-known port number:80

* + 1. What is the length of the TCP segment?

Ans: 0

* + 1. What is the initial sequence number for the segments from the client to the server?

Ans: 0

* + 1. What is the initial window size?

Ans: 64240

* + 1. What is the maximum segment size?

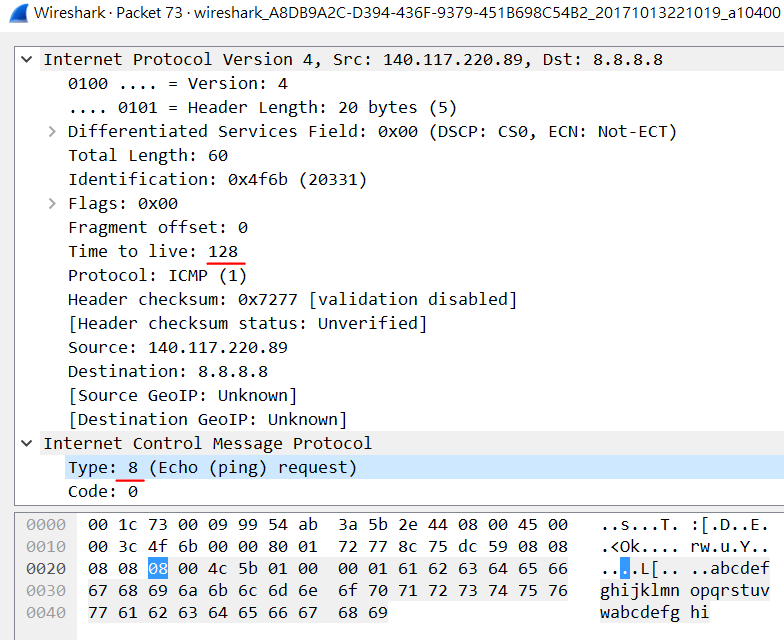
Ans: 1460bytes

* + 1. Find the hex character that contains the SYN flag bit

Ans:0x002

**Part 2: Probing the Internet (ICMP, PING, Traceroute)**

1. Ping Captured.
   1. Find the first ICMP Echo Request packet.



* + 1. First, examine the Internet Protocol. What is the Time-to-Live?

Ans: 128

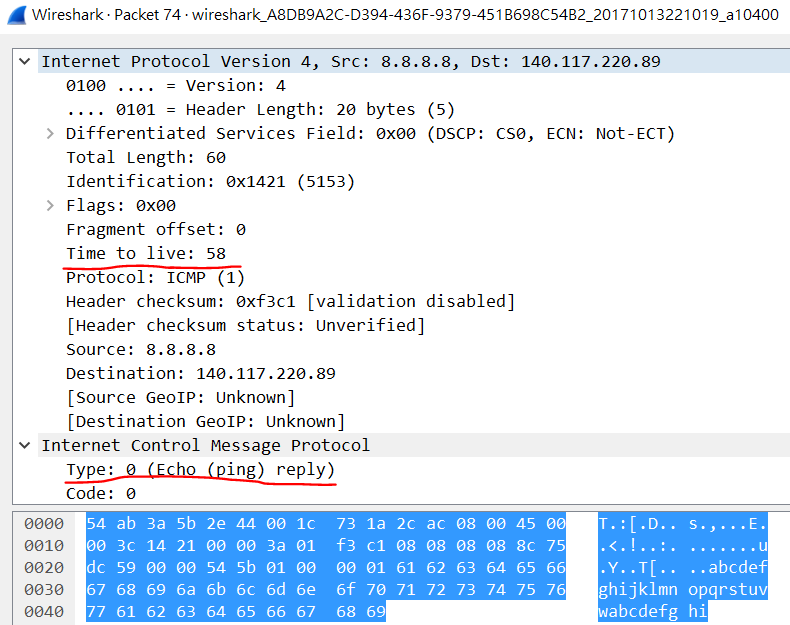
* + 1. Next examine the Internet Control Message Protocol. What is the ICMP message type?

Ans: 8(echo ping request)

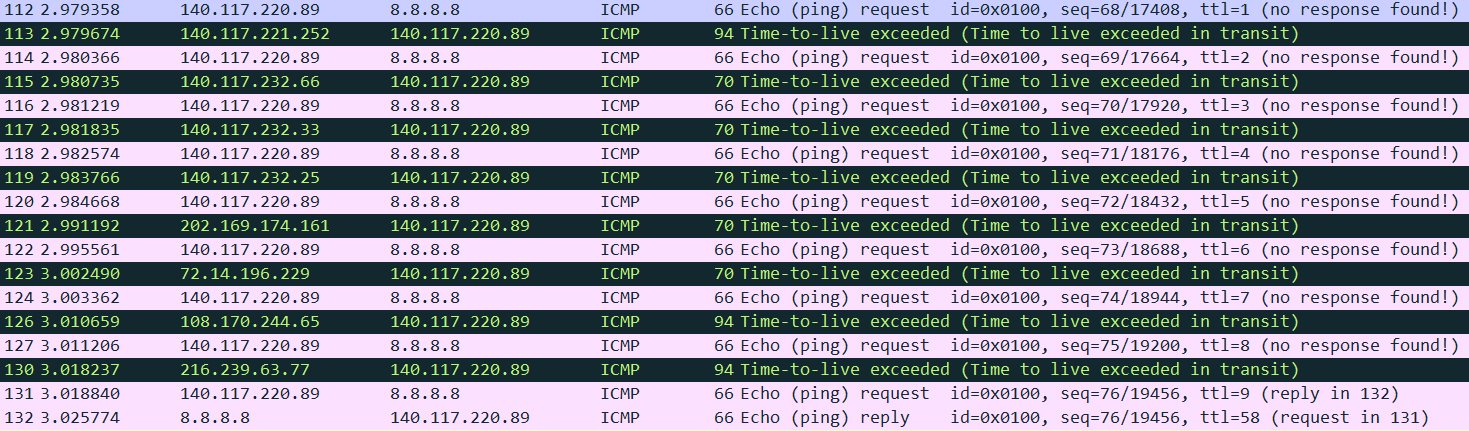
* 1. Find the first ICMP Echo Reply packet.

Ans: TTL:58

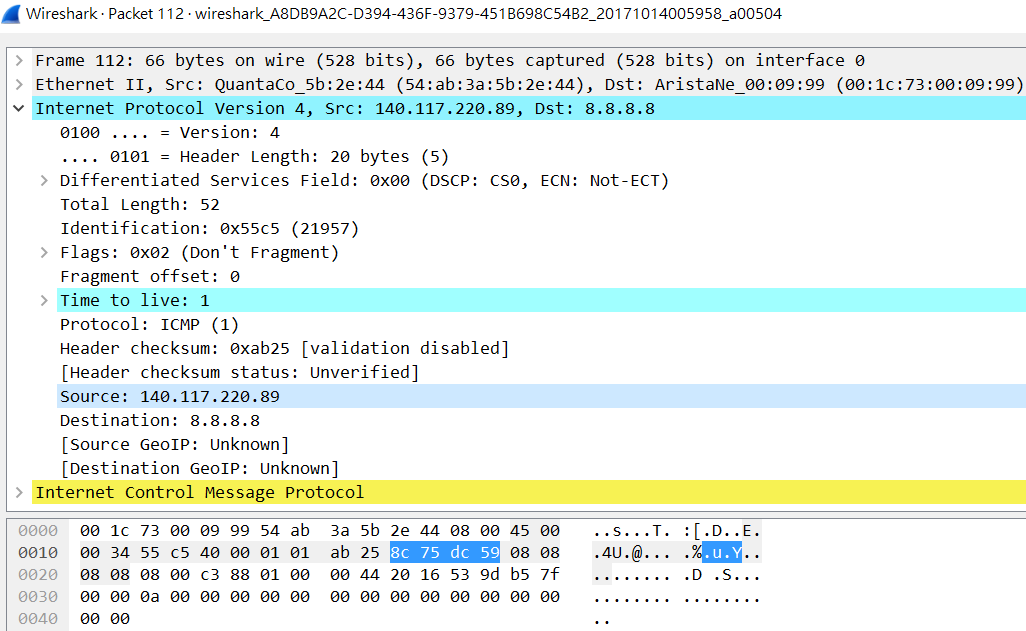
ICMP message type:0(echo ping reply)



1. Traceroute Captured.



* 1. Find the first ICMP Echo Request packet.



* + 1. Examine the Internet Protocol. What are the source and destination addresses?

Ans: source:140.117.220.89

Destination:8.8.8.8

* + 1. What are the protocol type and the Time-to-Live in the IP packet?

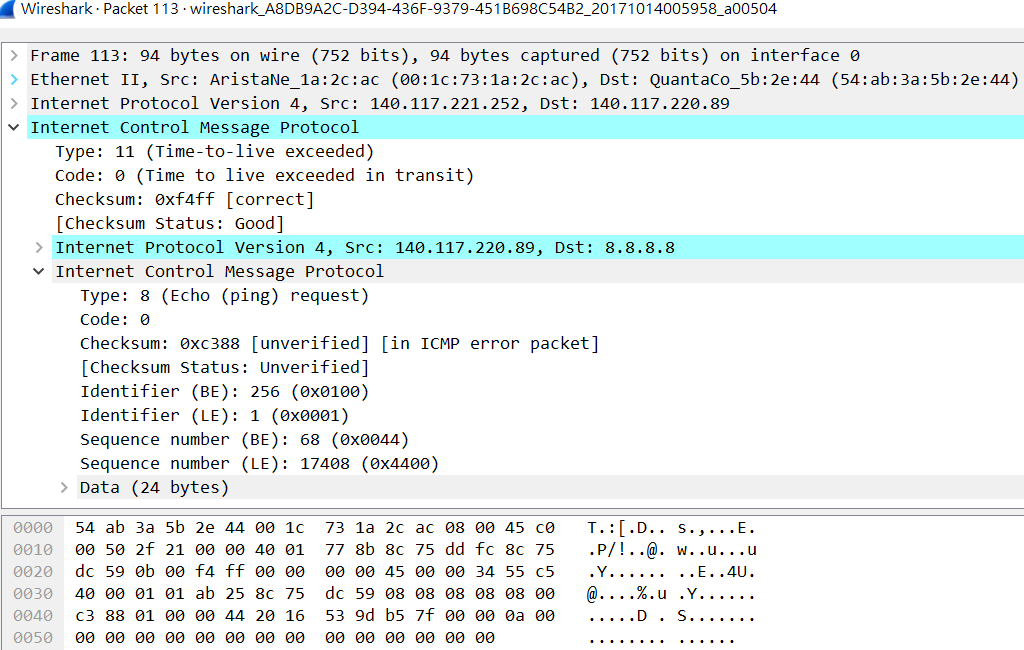
Ans: ICMP,TTL:1

* + 1. Next, examine the Internet Control Message Protocol. What is the ICMP message type? What are the message identifier and sequence number?

Ans: (BE) identifier:256, sequence number:68

(LE) identifier:1, sequence number:17408

* 1. Find an ICMP Time-to-live exceeded packet.



* + 1. Examine the Internet Protocol. What are the source and destination addresses?

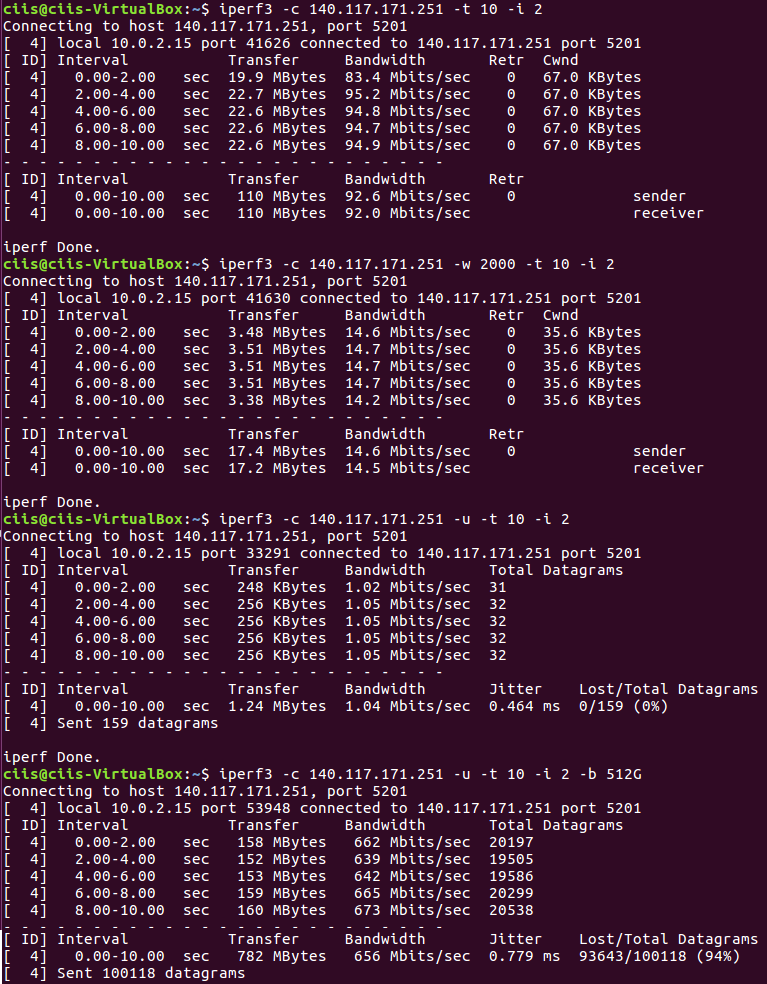
Ans: source:140.117.221.252

Destionation:140.117.220.89

* + 1. Next, examine the Internet Control Message Protocol. What is the ICMP message type?

Ans:8(echo ping request)

**Part 3 Measuring Network Bandwidth**



使用-w 2000 將window size設成2000K使得buffer減小，Transfer rate下降

使用-b 512G 將bandwidth 設為512G bits/sec ，Transfer rate上升，但buffer size不變讓UDP有較高的封包遺失率。