Computer Networks

Assignment – 2

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Part I

ICMP using ping

Quesion 1:

What is the IP address of your host? What is the IP address of the destination host?

Solution:

IP address(IPv6) of host is **2409:4f03:101c:741:302a:3544:1d9d:42d5** ***and IP address(IPv6) of the destination host is*** **2404:6800:4007:806: :2004.**

```
Frame 1: 118 bytes on wire (944 bits), 118 bytes captured (944 bits) on interface wlo1, id 0
Ethernet II, Src: AzureWav_91:b4:87 (34:6f:24:91:b4:87), Dst: 56:32:c7:b1:34:64 (56:32:c7:b1:34:64)
Internet Protocol Version 6, Src: 2409:40f3:101c:741:302a:3544:1d9d:42d5, Dst: 2404:6800:4007:806::2004
Internet Control Message Protocol v6
```

Question 2:

Why is it that an ICMP packet does not have source and destination port numbers?

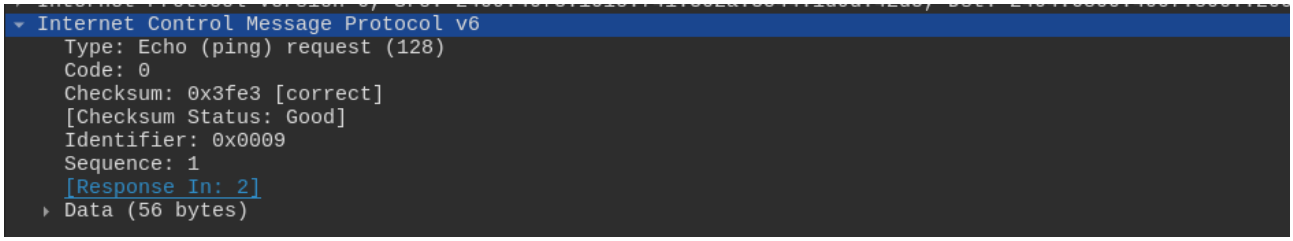
Solution:

The ICMP packet does not have source and destination port numbers because it was designed to communicate network-layer information between hosts and routers, not between application layer processes. Each ICMP packet has a "Type" and a "Code". The Type/Code combination identifies the specific message being received. Since the network software itself interprets all ICMP messages, no port numbers are needed to direct the ICMP message to an application layer process.

Question 3:

Examine one of the ping request packets sent by your host. What are the ICMP type and code numbers? What other fields does this ICMP packet have? How many bytes are the checksum, sequence number and identifier fields?

Solution:



- **ICMP Type:** ***Echo (ping) request (128)***
- **Code:** ***0 indicating that it's a general Echo Request without any specific code associated with it.***
- ***The other fields of ICMP packet are Checksum,Identifier,Sequence.***
- ***Checksum is 2 bytes long, Sequence number is also 2 bytes long and Identifier field is also 2 bytes.***

Question 4:

Examine the corresponding ping reply packet. What are the ICMP type and code numbers? What other fields does this ICMP packet have? How many bytes are the checksum, sequence number and identifier fields?

Solution:

- **ICMP Type:** ***Echo (ping) reply (129)***
- **Code:** ***0 indicating that it's a general Echo Reply without any specific code associated with it.***

- ***The other fields of ICMP packet are Checksum,Identifier,Sequence and Response Time.***

- ***Checksum is 2 bytes long, Sequence number is also 2 bytes long and Identifier field is also 2 bytes.***

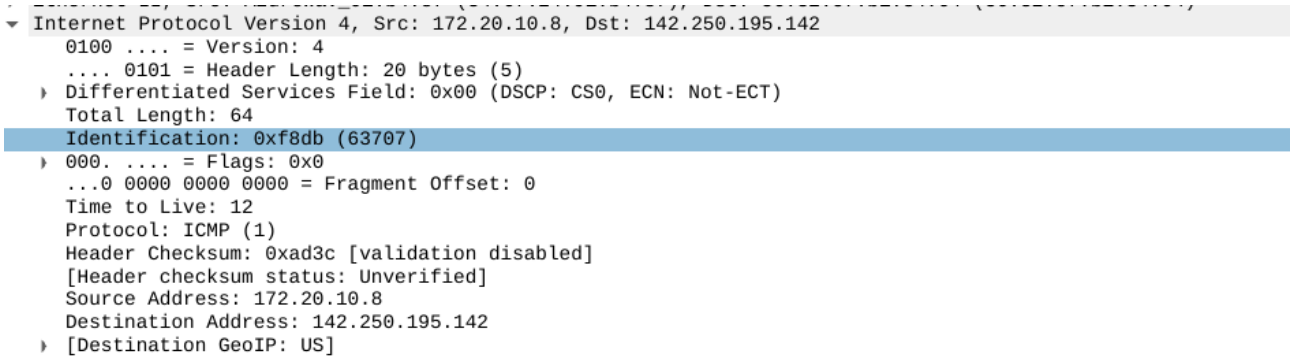
Part 2

`ICMP using traceroute`

Question 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.

Solution:



- **Header Length:** ***Indicates the size of the IP header. Here it's 20 bytes.***

- **Differentiated Services Field (DSCP):** ***Specifies priority or congestion control markings for quality of service.***

- **Total Length:** ***Specifies the overall size of the IP datagram***

- **Identification:** ***Provides a unique identifier for datagram fragments.***

- **Flags:** ***Indicates fragmentation status and other special settings.***

- **Time to Live (TTL):** ***Determines the maximum lifespan of a packet in the network.***

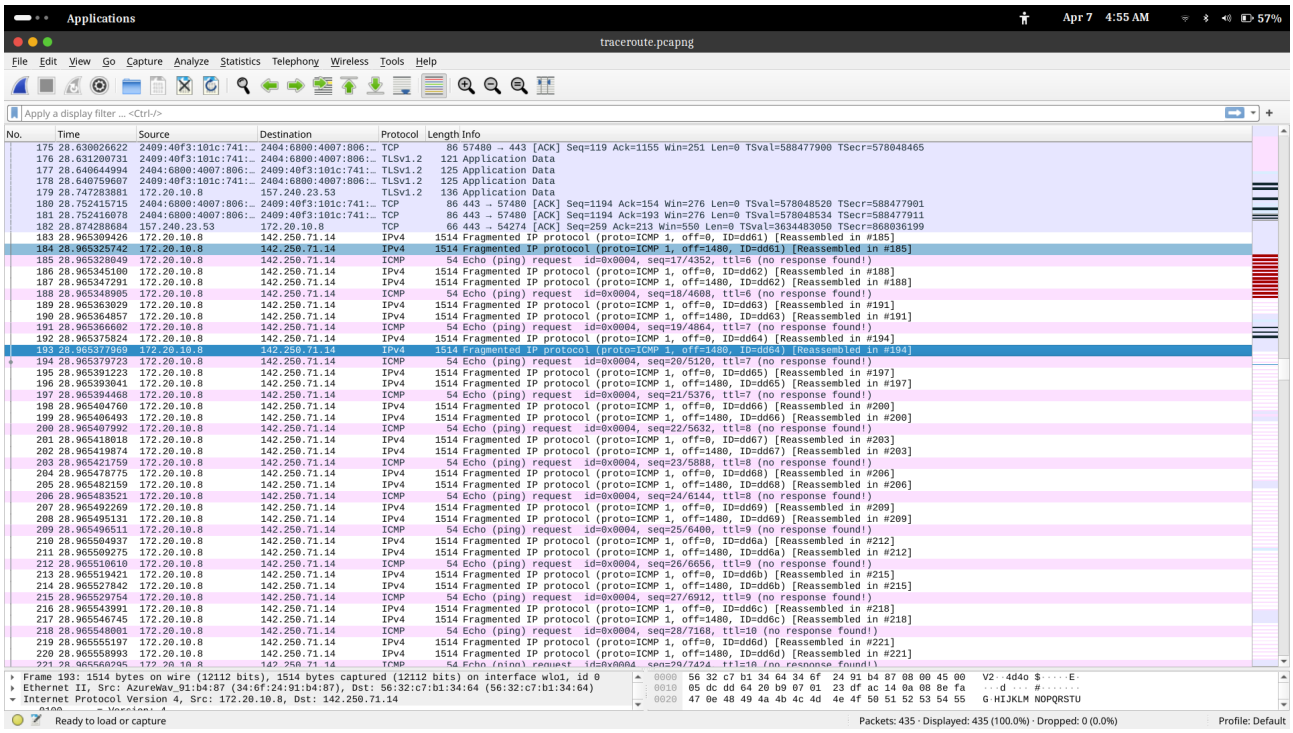
- **Protocol:** ***Specifies the protocol used in the IP payload, such as ICMP.***

Question 2:

Which of the IP datagrams are fragmented?

Solution:

Datagrams for the traceroute -I www.youtube.com 3000 are fragmented.



Question 3:

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

Solution:

- ***Header Checksum always change and TTL changes but not frequently.***

Question 4:

Which fields stay constant? Why?

Solution:

- **Version:** ***Utilizing IPv4 protocol consistently ensures a stable communication framework and addressing system.***
- **Header Length:** ***The IP header length remains fixed, indicating a static structure for basic ping requests.***
- ***Differentiated Services Field (DSCP):*** ***DSCP is likely to maintain a consistent configuration for prioritization or congestion control during ping operations.***
- ***Total Length:*** ***The total datagram size remains constant, covering both the header and data segments throughout the series.***
- ***Protocol:*** ***The identification of the ICMP protocol persists due to the ongoing series of ICMP echo requests (pings).***
- ***Source Address:*** ***The sender's static IP address remains unchanged throughout the ping sequence.***
- ***Destination Address:*** ***A consistent target IP address persists across repeated pings to the same host.***