NETWORKS LAB ASSIGNMENT

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A. Comparing ARP packets and IP packets (MAC Headers)

The MAC address Header contains :

1. Destination MAC address
2. Source MAC Address
3. Type of Protocol

The TCP packets have an IPv4 type while the ARP packets have ARP type. The ARP packet is used to find the MAC address by the packet. You would notice the protocol ID for IP packet (TCP) is 6. For an ARP packet there is no protocol ID. but a type of packet as 0x0800

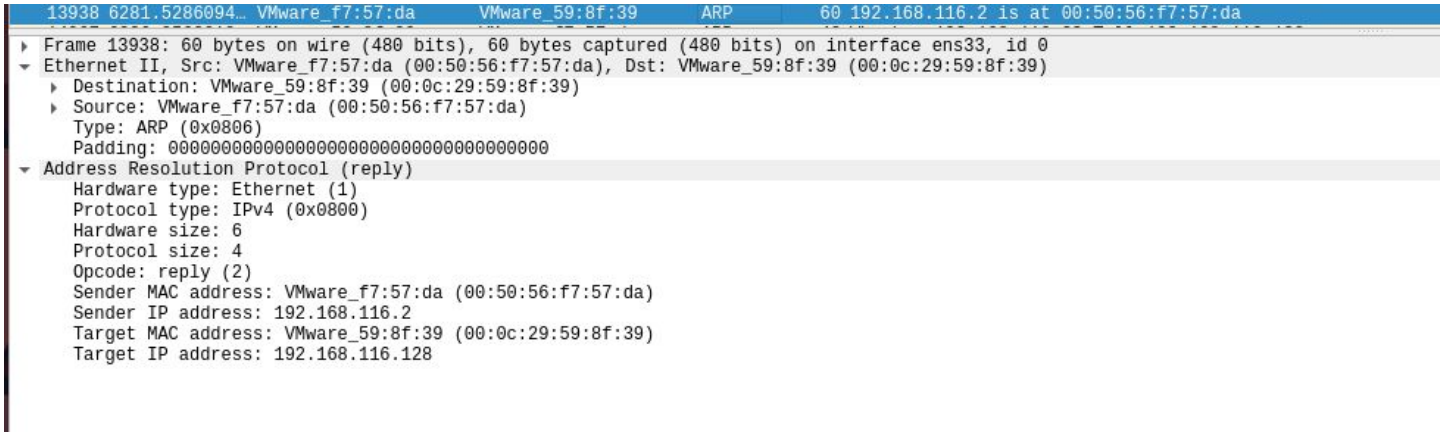


FIGURE : ARP PACKET

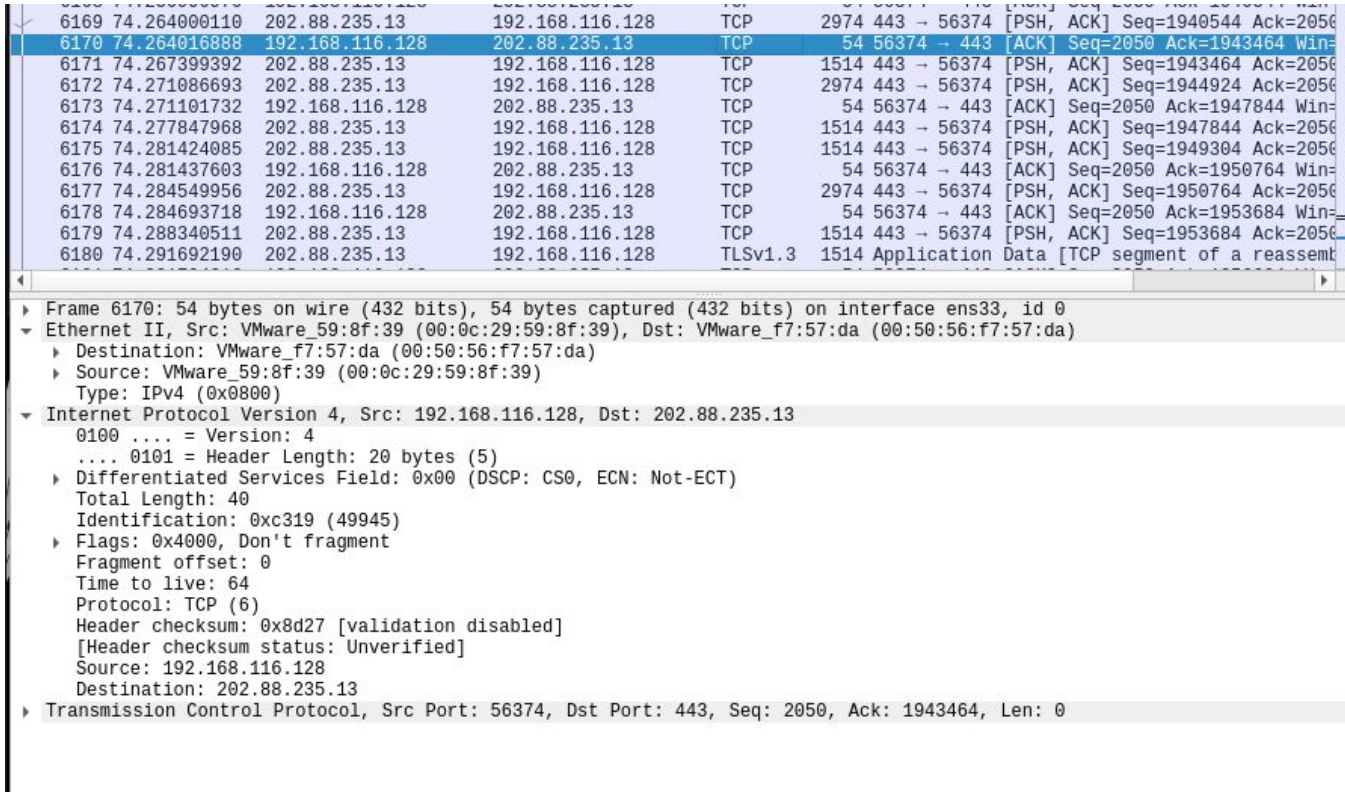
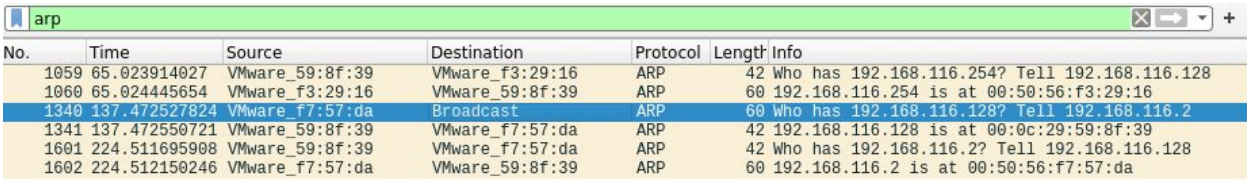


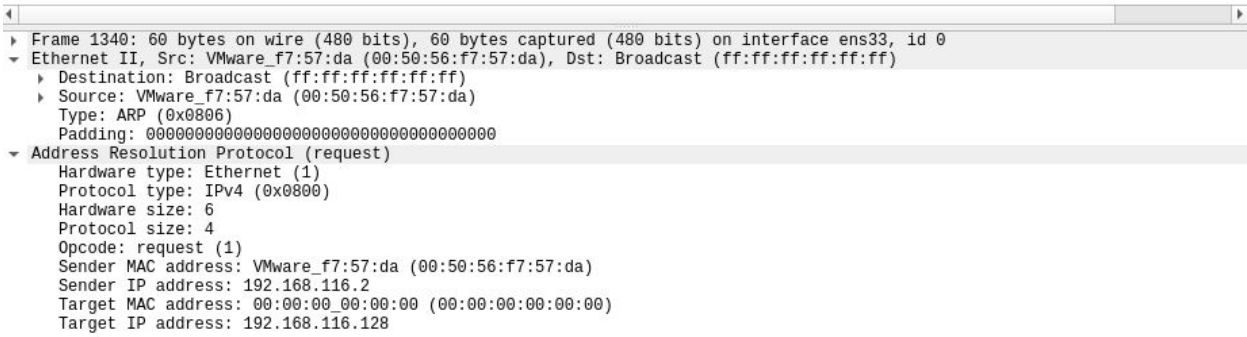
FIGURE : IPv4 PACKET

B. Destination of ARP packet

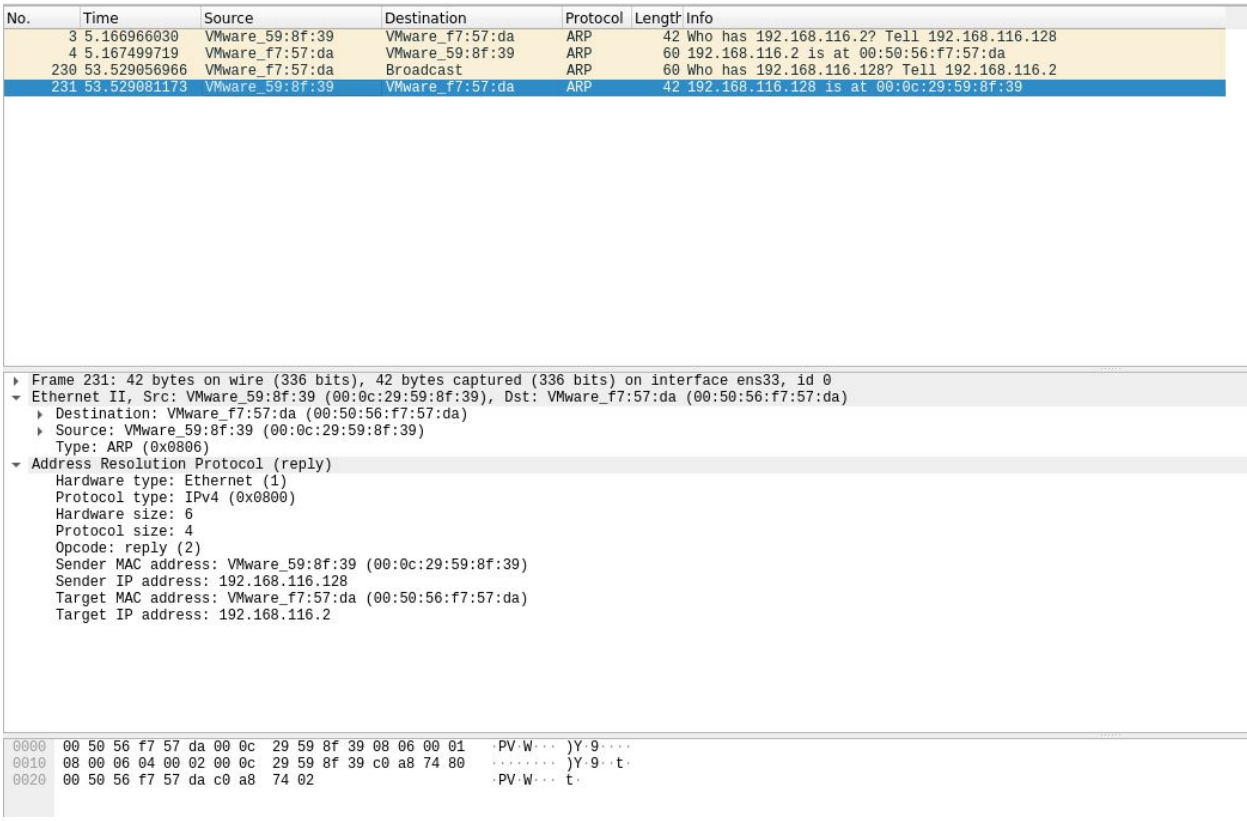
There can 3 destinations for an ARP packet

1. Broadcast where the request for the MAC address for the system is sent to a router having a network of systems





2. A reply where the requested MAC address is sent back to the client.



No.	Time	Source	Destination	Protocol	Length	Info
3	5.166966030	VMware_59:8f:39	VMware_f7:57:da	ARP	42	Who has 192.168.116.2? Tell 192.168.116.128
4	5.167499719	VMware_f7:57:da	VMware_59:8f:39	ARP	60	192.168.116.2 is at 00:50:56:f7:57:da
230	53.529056966	VMware_f7:57:da	Broadcast	ARP	60	Who has 192.168.116.128? Tell 192.168.116.2
231	53.529081173	VMware_59:8f:39	VMware_f7:57:da	ARP	42	192.168.116.128 is at 00:0c:29:59:8f:39

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▸ Frame 231: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface ens33, id 0
▾ Ethernet II, Src: VMware_59:8f:39 (00:0c:29:59:8f:39), Dst: VMware_f7:57:da (00:50:56:f7:57:da)
  ▸ Destination: VMware_f7:57:da (00:50:56:f7:57:da)
  ▸ Source: VMware_59:8f:39 (00:0c:29:59:8f:39)
    Type: ARP (0x0806)
▾ Address Resolution Protocol (reply)
    Hardware type: Ethernet (1)
    Protocol type: IPv4 (0x0800)
    Hardware size: 6
    Protocol size: 4
    Opcode: reply (2)
    Sender MAC address: VMware_59:8f:39 (00:0c:29:59:8f:39)
    Sender IP address: 192.168.116.128
    Target MAC address: VMware_f7:57:da (00:50:56:f7:57:da)
    Target IP address: 192.168.116.2
```

```
0000  00 50 56 f7 57 da 00 0c  29 59 8f 39 08 06 00 01   ·PV·W··· )Y·9····
0010  08 00 06 04 00 02 00 0c  29 59 8f 39 c0 a8 74 80   ········ )Y·9··t·
0020  00 50 56 f7 57 da c0 a8  74 02                     ·PV·W··· t·
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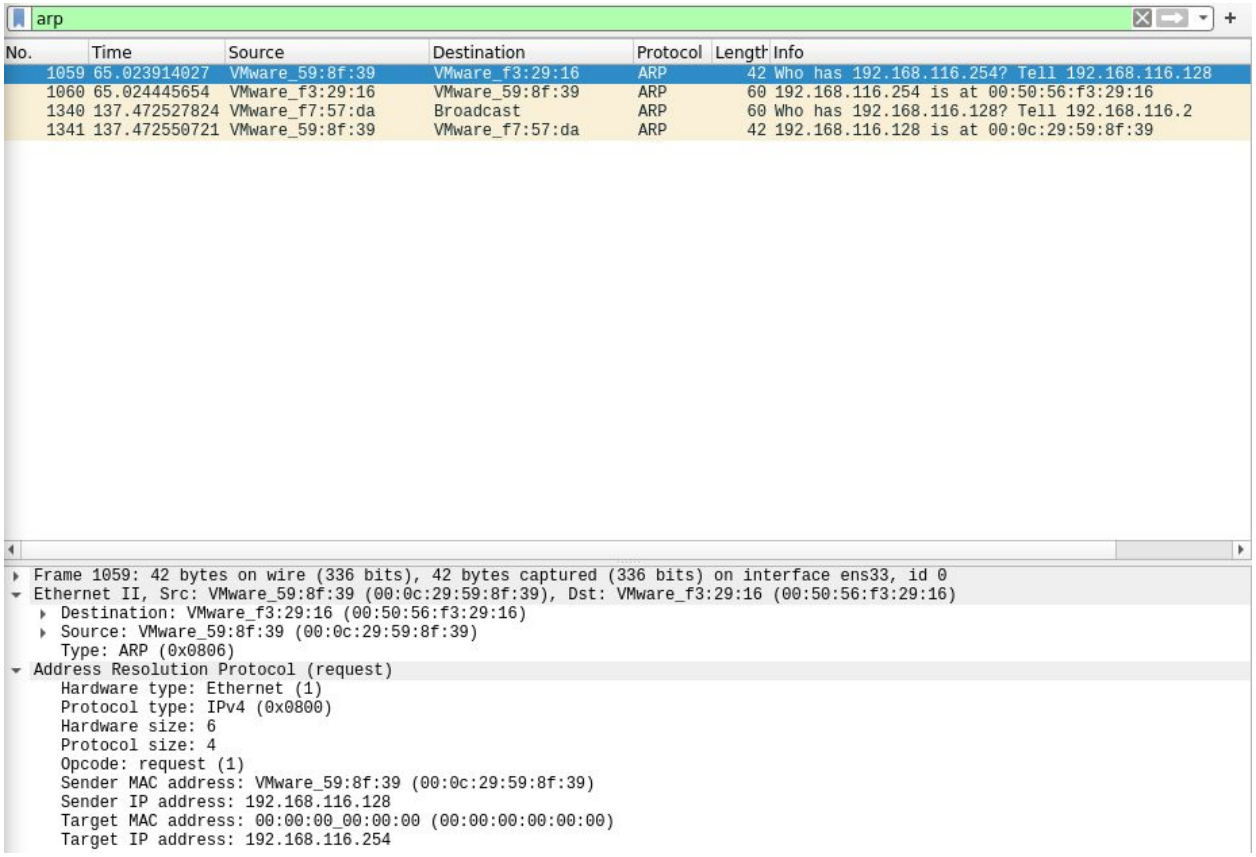
3. A request to know the MAC address from the client to a specific IP address



C. Type of ARP packets

Here there are 2 ARP packets is a requests and reply. The 1 and 3 are requests and the 2 is a reply. The first is a request is broadcasted to all devices 3 is to one device and 2 is a reply ie the MAC address from the device back.

D. Payloads of ARP packets

The Payload contains

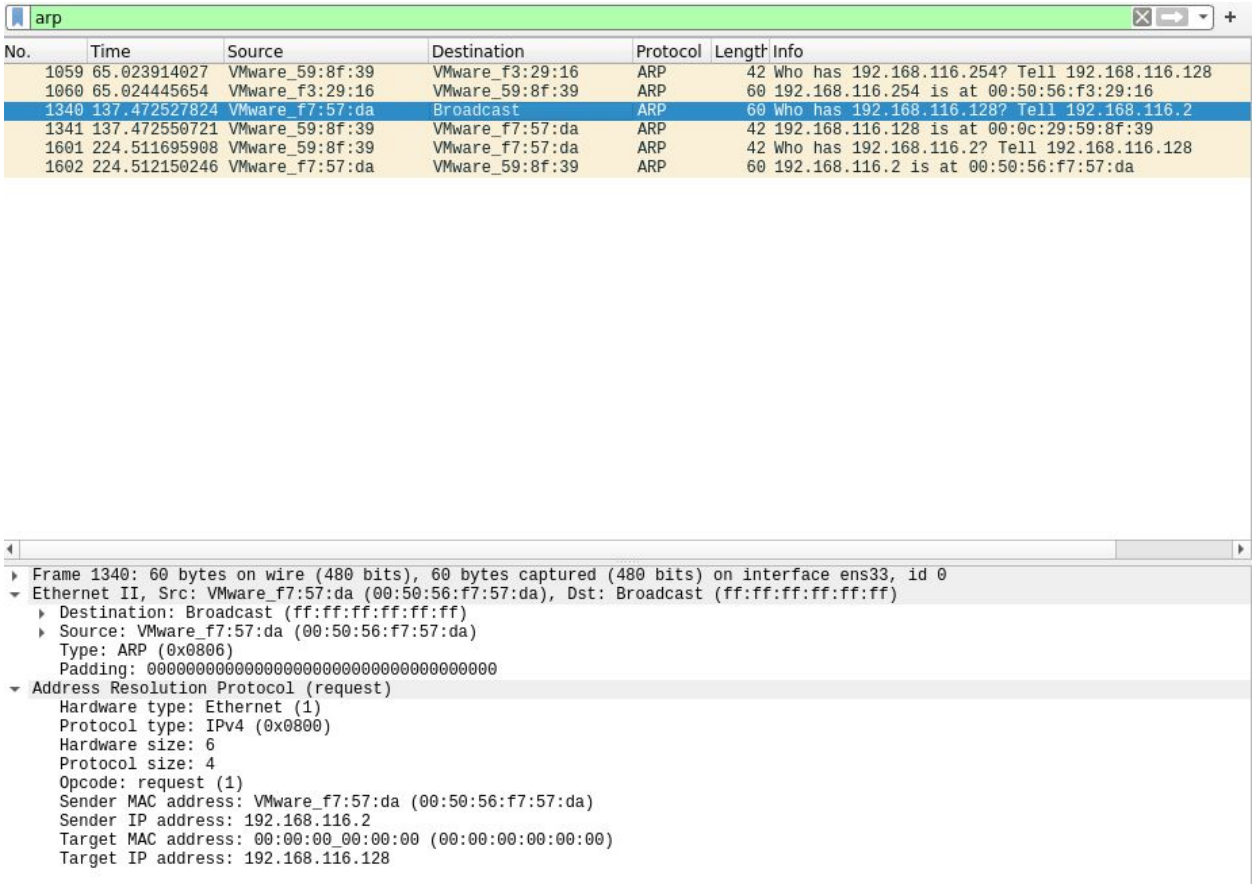
Payload of ARP Request Packet

MAC Address of the sender : 00:50:56:f7:57:da

IP address of the sender : 192.168.116.2

MAC address of the the receiver : 00:00:00:00:00:00

IP address of the receiver : 192.168.116.128



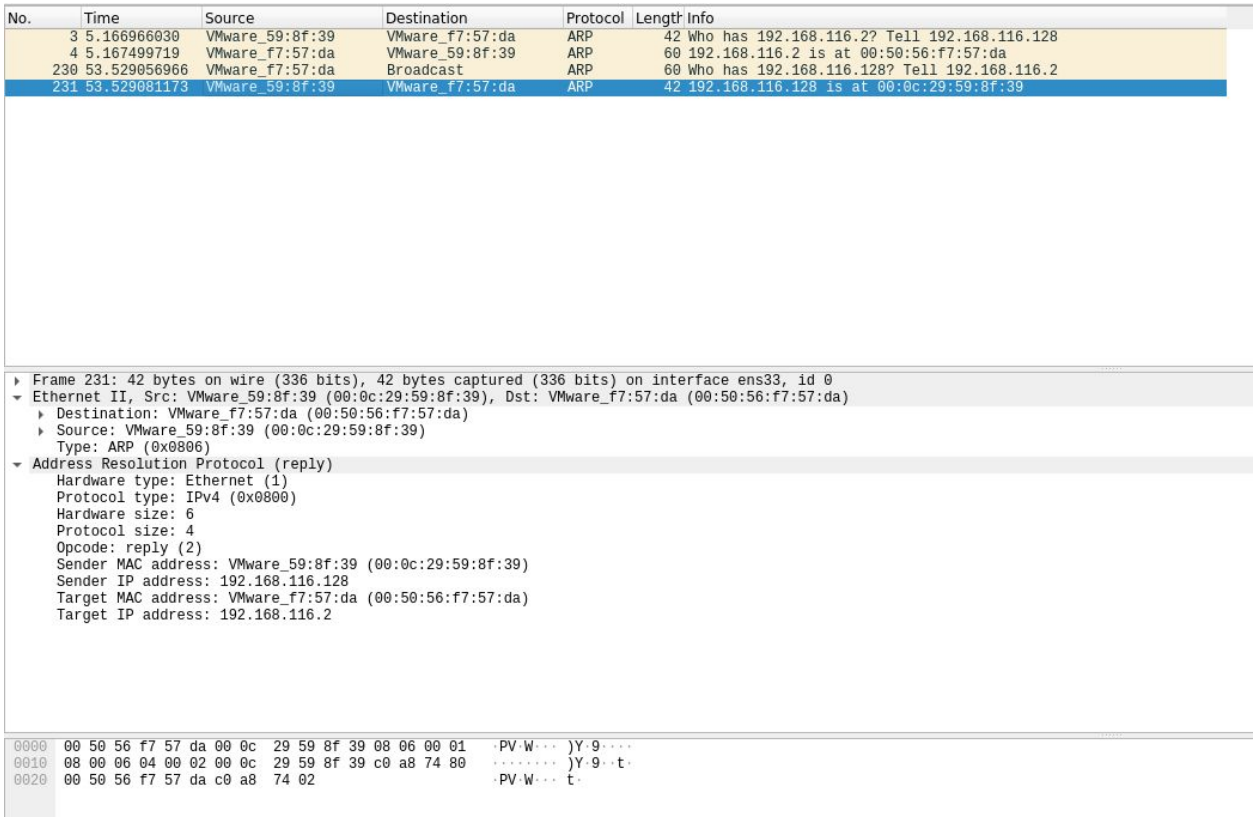
Payload of the ARP reply packet

MAC Address of the sender : 00:0c:29:59:8f:39

IP address of the sender : 192.168.116.128

MAC address of the the receiver : 00:50:56:f7:57:da

IP address of the receiver : 192.168.116.2



E. Skype and Zoom

Skype uses TCP to initiate connection or bypass any firewalls and use UDP to send audio and video over UDP. Firewalls block UDP because of the connectionless nature of UDP. UDP is a connection less protocol.

Zoom also uses combination of TCP and UDP, UDP are encrypted using a key negotiated over TLS