LAB 4: TCP and UDP

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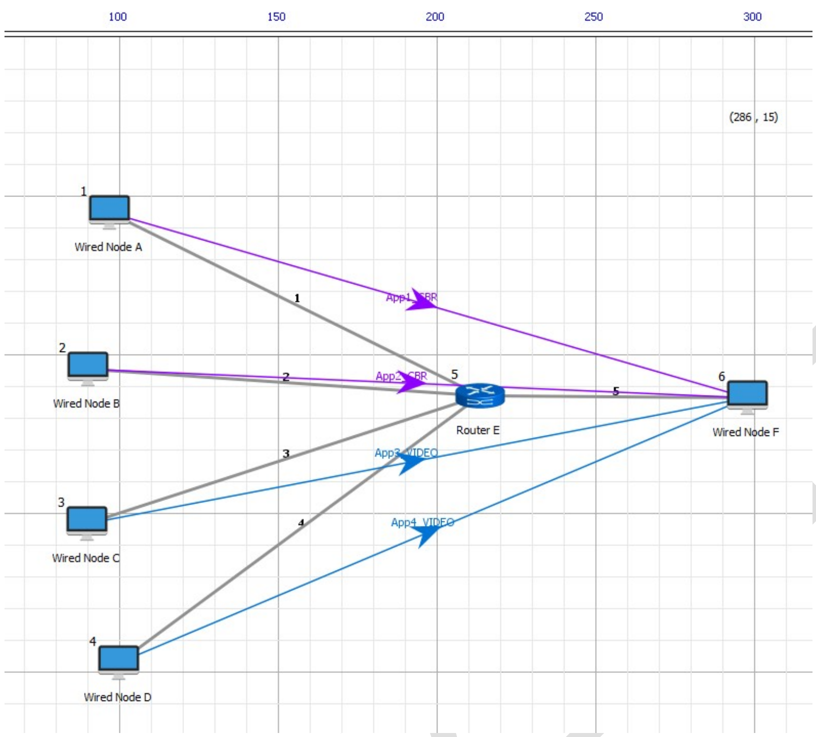
IT304 Computer Networks

9/12/23

Exercise:

1.2:



1.Calculate and Observe moving average throughput throughput of both the applications (CBR and VIDEO).

We observe the Throughput for CBR is 0.199600 Mbps and Video is 0.255613 Mbps

Application_metrics Detailed View

oughput Plot	Application Name	Packet transmitted	Packet received	Throughput (Mbps)	Delay(microsec)
plication throughput plot	APP1_CBR	499	499	0.199600	114.127134
plication throughput plot	APP2_CBR	499	499	0.199600	12226.512102
plication throughput plot	APP3_VIDEO	499	498	0.252925	179.272450
plication throughput plot	APP4_VIDEO	499	499	0.255613	183.780842

2. Observe the delay and throughput metrics in the simulation window and write down your observation.

Delay is in microseconds as 114.127 for CBR packet and 179.2724 for Video packet.

Queue_Metrics_Table

Queue_Metrics ☐ Detailed View

Device_id	Port_id	Queued_packet	Dequeued_packet	Dropped_packet
5	1	500	500	0
5	2	501	501	0
5	3	0	0	0
5	4	0	0	0
5	5	2000	2000	0

Calculate throughput:

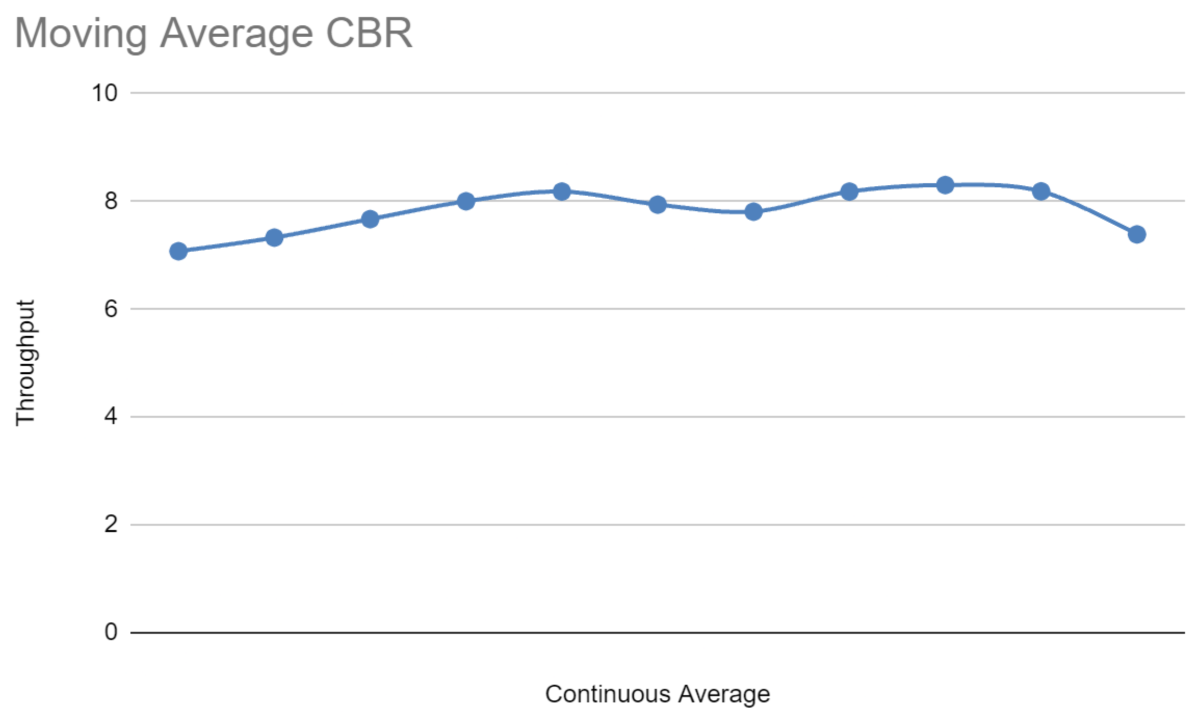
Here is the attached calculations from the packet trace of the output file.

Here we will notice that the values obtain will be >>0 rather than to be in the average , this shows that at starting the queue is empty and an easy flow is seen so the values are higher , as the queue will be filled this will start decreasing.

3) Sample calculation for Fix throughput

-> PAYLOAD/(APPLICATION LAYER ARRIVAL TIME - PHYSICAL LAYER END TIME)

for row 16th -> 566/(20098.92-20000) = 5.72179 Mbps.

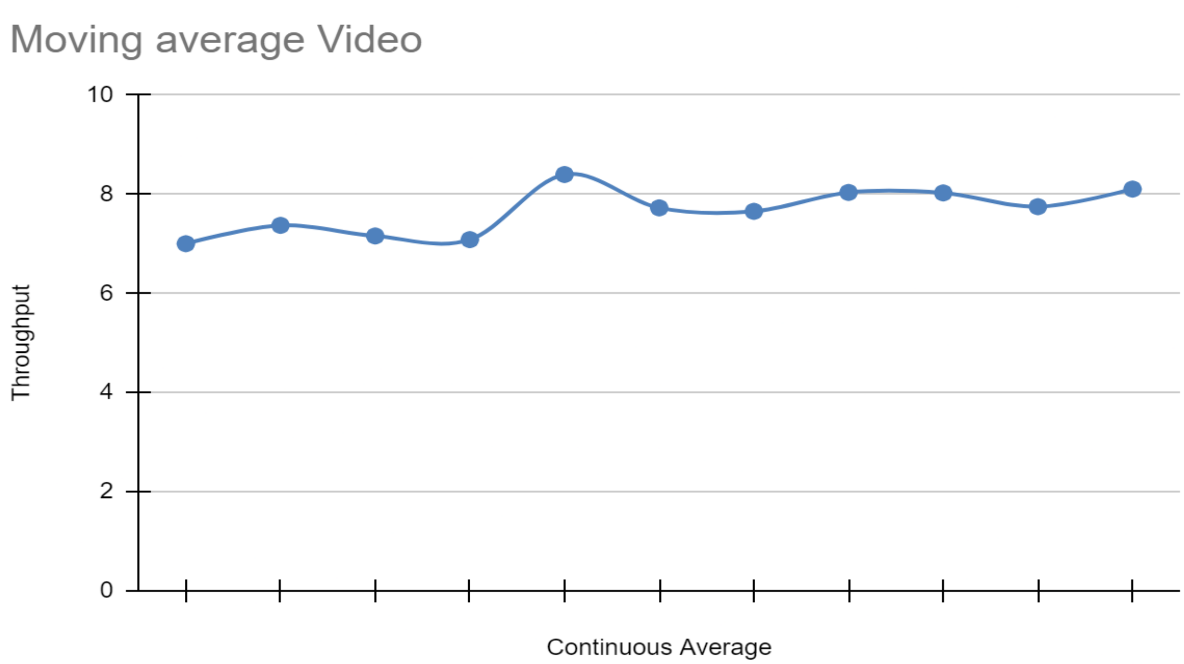


For CBR:

PACKET_ID	**PACKET_TYPE**	SOURCE_ID	DESTINATION_ID	APP_LAYER_ARRIVAL_TIME(US)	PHY_LAYER_END_TIME(US)	PHY_LAYER_PAYLOAD(Bytes)	DIfference	Throughput	Moving average
1	CBR	NODE-1	NODE-6	20000	20098.92	566	98.92	5.72179539	
1	CBR	NODE-2	NODE-6	20000	20105.48	566	105.48	5.365946151	6.871090946
1	CBR	NODE-1	NODE-6	20000	20215.84	566	215.84	2.622312824	6.861759457
1	CBR	NODE-2	NODE-6	20000	20262.08	566	262.08	2.15964591	7.16499127
2	CBR	NODE-1	NODE-6	40000	40050.28	566	50.28	11.25696102	8.17580406
2	CBR	NODE-2	NODE-6	40000	40050.28	566	50.28	11.25696102	8.483919756

2	CBR	NODE-1	NODE-6	40000	40125.36	566	125.36	4.514996809	7.550417337
2	CBR	NODE-2	NODE-6	40000	40171.6	566	171.6	3.298368298	7.47714945
3	CBR	NODE-1	NODE-6	60000	60050.28	566	50.28	11.25696102	8.36143753
3	CBR	NODE-2	NODE-6	60000	60050.28	566	50.28	11.25696102	8.36143753
3	CBR	NODE-1	NODE-6	60000	60100.56	566	100.56	5.628480509	7.736050807
3	CBR	NODE-2	NODE-6	60000	60146.8	566	146.8	3.855585831	7.534145105
4	CBR	NODE-1	NODE-6	80000	80050.28	566	50.28	11.25696102	
4	CBR	NODE-2	NODE-6	80000	80050.28	566	50.28	11.25696102	

For Video:



PACKET_ID	**PACKET_TYPE**	SOURCE_ID	DESTINATION_ID	APP_LAYER_ARRIVAL_TIME(US)	PHY_LAYER_END_TIME(US)	PHY_LAYER_PAYLOAD(Bytes)	DIfference	Throughput	Moving average
1	Video	NODE-4	NODE-6	20000	20043.88	486	43.88	11.07566089	7.003381407
1	Video	NODE-3	NODE-6	20000	20073.4	855	73.4	11.64850136	7.373580159
1	Video	NODE-4	NODE-6	20000	20087.76	486	87.76	5.537830447	7.159834099
1	Video	NODE-3	NODE-6	20000	20169.6	855	169.6	5.041273585	7.085831164
2	Video	NODE-3	NODE-6	40000	40039.56	432	39.56	10.92012133	8.398994145
2	Video	NODE-3	NODE-6	40000	40079.12	432	79.12	5.460060667	7.726337868
2	Video	NODE-4	NODE-6	40000	40096.52	1144	96.52	11.85246581	7.656276662
2	Video	NODE-4	NODE-6	40000	40264.08	1144	264.08	4.3320206	8.037492094
3	Video	NODE-4	NODE-6	60000	60019.72	184	19.72	9.330628803	8.02825839
3	Video	NODE-4	NODE-6	60000	60039.44	184	39.44	4.665314402	7.750384781

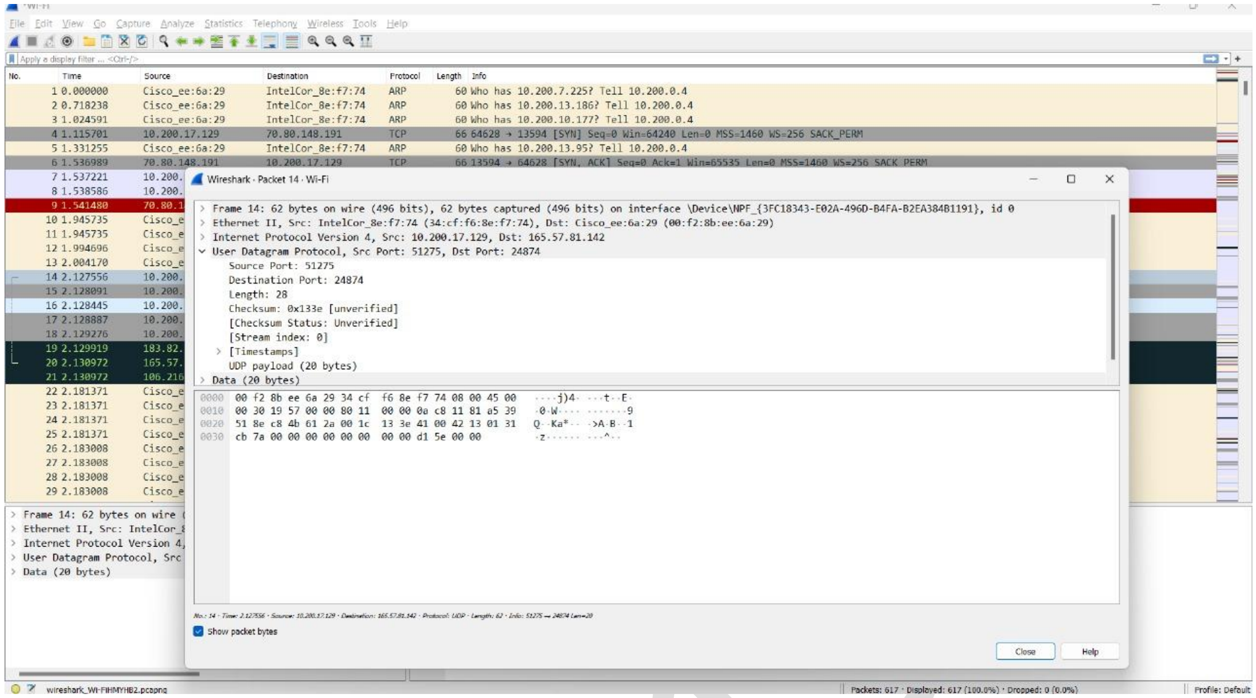
3	Video	NODE-3	NODE-6	60000	60079.88	936	79.88	11.71757636	8.105280422

2.2:

```
Microsoft Windows [Version 10.0.22621.2134]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ASUS>ipconfig /flushdns

Windows IP Configuration

Successfully flushed the DNS Resolver Cache.

C:\Users\ASUS>nslookup 8.8.8.8
Server:  smtp.daiict.ac.in
Address:  10.100.56.27

Name:    dns.google
Address:  8.8.8.8


C:\Users\ASUS>
```

1. Select one UDP packet from your trace. From this packet, determine how many fields there are in the UDP header. Name these fields.

There 4 fields observed: Destination and source port with length and checksum

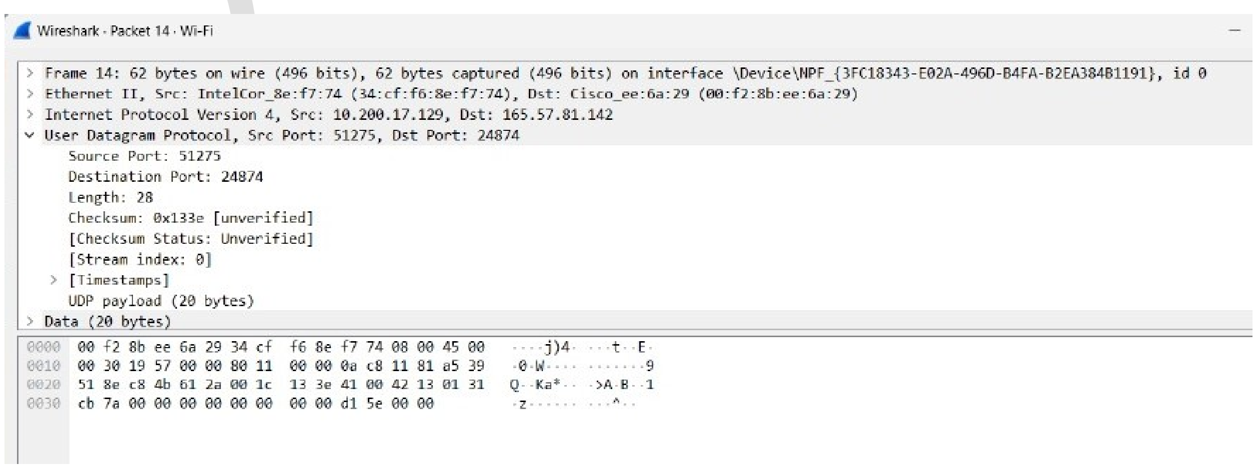


2. By consulting the displayed information in Wireshark's packet content field for this packet, determine the length (in bytes) of the UDP header fields.

From the above screenshot, The UDP header has a length of 8 bytes , where each field is 2 bytes long.

3. The value in the Length field is the length of what? Verify your claim with your captured UDP packet.

Here length observed is 28 and therefore the UDP payload is 28-8 bytes of length i.e 20 bytes.



4. What is the maximum number of bytes that can be included in a UDP payload?

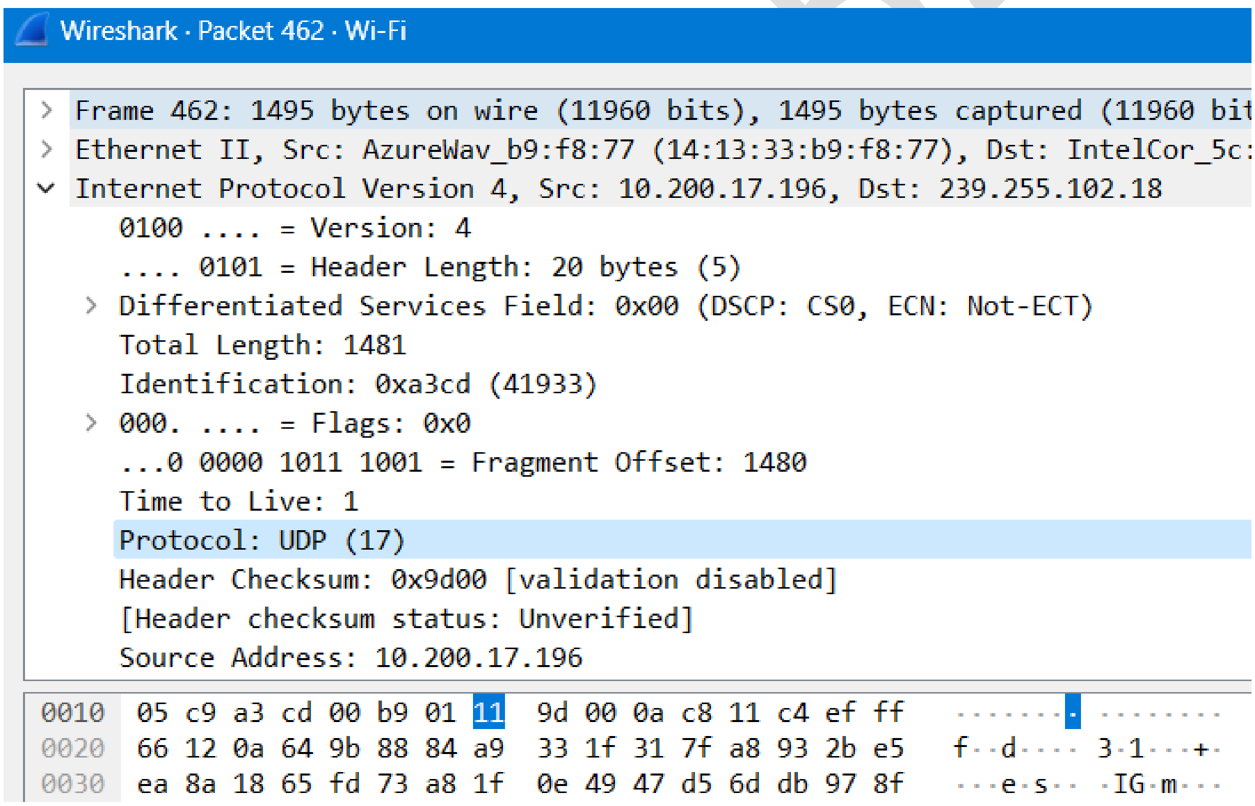
We know that the max no of payload is 2^16 - the header field bytes which is 65527-> 65535- 8 bytes if we consider 1 header file.

5. What is the largest possible source port number?

As mentioned above max payload port number is 2^16 -1 which is 65535.

6. What is the protocol number for UDP? Give your answer in both hexadecimal and decimal notation. To answer this question, you'll need to look into the Protocol field of the IP datagram containing this UDP segment.

Protocol number Decimal number is 17 and hexadecimal is 0x11.



7. Why have we used DNS commands to capture UDP packets? Do you know any-other method to generate UDP traffic using wireshark? Write your answer in detail.

```
> Internet Protocol Version 4, Src: 10.200.4.38, Dst: 10.100.5
✔ User Datagram Protocol, Src Port: 55325, Dst Port: 53
      Source Port: 55325
      Destination Port: 53
      Length: 79
      Checksum: 0x51cd [unverified]
      [Checksum Status: Unverified]
      [Stream index: 6]
    > [Timestamps]
      UDP payload (71 bytes)
> Domain Name System (query)
```

Port number:

Source = 55325

Destination = 53

We would further observe that the sending and receiving port number would come to be same as it connects to UDP.