1)
For UDP test case:
       Application Layer - none
       Transport Layer - UDP
       Network Layer - IPv4

For TCP test case:
       Application Layer - HTTP, JPEG File Interchange Format
       Transport Layer - TCP
       Network Layer - IPv4

Justification - For the UDP test case we ran the iperf command with flag "-u" which specifies only the transmission of UDP packets, so we received only the UDP packets in Transport Layer. For the TCP test case we ran the wget command which by default does the transmission by TCP protocol.

2)

a)
Pic1: 20 TCP Packets, 2 HTTP packets, Packet Sizes - 66, 74, 1514, 2962, 5858, 7306, 11650, 14546 bytes.
Pic2: 3029 TCP Packets, 1 HTTP packet, Packet Sizes - 66, 74, 78, 86, 94, 1514, 2962, 4410, 5858, 7306, 8754, 10202, 11650, 13098, 14546, 15994, 17442, 18890, 20338, 21786, 23234, 24682, 26130, 27578, 29026, 30474, 31922, 33370, 34818, 36266, 40610, 49298, 53642 bytes.
Pic3: 168 TCP Packets, 2 HTTP packets, Packet Sizes - 66, 74, 1514, 2962, 4410, 5858, 7306, 8754, 10202, 11650, 13098, 14546, 15994, 17442, 18890, 20338, 23234, 26130, 39162, 43506 bytes.
Pic4: 1044 TCP Packets, 1 HTTP packet, Packet Sizes - 66, 74, 1514, 2962, 4410, 5858, 7306, 8754, 10202, 11650, 13098, 14546, 15994, 17442, 18890, 20338, 21786, 23234, 26130, 27578, 29026, 30474, 31922, 33370, 34818, 36266, 39162, 40610, 42058, 44954 bytes.
Pic5: 211 TCP Packets, 2 HTTP packets, Packet Sizes - 66, 74, 1514, 2962, 4410, 5858, 7306, 8754, 10202, 11650, 13098, 14546, 15994, 17442, 20338, 23234, 24682, 34818, 39162 bytes.

The packets are of different size in TCP test case.
Packets of sizes 66, 10202, 4410, 13098, 7306, etc. bytes are observed. The most frequent is the size 66 which is common in all the 5 pics.

Justification - TCP protocol includes traffic control due to which we find that the packets received are of different sizes.
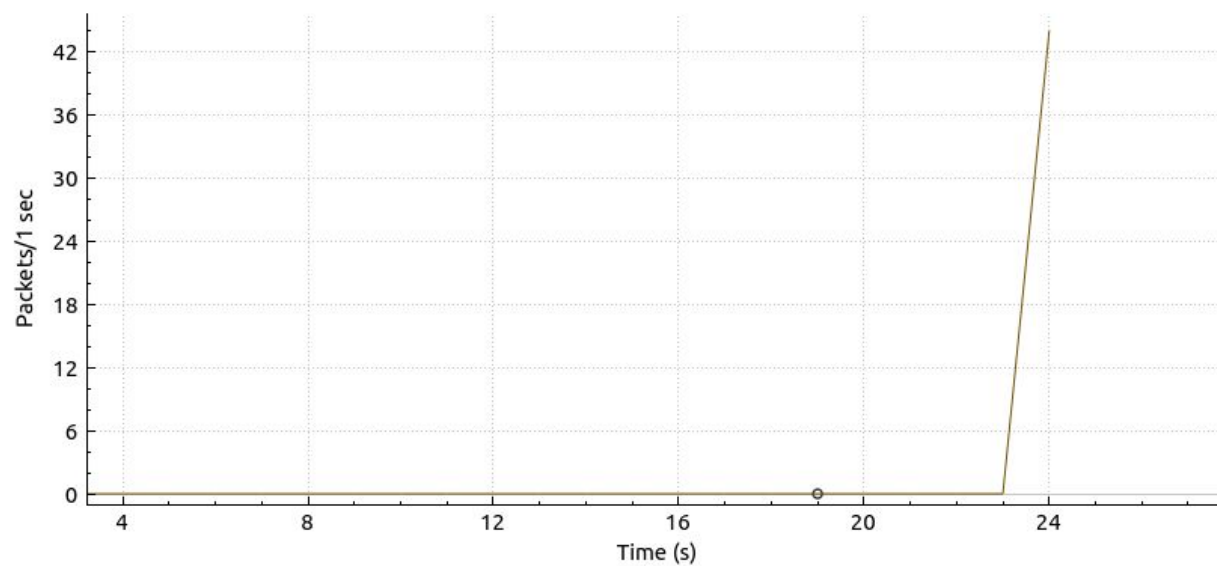
b)

For the UDP test case, 27 packets are observed. Size of each of the packet is same being 1514 bytes.

Justification - In UDP there no extra services provided as in TCP, so it just transmits packets which are all of same size.
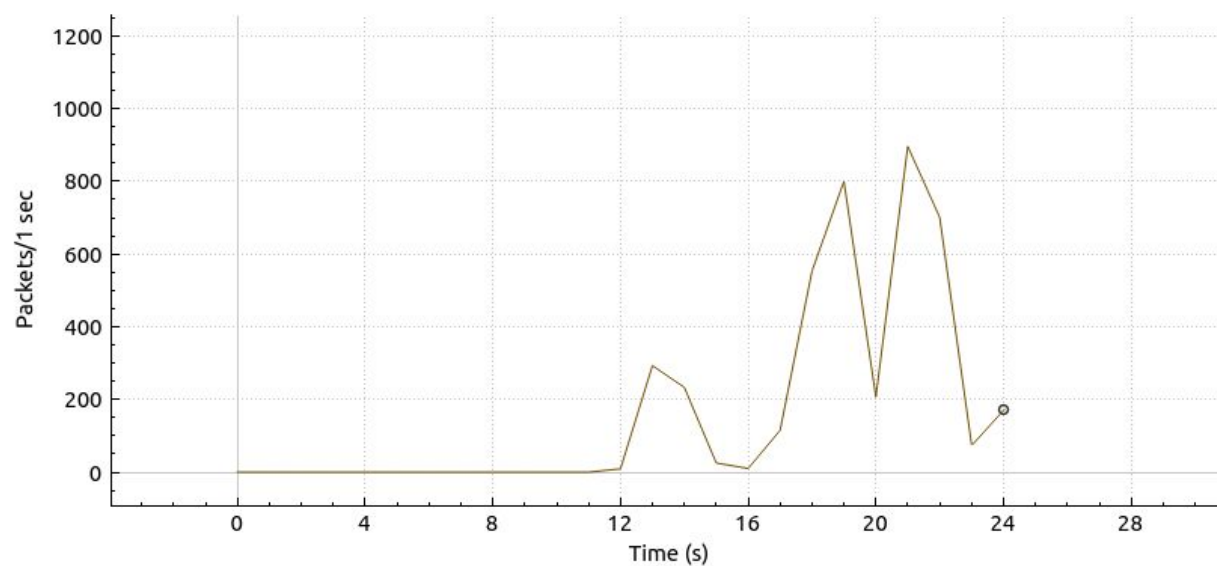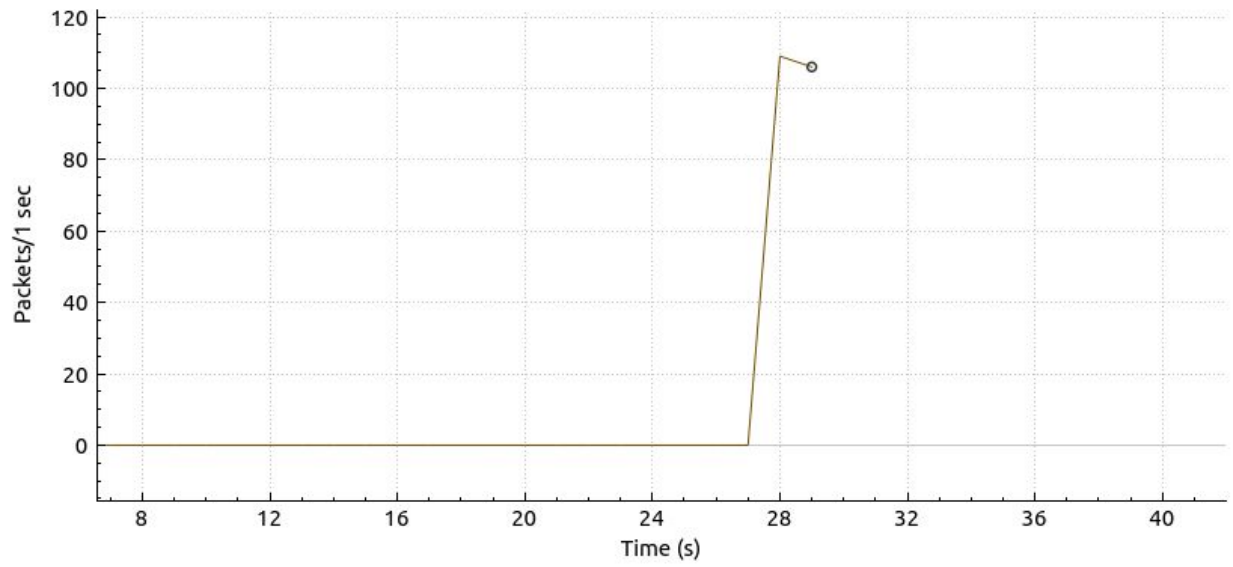
c)

Wireshark IO Graphs: wireshark_any_20180117225822_rqsSJu

UDP (28k bandwidth)
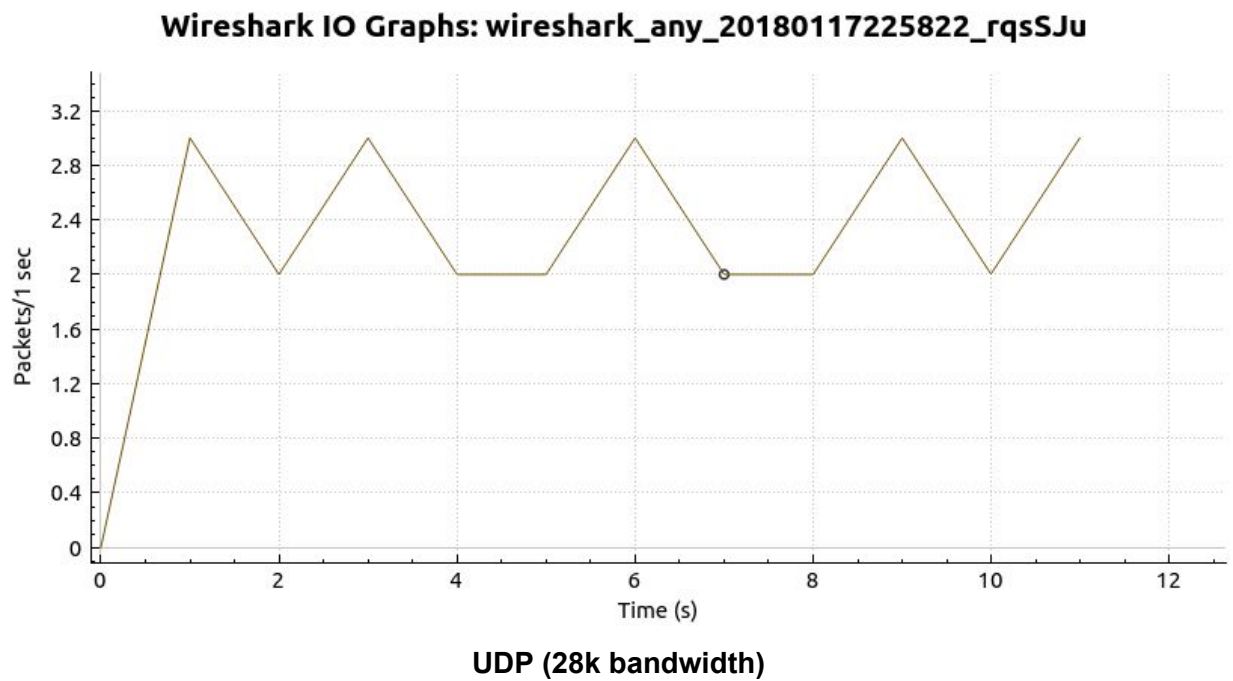
Wireshark IO Graphs: wireshark_any_20180117230638_K8JE4M

TCP pic1

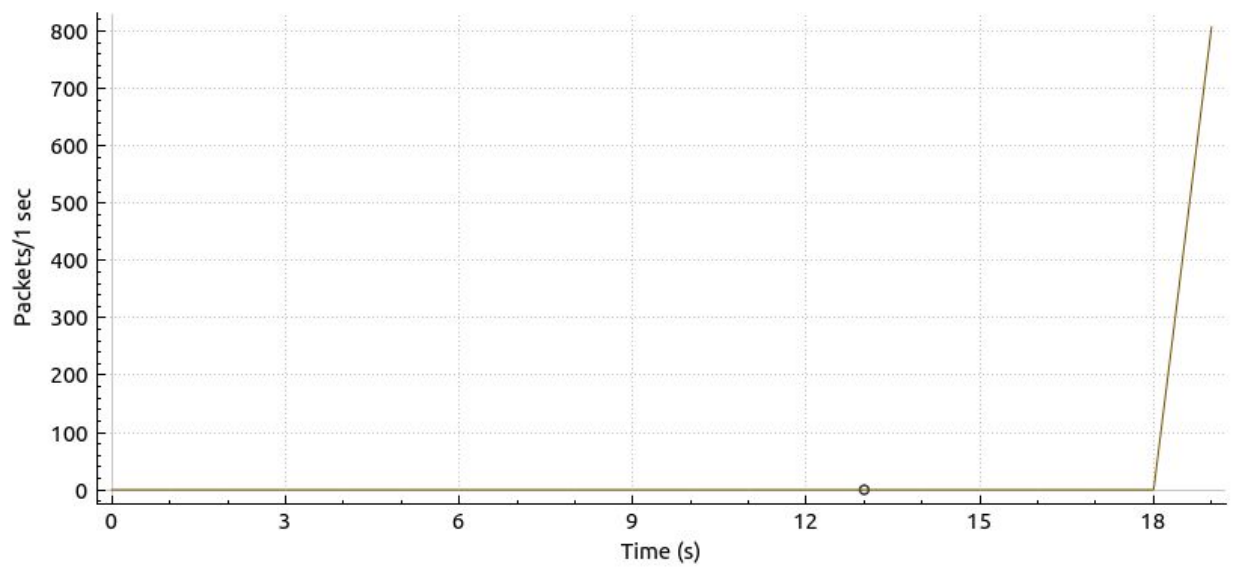**Wireshark IO Graphs: wireshark_wlp3s0_20180117230843_20WJWr**

TCP pic2

Wireshark IO Graphs: wireshark_wlp3s0_20180118004128_EG8kxE

TCP pic3

Wireshark IO Graphs: wireshark_wlp3s0_20180117231211_ureSKg

TCP pic4

Wireshark IO Graphs: wireshark_any_20180117230948_ONaXZU
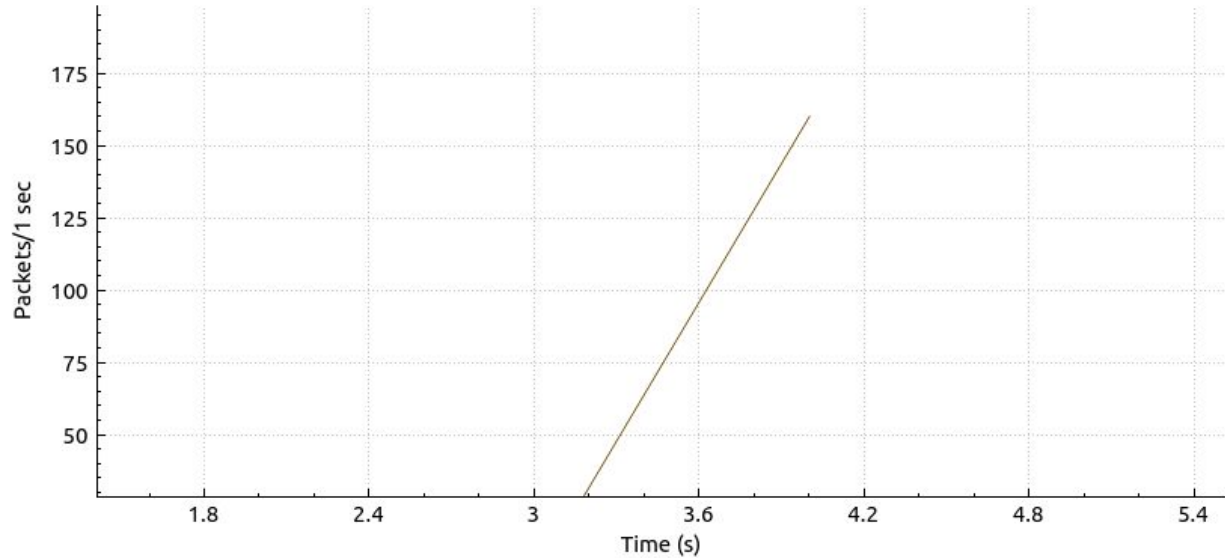
TCP pic5

d)

Speed (Kbps) - packets/(endTime - startTime) = (packets/sec)*size of packet = Throughput

28 - 13/(16.59 - 5.56) = 1.18 * 1514 = 1786.52 Bps

64 - 58/(15.63-5.32) = 5.62 * 1514 = 8508.68 Bps

128 - 112/(13.74 - 3.61) = 11.05 * 1514 = 167297 Bps

256 - 221/(11.30 - 1.23) = 21.95 * 1514 = 33232.3 Bps

512 - 439/(15.27 - 5.18) = 43.51 * 1514 = 65874.14 Bps

1024 - 874/(13.33 - 3.30) = 87.14 * 1514 = 131929.96 Bps

2048 - 1745/(14.13 - 4.12) = 174.32 * 1514 = 263920.48 Bps

3)

Pic1: None

Pic2: 7 - 1 TCP Fast Retransmission, 6 TCP retransmission

Pic3: None

Pic4: 9 - 3 TCP Fast Retransmission, 6 TCP retransmission

Pic5: None

Retransmission for pic2

Retransmission for pic2

4)

Plot of UDP Throughput vs Bandwidth
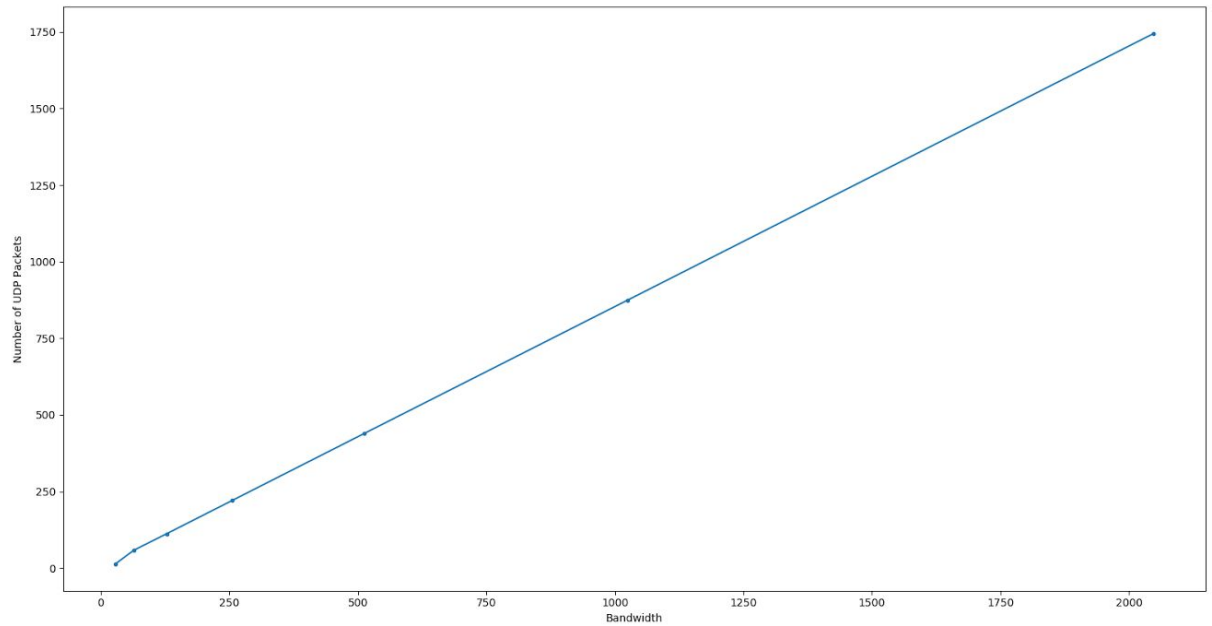
Plot of Number of UDP packets transmitted vs Bandwidth

The straight line obtained in the plots signify that The no. of packets (amd also throughput) received is directly proportional to the bandwidth.