CSE 421 **ID: 19101077**

Transport Layer Protocols (TCP) Examination Lab

Objectives:

Capture traffic and observe the PDUS for TCP when a HTTP request is made.
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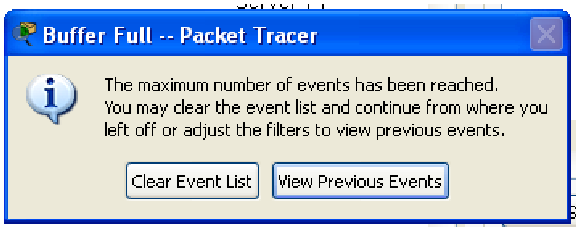
Task 1: Observe TCP traffic exchange between a client and server.

Step 1 – Run the simulation and capture the traffic.

- Enter **Simulation** mode.
- Check that your Event List Filters shows only **HTTP** and **TCP**.
- Click on the PC1. Open the **Web Browser** from the **Desktop**.
- Enter **www.bracu.ac.bd** into the browser. Clicking on **Go** will initiate a web server request. Minimize the Web Client configuration window.
- A TCP packet appears in the **Event List**, as we will only focus on TCP the DNS and ARP packets are not shown.
- Click the **Auto Capture / Play** button to run the simulation and capture events.
- Sit tight and observe the packets flowing through the network.



The maximum number of events has been reached. You may clear the event list and continue from where you left off or adjust the filters to view previous events.

- When the above message appears Click “View Previous Events".
- Click on PC1. The web browser displays a web page appears.

Step 2 – Examine the following captured traffic.

Our objective in this lab is only to observe TCP traffic.

	Last Device	**At Device**	**Type**
1.	PC1	Switch 0	TCP
2.	Local Web Server	Switch 1	TCP
3.	PC1	Switch 0	HTTP
4.	Local Web Server	Switch 1	HTTP
5.	PC1 (after HTTP response)	Switch 0	TCP
6.	Local Web Server	Switch 1	TCP
7.	PC1	Switch 0	TCP

- As before find the following packets given in the table above in the **Event List**, and click on the colored square in the **Info** column.

- When you click on the Info square for a packet in the event list the **PDU Information** window opens. If you click on these layers, the algorithm used by the device (in this case, the PC) is displayed. View what is going on at each layer.

For packet 1::

Click onto “Inbound PDU details” tab. Scroll down and observe the TCP header.

A. What is this TCP segment created by PC1 for? How do you know what is it for?

Connection establishment flag, for opening the TCP connection. SYN was created by PC1.

Because, It is the first handshake as only SYN control bit is 1.

B. What control flags are visible?

Only SYN

C. What are the sequence and acknowledgement numbers?

Sequence no. 0 and Acknowledge no. 0

For packet 2:

Click onto “Inbound PDU details” tab. Scroll down and observe the TCP header.

A. Why is this TCP segment created by the Local Web Server?

Replies to tell that it is going to start transmission if the client is still seeking for the data.

B. What control flags are visible?

SYN and ACK

C. Why is the acknowledgement number “ 1”?

It is Acknowledging that it has already received 0 number bit, now expects number 1.

For packet 3:

This HTTP PDU is actually the third packet of the “Three Way Handshake” process, along with the HTTP request.

A. Explain why control flags **ACK(Acknowledgement)** and **PSH (Push)** are visible in the TCP header?

ACK visible - since it is giving the confirmation that connection is alive.

PSH visible - since packet is carrying data.

For packet 5:

After PC1 receives the HTTP response from the Local Web Server, it again sends a TCP packet to the Local Web server why?

Because it gives a confirmation that the TCP connection has been terminated.

Click onto "Inbound PDU details" tab. Scroll down and observe the TCP header.

A. What control flags are visible?

FIN and ACK

B. Why the sequence number is 104 and acknowledge number 254? Note this packet is created after PC1 receives the HTTP response from the server.

Sequence number is 104 because till sequence number 103, data was sent earlier.

Acknowledge number 254 means it expects to receive 254th bit next.

For packet 6:

Click onto "Inbound PDU details" tab. Scroll down and observe the TCP header.

What is this packet sent from the webserver to PC1 for?

To confirm the termination of TCP connection.

What control flags are visible?

ACK and FIN

Why the sequence number is 254?

Because, in the previous TCP segment, acknowledgement number was 254, that is why in the reply sequence number is 254.