CSE 421 **ID:** 18301273

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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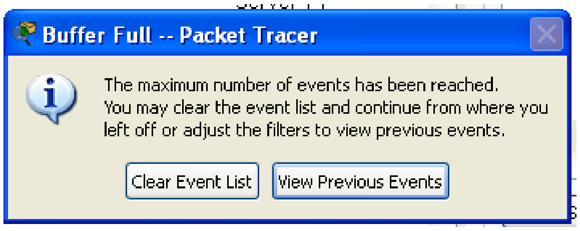
Task 1: Observe TCP traffic exchange between a client and server.

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.



Buffer Full -- Packet Tracer

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?

This TCP segment is created to establish TCP connection. This is the first of three way handshakes in order to establish TCP connection.

B. What control flags are visible?

Flag control signal 00000010 is only visible.

C. What are the sequence and acknowledgement numbers?

The sequence and acknowledge numbers both are 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?

TCP segment is created by Local Web server to response from web server to PC1. This is the first part of the three way handshake to establish TCP connection.

B. What control flags are visible?

Acknowledgement and Synchronize flags are visible.

C. Why is the acknowledgement number “ 1”?

The Web Server is acknowledging the request from PC1.

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?

It acknowledges the previous request and notifies the receiver that the data should be immediately sent up to the receiving application.

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?

PC1 again sends TCP packet to Local web server to close the established connection.

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

A. What control flags are visible?

Acknowledgement and Finish flags are visible.

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 105 that means sender will start to send data from no 105.

on the other hand, acknowledge number 254 means reciever expecting 254 as

sequence number 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?

TCP packet is sent to close established connection.

What control flags are visible?

Acknowledgement and Finish flags are visible.

Why the sequence number is 254?

Acknowledgement number in the previous TCP connection was 254 that means server expecting data from no 254. As a result the sequence number is 254.