**CSE 421 ID: \_17301121\_\_\_\_\_\_\_\_\_\_\_**

**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.



* 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.

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| --- | --- | --- | --- |
|  | **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.

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

The TCP segment is created for the three-way handshake by PC1 to make a connection with the server. The sequence, acknowledgment both are zero and SYN bit is enabled so it indicates the first step of the handshake.

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1. What control flags are visible?

SYN.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What are the sequence and acknowledgement numbers?

# Both sequence number and acknowledgment number is 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***For packet 2:***

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

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

Basically, to transfer data, this TCP segment created by the local web server

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1. What control flags are visible?

\_ ACK and SYN\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Why is the acknowledgement number “ 1”?

The acknowledgment =1 represents the second step of three way handshaking, which also indicates the local server acknowledgement \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***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 is visible means PC got the data and wants to tell the server and PSH is visible means it is giving signal to send the data immediately

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***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?

\_ Basically, to close the connection. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

A. What control flags are visible?

# \_\_\_ACK and FIN\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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.

The sequence number 104 represents that PC1 send data from bits and the acknowledgment 254 means it receives 253 bytes.

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***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 terminate the connection.

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What control flags are visible?

FIN and ARK

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Why the sequence number is 254?

\_\_\_ Sequence number is 254 means the server will send data upto 253

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