Department of Computer Science and Engineering

Islamic University of Technology (IUT)

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Lab Report 01_2

CSE 4512: Computer Network Lab

Name: Md Farhan Ishmam

Student ID: 180041120

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Title: Understanding the basics of OSI Model

Objective:

1. Examine HTTP Web Traffic
2. Display Elements of the TCP/IP Protocol Suite

Devices/ software Used:

Device: Windows PC
Software: Cisco Packet Tracer 7.3.0

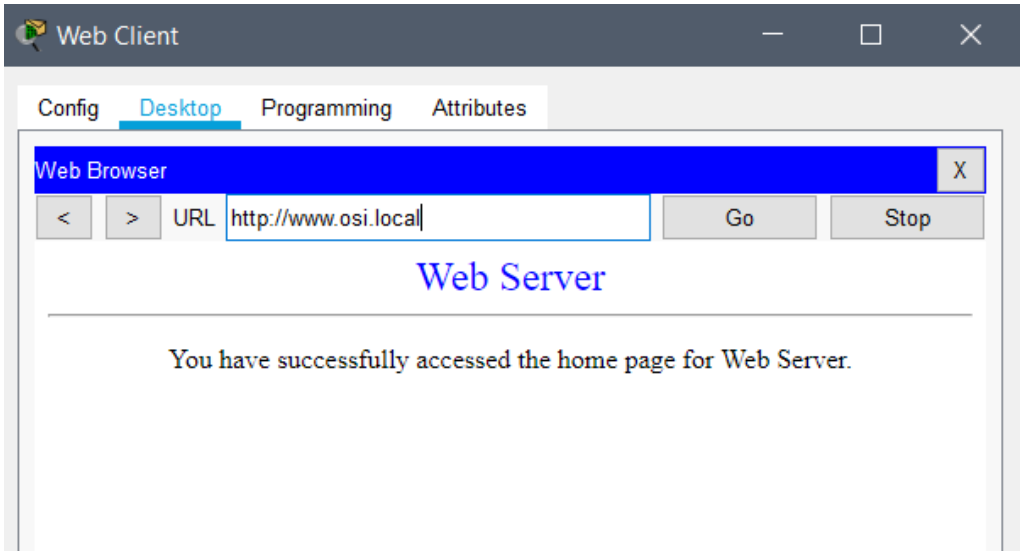
Diagram of the experiment:

Part - 1

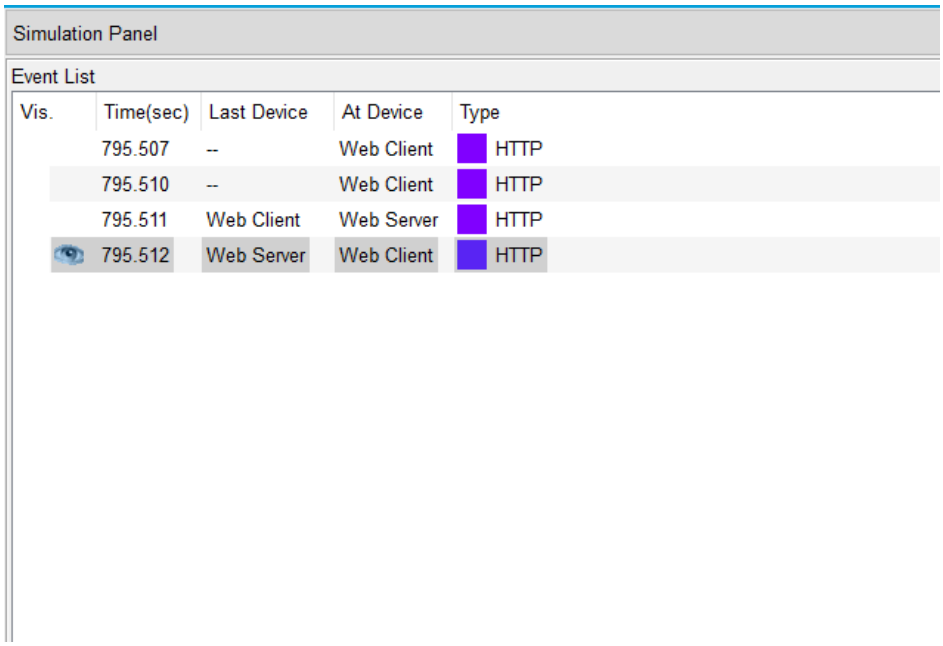
Working Procedure:

Following steps are taken to complete the Experiment:

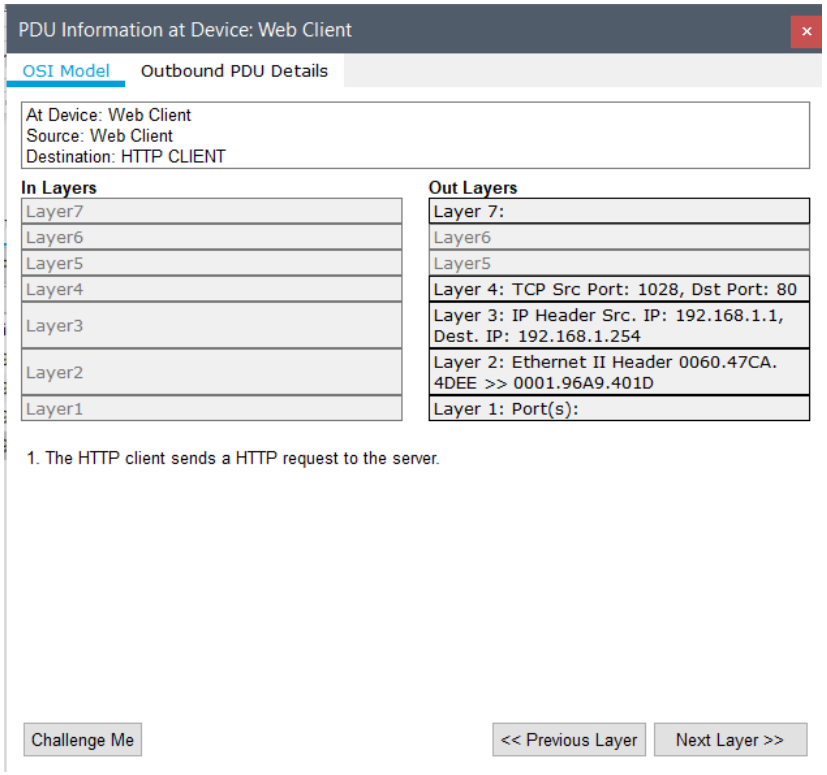
1. I ran the .pka provided to us in Cisco Packet Tracer
2. The mode was switched from realtime to simulation mode by toggling in the lower right corner of the interface.
3. In the events list, clicked on Edit Filters and then selected HTTP
4. Generated the HTTP traffic by clicking to the web client and then Desktop>Web Browser and searching www.osi.local. By clicking on the capture/forward button, 4 HTTP events were captured.
5. When we go to the web client's web browser page again, we see the web page has been loaded.



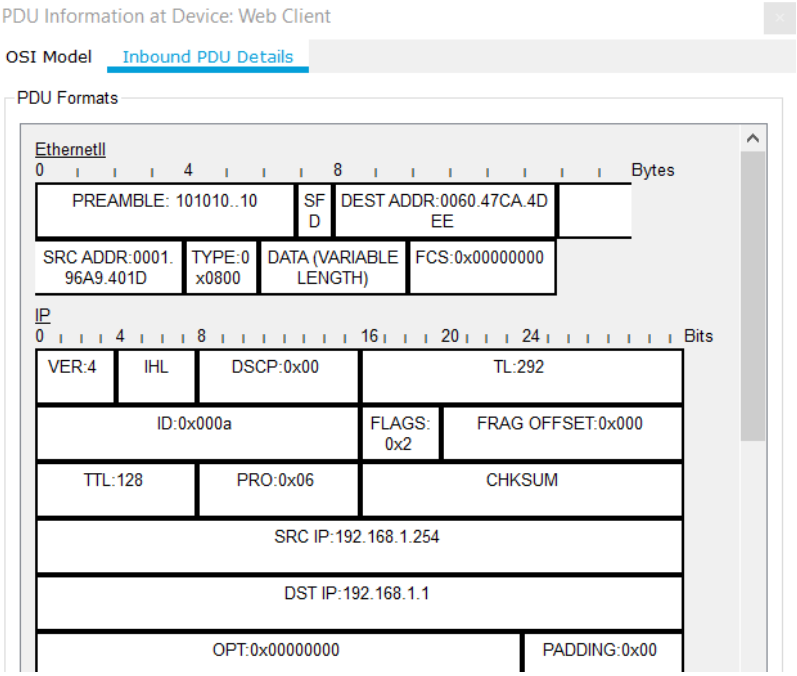
6. In the simulation tab we can see 4 HTTP events have been loaded.



7. By clicking on the events, we can see the description in the OSI model tab. The description of the 7 layers is given. By clicking on next and previous layer, we can see how the HTTP packet is processed from layer-7 down to the layer-1



8. Clicking on the Outbound PDU Details tab we can see information of the whole packet in various layers. This is a descriptive view of the packet showing the data, headers, trailers and all the necessary bits that have been added.



Observation:

At the time of exploring the contents of HTTP packets from the event list, I observed there are four HTTP events taking place. I found notable findings in each of the event and explanation of the findings are listed below: (see the PT Activity window and answer the questions noted there in respective events)

1st HTTP Event:

1. What is the text displayed next to the Layer 7 label?
   Ans: There is no text displayed next to the Layer 7 label.
2. What information is listed in the numbered steps directly below the In Layers and Out Layers boxes?
   Ans: The HTTP client sends a HTTP request to the server
3. What is the Dst Port value?
   Ans: 80
4. What is the Dest. IP value?
   Ans: 192.168.1.254
5. What information is displayed at this (layer-2) layer?
   Ans:
   a. The next-hop IP address is a unicast. The ARP process looks it up in the ARP table.
   b. The next-hop IP address is in the ARP table. The ARP process sets the frame's destination MAC address to the one found in the table.
   c. The device encapsulates the PDU into an Ethernet frame.
6. What is the common information listed under the IP section of PDU Details as compared to the information listed under the OSI Model tab, and with which layer is it associated?
   Ans: The common information is the source and destination IP address and it is associated with the Layer-3.
7. What is the common information listed under the TCP section of PDU Details, as compared to the information listed under the OSI Model tab, and with which layer is it associated?
   Ans: The common information is the source and destination port and it is associated with the Layer-4.
8. What is the Host listed under the HTTP section of the PDU Details? What layer would this information be associated with under the OSI Model tab?
   Ans: www.osi.local
   The information can be associated with the Layer-7.

2nd HTTP Event:

<no questions>

3rd HTTP Event:

1. Comparing the information displayed in the In Layers column with that of the Out Layers column, what are the major differences?
   Ans:
   - In Layer-4, source and destination ports are swapped.
   - In Layer-3, source and destination IP addresses are swapped.
   - In Layer-2, the addresses are swapped
2. Click the Outbound PDU Details tab. Scroll down to the HTTP section. What is the first line in the HTTP message that displays?
   Ans: HTTP Data: Connection: close

4th HTTP Event:

1. How many tabs are displayed with this event and why?
   Ans: 2 tabs are displayed - OSI model and Inbound PDU details as it is a receiving request.

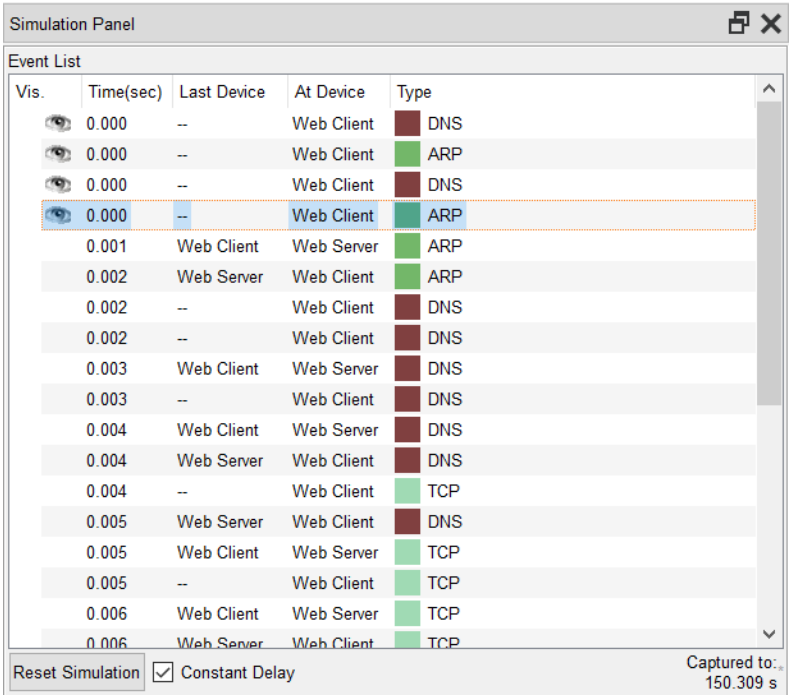
Challenges:

- I face no significant challenges in this task.

Part - 2

Working Procedure:

- The procedure is same as part-1, except all the events are showed instead of HTTP only



Observation:

1. What additional Event Types are displayed?
   Ans: DNS, ARP, TCP
2. What information is listed in the NAME: in the DNS QUERY section?
   Ans: www.osi.local
3. Which device is displayed in the last DNS colored box?
   Ans: Web Client
4. What is the value listed next to ADDRESS: in the DNS ANSWER section of the Inbound PDU Details?
   Ans: 192.168.1.254
5. In Layers and Out Layers, what is the information displayed under items 4 and 5?
   Ans: 4. The TCP connection is successful.
   5. The device sets the connection state to ESTABLISHED
6. What is the purpose of this event, based on the information provided in the last item in the list (should be item 4)?
   Ans: To close the connection

Challenge:

1. Based on the information that was inspected during the Packet Tracer capture, what port number is the Web Server listening on for the web request?
   Ans: 80
2. What port is the Web Server listening on for a DNS request?
   Ans: 53

Challenges:

- I face no significant challenges in this task.