ASSIGNMENT 1

CSCI 6704 - Advanced Topics in Networks

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Exercise 1: <Virtual Circuit Paths>

Source	Destination	Switch
A	J	#2
B	H	#2 and #5
C	E	#1
D	H	#5
F	I	#4
E	B	#4, #5 and #2
G	D	#5
H	C	#3 and #1
I	F	#4
J	A	#2

Switch #1

VC in	In Port	VC out	Out Port
10	1	10	3
10	2	20	3
10	3	10	4
20	3	10	2
10	4	30	3
30	3	10	1

Switch #2

VC in	In Port	VC out	Out Port
10	2	10	4
20	2	20	4
10	1	10	2
10	3	30	4
10	4	20	2
20	4	10	3
30	2	10	1
30	4	30	2

Switch #3

VC in	In Port	VC out	Out Port
10	1	10	2
10	4	10	3
10	2	20	3
10	3	10	1
20	3	10	4

Switch #4

VC in	In Port	VC out	Out Port
10	3	10	4
20	3	20	4
10	1	10	3
20	1	20	3
10	2	30	3
10	4	10	1
30	3	20	1

Switch #5

VC in	In Port	VC out	Out Port
10	1	10	4
20	1	10	2
30	1	20	2
10	2	10	3
20	2	10	1
30	2	20	1
10	3	30	2
10	4	30	1

Exercise 2: <TCP/IP Encapsulation Discovery using Wireshark>

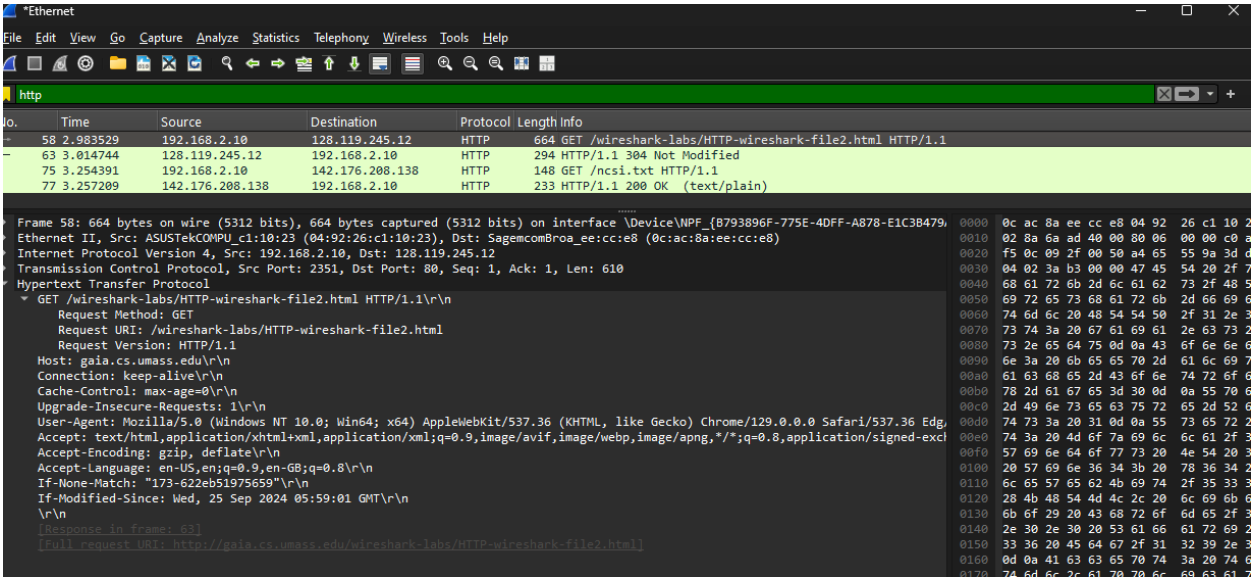

Figure 1 Screenshot of the Application Layer

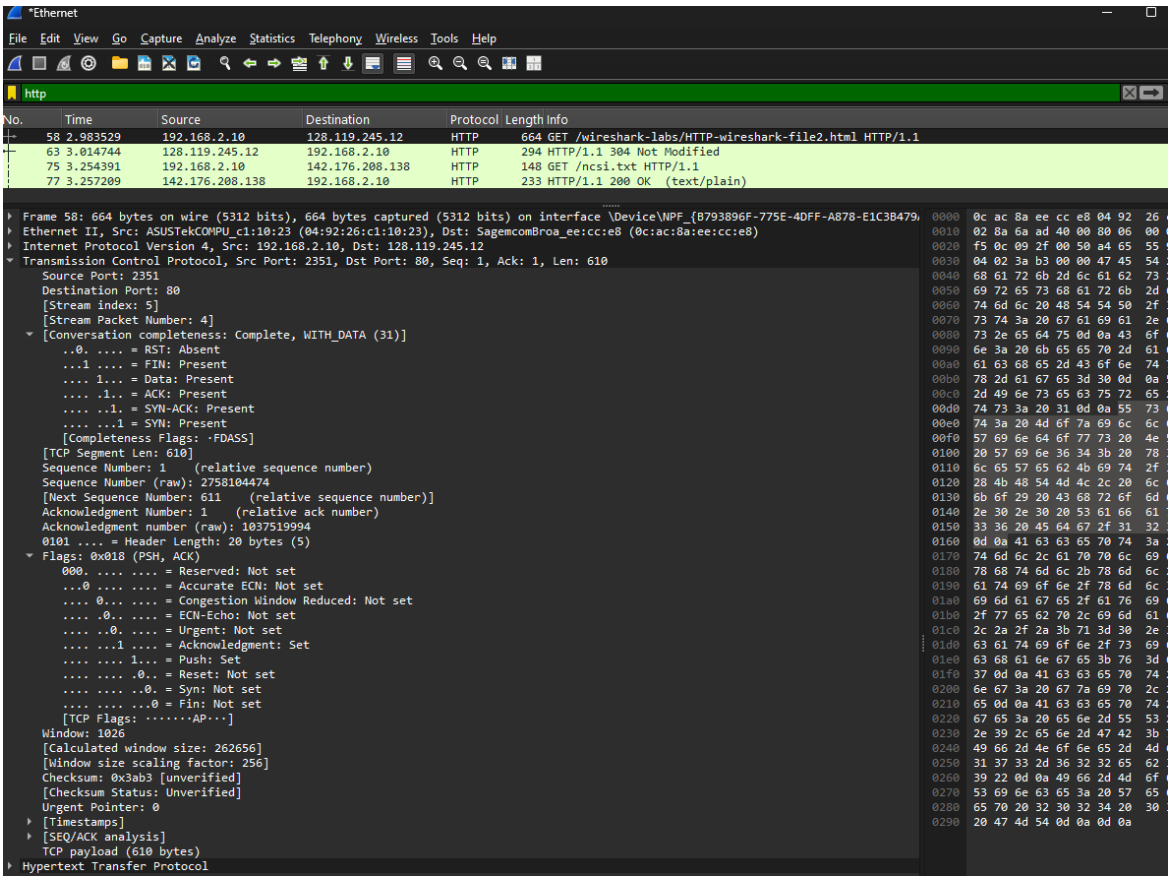

Figure 2 Screenshot of the TCP Header

TCP Header Fields:

TCP HEADER										
16-bit source port number **(2351)**										16-bit destination port number **(80)**
32-bit sequence number **(1)**										
32-bit acknowledgement number **(1)**										
4-bit header length **(5)**	3-bit reserved **(0)**	Nonce **(0)**	CRW **(0)**	ECN-Echo **(0)**	URG **(0)**	ACK **(1)**	PSH **(1)**	RST **(0)**	SYN **(0)**	FIN **(0)**	16-bit window size **(1026)**
16-bit TCP checksum **(0x3ab3)**										16-bit urgent pointer **(0)**
Options (if any)										
Data **(610 bytes)**										

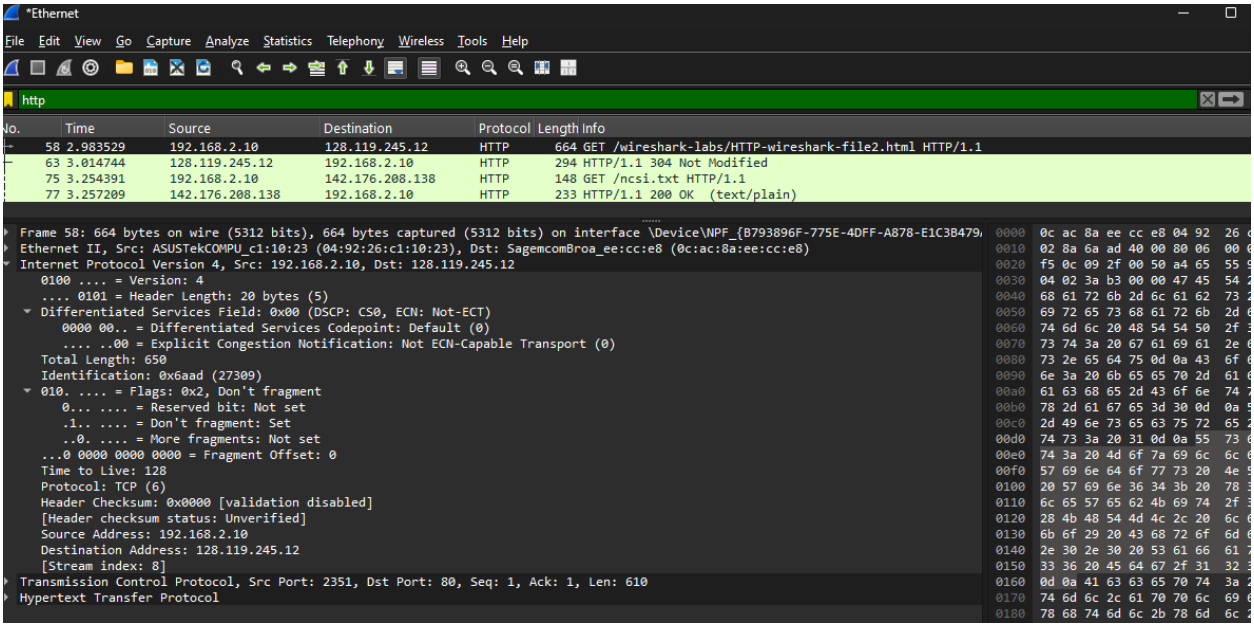

Figure 3 Screenshot of the IP Header

IP Header Fields:

IP HEADER						
4-bit IP version **(4)**	4-bit Header length **(5)**	8-bit Type of Service **(0)**	16-bit Total length **(650)**			
16-bit Identification **(0x6aad | 27309)**			R **(0)**	DF **(1)**	MF **(0)**	13-bit Fragment offset **(0)**
8-bit Time To Live **(128)**	8-bit Protocol **(6 - TCP)**		16-bit Header checksum **(0x0000)**			

32-bit source IP **(192.168.2.10)**
32-bit destination IP **(128.119.245.12)**
Options (if any)
Data

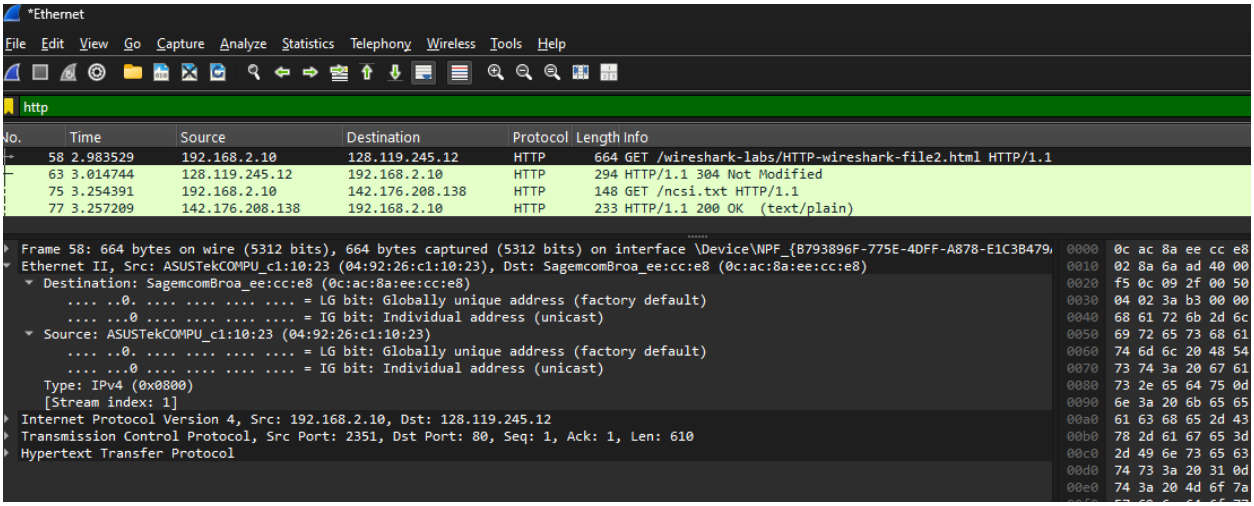

Figure 4 Screenshot of the Ethernet Header

Ethernet Header Fields:

ETHERNET FRAME						
7-bytes Preamble	SFD	6-bytes Destination MAC address **(0c:ac:8a:ee:cc:e8)**	6-bytes Source MAC address **(04:92:26:c1:10:23)**	2-bytes Type/Length **(IPv4)**	Data	4-bytes Frame Check Sequence

Short paragraph answer:

No, I could not find any Data Link Trailer in the Ethernet frame. Because there are no separate Data Link Trailer in Ethernet frames. The CRC (Cyclic Redundancy Check) field, which is used for error detection, is typically considered part of the Data field rather than a separate trailer. Additionally, The Data Link Trailer is calculated by the sender's Network Interface Card (NIC). Since this is outgoing data from the sender, it first passes through Wireshark's capture system before being sent to the NIC.