CSP334 : Computer Networks Lab Assignment No 1 Assignment on Wireshark

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September 10, 2018

1 Network Interface:

The network interfaces available on the computer are shown in the snapshot below. They include **Wi-Fi**, virtual wireless interface **p2p0**, Thunderbolt bridge, Thunderbolt 1, Software Network interface (gif0) and tunnel interface (stf0).

Welcome to Wireshark								
Capture								
using this filter: 📙 Enter a capture filter								
Wi-Fi: en0	ــــالـم							
p2p0								
awdl0								
Thunderbolt Bridge: bridge0								
utun0								
Thunderbolt 1: en1								
Loopback: Io0								
gif0								
stf0								
XHC20	-							
Cisco remote capture: ciscodump	-							
Random packet generator: randpkt								
SSH remote capture: sshdump								
UDP Listener remote capture: udpdump								

 ${f Wi-Fi}$ network interface was eventually selected.

2 Application Layer protocol used:

```
▶ Frame 10145: 465 bytes on wire (3720 bits), 465 bytes captured (3720 bits) on interface 0
▶ Ethernet II, Src: Apple_24:e0:94 (f0:79:60:24:e0:94), Dst: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
▶ Internet Protocol Version 4, Src: 10.10.40.146, Dst: 128.119.245.12
▶ Transmission Control Protocol, Src Port: 49302, Dst Port: 80, Seq: 1, Ack: 1, Len: 399
▼ Hypertext Transfer Protocol
  ▶ GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
    Host: gaia.cs.umass.edu\r\n
    Upgrade-Insecure-Requests: 1\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
    User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_13_6) AppleWebKit/605.1.15 (KHTML, li
    Accept-Language: en-us\r\n
     Accept-Encoding: gzip, deflate\r\n
     Connection: keep-alive\r\n
     [Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file1.html]
     [HTTP request 1/1]
     [Response in frame: 10171]
```

The application layer protocol used is **HTTP**, i.e. HyperText Transfer Protocol, as highlighted in the frame captured.

3 Other protocols used:

Source	▲ Destination	Protocol	Length	Info
10.10.40.146	8.8.8.8	DNS	77	Standard query 0x69ce A gaia.cs.umass.edu
8.8.8.8	10.10.40.146	6 DNS	93	Standard query response 0x69ce A gaia.cs.umass.edu A 12
10.10.40.146	128.119.245.	.12 TCP	78	49434 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=32 T
10.10.40.146	128.119.245.	.12 TCP	78	49435 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=32 T
128.119.245.12	10.10.40.146	6 TCP	74	80 → 49434 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1
10.10.40.146	128.119.245.	.12 TCP	66	49434 → 80 [ACK] Seq=1 Ack=1 Win=131744 Len=0 TSval=146
10.10.40.146	128.119.245.	.12 HTTP	498	GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1
128.119.245.12	10.10.40.146	6 TCP	74	80 → 49435 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1
10.10.40.146	128.119.245.	.12 TCP	66	49435 → 80 [ACK] Seq=1 Ack=1 Win=131744 Len=0 TSval=146
128.119.245.12	10.10.40.146	6 TCP	66	80 → 49434 [ACK] Seq=1 Ack=433 Win=30080 Len=0 TSval=42
128.119.245.12	10.10.40.146	6 НТТР	552	HTTP/1.1 200 OK (text/html)
10.10.40.146	128.119.245.	.12 TCP	66	49434 → 80 [ACK] Seq=433 Ack=487 Win=131264 Len=0 TSval
10.10.40.146	128.119.245.	.12 HTTP	469	GET /favicon.ico HTTP/1.1
128.119.245.12	10.10.40.146	6 НТТР	550	HTTP/1.1 404 Not Found (text/html)
10.10.40.146	128.119.245.	.12 TCP	66	49434 → 80 [ACK] Seq=836 Ack=971 Win=130784 Len=0 TSval

The other protocols used are **DNS** which in turn used UDP and **TCP**. **IP** is not displayed in the packet listing window since it is always used.

4 IPA of source and destination:

```
▶ Frame 22657: 498 bytes on wire (3984 bits), 498 bytes captured (3984 bits) on interface 0
▶ Ethernet II, Src: Apple_24:e0:94 (f0:79:60:24:e0:94), Dst: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
▼ Internet Protocol Version 4, Src: 10.10.40.146, Dst: 128.119.245.12
     0100 .... = Version: 4
     .... 0101 = Header Length: 20 bytes (5)
  ▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
     Total Length: 484
     Identification: 0x0000 (0)
  ▶ Flags: 0x4000, Don't fragment
     Time to live: 64
     Protocol: TCP (6)
     Header checksum: 0x90f4 [validation disabled]
     [Header checksum status: Unverified]
     Source: 10.10.40.146
     Destination: 128,119,245,12
▶ Transmission Control Protocol, Src Port: 49434, Dst Port: 80, Seq: 1, Ack: 1, Len: 432
▼ Hypertext Transfer Protocol
  ▼ GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
```

The IPA of the **source machine** is: 10.10.40.146 The IPA of the **destination machine** is: 128.119.245.12

We can ascertain that the IPA of the destination is indeed the same as that observed in the wireshark by either entering the IPA in the web browser since its an HTTP request, or we can do ping to the web address requested to get its IPA.

Another alternative way is to look at the following **DNS** packet captured, which clearly mentions the resolved IPA of the requested website, which is the destination.

```
▶ Frame 22647: 93 bytes on wire (744 bits), 93 bytes captured (744 bits) on interface 0
▶ Ethernet II, Src: Cisco_af:0c:64 (a0:3d:6f:af:0c:64), Dst: Apple_24:e0:94 (f0:79:60:24:e0:94)
▶ Internet Protocol Version 4, Src: 8.8.8.8, Dst: 10.10.40.146
▶ User Datagram Protocol, Src Port: 53, Dst Port: 57997
▼ Domain Name System (response)
    Transaction ID: 0x69ce
    Flags: 0x8180 Standard query response, No error
    Ouestions: 1
     Answer RRs: 1
     Authority RRs: 0
     Additional RRs: 0
    Queries
     ▶ gaia.cs.umass.edu: type A, class IN
    Answers
     ▶ gaia.cs.umass.edu: type A, class IN, addr 128.119.245.12
     [Request In: 22644]
     [Time: 0.094025000 seconds]
```

5 Class of IPA:

IPA of **source** belongs to **class A** since class A contains IPA from 0.0.0.0 to 127.255.255.255 whereas the IPA of **destination** belongs to **class B** since class B contains IPA from 128.0.0.0 to 191.255.255.255.

6 Frame: Information about packet

The no. of bits captured in the HTTP packet: 3984 The time at which the packet was captured: Sep $10,\,2018\,08:24:17.473788000$ IST

```
▼ Frame 22657: 498 bytes on wire (3984 bits), 498 bytes captured (3984 bits) on interface 0
  ▶ Interface id: 0 (en0)
    Encapsulation type: Ethernet (1)
    Arrival Time: Sep 10, 2018 08:24:17.473788000 IST
     [Time shift for this packet: 0.000000000 seconds]
    Epoch Time: 1536548057.473788000 seconds
     [Time delta from previous captured frame: 0.000260000 seconds]
     [Time delta from previous displayed frame: 0.000260000 seconds]
     [Time since reference or first frame: 778.439603000 seconds]
    Frame Number: 22657
    Frame Length: 498 bytes (3984 bits)
    Capture Length: 498 bytes (3984 bits)
     [Frame is marked: True]
     [Frame is ignored: False]
     [Protocols in frame: eth:ethertype:ip:tcp:http]
     [Coloring Rule Name: HTTP]
     [Coloring Rule String: http || tcp.port == 80 || http2]
```

7 Interface ID and address of interface:

The interface ID used is: 0 (en0)
The address of the interface is: f0:79:60:24:e0:94.

```
▼ Frame 22657: 498 bytes on wire (3984 bits), 498 bytes captured (3984 bits) on interface 0
  ▼ Interface id: 0 (en0)
      Interface name: en0
    Encapsulation type: Ethernet (1)
    Arrival Time: Sep 10, 2018 08:24:17.473788000 IST
    [Time shift for this packet: 0.000000000 seconds]
    Epoch Time: 1536548057.473788000 seconds
    [Time delta from previous captured frame: 0.000260000 seconds]
    [Time delta from previous displayed frame: 0.000260000 seconds]
    [Time since reference or first frame: 778.439603000 seconds]
    Frame Number: 22657
    Frame Length: 498 bytes (3984 bits)
    Capture Length: 498 bytes (3984 bits)
    [Frame is marked: True]
    [Frame is ignored: False]
    [Protocols in frame: eth:ethertype:ip:tcp:http]
    [Coloring Rule Name: HTTP]
    [Coloring Rule String: http || tcp.port == 80 || http2]
▼ Ethernet II, Src: Apple_24:e0:94 (f0:79:60:24:e0:94), Dst: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
  ▶ Destination: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
  ▼ Source: Apple_24:e0:94 (f0:79:60:24:e0:94)
      Address: Apple_24:e0:94 (f0:79:60:24:e0:94)
       .....0. .... = LG bit: Globally unique address (factory default)
       .... = IG bit: Individual address (unicast)
    Type: IPv4 (0x0800)
```

8 Time taken between HTTP GET and HTTP OK reply:

The HTTP GET message sent and the HTTP OK reply are highlighted, the time taken = 17.768101 - 17.473788 = 0.294313 seconds.

	226	08:24:17.120266	10.10.40.146	128.119.245.12	TCP	78 49434 → 80 [SYN] Seq=0 Win=.
	226	08:24:17.276635	10.10.40.146	128.119.245.12	TCP	78 49435 → 80 [SYN] Seq=0 Win=.
	226	08:24:17.473429	128.119.245.12	10.10.40.146	TCP	74 80 → 49434 [SYN, ACK] Seq=0.
	226	08:24:17.473528	10.10.40.146	128.119.245.12	TCP	66 49434 → 80 [ACK] Seq=1 Ack=.
	226	08:24:17.473788	10.10.40.146	128.119.245.12	HTTP	498 GET /wireshark-labs/HTTP-wi.
Ī	226	08:24:17.564789	128.119.245.12	10.10.40.146	TCP	74 80 → 49435 [SYN, ACK] Seq=0.
	226	08:24:17.564861	10.10.40.146	128.119.245.12	TCP	66 49435 → 80 [ACK] Seq=1 Ack=.
	226	08:24:17.767536	128.119.245.12	10.10.40.146	TCP	66 80 → 49434 [ACK] Seq=1 Ack=.
	226	08:24:17.768101	128.119.245.12	10.10.40.146	HTTP	552 HTTP/1.1 200 OK (text/html
	226	08:24:17.768150	10.10.40.146	128.119.245.12	TCP	66 49434 → 80 [ACK] Seq=433 Ac.
	226	08:24:17.987329	10.10.40.146	128.119.245.12	HTTP	469 GET /favicon.ico HTTP/1.1
	226	08:24:18.375716	128.119.245.12	10.10.40.146	HTTP	550 HTTP/1.1 404 Not Found (te.

9 HTTP GET and OK messages:

```
Source
10.10.40.146
No. Time
22657 08:24:17.473788
                                                                  Destination
                                                                                               Protocol Length Info
                                                                  128.119.245.12
                                                                                               HTTP
                                                                                                           498
                                                                                                                    GET /
wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1
Frame 22657: 498 bytes on wire (3984 bits), 498 bytes captured (3984 bits) on interface 0 Ethernet II, Src: Apple_24:e0:94 (f0:79:60:24:e0:94), Dst: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
Internet Protocol Version 4, Src: 10.10.40.146, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 49434, Dst Port: 80, Seq: 1, Ack: 1, Len: 432
Hypertext Transfer Protocol
No. Time
22665 08:24:17.768101
                                    Source
                                                                  Destination
                                                                                               Protocol Length Info
                                    128.119.245.12
                                                                                                                    HTTP/1.1
                                                                 10.10.40.146
                                                                                                           552
200 OK (text/html)
Frame 22665: 552 bytes on wire (4416 bits), 552 bytes captured (4416 bits) on interface 0
Ethernet II, Src: Cisco_af:0c:64 (a0:3d:6f:af:0c:64), Dst: Apple_24:e0:94 (f0:79:60:24:e0:94)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 10.10.40.146
Transmission Control Protocol, Src Port: 80, Dst Port: 49434, Seq: 1, Ack: 433, Len: 486
Hypertext Transfer Protocol
Line-based text data: text/html (4 lines)
```

The HTTP GET and OK messages are as shown above.

10 Destination physical address of the first packet captured and device it belongs to:

```
▶ Frame 22644: 77 bytes on wire (616 bits), 77 bytes captured (616 bits) on interface 0
▼ Ethernet II, Src: Apple_24:e0:94 (f0:79:60:24:e0:94), Dst: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
▼ Destination: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
■ Address: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
■ .....0. ....... = LG bit: Globally unique address (factory default)
■ .....0 ....... = IG bit: Individual address (unicast)
▼ Source: Apple_24:e0:94 (f0:79:60:24:e0:94)
■ Type: IPv4 (0x0800)
▼ Internet Protocol Version 4, Src: 10.10.40.146, Dst: 8.8.8.8
■ User Datagram Protocol, Src Port: 57997, Dst Port: 53
■ Domain Name System (query)
```

The destination physical address of the first packet (HTTP) captured is **a0:3d:6f:af:0c:64** and it belongs to the device Cisco.

11 Bytes of header in the first frame:

The bytes of header in the first frame is the sum of bytes of header at the different layers. This is not directly visible, but we have to add the **Header length** field values for the Ethernet, IP and transport layers.

```
Ethernet Header: Size = 6 + 6 + 2 = 14 bytes for the 3 fields shown.
▼ Ethernet II, Src: Apple_24:e0:94 (f0:79:60:24:e0:94), Dst: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
   ▼ Destination: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
         Address: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
         .... .0. .... = LG bit: Globally unique address (factory default)
         .... ...0 .... = IG bit: Individual address (unicast)
   ▼ Source: Apple_24:e0:94 (f0:79:60:24:e0:94)
         Address: Apple_24:e0:94 (f0:79:60:24:e0:94)
         .... .0. .... = LG bit: Globally unique address (factory default)
         .... ...0 .... = IG bit: Individual address (unicast)
      Type: IPv4 (0x0800)
   IP Header: Size = 20 bytes
  Frame 22657: 498 bytes on wire (3984 bits), 498 bytes captured (3984
▶ Ethernet II, Src: Apple_24:e0:94 (f0:79:60:24:e0:94), Dst: Cisco_af:
  Internet Protocol Version 4, Src: 10.10.40.146, Dst: 128.119.245.12
  0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
```

TCP Header: Size = 32 bytes

Header checksum: 0x90f4 [validation disabled] [Header checksum status: Unverified]

Total Length: 484 Identification: 0x0000 (0) ▶ Flags: 0x4000, Don't fragment Time to live: 64 Protocol: TCP (6)

Source: 10.10.40.146 Destination: 128.119.245.12

▶ Hypertext Transfer Protocol

```
Transmission Control Protocol, Src Port: 49434, Dst Port: 80,
   Source Port: 49434
  Destination Port: 80
   [Stream index: 216]
   [TCP Segment Len: 432]
  Sequence number: 1 (relative sequence number)
   [Next sequence number: 433 (relative sequence number)]
  Acknowledgment number: 1
                              (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x018 (PSH, ACK)
  Window size value: 4117
  [Calculated window size: 131744]
   [Window size scaling factor: 32]
  Checksum: 0x6eaa [unverified]
   [Checksum Status: Unverified]
  Urgent pointer: 0
```

▶ Transmission Control Protocol, Src Port: 49434, Dst Port: 80, Seq: 1

Thus, total bytes of header = 14 + 20 + 32 = 66 bytes

How to know if Ethernet header contains an IP packet?

```
▶ Frame 22657: 498 bytes on wire (3984 bits), 498 bytes captured (3984 bits) on interface 0
v Ethernet II, Src: Apple_24:e0:94 (f0:79:60:24:e0:94), Dst: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
  ▼ Destination: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
      Address: Cisco_af:0c:64 (a0:3d:6f:af:0c:64)
       .... .0. .... = LG bit: Globally unique address (factory default)
       .... ...0 .... = IG bit: Individual address (unicast)
  ▼ Source: Apple_24:e0:94 (f0:79:60:24:e0:94)
      Address: Apple_24:e0:94 (f0:79:60:24:e0:94)
       .... ..0. .... = LG bit: Globally unique address (factory default)
       .... ...0 .... = IG bit: Individual address (unicast)
   Type: IPv4 (0x0800)
  Internet Protocol Version 4, Src: 10.10.40.146, Dst: 128.119.245.12
▶ Transmission Control Protocol, Src Port: 49434, Dst Port: 80, Seq: 1, Ack: 1, Len: 432
▼ Hypertext Transfer Protocol
  ▶ GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
    Hosti daia os umass odulista
```

We can determine by looking at the Ethernet header of the frame whether it contains an IP packet since the field **Type** contains this detail as highlighted above.

13 How to know if the first packet captured has TCP or UDP as transport protocol by looking at the IP header?

We can know whether the packet captured has TCP or UDP as transport protocol by looking at the **Protocol** field in the IP header. If we consider DNS as the first packet captured, it has UDP whereas considering HTTP as the first packet, it has TCP.

DNS packet:

```
▼ Internet Protocol Version 4, Src: 10.10.40.146, Dst: 8.8.8.8

0100 .... = Version: 4

.... 0101 = Header Length: 20 bytes (5)

▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT Total Length: 63

Identification: 0x0b15 (2837)

▶ Flags: 0x0000

Time to live: 64

Protocol: UDP (17)

Header checksum: 0x2cee [validation disabled]

[Header checksum status: Unverified]

Source: 10.10.40.146

Destination: 8.8.8.8

▶ User Datagram Protocol, Src Port: 57997, Dst Port: 53
```

HTTP packet:

```
Internet Protocol Version 4, Src: 10.10.40.146, [
   0100 .... = Version: 4
   .... 0101 = Header Length: 20 bytes (5)
   Differentiated Services Field: 0x00 (DSCP: CS0
   Total Length: 484
   Identification: 0x0000 (0)
   Flags: 0x4000, Don't fragment
   Time to live: 64
   Protocol: TCP (6)
   Header checksum: 0x90f4 [validation disabled]
   [Header checksum status: Unverified]
   Source: 10.10.40.146
   Destination: 128.119.245.12
```

14 Source and destination ports in the SYN, ACK:

```
▶ Frame 22655: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface 0
▶ Ethernet II, Src: Cisco_af:0c:64 (a0:3d:6f:af:0c:64), Dst: Apple_24:e0:94 (f0:79:60:24:e0:94)
  Internet Protocol Version 4, Src: 128.119.245.12, Dst: 10.10.40.146
▼ Transmission Control Protocol, Src Port: 80, Dst Port: 49434, Seq: 0, Ack: 1, Len: 0
    Source Port: 80
    Destination Port: 49434
     [Stream index: 216]
     [TCP Segment Len: 0]
     Sequence number: 0 (relative sequence number)
     [Next sequence number: 0 (relative sequence number)]
     Acknowledgment number: 1
                               (relative ack number)
    1010 .... = Header Length: 40 bytes (10)
  ▼ Flags: 0x012 (SYN, ACK)
       000. .... = Reserved: Not set
       ...0 .... = Nonce: Not set
```

In the SYN, ACK message, the source port is 80 and the destination port is 49434 as shown above. It has to be a well-known port for the server which is source here since client first sent a SYN in response to which server sends a SYN, ACK message. It cannot be the same for the client since client sends a request from ephemeral port number.

15 Server Hello message has 1 as relative sequence number and 185 as relative acknowledgement number:

Initially, the sequence number starts from 0 when the client requests a connection, and when the connection has been setup, the next packet from client has

a relative sequence number of 1, this is incremented each time a new request is made. The acknowledgement number is 433 as shown,

```
Frame 22664: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0

Ethernet II, Src: Cisco_af:0c:64 (a0:3d:6f:af:0c:64), Dst: Apple_24:e0:94 (f0:79:60:24:e0:94)

Internet Protocol Version 4, Src: 128.119.245.12, Dst: 10.10.40.146

Transmission Control Protocol, Src Port: 80, Dst Port: 49434, Seq: 1, Ack: 433, Len: 0

Source Port: 80

Destination Port: 49434

[Stream index: 216]

[TCP Segment Len: 0]

Sequence number: 1 (relative sequence number)

[Next sequence number: 1 (relative sequence number)]

Acknowledgment number: 433 (relative ack number)
```

This is because the request sent from the client had a TCP header length of 432 bits, so the acknowledgement number for the request is (size of request) + 1.

```
Transmission Control Protocol, Src Port: 49434, Dst Port: 80, Seq: 1, Ack: 1, Len: 432
```

```
Source Port: 49434

Destination Port: 80

[Stream index: 216]

[TCP Segment Len: 432]

Sequence number: 1 (relative sequence number)

[Next sequence number: 433 (relative sequence number)]

Acknowledgment number: 1 (relative ack number)

1000 ... = Header Length: 32 bytes (8)
```

16 First sequence number sent by the server to the client:

```
22651 08:24:17.276635 10.10.40.146
                                                       128,119,245,12
                                                                              TCP
                                                                                          78 49435 → 80 [SYN] Seg=2924163963 Win=6
                                                                                          74 80 → 49434 [SYN, ACK] Seq=1034420246
66 49434 → 80 [ACK] Seq=21859282 Ack=103
       22655 08:24:17.473429 128.119.245.12
                                                       10.10.40.146
                                                                              TCP
                                                       128.119.245.12
        22656 08:24:17.473528 10.10.40.146
       22657 08:24:17.473788 10.10.40.146
                                                       128.119.245.12
                                                                              HTTP
                                                                                         498 GET /wireshark-labs/HTTP-wireshark-fi
       22660 08:24:17.564789 128.119.245.12
22661 08:24:17.564861 10.10.40.146
                                                                                          74 80 → 49435 [SYN, ACK] Seq=616578884 A
66 49435 → 80 [ACK] Seq=2924163964 Ack=6
                                                       10.10.40.146
                                                                              TCP
                                                       128,119,245,12
                                                                              TCP
       22664 08:24:17.767536 128.119.245.12
                                                                              TCP
                                                                                          66 80 → 49434 [ACK] Seq=1034420247 Ack=2
                                                       10.10.40.146
Frame 22655: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface 0
Ethernet II, Src: Cisco_af:0c:64 (a0:3d:6f:af:0c:64), Dst: Apple_24:e0:94 (f0:79:60:24:e0:94)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 10.10.40.146
Transmission Control Protocol, Src Port: 80, Dst Port: 49434, Seq: 1034420246, Ack: 21859282, Len: 0
   Source Port: 80
   Destination Port: 49434
   [Stream index: 216]
   [TCP Segment Len: 0]
   Sequence number: 1034420246
    [Next sequence number: 1034420246]
   Acknowledgment number: 21859282
   1010 .... = Header Length: 40 bytes (10)
   Flags: 0x012 (SYN, ACK)
      000. .... = Reserved: Not set ...0 .... = Nonce: Not set
      .... 0... = Congestion Window Reduced (CWR): Not set
      .... .0.. .... = ECN-Echo: Not set
      .... ..0. .... = Urgent: Not set
      .... ...1 .... = Acknowledgment: Set
      .... 0... = Push: Not set
       .... .... .0.. = Reset: Not set
    ▶ .... ...1. = Syn: Set
      .... .... 0 = Fin: Not set

[TCP Flags: .....A..S.]
```

The first sequence number sent by the server to the client is not 0 because intially the client sends a random sequence number which then is incremented by the server to 1 and sent to the client along with an acknowledgement. Also, it would have been shown as 0 if we viewed relative sequence numbers since wireshark starts the sequence numbers from 0 in relative ordering.