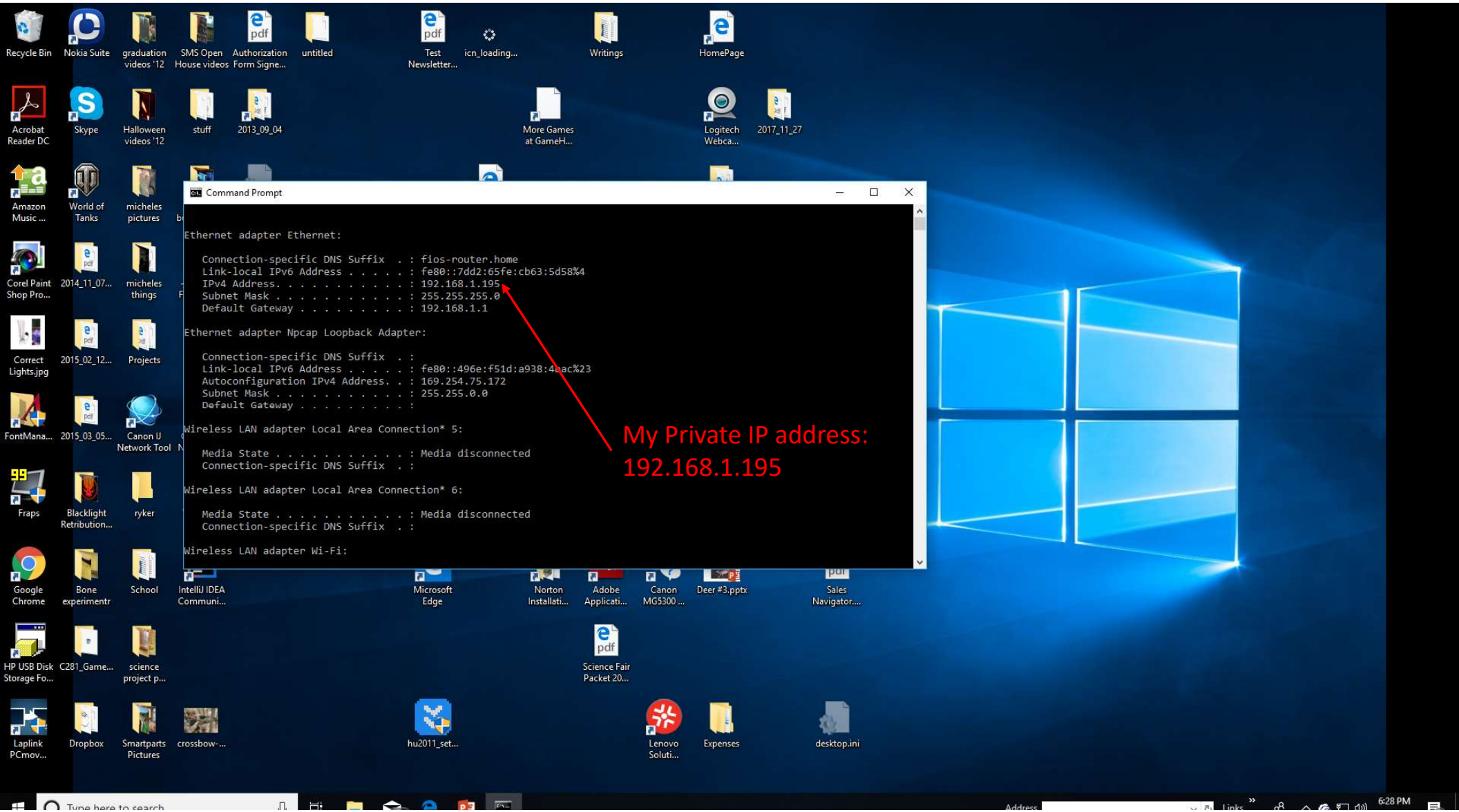
Wireshark Lab 8 – SSL / TLS

IT 520 –A – Enterprise Infrastructure & Networks

David Gogolkiewicz


Command Prompt
Ethernet adapter Ethernet:
Connection-specific DNS Suffix . : fios-router.home
Link-local IPv6 Address . . . . . : fe80::7dd2:65fe:cb63:5d58%4
IPv4 Address. . . . . : 192.168.1.195
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.1.1
Ethernet adapter Npcap Loopback Adapter:
Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::496e:f51d:a938:4bac%23
Autoconfiguration IPv4 Address. . : 169.254.75.172
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . :
Wireless LAN adapter Local Area Connection* 5:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Wireless LAN adapter Local Area Connection* 6:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Wireless LAN adapter Wi-Fi:
My Private IP address:
192.168.1.195

Wireshark Lab 8.pcapng

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Question 1

ssl

No.	Time	Source	Destination	Protocol	Length	Info
17	1.491840	192.168.1.195	13.107.42.12	TLSv1.2	234	Client Hello
25	1.502519	13.107.42.12	192.168.1.195	TLSv1.2	1348	Server Hello, Certificate, Certificate Status, Server Key Exchange, Server Hello Done
27	1.505990	192.168.1.195	13.107.42.12	TLSv1.2	147	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
29	1.521131	13.107.42.12	192.168.1.195	TLSv1.2	380	New Session Ticket, Change Cipher Spec, Encrypted Handshake Message
30	1.521975	192.168.1.195	13.107.42.12	TLSv1.2	1673	Application Data
31	1.522006	192.168.1.195	13.107.42.12	TLSv1.2	305	Application Data
34	1.561956	13.107.42.12	192.168.1.195	TLSv1.2	887	Application Data
35	1.561957	13.107.42.12	192.168.1.195	TLSv1.2	111	Application Data
49	5.233894	192.168.1.195	52.242.211.89	TLSv1.2	97	Application Data
50	5.298797	52.242.211.89	192.168.1.195	TLSv1.2	179	Application Data
65	7.326627	192.168.1.195	40.122.162.208	TLSv1.2	230	Client Hello
70	7.379406	40.122.162.208	192.168.1.195	TLSv1.2	1346	Server Hello, Certificate, Server Key Exchange, Server Hello Done
71	7.381808	192.168.1.195	40.122.162.208	TLSv1.2	180	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
72	7.426495	40.122.162.208	192.168.1.195	TLSv1.2	105	Change Cipher Spec, Encrypted Handshake Message
73	7.427872	192.168.1.195	40.122.162.208	TLSv1.2	1269	Application Data
74	7.476453	40.122.162.208	192.168.1.195	TLSv1.2	439	Application Data
75	7.477393	40.122.162.208	192.168.1.195	TLSv1.2	88	Application Data

```
    Destination: 13.107.42.12
Transmission Control Protocol, Src Port: 58139, Dst Port: 443, Seq: 1, Ack: 1, Len: 180
    Source Port: 58139
    Destination Port: 443
    [Stream index: 0]
    [TCP Segment Len: 180]
    Sequence number: 1    (relative sequence number)
    [Next sequence number: 181    (relative sequence number)]
    Acknowledgment number: 1    (relative ack number)
    0101 .... = Header Length: 20 bytes (5)
  > Flags: 0x018 (PSH, ACK)
    Window size value: 258
    [Calculated window size: 66048]
    [Window size scaling factor: 256]
    Checksum: 0xfab0 [unverified]
    [Checksum Status: Unverified]
    Urgent pointer: 0
  > [SEQ/ACK analysis]
  > [Timestamps]
    TCP payload (180 bytes)
Transport Layer Security
  > TLSv1.2 Record Layer: Handshake Protocol: Client Hello
```

```
0000  48 5d 36 68 c5 b8 00 01  6c d1 d3 8c 08 00 45 00   H]6h···· l·····E·
0010  00 dc 63 a1 40 00 80 06  00 00 c0 a8 01 c3 0d 6b   ··c·@··· ·······k
0020  2a 0c e3 1b 01 bb a9 d1  c9 d8 dc 36 ec 26 50 18   *······ ···6·&P·
0030  01 02 fa b0 00 00 16 03  03 00 af 01 00 00 ab 03   ···· ···· ····
0040  03 5c be 41 ed d3 5c 83  1c da ed ef 75 37 49 29   ·\·A··\· ····u7I)
0050  44 c9 d5 f7 00 51 04 0c  66 91 d7 97 6d 02 07 a7   D····Q·· f···m···
0060  ab 00 00 2a c0 2c c0 2b  c0 30 c0 2f 00 9f 00 9e   ···*·,·+ ·0·/····
0070  c0 24 c0 23 c0 28 c0 27  c0 0a c0 09 c0 14 c0 13   ·$·#·(·' ····
0080  00 9d 00 9c 00 3d 00 3c  00 35 00 2f 00 0a 01 00   ·····=·< ·5·/····
0090  00 58 00 00 00 14 00 12  00 00 0f 64 2e 64 6f 63   ·X····· ···d.doc
00a0  73 2e 6c 69 76 65 2e 6e  65 74 00 05 00 05 01 00   s.live.n et·····
00b0  00 00 00 00 0a 00 08 00  06 00 1d 00 17 00 18 00   ···· ···· ····
00c0  0b 00 02 01 00 00 0d 00  14 00 12 04 01 05 01 02   ···· ···· ····
00d0  01 04 03 05 03 02 03 02  02 06 01 06 03 00 23 00   ···· ···· ····#·
```

What is the SSL/TLS version of the of the Client Hello frame?

- Version 1.2

Wireshark Lab 8.pcapng | Packets: 25040 · Displayed: 11292 (45.1%) · Dropped: 0 (0.0%) | Profile: Default

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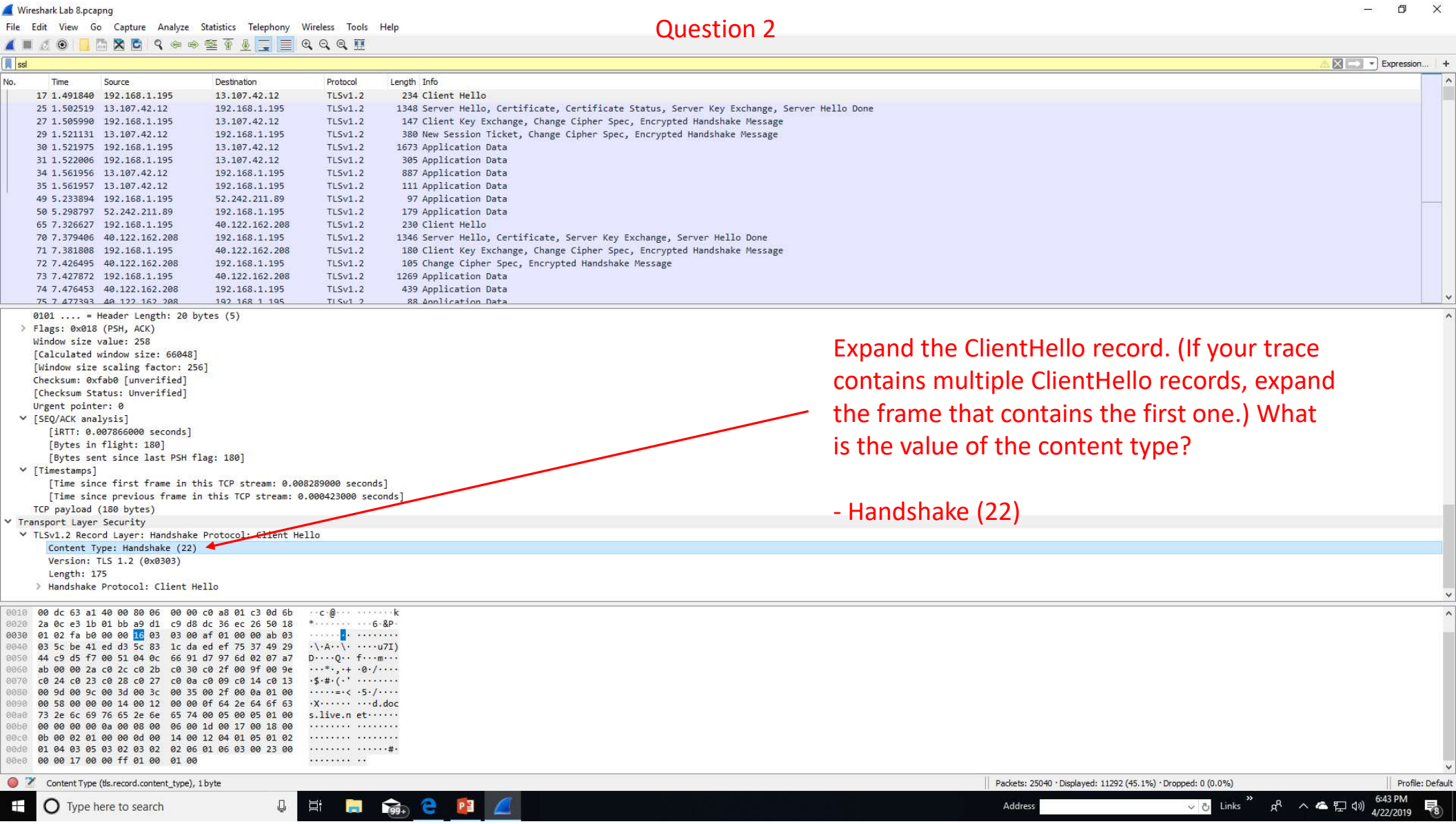
Address Links

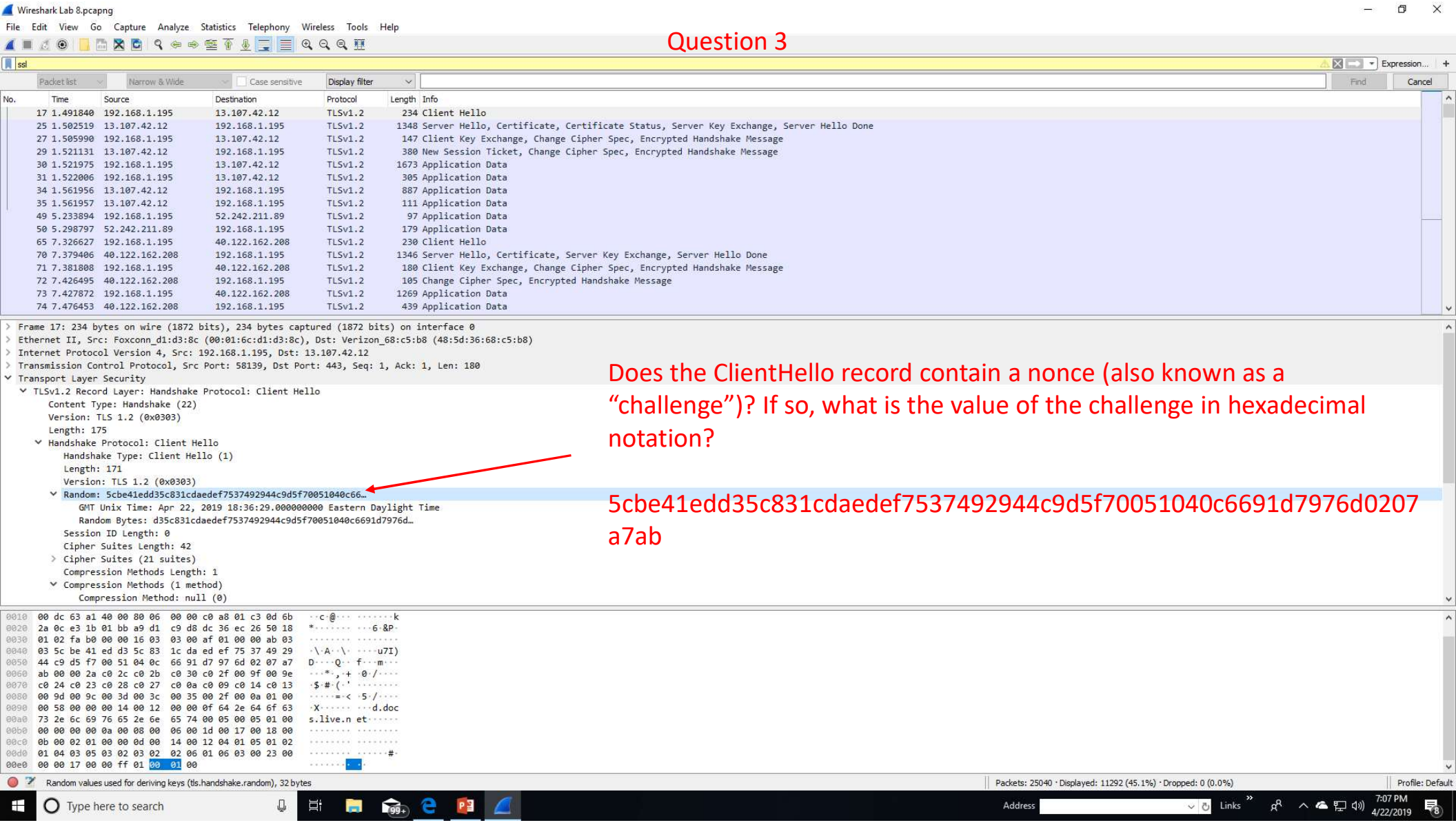
6:41 PM 4/22/2019

Question 2



Expand the ClientHello record. (If your trace contains multiple ClientHello records, expand the frame that contains the first one.) What is the value of the content type?

- Handshake (22)



Does the ClientHello record contain a nonce (also known as a "challenge")? If so, what is the value of the challenge in hexadecimal notation?

5cbe41edd35c831cdaedef7537492944c9d5f70051040c6691d7976d0207a7ab

Wireshark Lab 8.pcapng

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Question 4

ssl

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74	7.476453	40.122.162.208	192.168.1.195	TLSv1.2	439	Application Data

```
Cipher Suites (21 suites)
    Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 (0xc02c)
    Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
    Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xc030)
    Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
    Cipher Suite: TLS_DHE_RSA_WITH_AES_256_GCM_SHA384 (0x009f)
    Cipher Suite: TLS_DHE_RSA_WITH_AES_128_GCM_SHA256 (0x009e)
    Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 (0xc024)
    Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 (0xc023)
    Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384 (0xc028)
    Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256 (0xc027)
    Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA (0xc00a)
    Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA (0xc009)
    Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA (0xc014)
    Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA (0xc013)
    Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
    Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
    Cipher Suite: TLS_RSA_WITH_AES_256_CBC_SHA256 (0x003d)
    Cipher Suite: TLS_RSA_WITH_AES_128_CBC_SHA256 (0x003c)
    Cipher Suite: TLS_RSA_WITH_AES_256_CBC_SHA (0x0035)
    Cipher Suite: TLS_RSA_WITH_AES_128_CBC_SHA (0x002f)
    Cipher Suite: TLS_RSA_WITH_3DES_EDE_CBC_SHA (0x000a)
```

```
0010  00 dc 63 a1 40 00 80 06  00 00 c0 a8 01 c3 0d 6b   ··c·@··· ·······k
0020  2a 0c e3 1b 01 bb a9 d1  c9 d8 dc 36 ec 26 50 18   *······ ···6·&P·
0030  01 02 fa b0 00 00 16 03  03 00 af 01 00 00 ab 03   ·····... ........
0040  03 5c be 41 ed d3 5c 83  1c da ed ef 75 37 49 29   ·\·A··\· ····u7I)
0050  44 c9 d5 f7 00 51 04 0c  66 91 d7 97 6d 02 07 a7   D····Q·· f···m···
0060  ab 00 00 2a c0 2c c0 2b  c0 30 c0 2f 00 9f 00 9e   ···*·,·+ ·0·/····
0070  c0 24 c0 23 c0 28 c0 27  c0 0a c0 09 c0 14 c0 13   ·$·#·(·' ........
0080  00 9d 00 9c 00 3d 00 3c  00 35 00 2f 00 0a 01 00   ·····=·< ·5·/····
0090  00 58 00 00 00 14 00 12  00 00 0f 64 2e 64 6f 63   ·X····· ···d.doc
00a0  73 2e 6c 69 76 65 2e 6e  65 74 00 05 00 05 01 00   s.live.n et......
00b0  00 00 00 00 0a 00 08 00  06 00 1d 00 17 00 18 00   ........ ........
00c0  0b 00 02 01 00 00 0d 00  14 00 12 04 01 05 01 02   ........ ........
00d0  01 04 03 05 03 02 03 02  02 06 01 06 03 00 23 00   ........ ......#·
00e0  00 00 17 00 00 ff 01 00  01 00                     ........ ··
```

Does the ClientHello record advertise the cyber suites it supports? If so, in the first listed suite, what are the public-key algorithm, the symmetric-key algorithm, and the hash algorithm?

-TLS
-RSA
-AES 256
-AES 128
-GCM
-SHA256
-SHA384
-CBC

Cipher Suite (tls.handshake.ciphersuite), 2 bytes | Packets: 25040 · Displayed: 11292 (45.1%) · Dropped: 0 (0.0%) | Profile: Default

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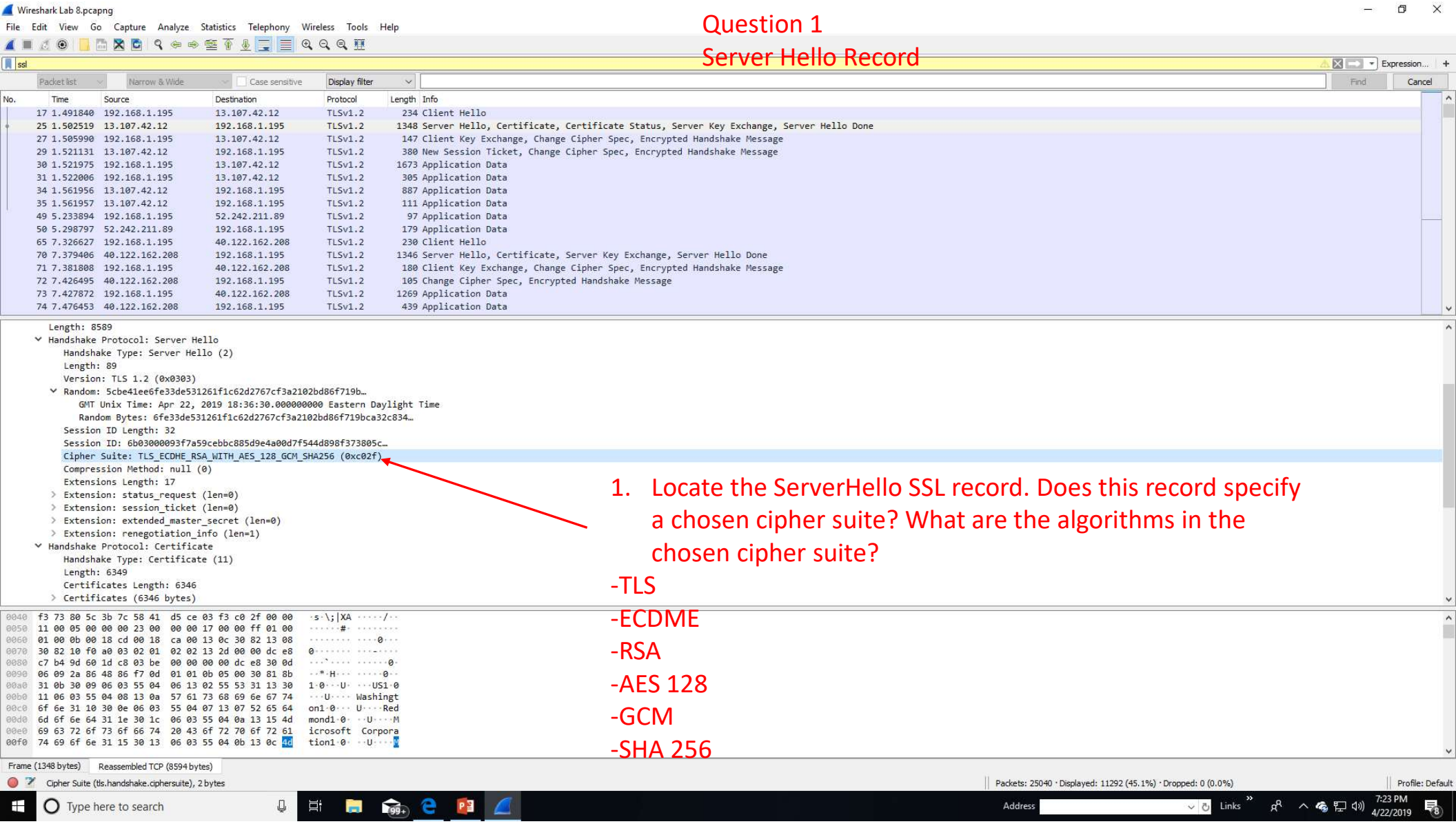
Address Links

7:14 PM
4/22/2019



Question 1
Server Hello Record

1. Locate the ServerHello SSL record. Does this record specify a chosen cipher suite? What are the algorithms in the chosen cipher suite?

-TLS
-ECDME
-RSA
-AES 128
-GCM
-SHA 256

C:\Users\dgogo\OneDrive\Masters\Computer Networking Course\Presentation 2\Project Files\Wireshark Lab 8.pcapng 25040 total packets, 20 shown

```
No.     Time           Source                Destination           Protocol Length Info
  13662 42.770948      104.119.136.209       192.168.1.195         OCSP     967    Response
Frame 13662: 967 bytes on wire (7736 bits), 967 bytes captured (7736 bits) on interface 0
Ethernet II, Src: Verizon_68:c5:b8 (48:5d:36:68:c5:b8), Dst: Foxconn_d1:d3:8c (00:01:6c:d1:d3:8c)
Internet Protocol Version 4, Src: 104.119.136.209, Dst: 192.168.1.195
Transmission Control Protocol, Src Port: 80, Dst Port: 58328, Seq: 1461, Ack: 230, Len: 913
[2 Reassembled TCP Segments (2373 bytes): #13661(1460), #13662(913)]
Hypertext Transfer Protocol
    HTTP/1.1 200 OK\r\n
    Content-Type: application/ocsp-response\r\n
    Content-Transfer-Encoding: Binary\r\n
    Content-Length: 1991\r\n
    Last-Modified: Mon, 22 Apr 2019 18:12:47 GMT\r\n
    ETag: "AF09CB2DD8BBD9A8A701A53B317C06E76B76F521"\r\n
    Cache-Control: public, no-transform, must-revalidate, max-age=1797\r\n
    Expires: Mon, 22 Apr 2019 23:07:08 GMT\r\n
    Date: Mon, 22 Apr 2019 22:37:11 GMT\r\n
    Connection: keep-alive\r\n
    \r\n
    [HTTP response 1/1]
    [Time since request: 0.018729000 seconds]
    [Request in frame: 13657]
    [Request URI: http://ocsp.entrust.net/
ME0wSzBJMEcwRTAJBgUrDgMCGgUABBTLXNCzDvBhHecWjg70iJhBW0InywQUanImetAe733nO2lR1GyNn5ASZqsCDGGh59IAAAAAUdNmpg%3D%3D]
    File Data: 1991 bytes
Online Certificate Status Protocol
```