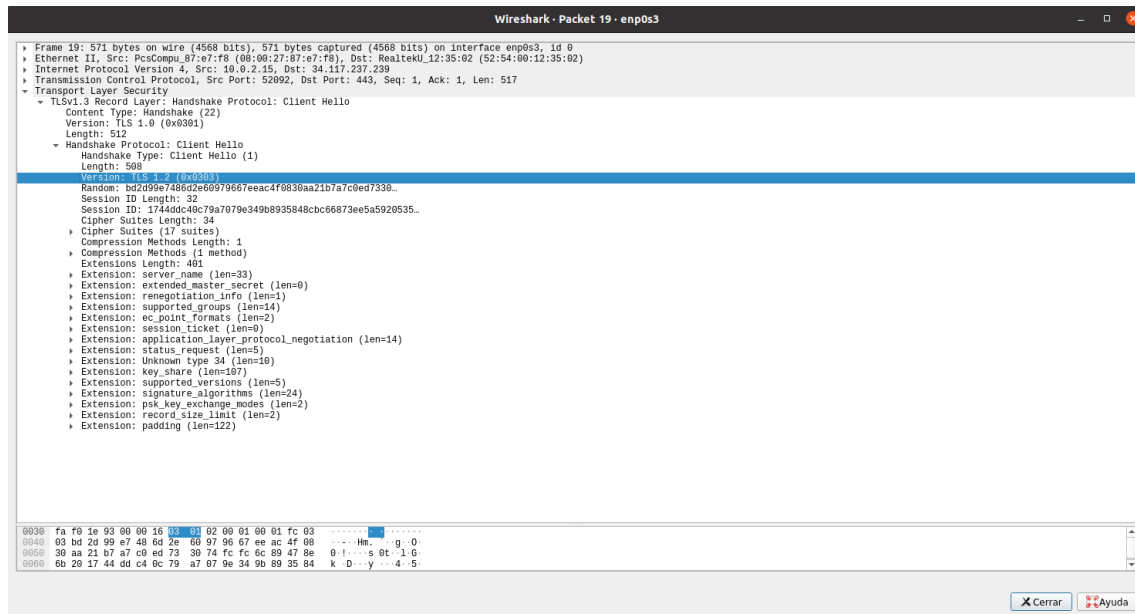
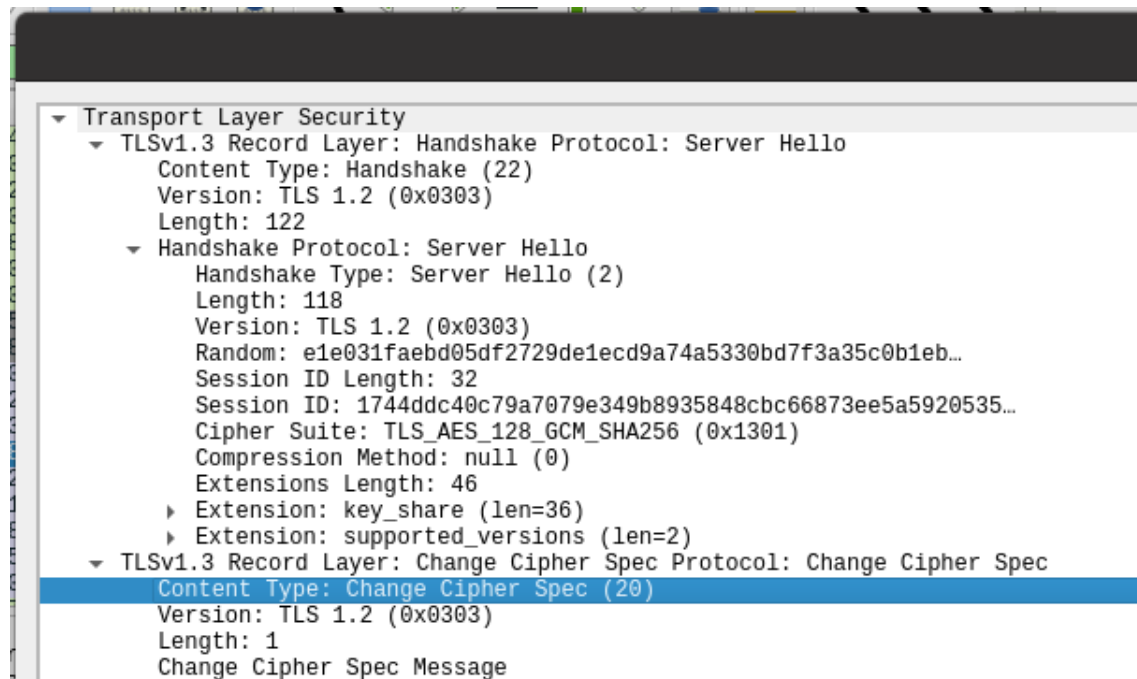


Primero El cliente le envia al server un paquete con un las distintas claves de encriptawcion para que el servidor escoja cual de todas decide usar la captura del paquete de las claves es el es siguiente:

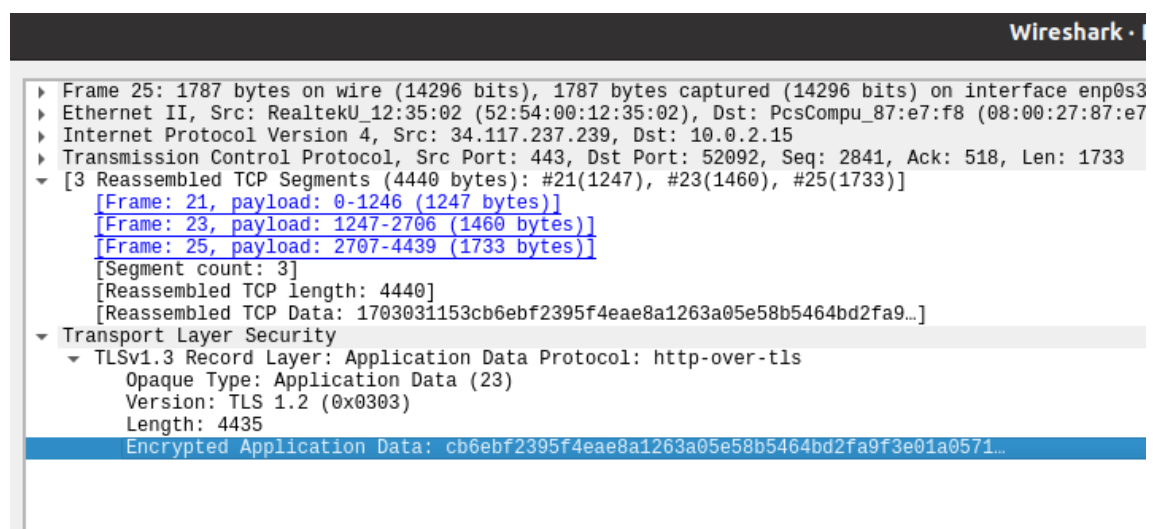


- ▼ Transport Layer Security
 - ▼ TLSv1.3 Record Layer: Handshake Protocol: Client Hello
 - Content Type: Handshake (22)
 - Version: TLS 1.0 (0x0301)
 - Length: 512
 - ▼ Handshake Protocol: Client Hello
 - Handshake Type: Client Hello (1)
 - Length: 508
 - Version: TLS 1.2 (0x0303)
 - Random: bd2d99e7486d2e60979667eeac4f0830aa21b7a7c0ed7330...
 - Session ID Length: 32
 - Session ID: 1744ddc40c79a7079e349b8935848cbc66873ee5a5920535...
 - Cipher Suites Length: 34
 - Cipher Suites (17 suites)
 - Compression Methods Length: 1
 - Compression Methods (1 method)
 - Extensions Length: 401
 - Extension: server_name (len=33)
 - Extension: extended_master_secret (len=0)
 - Extension: renegotiation_info (len=1)
 - Extension: supported_groups (len=14)
 - Extension: ec_point_formats (len=2)
 - Extension: session_ticket (len=0)
 - Extension: application_layer_protocol_negotiation (len=14)
 - Extension: status_request (len=5)
 - Extension: Unknown type 34 (len=10)
 - Extension: key_share (len=107)
 - Extension: supported_versions (len=5)
 - Extension: signature_algorithms (len=24)
 - Extension: psk_key_exchange_modes (len=2)
 - Extension: record_size_limit (len=2)
 - Extension: padding (len=122)

Ahora el server nos responde con La clave que ha elegido, ya que el que decide que cod de cifrado usar es el servidor TLS.



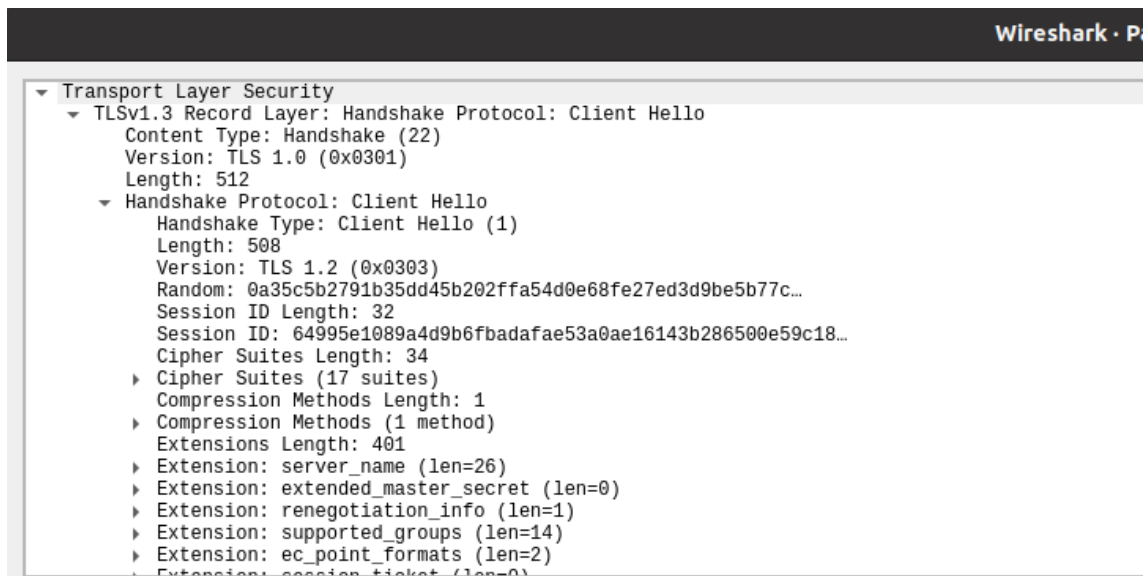
Aquí tienes el cifrado de un paquete con TLS, es ilegible a nos ser que conozcas las claves de cifrado.



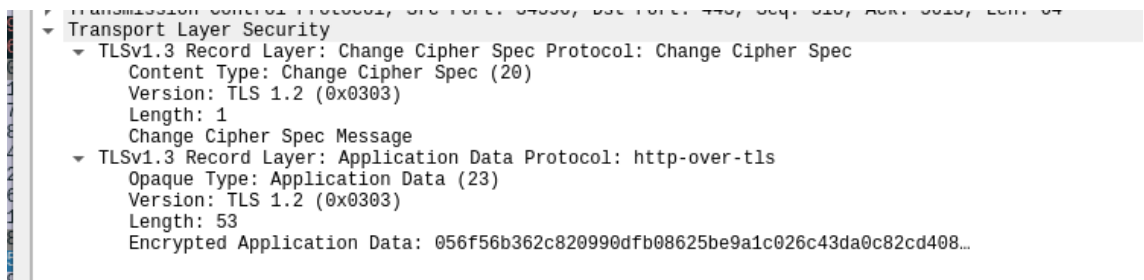
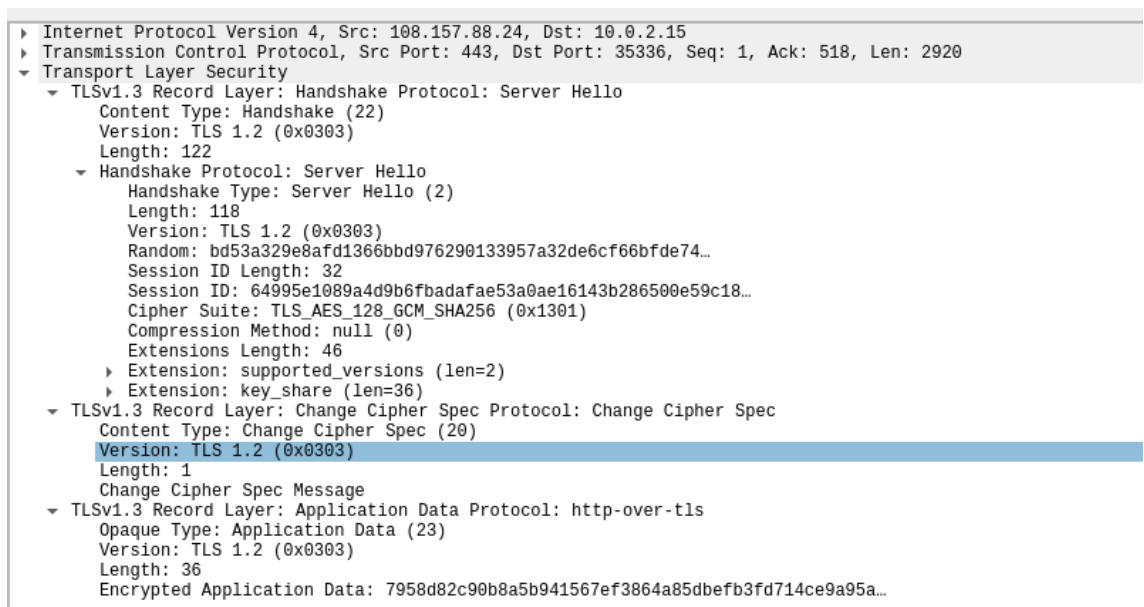
2.Ejercicio que nos has enviado

1. EL mundo con firefox

Aquí podemos ver que nosotros le enviamos un paquete por TCP ya que el TLS o el SSL se montan sobre el protocolo orientado a conexión TCP, Aquí vemos el Client Hello el primer paquete que enviamos al server esperando la contestación del mismos con un Server Hello, que es el mensaje en el que el servidor escoje cual va ha ser nuestra clave de cifrado entre todas las claves que hemos mandado como opciones al server.



Aquí tenemos el Server Hello, en este paquete el servidor correspondiente nos responde con el método de cifrado escogido así convirtiéndose en una clave simétrica para el cifrado público.



1.2 El mundo con Chrome.

```

▶ Frame 6: 571 bytes on wire (4568 bits), 571 bytes captured (4568 bits) on interface enp0s3, id 0
▶ Ethernet II, Src: PcsCompu_87:e7:f8 (08:00:27:87:e7:f8), Dst: RealtekU_12:35:02 (52:54:00:12:35:02)
▶ Internet Protocol Version 4, Src: 10.0.2.15, Dst: 142.250.178.174
▶ Transmission Control Protocol, Src Port: 39986, Dst Port: 443, Seq: 1, Ack: 1, Len: 517
▼ Transport Layer Security
  ▼ TLSv1.3 Record Layer: Handshake Protocol: Client Hello
    Content Type: Handshake (22)
    Version: TLS 1.0 (0x0301)
    Length: 512
    ▼ Handshake Protocol: Client Hello
      Handshake Type: Client Hello (1)
      Length: 508
      Version: TLS 1.2 (0x0303)
      Random: aacf94d520ccdd7cb2051e8cec5996d8dc56ae4cb533c33...
      Session ID Length: 32
      Session ID: 59f70c16415e0cc5ce326c3d16c35548bcf577a8ef7dbdee...
      Cipher Suites Length: 32
      ▼ Cipher Suites (16 suites)
        Cipher Suite: Reserved (GREASE) (0x1a1a)
        Cipher Suite: TLS_AES_128_GCM_SHA256 (0x1301)
        Cipher Suite: TLS_AES_256_GCM_SHA384 (0x1302)
        Cipher Suite: TLS_CHACHA20_POLY1305_SHA256 (0x1303)
        Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
        Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
        Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 (0xc02c)
        Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xc030)
        Cipher Suite: TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256 (0xc03a)
        Cipher Suite: TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 (0xc03b)
        Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA (0xc013)
        Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA (0xc014)
        Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
        Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
        Cipher Suite: TLS_RSA_WITH_AES_128_CBC_SHA (0x002f)
        Cipher Suite: TLS_RSA_WITH_AES_256_CBC_SHA (0x0035)
      Compression Methods Length: 1
      ▶ Compression Methods (1 method)
      Extensions Length: 403
      ▶ Extension: Reserved (GREASE) (len=0)
      ▶ Extension: server_name (len=24)
      ▶ Extension: extended_master_secret (len=0)
      ▶ Extension: renegotiation_info (len=1)
      ▶ Extension: supported_groups (len=10)
      ▶ Extension: ec_point_formats (len=2)
      ▶ Extension: session_ticket (len=0)

```

El cipher switch

```

▶ Frame 16: 2974 bytes on wire (23792 bits), 2974 bytes captured (23792 bits) on interface enp0s3, id 0
▶ Ethernet II, Src: RealtekU_12:35:02 (52:54:00:12:35:02), Dst: PcsCompu_87:e7:f8 (08:00:27:87:e7:f8)
▶ Internet Protocol Version 4, Src: 142.250.178.174, Dst: 10.0.2.15
▶ Transmission Control Protocol, Src Port: 443, Dst Port: 39986, Seq: 1, Ack: 518, Len: 2920
▼ Transport Layer Security
  ▼ TLSv1.3 Record Layer: Handshake Protocol: Server Hello
    Content Type: Handshake (22)
    Version: TLS 1.2 (0x0303)
    Length: 122
    ▼ Handshake Protocol: Server Hello
      Handshake Type: Server Hello (2)
      Length: 118
      Version: TLS 1.2 (0x0303)
      Random: 082232faaca5395aa59dd4aac4ef1fcede50be11461e4837...
      Session ID Length: 32
      Session ID: 59f70c16415e0cc5ce326c3d16c35548bcf577a8ef7dbdee...
      Cipher Suite: TLS_AES_128_GCM_SHA256 (0x1301)
      Compression Method: null (0)
      Extensions Length: 46
      ▶ Extension: key_share (len=36)
      ▶ Extension: supported_versions (len=2)
    ▼ TLSv1.3 Record Layer: Change Cipher Spec Protocol: Change Cipher Spec
      Content Type: Change Cipher Spec (20)
      Version: TLS 1.2 (0x0303)
      Length: 1
      Change Cipher Spec Message

```

1.3 firefox con Youtube

```

▶ Frame 16: 2974 bytes on wire (23792 bits), 2974 bytes captured (23792 bits) on interface enp0s3, id 0
▶ Ethernet II, Src: RealtekU_12:35:02 (52:54:00:12:35:02), Dst: PcsCompu_87:e7:f8 (08:00:27:87:e7:f8)
▶ Internet Protocol Version 4, Src: 142.250.178.174, Dst: 10.0.2.15
▶ Transmission Control Protocol, Src Port: 443, Dst Port: 39986, Seq: 1, Ack: 518, Len: 2920
▼ Transport Layer Security
  ▼ TLSv1.3 Record Layer: Handshake Protocol: Server Hello
    Content Type: Handshake (22)
    Version: TLS 1.2 (0x0303)
    Length: 122
    ▼ Handshake Protocol: Server Hello
      Handshake Type: Server Hello (2)
      Length: 118
      Version: TLS 1.2 (0x0303)
      Random: 082232faaca5395aa59dd4aac4ef1fcde50be11461e4837...
      Session ID Length: 32
      Session ID: 59f70c16415e0cc5ce326c3d16c35548bcf577a8ef7dbdee...
      Cipher Suite: TLS_AES_128_GCM_SHA256 (0x1301)
      Compression Method: null (0)
      Extensions Length: 46
      ▶ Extension: key_share (len=36)
      ▶ Extension: supported_versions (len=2)
    ▼ TLSv1.3 Record Layer: Change Cipher Spec Protocol: Change Cipher Spec
      Content Type: Change Cipher Spec (20)
      Version: TLS 1.2 (0x0303)
      Length: 1
      Change Cipher Spec Message

```

Wireshark - Packet 3805 - Enpos3

```

▼ Transport Layer Security
  ▼ TLSv1.3 Record Layer: Handshake Protocol: Server Hello
    Content Type: Handshake (22)
    Version: TLS 1.2 (0x0303)
    Length: 122
    ▼ Handshake Protocol: Server Hello
      Handshake Type: Server Hello (2)
      Length: 118
      Version: TLS 1.2 (0x0303)
      Random: 79044b5a33e47495e6db53b2b73b49d7e5520ae7709efa6a...
      Session ID Length: 32
      Session ID: d85d696593d9f1a730a4627ab73777e24fe891e935994492...
      Cipher Suite: TLS_AES_128_GCM_SHA256 (0x1301)
      Compression Method: null (0)
      Extensions Length: 46
      ▶ Extension: key_share (len=36)
      ▶ Extension: supported_versions (len=2)
    ▼ TLSv1.3 Record Layer: Change Cipher Spec Protocol: Change Cipher Spec
      Content Type: Change Cipher Spec (20)
      Version: TLS 1.2 (0x0303)
      Length: 1
      Change Cipher Spec Message

```

Youtube en Google

```

Version: TLS 1.2 (0x0303)
Random: 37c98a530d727edc4dccc36bc0cfa174957cc9e84615bf6..
Session ID Length: 32
Session ID: 7cdc3d8f0468b656a1d5beff18b6f2ab53c44f926ad4c6..
Cipher Suites Length: 32
▼ Cipher Suites (16 suites)
  Cipher Suite: Reserved (GREASE) (0x7a7a)
  Cipher Suite: TLS_AES_128_GCM_SHA256 (0x1301)
  Cipher Suite: TLS_AES_256_GCM_SHA384 (0x1302)
  Cipher Suite: TLS_CHACHA20_POLY1305_SHA256 (0x1303)
  Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
  Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
  Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 (0xc02c)
  Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xc030)
  Cipher Suite: TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256 (0xcca9)
  Cipher Suite: TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 (0xc03a)
  Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA (0xc013)
  Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA (0xc014)
  Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
  Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
  Cipher Suite: TLS_RSA_WITH_AES_128_CBC_SHA (0x002f)
  Cipher Suite: TLS_RSA_WITH_AES_256_CBC_SHA (0x0035)
Compression Method Length: 4

```

Wireshark - Packet 19 - en

```

▶ Frame 19: 2974 bytes on wire (23792 bits), 2974 bytes captured (23792 bits) on interface enp0s3, id 0
▶ Ethernet II, Src: RealtekU_12:35:02 (52:54:00:12:35:02), Dst: PcsCompu_87:e7:f8 (08:00:27:87:e7:f8)
▶ Internet Protocol Version 4, Src: 142.250.200.78, Dst: 10.0.2.15
▶ Transmission Control Protocol, Src Port: 443, Dst Port: 39948, Seq: 1, Ack: 518, Len: 2920
▼ Transport Layer Security
  ▼ TLSv1.3 Record Layer: Handshake Protocol: Server Hello
    Content Type: Handshake (22)
    Version: TLS 1.2 (0x0303)
    Length: 122
    ▼ Handshake Protocol: Server Hello
      Handshake Type: Server Hello (2)
      Length: 118
      Version: TLS 1.2 (0x0303)
      Random: fe0810b2632860e765ead99415ce2ee9a7f276e7dd52a57...
      Session ID Length: 32
      Session ID: 7cdc3d8f0468b656a1d5beff18b6f2ab53c44f926ad4c6..
      Cipher Suite: TLS_AES_128_GCM_SHA256 (0x1301)
      Compression Method: null (0)
      Extensions Length: 46
      ▶ Extension: key_share (len=36)
      ▶ Extension: supported_versions (len=2)
    ▼ TLSv1.3 Record Layer: Change Cipher Spec Protocol: Change Cipher Spec
      Content Type: Change Cipher Spec (20)
      Version: TLS 1.2 (0x0303)
      Length: 1
      Change Cipher Spec Message

```

3.Apuntes.

TLS (Transfer Layer Security) es un protocolo de la capa de aplicación utilizado para el envío de paquetes de forma “Segura ” a través de la red, lo utilizan la mayoría de navegadores el sucesor de SSL o Secure Sockets Layer, se monta en el protocolo TCP de transporte ya que está orientado a conexión ya que envían varios paquetes previos al envío del primer paquete de datos, los datos suelen ir encriptados con un protocolo ASIMETRICO , usualmente es el RSA, pero no es el único, también podemos encontrar otros tales como ELGAMAL.

TLS/SSL, con protocolos usados para la certificación de identidad entre un servidor y un cliente, asegurando así una comunicación “segura entre ambos ordenadores”.

TLS usa un Cipher Switch que consiste en el envío desde el cliente al servidor con los diferentes cipher switch, dejando el trabajo de elegir el formato al servidor que recibe la información.