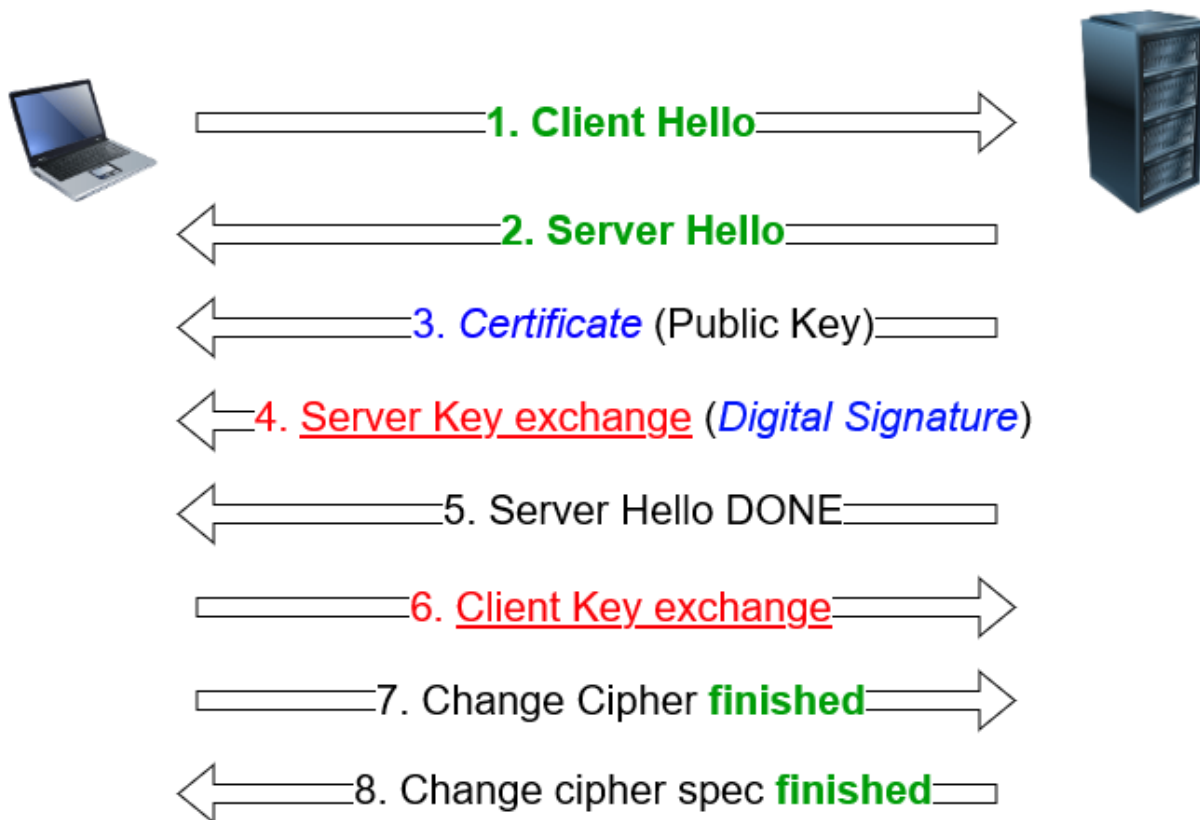


Security: TLS 1.2 operating scheme

(TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384, 256-bitowe klucze, TLS 1.2)

Transport Layer Security

TLS 1.2 handshake



Shared Secret (e.g. Elliptic Curve Diffie-Hellman Ephemeral - ECDHE)

Server Authenticity (e.g. Rivest–Shamir–Adleman - RSA)

Mechanism to make sure nobody tampered with the message

TLS 1.2 Handshake

1. client Hello

The client initiates the connection by sending the message **ClientHello** message, which contains:

- the supported version of the TLS protocol
- list of supported cipher suites

- random byte string (client random)
- optional extensions such as SNI (Server Name Indication)

The purpose of this message is to start negotiating security parameters with the server.

Server Hello

([Microsoft Learn](#))[1])

The server responds with the message **ServerHello** message which contains:([Wikipedia](#))[2])

- the selected TLS protocol version
- the selected cipher suite
- random sequence of bytes (server random)
- optional extensions

This message confirms the selection of common security parameters for the session.

3 Certificate (Public Key)

The server sends its X.509 certificate containing the public key. The client uses this certificate to:([catchpoint.com](#))[3])

- verify the identity of the server
- obtain the public key for encrypting the premaster secret([ManageEngine](#))[4])

4th Server Key Exchange (Digital Signature)

Depending on the selected cipher suite, the server can send a message **ServerKeyExchange** message that contains:([Wikipedia](#))[2])

- additional key exchange parameters (e.g. for DHE or ECDHE)([Wikipedia](#))[2]).
- the digital signature of these parameters

The client verifies the signature to ensure that the parameters come from an authorised server.

5 Server Hello Done

([Taro](#))[5])

The server sends a message **ServerHelloDone** message, signalling the end of its part of the negotiation. The client can now continue with the handshake process.

6 Client Key Exchange

The client generates a premaster secret and sends it to the server in a message **ClientKeyExchange**. Depending on the key exchange method:([ManageEngine][4])

- for RSA: the premaster secret is encrypted with the server's public key([Cloudflare][6])
- for DHE/ECDHE: the client sends its key exchange parameters([Taro][5])

Both parties use the premaster secret and random values to compute the shared master secret.([Wikipedia][2])

7 Change Cipher Spec

([Fortinet Docs][7])

The client sends a message **ChangeCipherSpec**, informing the server that from this point onwards all messages will be encrypted using the agreed parameters.([takethenotes.com][8])

8 Finished

([Fortinet Docs][7])

The client sends a message **Finished**message, which is the first encrypted message in the session. It contains a digest of all previous handshake messages, allowing the server to verify the integrity and authenticity of the negotiation.

After receiving and verifying the message **Finished**message, the server also sends its **ChangeCipherSpec** i **Finished**message, completing the handshake process.

From this point onwards, the communication between client and server is encrypted and secure.

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