TLS/SSL

Securing your traffic

SANOG 25

Security Workshop

Fakrul Alam
bdHUB Limited
fakrul@bdhub.com

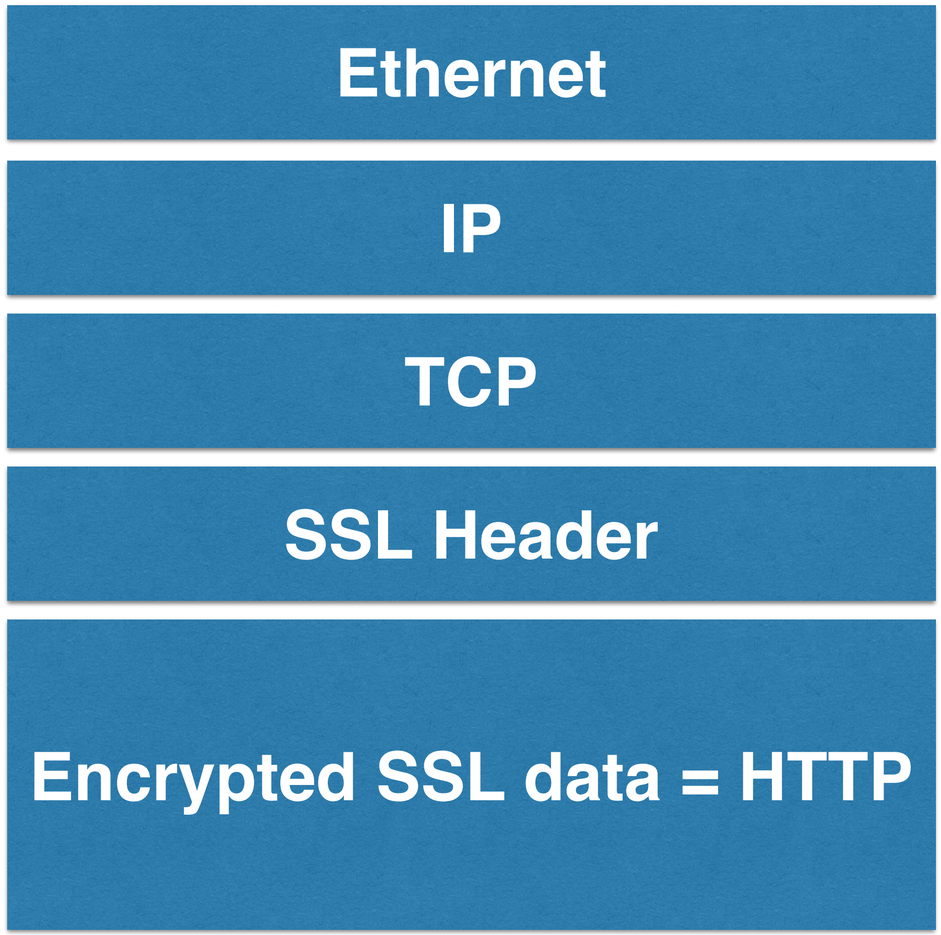
History

- Secure Sockets Layer was developed by Netscape in 1994 as a protocol which permitted persistent and secure transactions.
- In 1997 an Open Source version of Netscape’s patented version was created, which is now OpenSSL.
- In 1999 the existing protocol was extended by a version now known as Transport Layer Security (TLS).
- By convention, the term "SSL" is used even when technically the TLS protocol is being used.

TLS/SSL : What it does

- Encryption
- Integrity
- Authentication

Location of SSL Protocol & TCP Ports

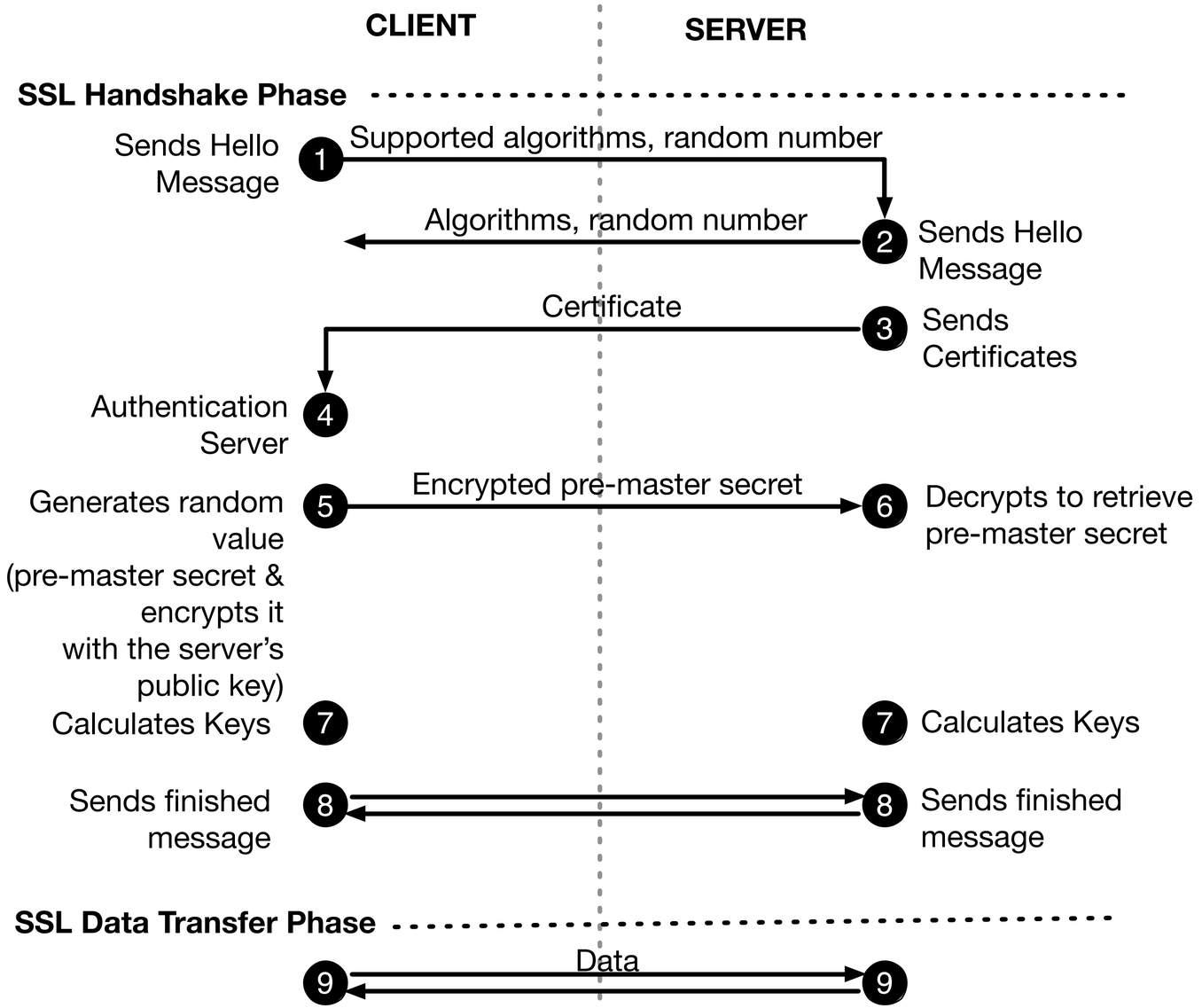


- Independent of packet boundaries
- IANA has over 60 ports specified for SSL/TLS use. Some ports seen more than others
  - https 443
  - pop3s 995

SSL Operations

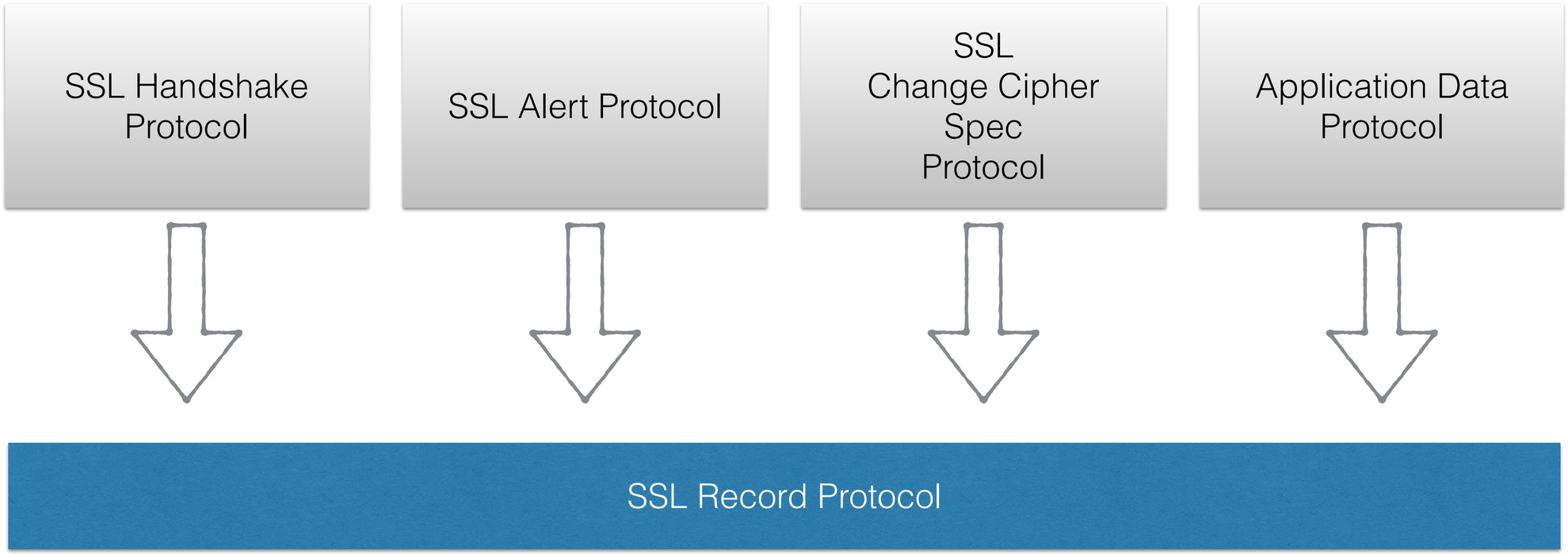
- Application calls SSL connect routines to set up channel
- **Public Key** cryptography is used during handshake to authenticate parties and exchange session key.
- **Symmetric Key** cryptography (using session key) is used to encrypt data.

How SSL Works

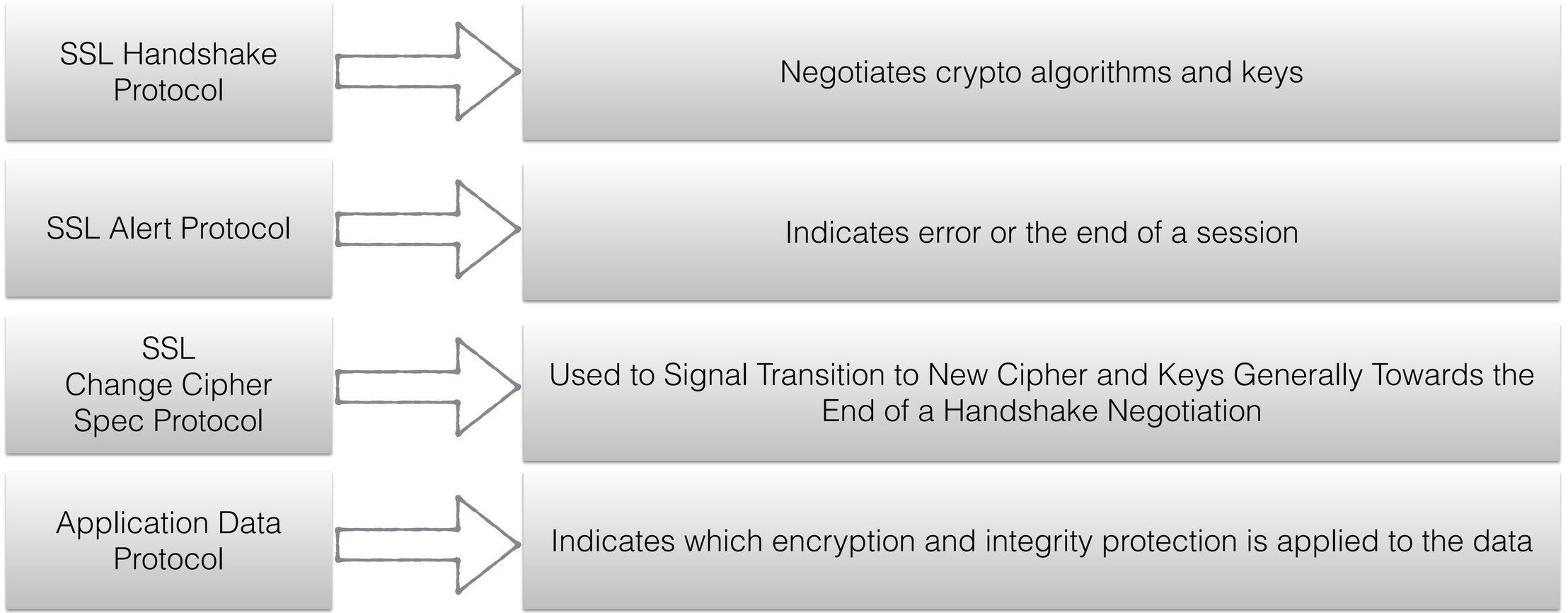


SSL Protocol Building Blocks

- SSL is a Combination of a Primary Record Protocol with Four ‘Client’ Protocols



SSL Protocol Building Block Functions



SSL Handshake protocol

Key	Cipher	Hash
RSA	RC4	HMAC-MD5
Diffie-Hellman	Triple DES	HMAC-SHA
DSA	AES	

Version	3.3
Random Number	289484848484

Key	Cipher	Hash
RSA	RC4	HMAC-MD5
Diffie-Hellman	Triple DES	HMAC-SHA
DSA	AES	

SSL Alert Protocol

- Alert messages communicate the severity of the message and a description of the alert
- Fatal messages result in connection termination.

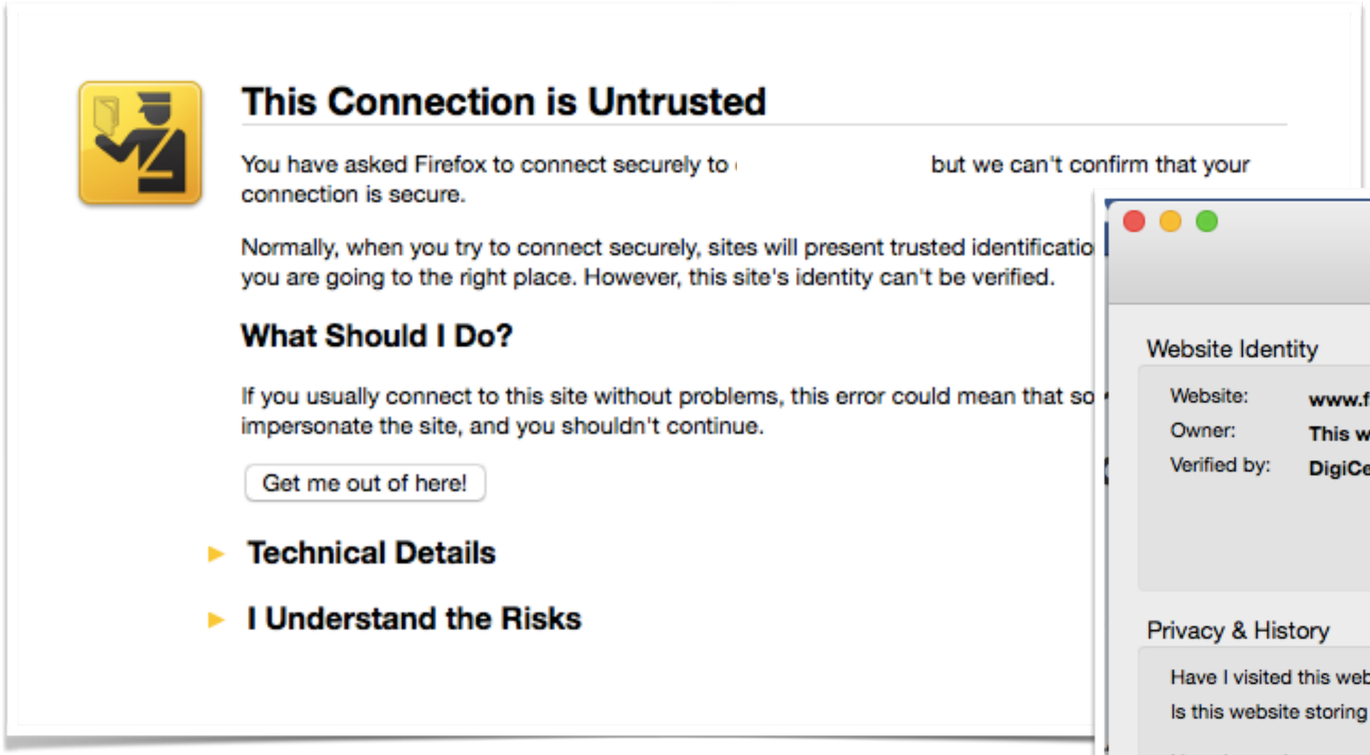
SSL ChangeCipherSpec Protocol

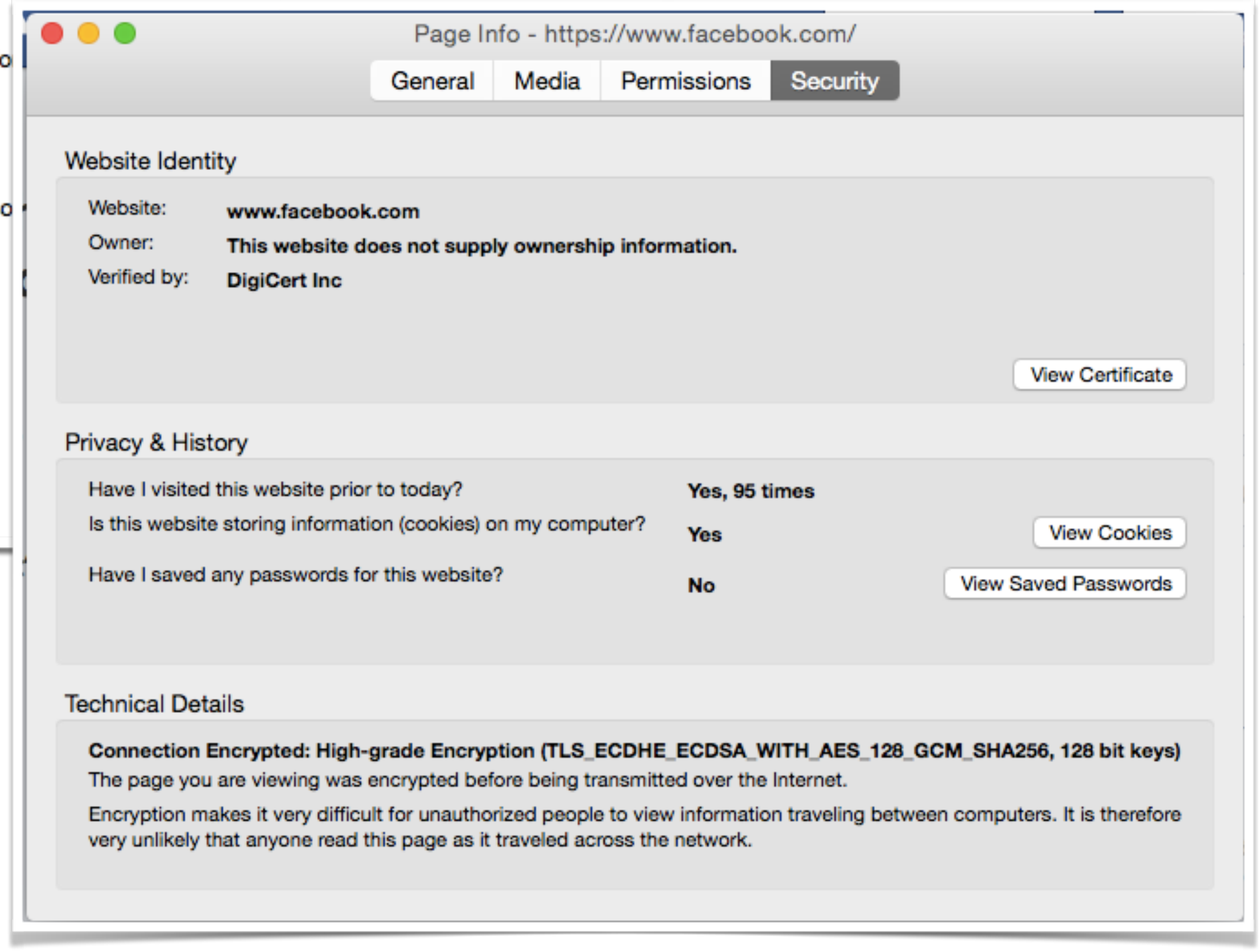
- The ChangeCipherSpec layer is composed of one message that signals the beginning of secure communications between the client and server.

Application Data Protocol

- Application data messages are carried by the record layer and are fragmented, compressed, and encrypted based on the current connection state. The messages are treated as transparent data to the record layer.

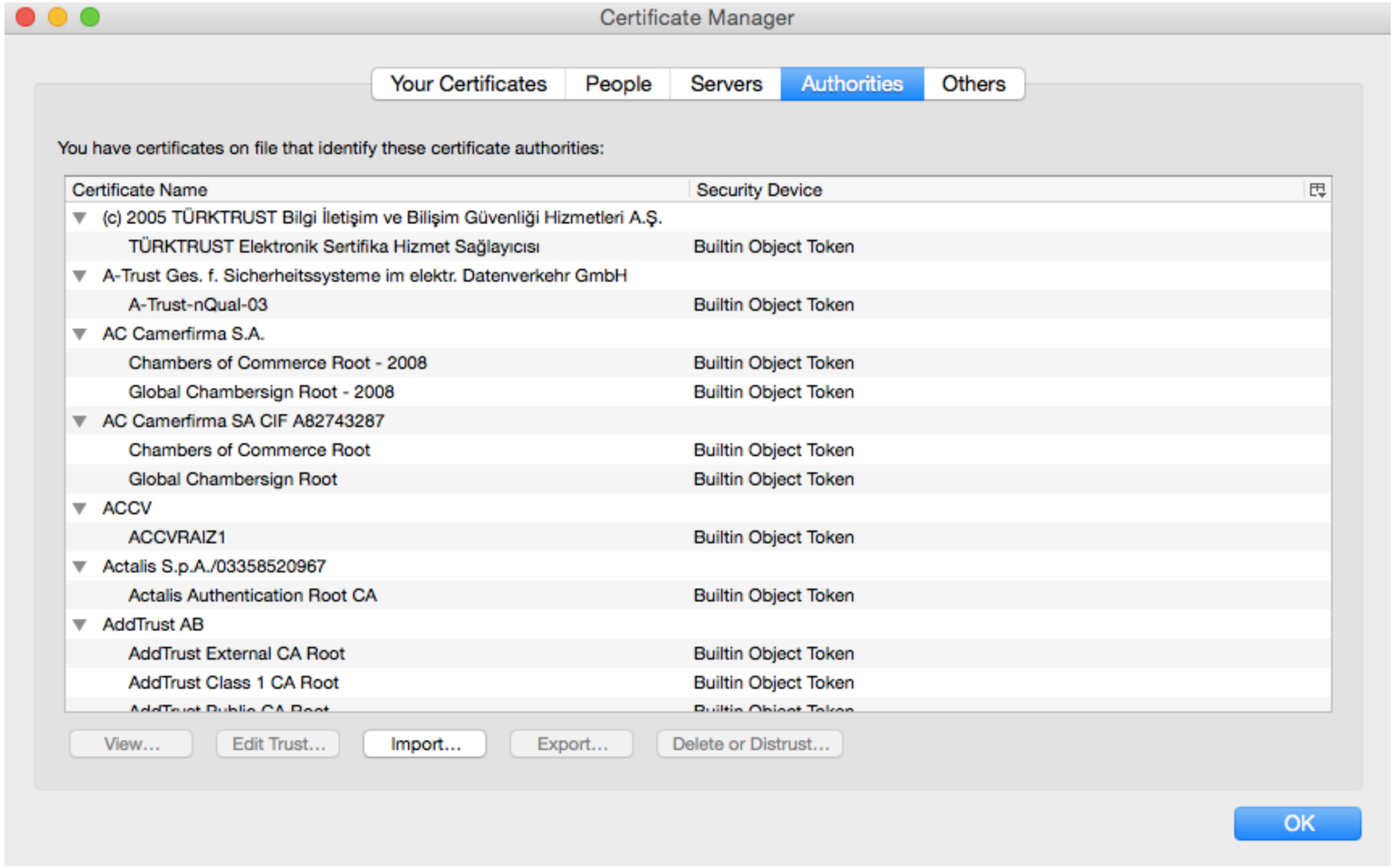
Trusted vs Non Trusted Certificate





Certificate Authority

- Someone both parties trust
- Issuer of Certificates
- Many standard ones listed in browser option
  - VeriSign
  - Comodo SSL
  - GlobalSign
  - Go Daddy
  - DigiCert



Question?