

Network layers OSI/TCP model

Tuesday, 21 March 2023

6:00 PM

Application layer

HTTP and HTTPS

SSH

NTP

Transport layer

TCP

UDP

Network layer

IP

ICMP

ARP

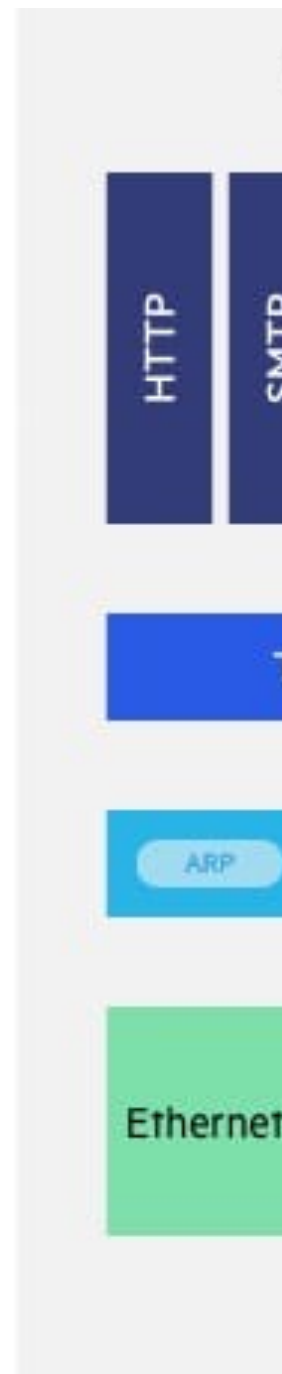
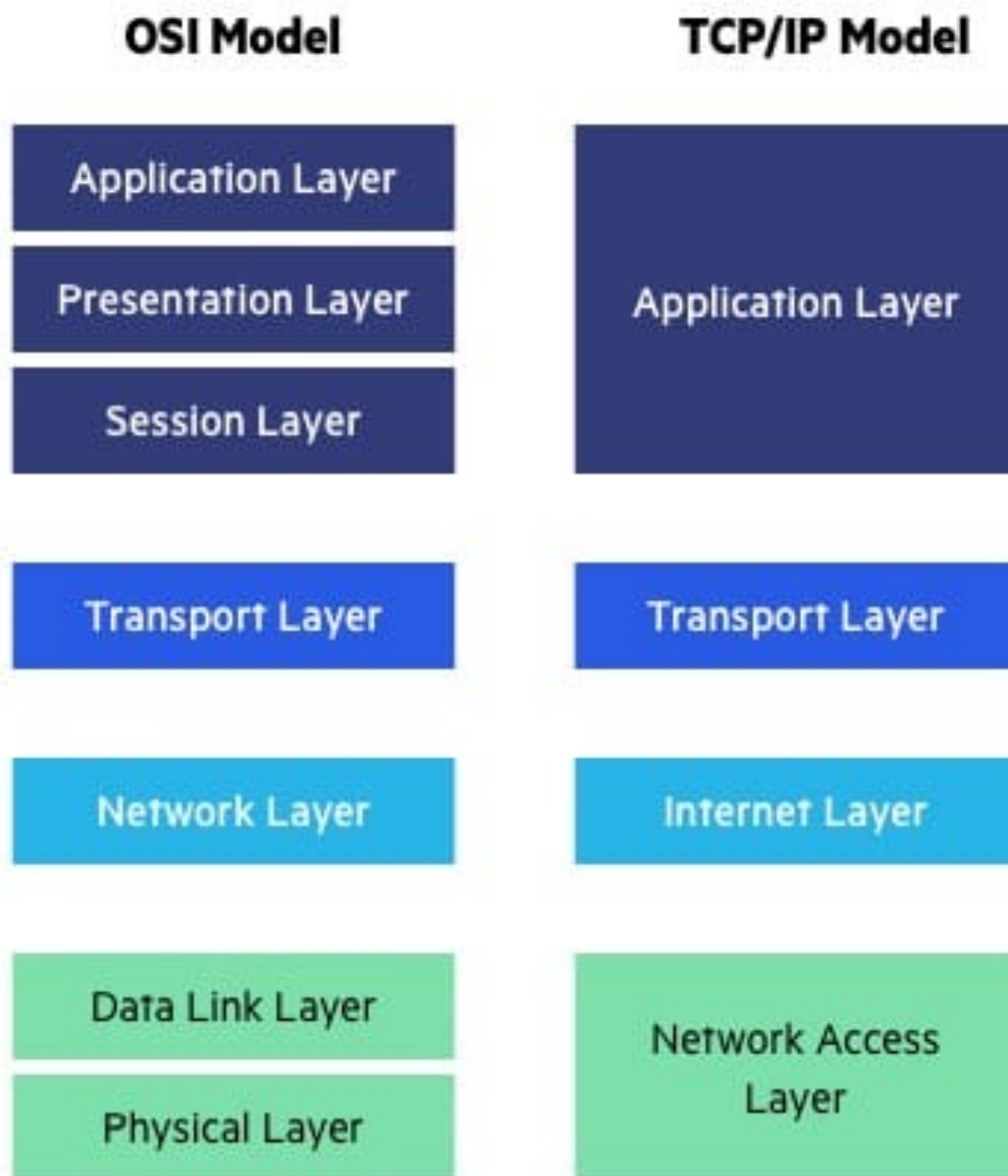
<https://www.geeksforgeeks.org/tcp-ip-model/>

<https://www.imperva.com/learn/application-security/osi-model/>

OSI model - 7 layers

TCP/IP model - 5 layers

Layers in TCP/IP	OSI Model
Application	Application
Transport	Presentation
	Session
	Transport
Network/Internet	Network
Data-link	Data-link
Physical	Physical

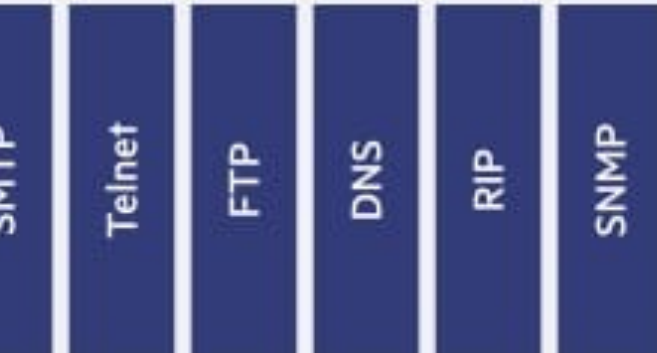


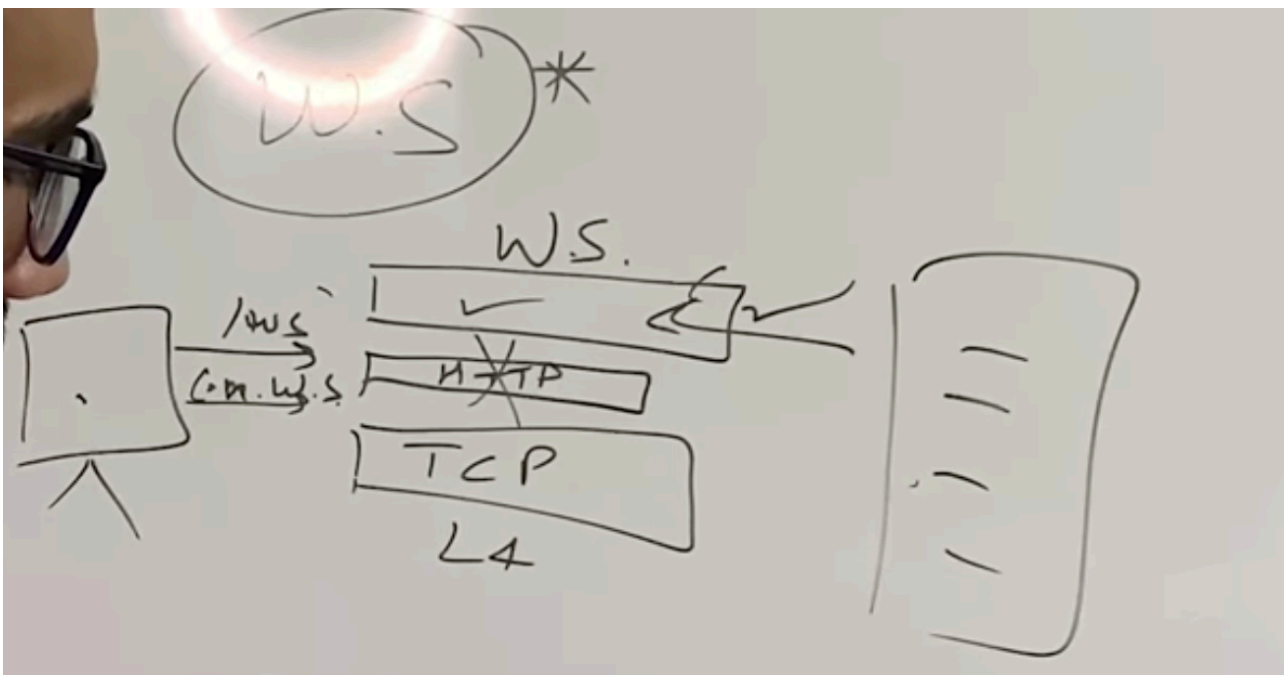
Websockets vs HTTP

[What are WebSockets? How is it different from HTTP?](#)



TCP/IP Protocol Suite







TCP vs UDP

<https://www.geeksforgeeks.org/tcp-vs-udp-for-video-streaming/?ref=rp>

<https://www.geeksforgeeks.org/why-does-dns-use-udp-and-not-tcp/?ref=rp>

<https://www.geeksforgeeks.org/differences-between-tcp-and-udp/>

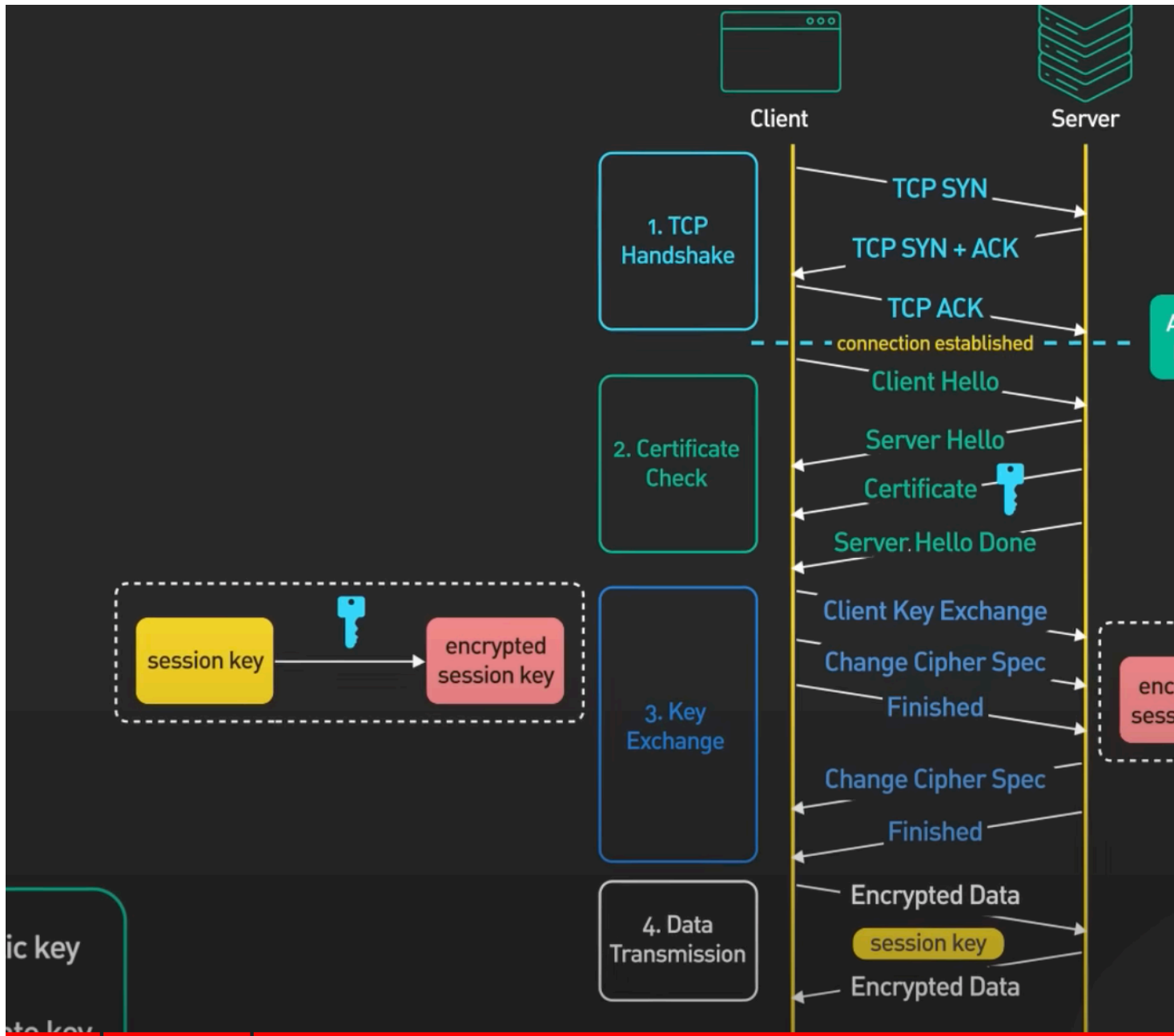
Basis	Transmission control protocol (TCP)	User datagram protocol (UDP)
Type of Service	TCP is a connection-oriented protocol. Connection-orientation means that the communicating devices should establish a connection before transmitting data and should close the connection after transmitting the data.	UDP is the Datagram-oriented protocol. This is because there is no overhead for opening a connection, maintaining a connection, and terminating a connection. UDP is efficient for broadcast and multicast types of network transmission.
Reliability	TCP is reliable as it guarantees the delivery of data to the destination router.	The delivery of data to the destination cannot be guaranteed in UDP.
Error checking mechanism	TCP provides extensive error-checking mechanisms. It is because it provides flow control and acknowledgment of data.	UDP has only the basic error checking mechanism using checksums.
Acknowledgment	An acknowledgment	No acknowledgment

gment	segment is present.	segment.
Sequence	Sequencing of data is a feature of Transmission Control Protocol (TCP). this means that packets arrive in order at the receiver.	There is no sequencing of data in UDP. If the order is required, it has to be managed by the application layer.
Speed	TCP is comparatively slower than UDP.	UDP is faster, simpler, and more efficient than TCP.
Retransmission	Retransmission of lost packets is possible in TCP, but not in UDP.	There is no retransmission of lost packets in the User Datagram Protocol (UDP).
Header Length	TCP has a (20-60) bytes variable length header.	UDP has an 8 bytes fixed-length header.
Weight	TCP is heavy-weight.	UDP is lightweight.
Handshaking Techniques	Uses handshakes such as SYN, ACK, SYN-ACK	It's a connectionless protocol i.e. No handshake
Broadcasting	TCP doesn't support Broadcasting.	UDP supports Broadcasting.
Protocols	TCP is used by HTTP , HTTPs , FTP , SMTP and Telnet .	UDP is used by DNS , DHCP , TFTP , SNMP , RIP , and VoIP .
Stream Type	The TCP connection is a byte stream.	UDP connection is message stream.
Overhead	Low but higher than UDP.	Very low.

HTTP/TCP

<https://www.goanywhere.com/blog/http-vs-tcp-whats-the-difference#:~:text=TCP%20tells%20the%20destination%20computer,desired%20documents%20on%20the%20Internet.>

TLS:



- TCP handshake
 - 3 way handshake
- TLS handshake(transport layer security)
 - Client hello with all TLS supported, cipher encryption supported details
 - Server hello with SSL certificate(public key)
- Key exchange(asymmetric encryption)
 - Client use it to attach session key and send it to server
 - Server decrypt it with private key
- Data transmission
 - Using session key.(symmetric encryption)

[SSL, TLS, HTTPS Explained](#)

Asymmetric
Encryption



encrypted
session key



session key

| How Does HTTPS Work?

