

NETWORK FUNDAMENTALS

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ENCAPSULATION

- The entire upper protocol packet (header plus payload) is the payload of the lower one; this is called encapsulation.
- During encapsulation every protocol adds its own header to the packet, treating it as a payload. This happens to every packet sent by a host
- The receiving host does the same operation in reverse order. Using this method, the application does not need to worry about how the transport, network and link layers work. It just hands in the packet to the transport layer.

HUB	SWITCH	ROUTER
Older device. Not used now	Advanced than hub which is used	Advanced device
Present in OSI Layer 1	Present in OSI Layer 2	Present in OSI Layer 3
It is also called collision domain - it has no memory	It has a memory - MAC Table MAC Address 48 bits	It has a memory - IP Table IP Address 32 Bits
Type Active HUB - will boost signal Passive HUB - will not boost signal	Manageable Switch (can config) Unmanageable Switch (cannot config)	Types of Packet Forwarding Cut through - will check 48 bits of packet and transfer quick Fragment free - half packet Store and forward - full packet (slow) , secure
Ports 4 port hub 8 port hub 16 port hub	It is called broadcast domain.	Function To find the best path where network and speed will be good Routing Static Dynamic

NETWORKING PROTOCOLS



TCP FLAGS

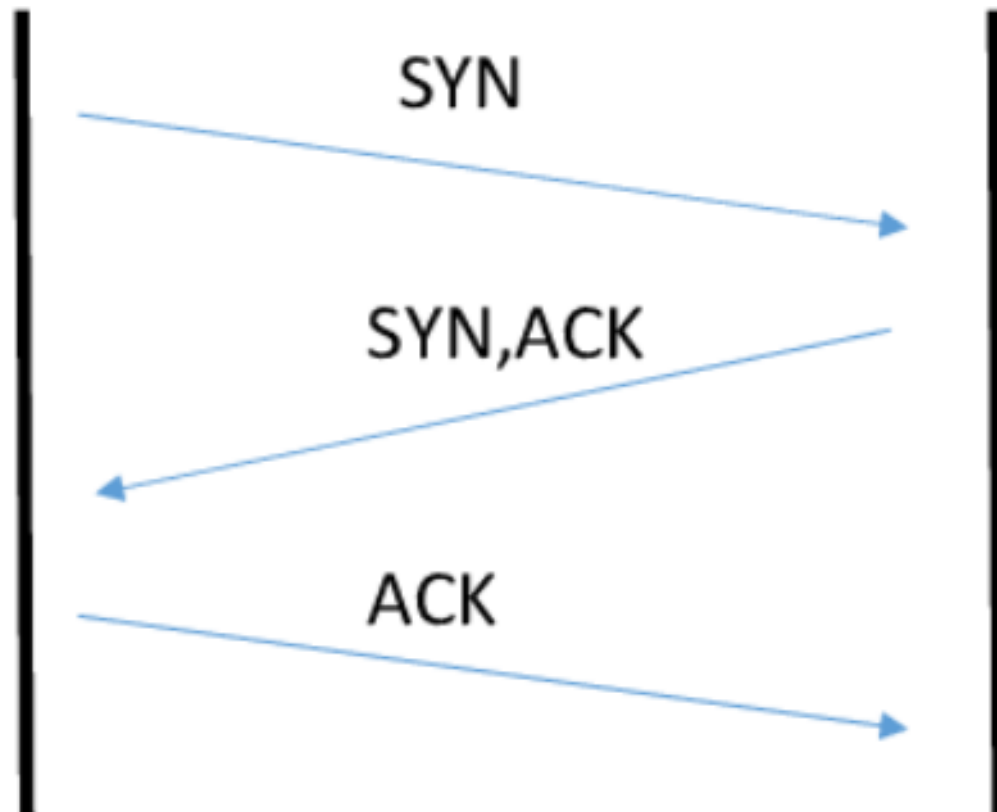
- RST - RESET
- ACK - ACKNOWLEDGE
- SYN - SYNCHRONIZE
- FIN - FINISH
- URG - URGENT
- PSH - PUSH

TCP	UDP
Will always check if the recipient is available or not.	Will not check
Will always expect an acknowledgement from the recipient	Will not expect
Will be slow	Will be fast
No data loss	Data loss will occur
It is called heavy weighted protocol	It is called light weighted protocol
Ex : normal browser communication	Ex: Whatsapp, voip calls.

TCP 3 WAY HANDSHAKE

Client

Server



TCP PORTS

- SERVICE IDENTIFIER
- 16 BITS

TCP HEADER

Source Port no		Destination Port No
SEQ NO		ACK NO
FLAG STATUS - RST FIN URG		
Data		
Options(any)		

APPLICATION PROTOCOLS

- HTTP - 80
- HTTPS - 443
- FTP - 21
- SMTP - 25
- POP3 - 995
- IMAP4 - 993
- DNS - 53
- DHCP – 67 & 68
- SSH - 22
- SSL - 587

SNIFFING

- TCP DUMP
- WIRESHARK

IP – INTERNET PROTOCOL

IP RANGE

DECIMAL TO
BINARY
CONVERSIONS

WHY IP IS 32
BIT?

WHY RANGE IS
255. Can we
extend the range
to 455, 855, 955 ?

CLASSES OF IP