TCP and UDP

TCP	UDP
Connection oriented	Connectionless
Error detection and recovery	Error detection, but no recovery
Slower	Faster
HTTP(80), FTP(20,21), SMTP(25), Telnet(23)	DHCP(67,68), TFTP(69), SNMP(161,162), NTP(123)

TCP/IP model

Application	HTTP, FTP/TFTP, SNMP, SMTP, Telnet/SSH, DHCP/BootP, DNS, NTP, Email/POP	
Presentation	HTML, JPEG, Mp3	
Session		
Transport	TCP/UDP, SSL, TLS	Segment
Network	IP, ICMP, ARP/RARP, OSPF, IPSec	Packet
Data-link	Ethernet , PPP , HDLC , CDP/LLDP	Frame
Physical	RJ45, 1000BASE-TX	Data

TCP

- FTP - 20,21
- Telnet - 23
- SMTP - 25
- HTTP - 80
- POP3 - 110

UDP

- DHCP - 67,68
- TFTP - 69
- NTP - 123

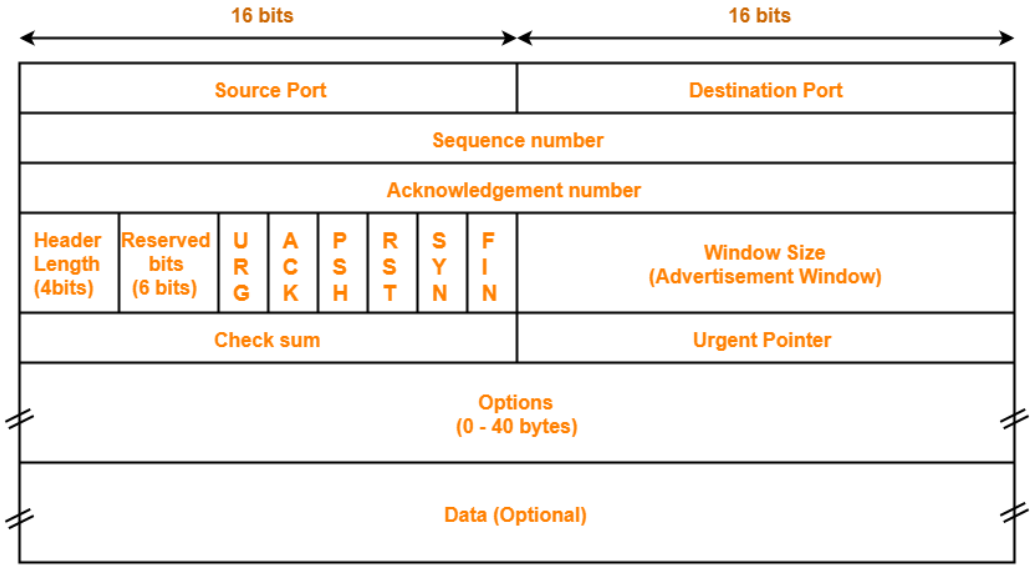
- SNMP - 161,162
- RADIUS(Remote Authentication Dial-In User Service) - 1812,1813

Both

- DNS - 53

TCP Header :

Sab Darbhanga
Se
Ayenge
HumLog RepublicDay pe Flags Waha se
Check kar k Utar lenge



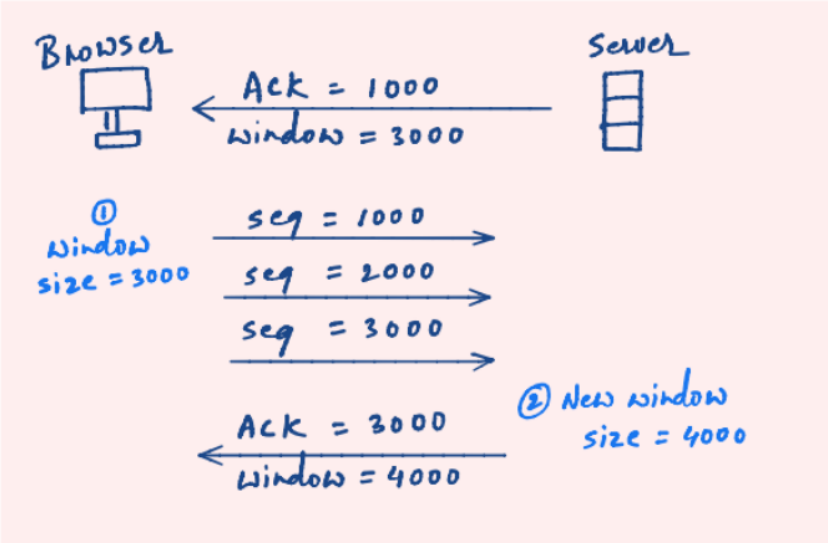
TCP Header

Features :

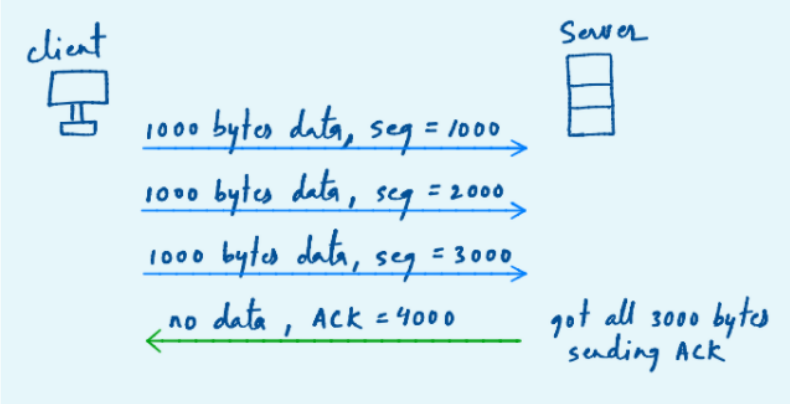
1. Multiplexing using port no.
    - which app gets the data using dest port no.

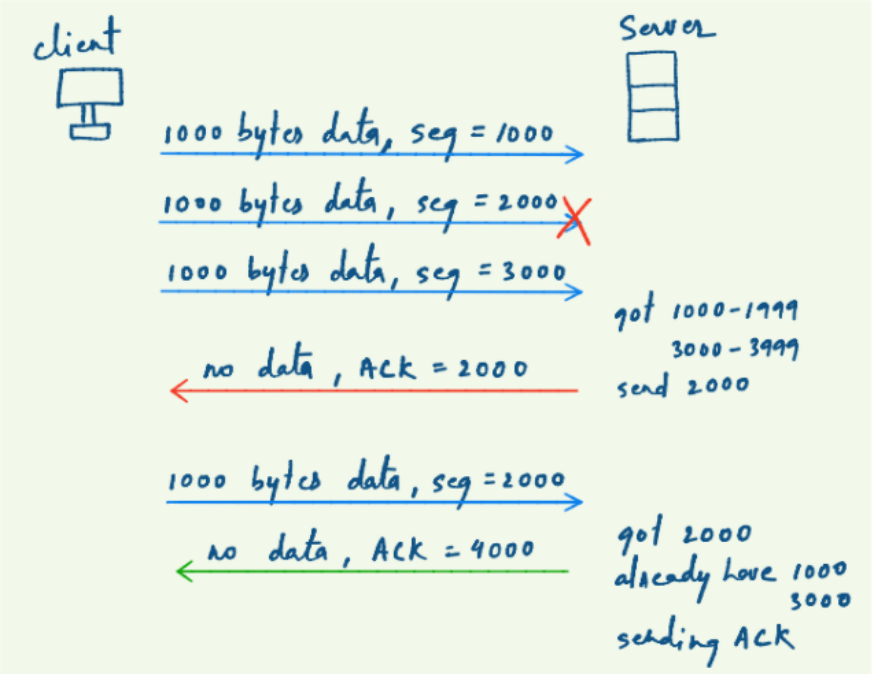
- Used by socket
  - (ip address ,
  - protocol ,
  - port no)
    - Well-known (system) port → 1 - 1023
    - User (registered) port → 1024 - 49151
    - ephemeral (private) port → 49152 - 65535

2. Flow control using windowing
   - Server tells client how much data can be sent



3. Error recovery and reliability
   - Records data bytes in the form of sequencing and acknowledgement
   - Forward acknowledgement - guessing next expected data byte size

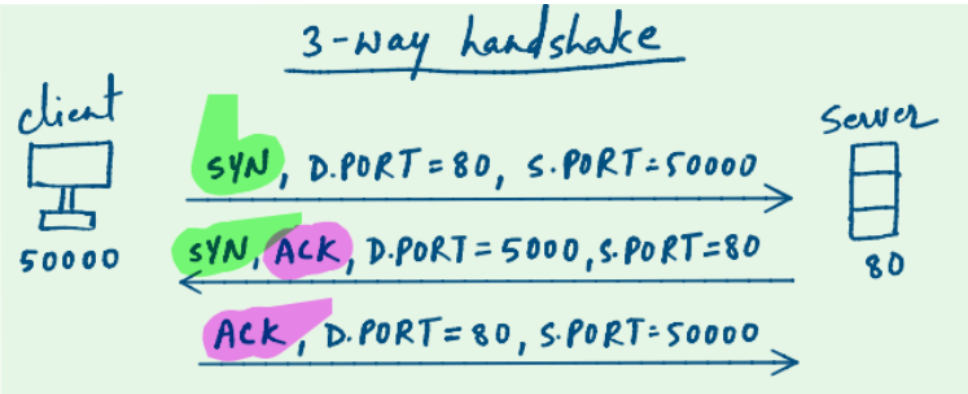




4. Connection establishment and termination

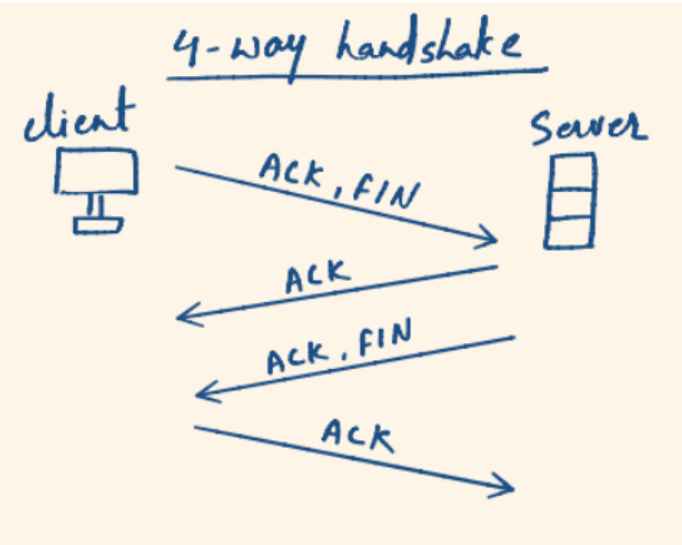
Establishment :

- Initializing SEQ field
- Acknowledging port no. used



Termination :

- 4-way handshake with FIN bit


4-way handshake
client
Server
ACK, FIN
ACK
ACK, FIN
ACK