Workmate

Date

Page No

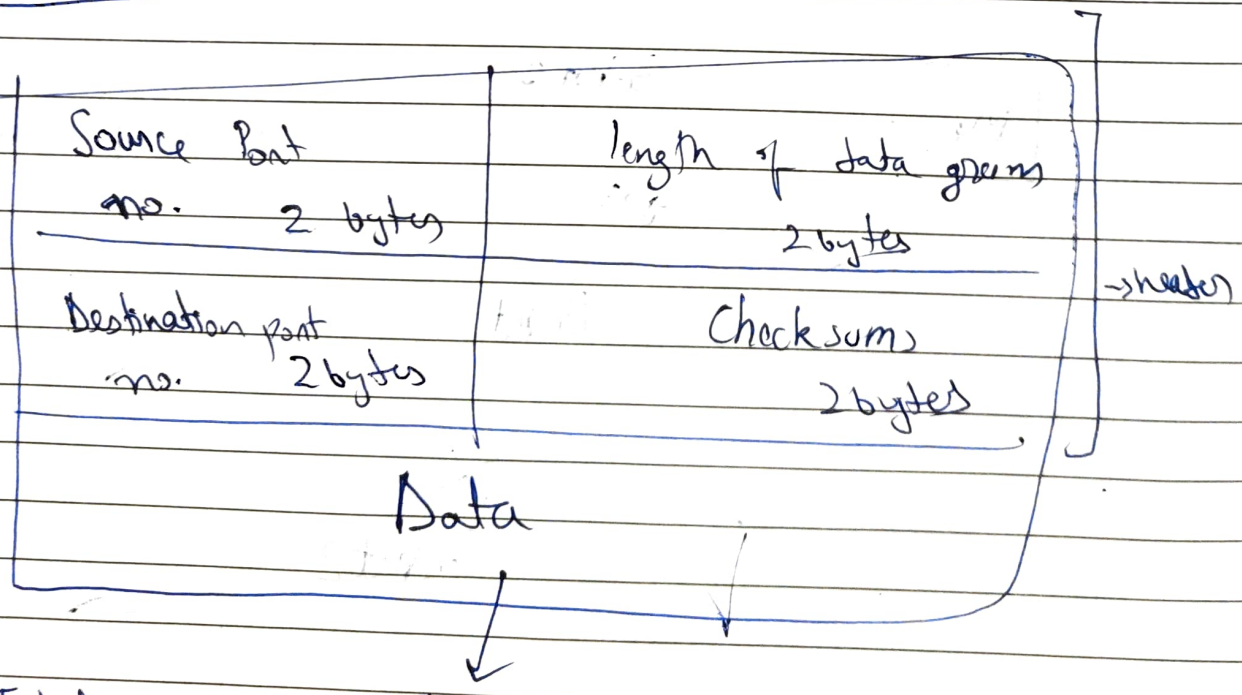
UDP

→ User Datagram Protocol
→ Transport layer protocol
→ Data may not be delivered
→ may change
→ may not be in order

→ connection less protocol

→ UDP uses checksums

UDP Packet :



Total size = 2^{16} → 8 bytes (size you can send in one packet)

→ UDP faster (a lot)

Uses of UDP

→ Video conferencing
→ DNS uses UDP
→ Games

(Fast as fuck)

start at 3:02:07

TCP

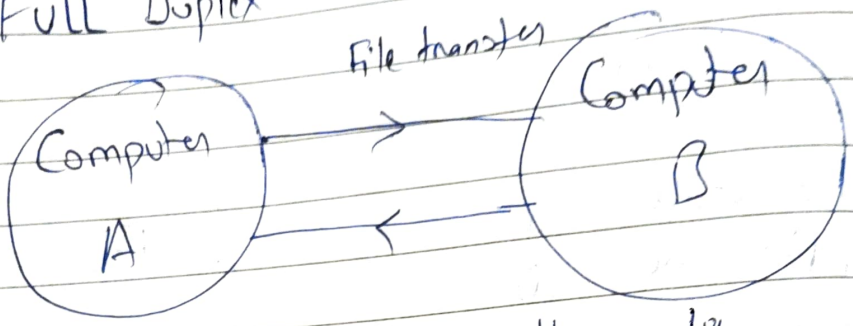
→ Transmission Control Protocol
→ Transport Layer Protocol
→ Application layer sends raw data TCP segments this data i.e. divides in chunks, add headers.
→ It may also collect the data from network layers
→ Congestion Control

→ Takes care of :
  * When data is not arrived
  * Maintains the order of the data

Features
  * Connection oriented
    • First connection need to be established then you can send the data
  * It also provides error control, Congestion control

Date
Page No

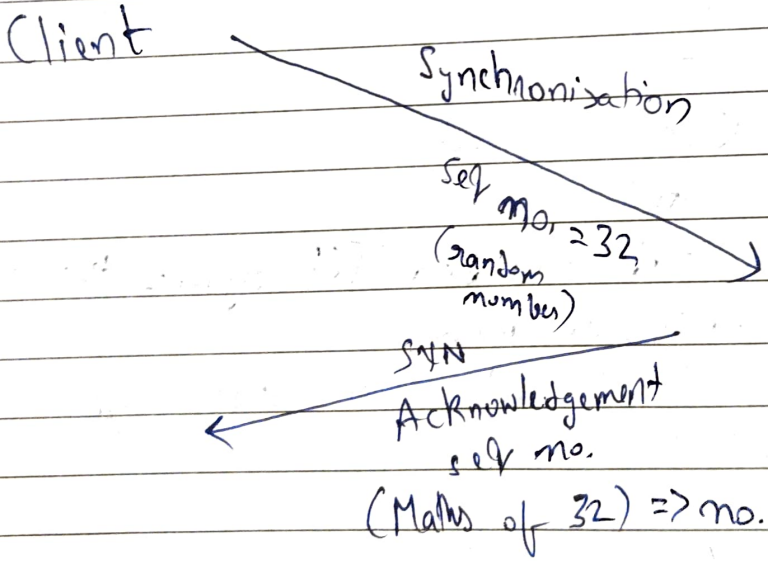
Full Duplex

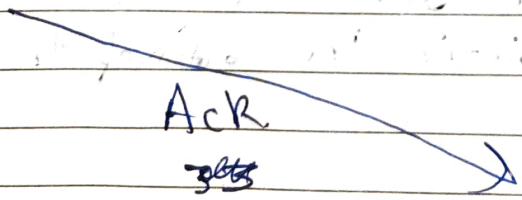


- Both can send file simultaneously
- 1 TCP connection only b/w two computers

3 Way Handshake

Imp

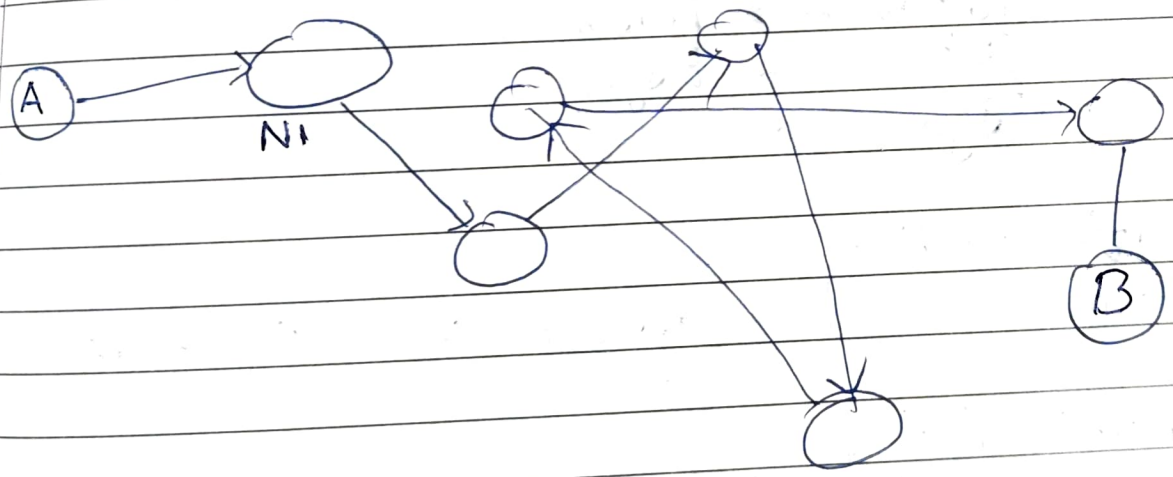




3) Network Layer

Transport → Segments
Network → Packets
Data Link → Frames

→ Here we work with routers



→ For data (packet) to travel from A → B it has to go through a lot of routers, each router will have its network address ~~mac add, ip add~~ of sender & receiver in ~~forwarding table~~ which is a part of ~~routing~~ and what data you are sending, so the router will checks in B its ~~for~~ forwarding table which shows where the data packet need to go next this is called hop-by-hop forwarding, till it reaches the target (B).

Date
Page No

ip address : 192.168.2.30

network address → device address

Control Plane

→ Builds routing table

Routers ⟶ Nodes
Links ⟶ Edges
~~Edges ⟹~~

(I) Static Routing
→ manually adding addresses in routing table

(II) Dynamic Routing
→ evolves with change in network.

Internet Protocol (IP)
→ lies in network layer
→
IPv4
→ 32 bit, 4-words

IPv6
→ 128-bits

Workmate

Date

Page No

192.168.2 . 30

subnet id — host id

→ when router forwards data packet it should know subnet id of the destination

Class of IP addresses

A	0.0.0.0	-	127.255.255.255
B	128.0.0.0	-	191.255.255.255
C	192.0.0.0	-	223.255.255.255
D	224.0.0.0	-	239.255.255.255
E	240.0.0.0	-	255.255.255.255

Subnet Masking

→ Subnet mask will mask the network part of the ip address and leave the host or device part.

Ex: 255.255.0.0

we can change these

Workmate

Date

Page No

Packets:

→ Header is of 20 bytes

↳ contains: IPV, length, identifications, flags, protocols, checksums, address, TTL etc

TTL

→ ~~Ti~~ Time To Live

→ Set time so that data packet will not be roaming inside the network forever.

IPV6

→ IPV4: $2^{32} \approx$ 4.3 billion unique addresses

→ 4x longer $\approx 2^{32 \times 4} = 3.4 \times 10^{38}$ "

Cons:

→ Not

→ ISPs

How rep

a:

Hexadeci

16 b

Ex: AB

Middle bo

① Firew

Filter

→ A

→ M

→

→

→

Date
Page No

Cons:

→ Not backward compatible
→ ISPs would have to shift, lot of hardware work

How represented?

a:a:a:a:a:a:a:a

↓

Hexadecimal
(16 bit)

Ex: ABFE:F001:3210:9182:0:0:1:3

Middleboxes:

① Firewall → Global internet
→ Your trusted network

Filter out IP packets based on various rules!
→ Address
→ Modify packets
→ Port no.
→ Flags
→ Protocols

Date
Page No

Stateless Vs Stateful firewalls

→ more efficient

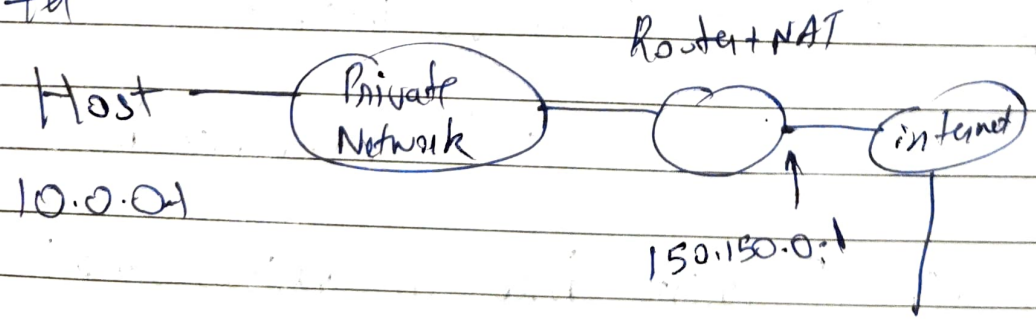
→ stores data packet in cache memory, makes more efficient

→ two types

→ hosted by host

→ in network

Network address Translation (NAT)

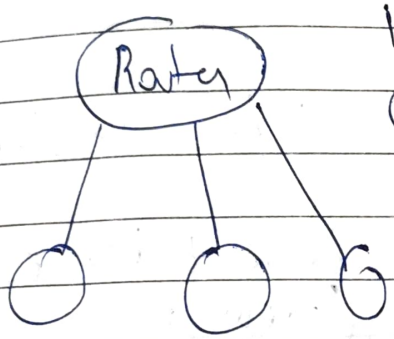


→ NAT modified IP, so that all its can work as private IP

→ To slow down consumption of IP addresses

Data Link Layer

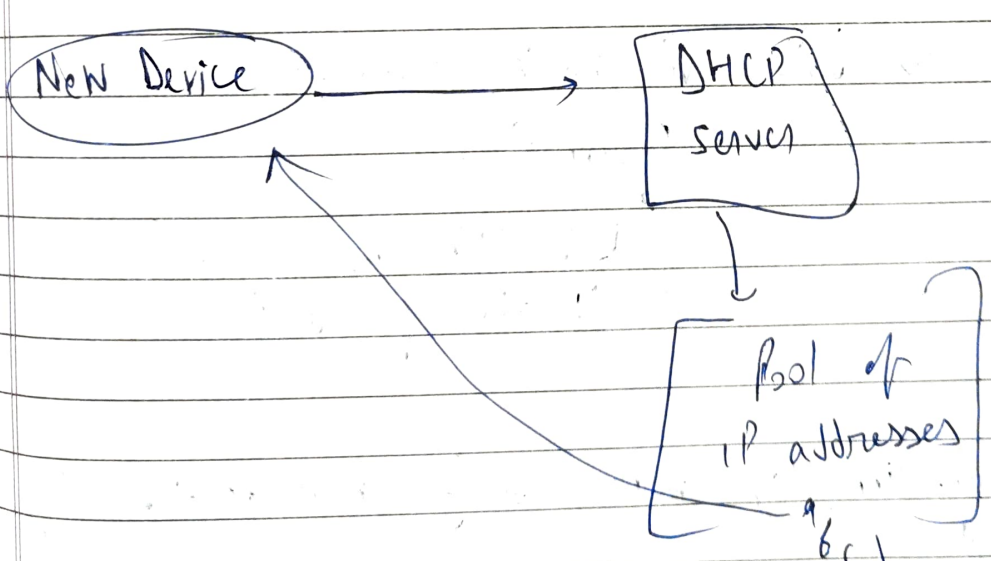
→ Data Packets received from network layer, data link layer is responsible to send it over physical layer



IP add ⟶ ISP

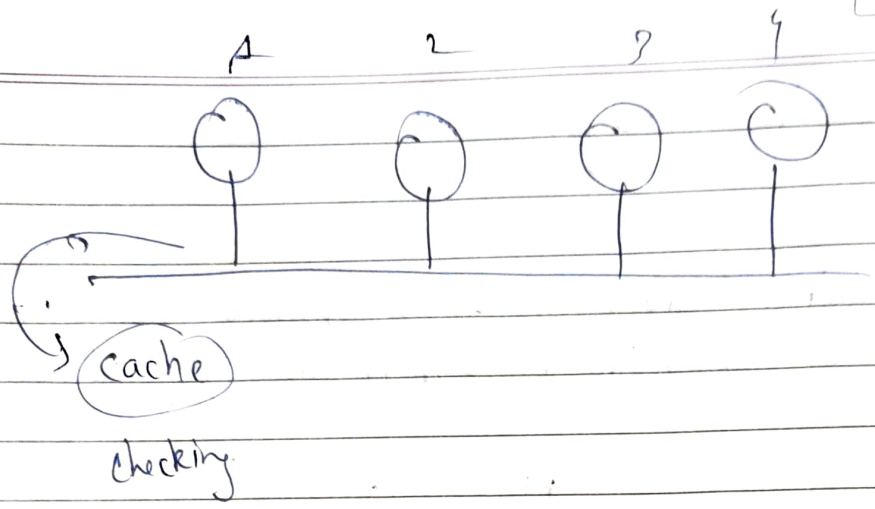
Subnet → new IP will be allocated to this using DHCP

(Dynamic Host Configuration Protocol)



→ many devices connected in LAN:

using data link layer address (MAC addresses)



→ Device 1 will check, do i have data link add of device 4

→ if not, it will ask to next device known as ARP (Address resolution Protocol)

ARP cachce

→ all devices will recieve a message

Frame

[Data Link layer address
IP add of destination]

→ Data link layer works closely with physical layer