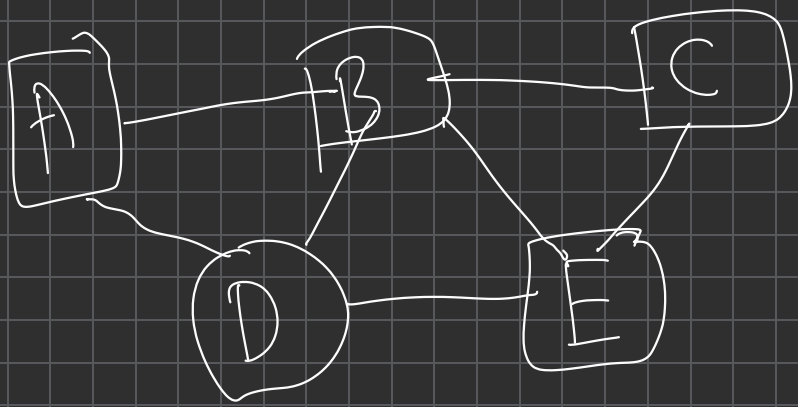
COMPUTER NETWORKING

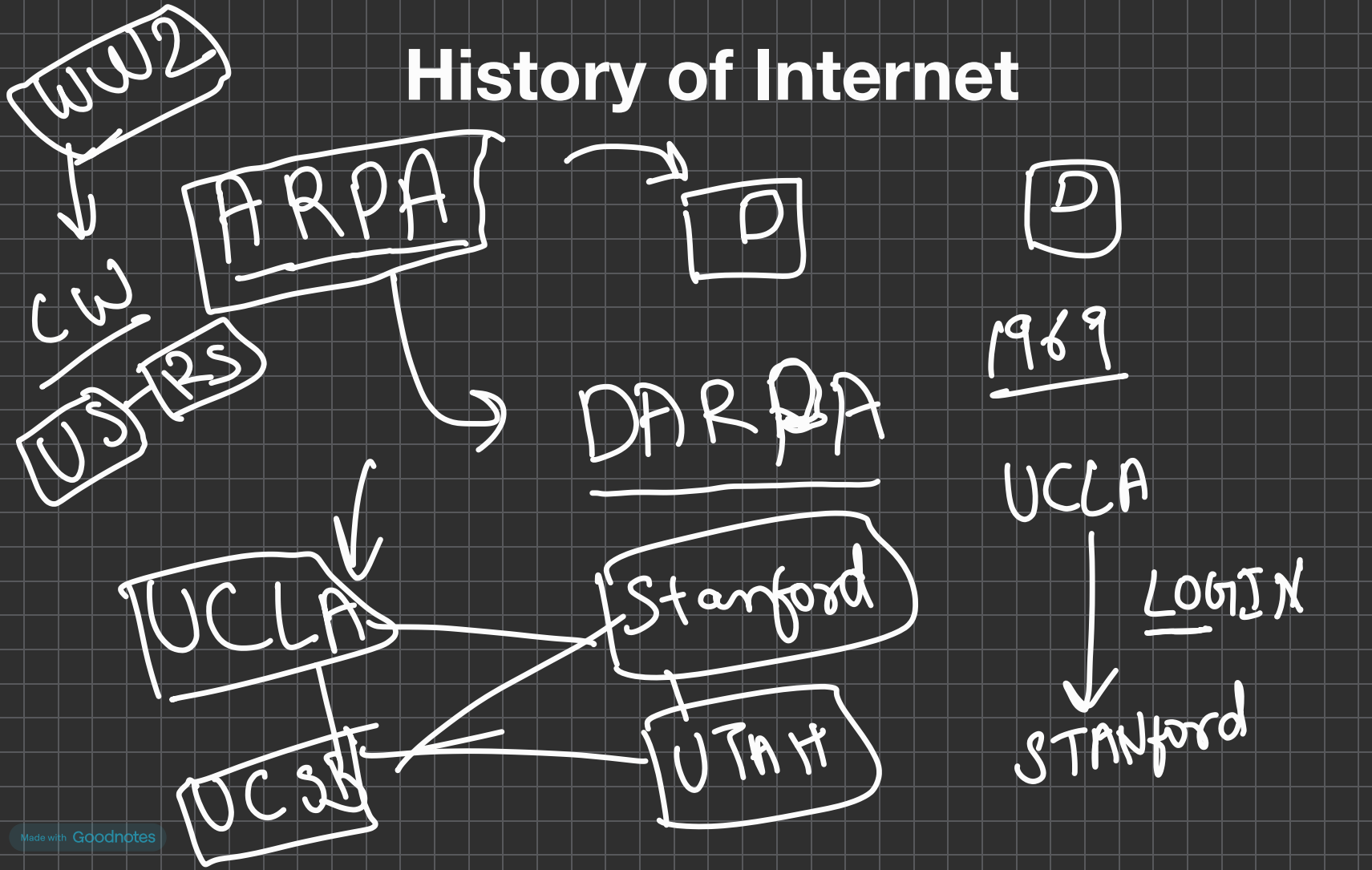
How Internet works?



TCP

UDP

History of Internet



1983 → TCP/IP

1990s

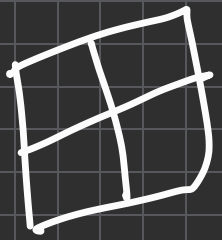
↳ TBL

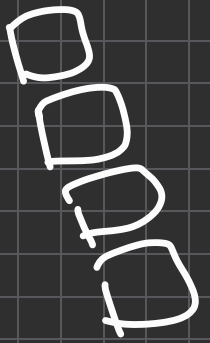
→ WWW

→ HTTP

ARPANET

HTML





DNS

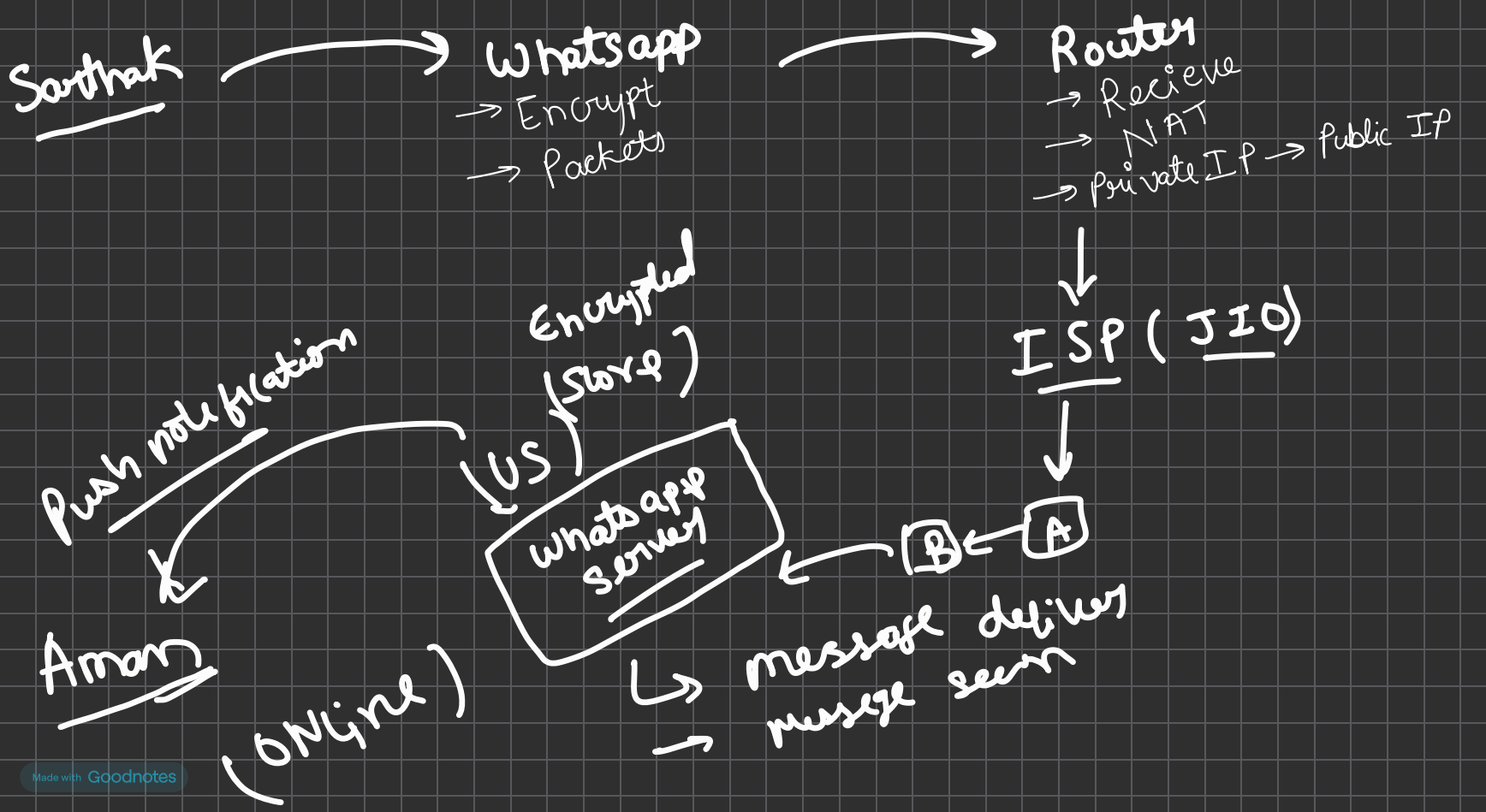
IP → IPV4

99999888888

255.255.255.255

↳ AMAN

How data is transferred?



IP address → IP
→ PORT

65,535

→ 0 – 1023
well known Ports
System

:3000

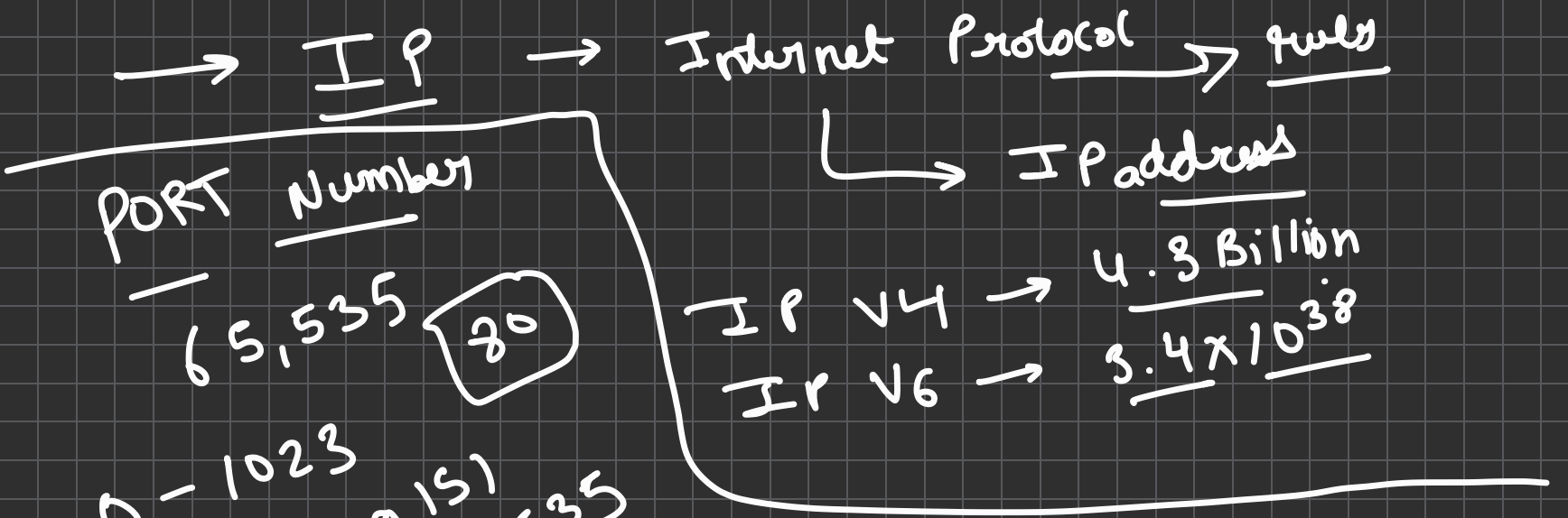
:5500

:5732

1023 – 49,000

IP (Private) → IP (public)

IP Address and Port Number



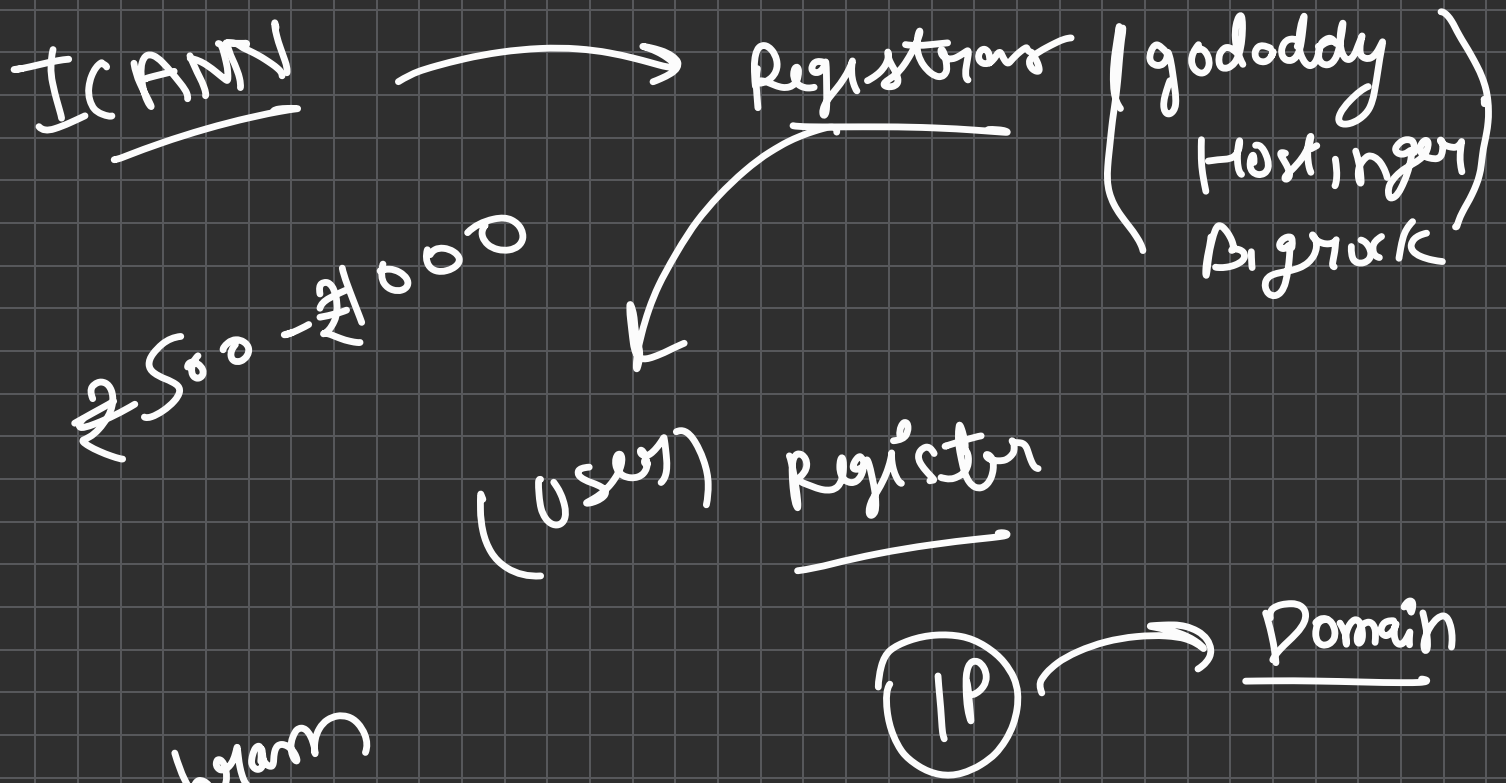
DNS (Domain name System)

Sarthak Sharma.com → 192.168.0.1

- .app → niche
- .ai
- .dev
- .com – Commercial
- .org – non profit
- .in → Country
- .us → countries
- .uk

courses.sheryians.com

- courses → Subdomain
- sheryians → SLD
- com → TLD



Types of Network

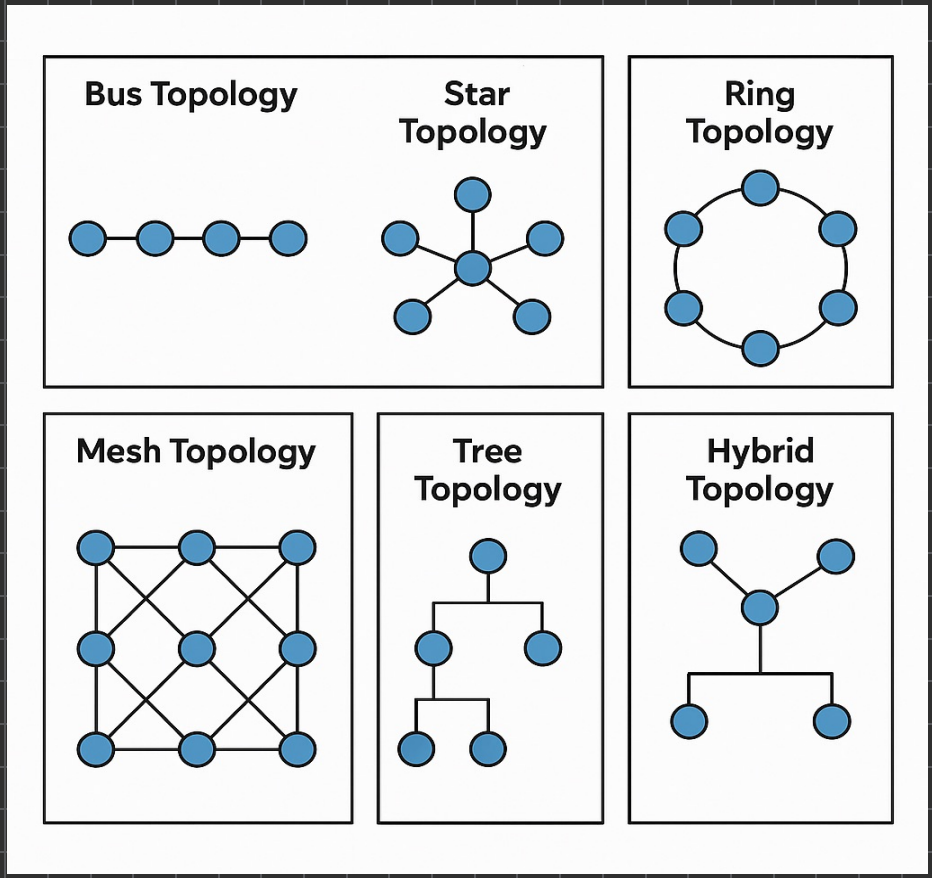
1. PAN → Personal Area Network
2. LAN → Local
3. MAN → Metropolitan
4. WAN → Wide
5. CAN → Campus

VPN → Virtual private Network
- Shoppians
- Home

Network Type	Range/Area	Speed	Usage	Khasiyat (Pros)	Buraiya (Cons)
PAN (Personal)	1–10 meters	Low	Personal devices (phone, watch)	Low cost, easy to use, wireless	Very short range, low security
LAN (Local)	1 building/room	High (100 Mbps–1 Gbps)	Home, schools, offices	Fast, secure, easy sharing	Limited to small area, failure risk
MAN (Metro)	City level	Medium	Cable TV, universities	Connects LANs, city-wide use	Costly, complex, traffic overload
WAN (Wide)	Global	Medium–Low	Internet, MNCs	Long-distance sharing, global use	Expensive, slow, security risk
CAN (Campus)	College/corporate campus	High	Universities, tech parks	Secure, high performance	Costly setup, limited coverage

Topologies

1.) Bus Topology
2.) Ring Topology
3) Star topology
4.) Mesh topology
5) Tree Topology
6.) Hybrid Topologies



Let's take a example of Zomato

OSI Model

Before OSI
→ MS, Apple, IBM

After OSI — Open System Interconnection

7 layers

→ Universal standard — ISO → 1984

→ Standard Protocols ✓ X

Sender → Reciever

Top → Bottom

Bottom to Top

7.) Application Layer –

6.) Presentation Layer –

5.) Session Layer –

4.) Transport Layer

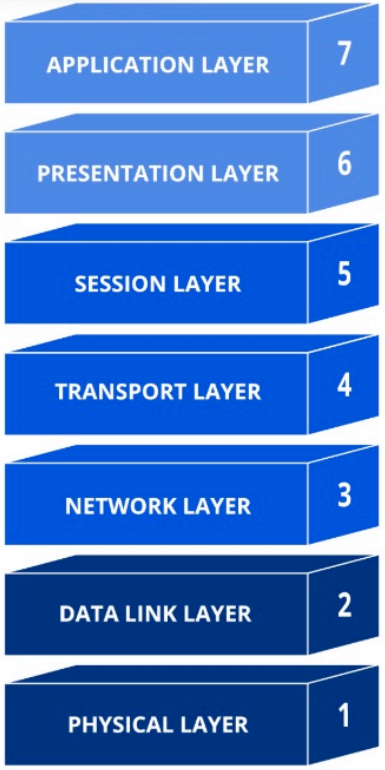
3.) Network Layer

2.) Data Link Layer

1.) Physical Layer

Sender

OSI Model 7 layers

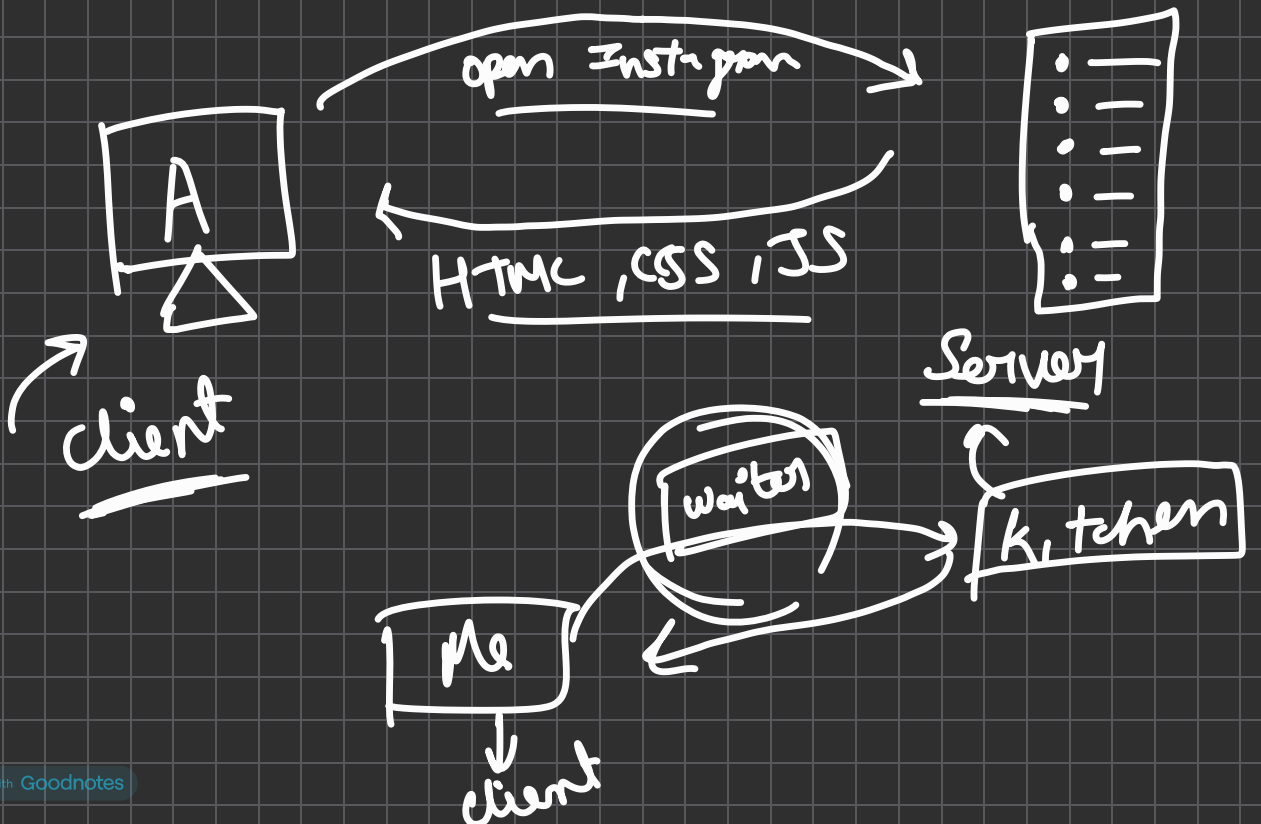


- Human-computer interaction layer, where applications can access the network services
- Ensures that data is in a usable format and is where data encryption occurs
- Maintains connections and is responsible for controlling ports and sessions
- Transmits data using transmission protocols including TCP and UDP
- Decides which physical path the data will take
- Defines the format of data on the network
- Transmits raw bit stream over the physical medium

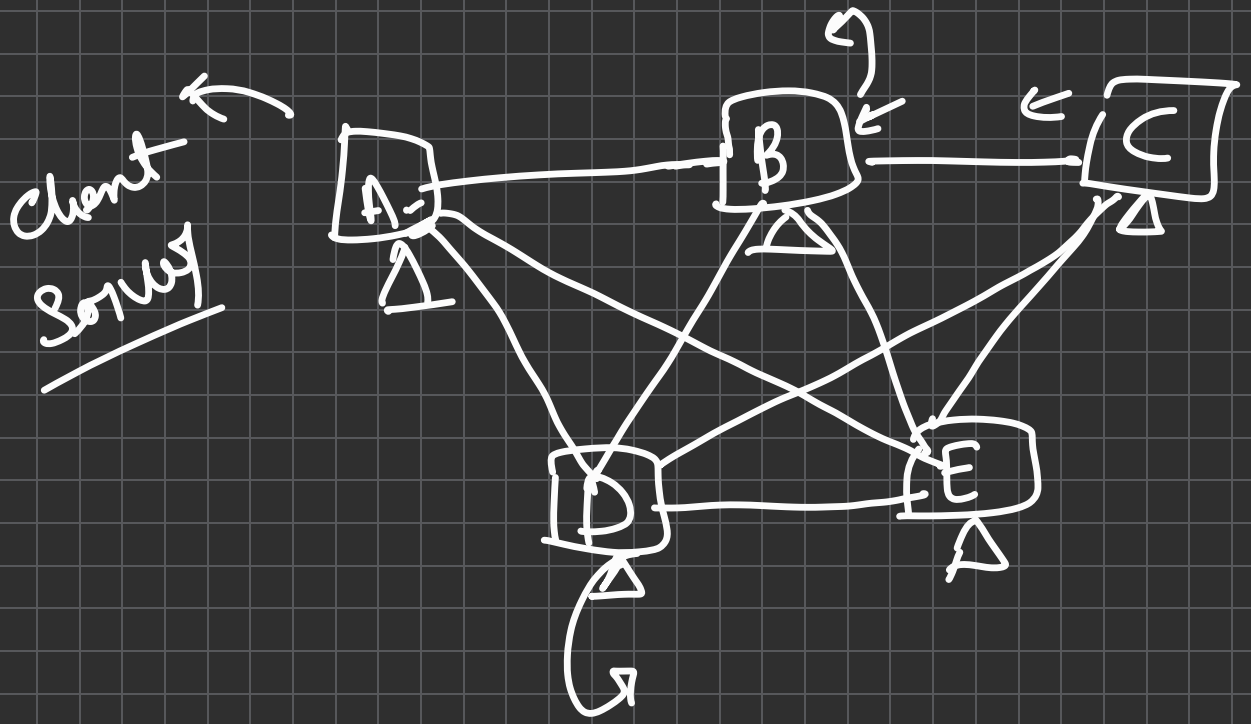
Reciever

How Computers Communicate

(Client Server Architecture)



(Peer to Peer Architecture)



Protocols

→ Set of rules

→ Verify

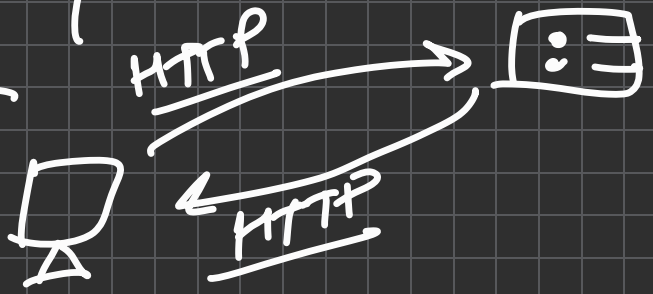
→ Data → Data

Communication

→ Ack

→ Resend and Ack

→ Faster

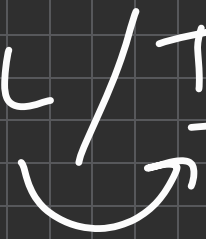


HTTP and HTTPS

Hyper text Transmission Protocol

→ Application Layer Protocol

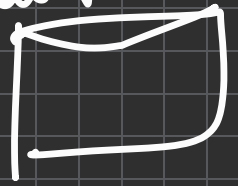
SSL / TSL



IP (Internet Protocol)

→ Network layer protocol

→ Source IP
Destination IP



TCP (Transmission Control Protocol

Packets
Sequencing
ACK
Resend

Transport
Layer
Protocol

UDP (User Datagram Protocol)

→ Bohot fast

Sequencing ✗

ACK ✗

TCP	UDP
→ Banking & Jobs	→ Live → Games → Video/Voice

Feature / Protocol	TCP	UDP	HTTP	HTTPS	IP
Full Form	Transmission Control Protocol	User Datagram Protocol	HyperText Transfer Protocol	HyperText Transfer Protocol Secure	Internet Protocol
Layer	Transport Layer	Transport Layer	Application Layer	Application Layer	Network Layer
Connection Type	Connection-Oriented	Connectionless	Connectionless	Connectionless	Connectionless
Reliability	Reliable (acknowledgment, retry)	Not Reliable (no checks)	Not Reliable	Not Reliable (uses TCP for that)	Not Reliable
Speed	Slower	Faster	Fast	Slower than HTTP	Very Fast
Data Order	Maintains Order	Doesn't Maintain Order	Not Applicable	Not Applicable	Doesn't Maintain Order
Error Handling	Yes	No	No	No (uses SSL/TLS for encryption)	No
Security	No	No	No	✅ Encrypted (SSL/TLS)	No
Use Cases	Email, Web, File Transfer	Video calls, Gaming, Streaming	Browsing websites	Secure websites, Banking	Routing data between networks
Port Example	Port 80 (with HTTP), 443 (HTTPS)	Port 53 (DNS), 67 (DHCP)	Port 80	Port 443	N/A