

## Computer Networks

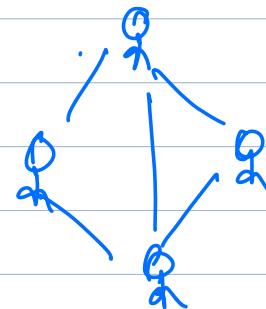
⇒ Intro to Networks / Internet

⇒ Network Topologies

(layering architecture)

N/W ⇒ group of interconnected items

Internet ⇒ N/W of computers

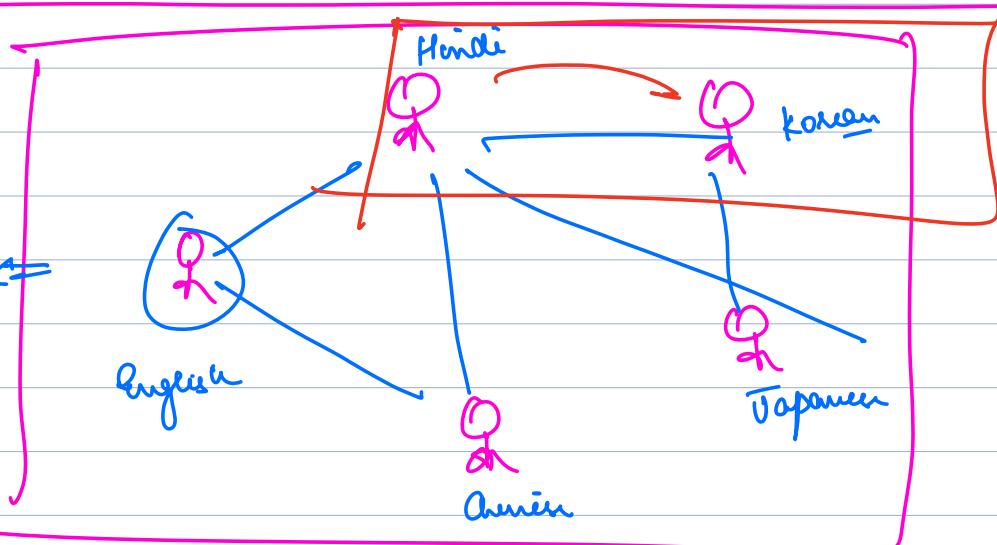
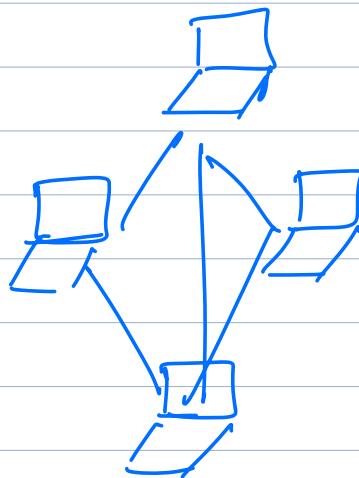


Why Internet

TARPA Net ⇒ Internet

- Communication
- Resource Sharing

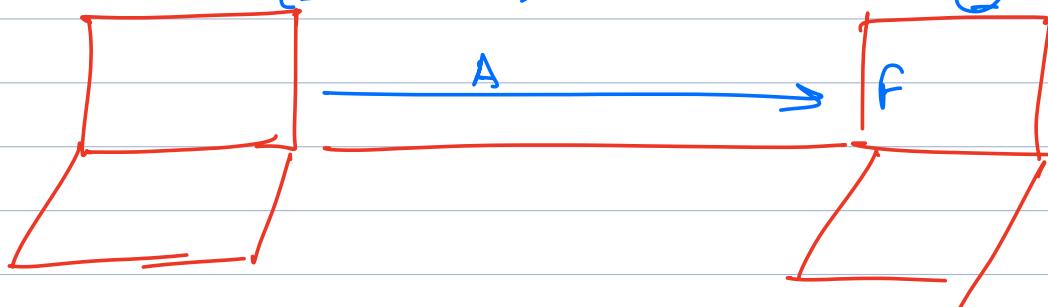
Social N/W



→ existence of a common language

$$\text{ASCII} \quad A \Rightarrow 110011$$

$$\text{WTF} \quad A = 001011 \\ F = 110011$$



Grammar → set of rules to talk in that language

Protocols → Set of rules that must be followed when 2 computers talking to each other

http:// Scale.com

HyperText Transfer Protocol

IP ⇒ Internet Protocol  
TCP ⇒ Transmission Control  
UDP ⇒ User Datagram Protocol

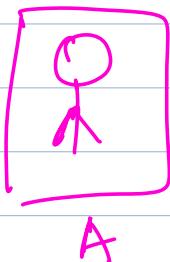
HTTP



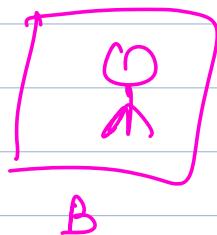
RFC (Request for Comments)

IETF

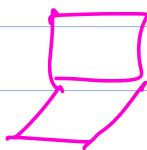
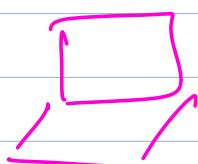
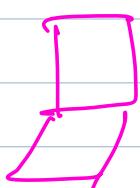
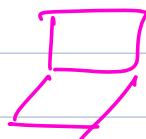
Internet Engineering  
Task force



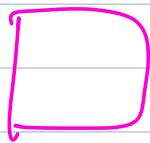
A



B



♀ → Sales.com



California

Server Deck 123  
Behind Forum Mall  
California

Behind BigTree  
Lucknow

IP Address ⇒ Internet Protocol Addresses

V4

192.168.1.1  
0-255 0-255 0-255 0-255  
8Bit 8B 8B 8B

⇒ 12 Billion

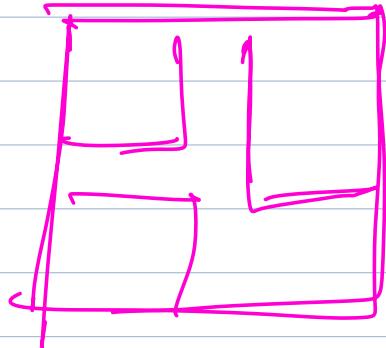
→ 32 Bits  
4 Bytes

V6

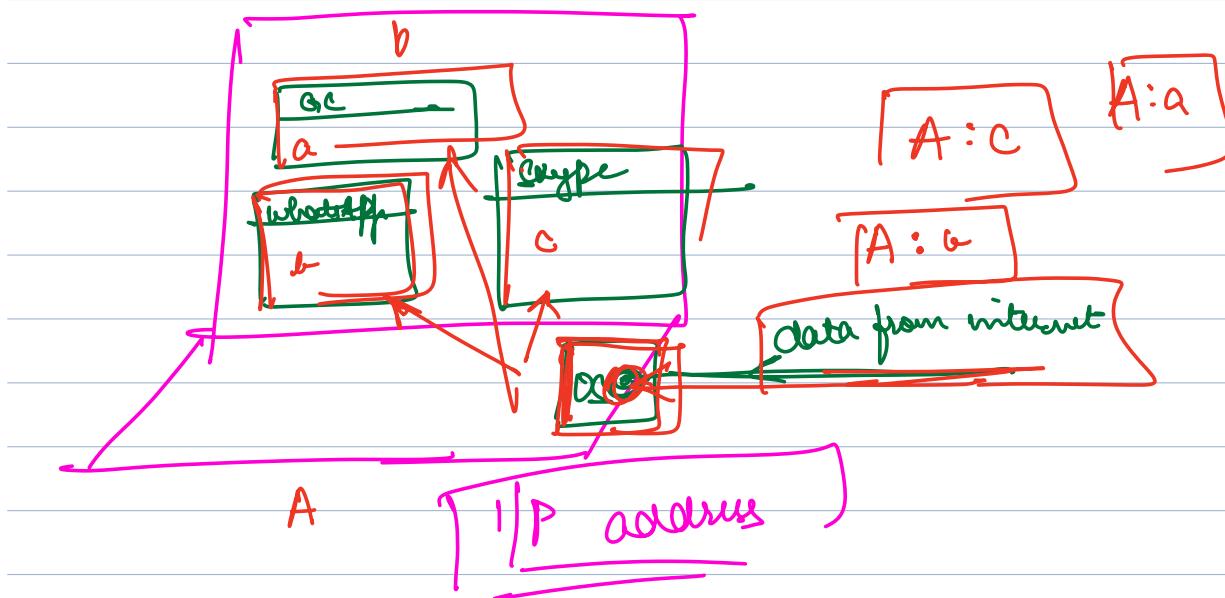
→ 128 Bits

$2^{128}$

⇒ # of atoms  
in the  
world

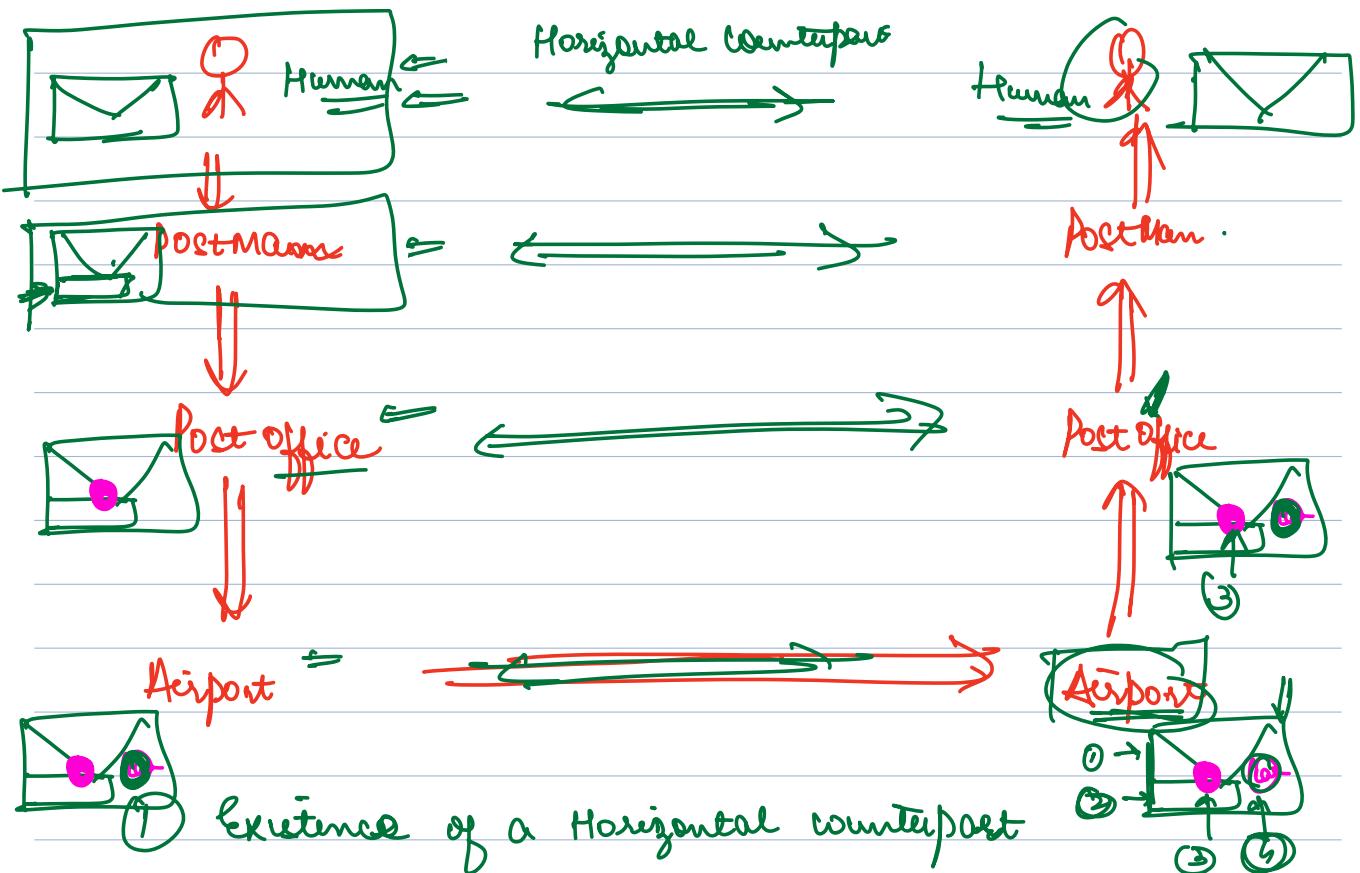


Room No 420  
ABC Hostel  
Delhi



### Port Number

→ every computer may have multiple ports  
→ 16 Bit - 10 - 65535



② Counterpart on the other side will be able to take necessary action based on data set by the other counterpart

③ Upper layer chooses lower layer based upon services they offer and aren't concerned about working of their services

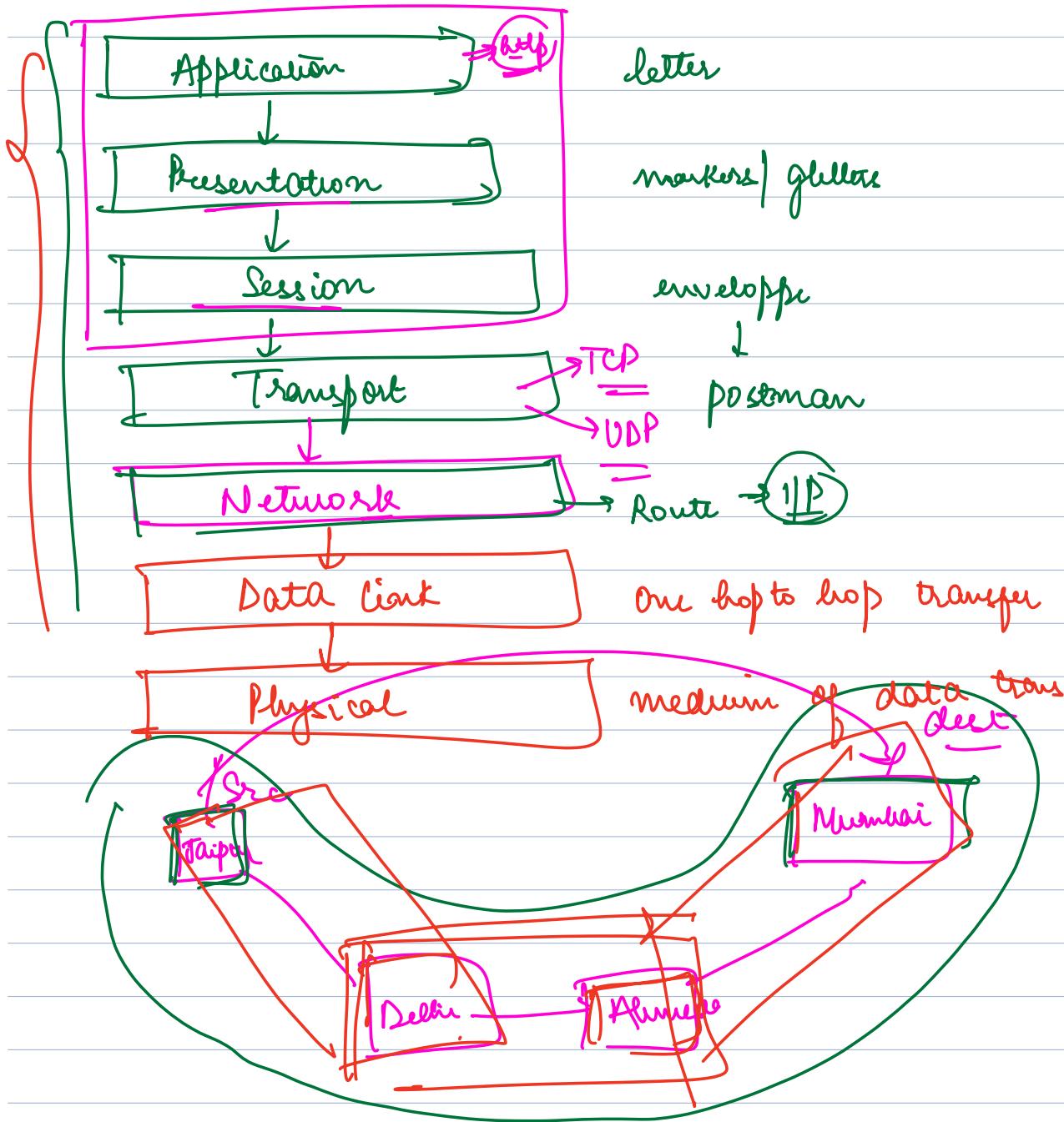
Human cares about:

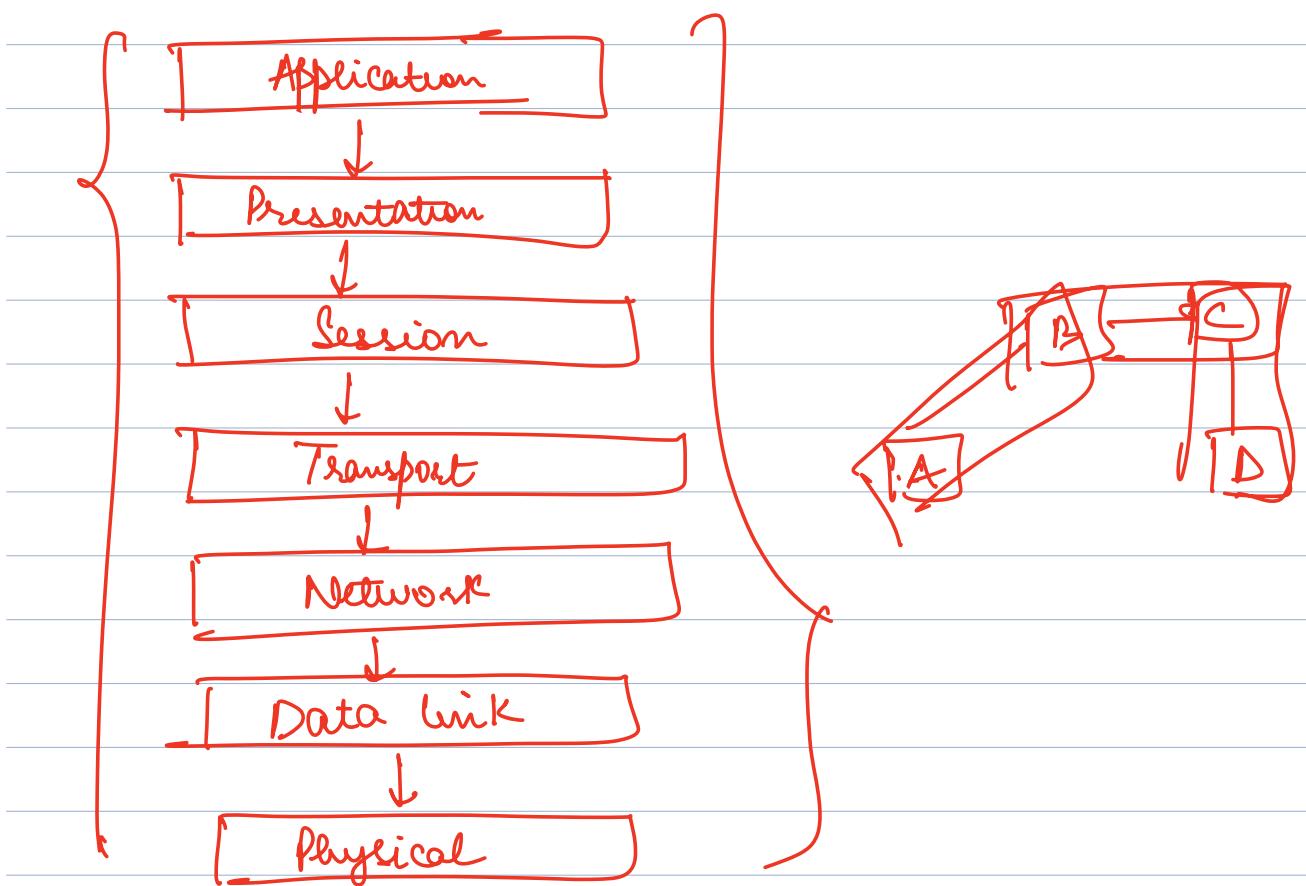
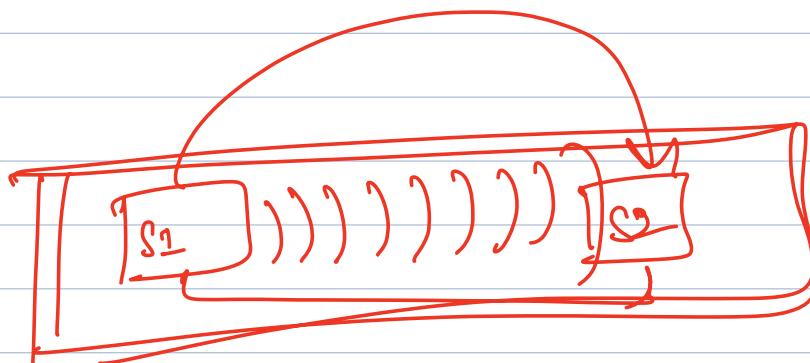
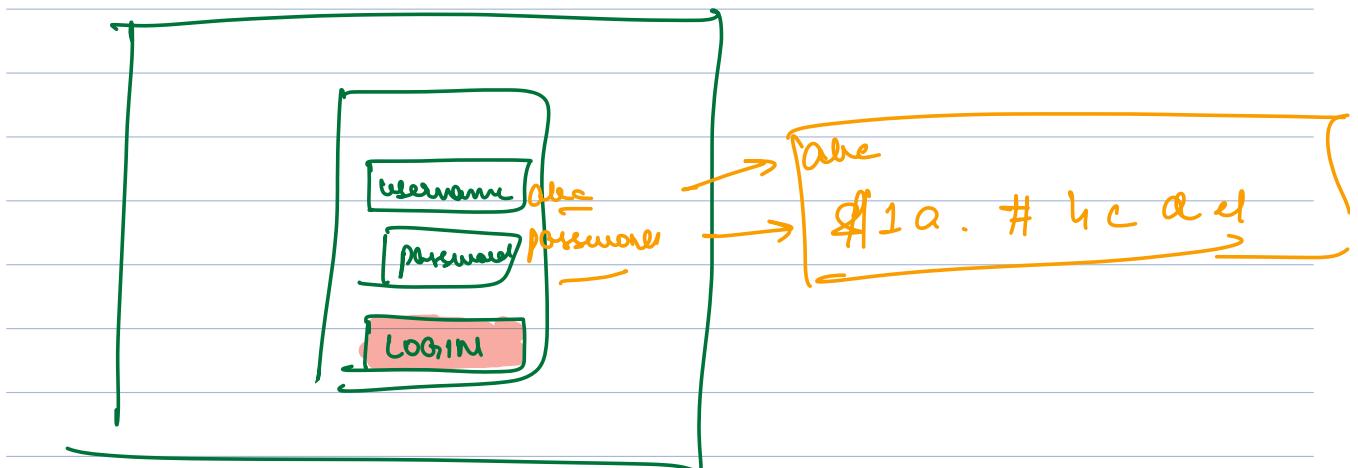
- ① How long
- ② Guarantee
- ③ On time delivery
- ④ Cost

## Internet's layered Architecture

## OSI layered Architecture

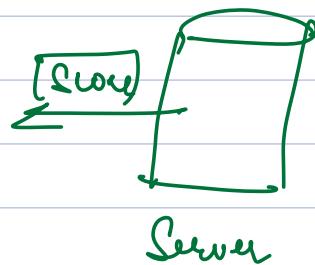
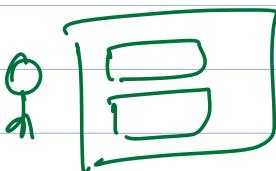
- Came even before internet
- theoretical architecture





## Application layer

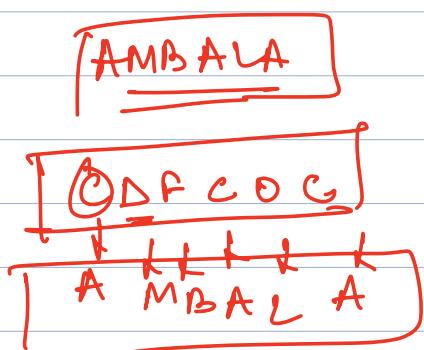
- used by end user
- creates data for other layers



## Presentation

- ① Compression
- ② Encoding
- ③ Encryption

encoding: mapping from 1 form to another  
(change the data to some other form)



$$\begin{array}{ll} A \rightarrow C & \\ M \rightarrow D & \\ B \rightarrow F & \\ L \rightarrow O & \end{array}$$

~~Encryption~~  $\Rightarrow$

Securing

= may not be decyptable without  
some extra info

password



$A \rightarrow B$

$B \rightarrow C$

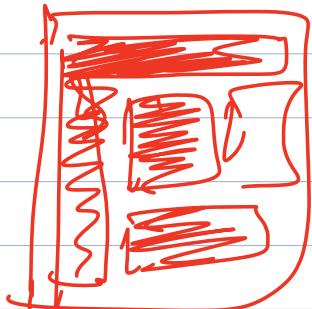
$C \rightarrow D$



abc de

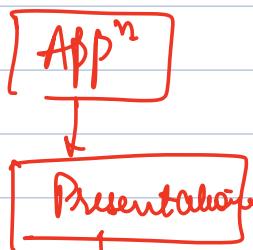


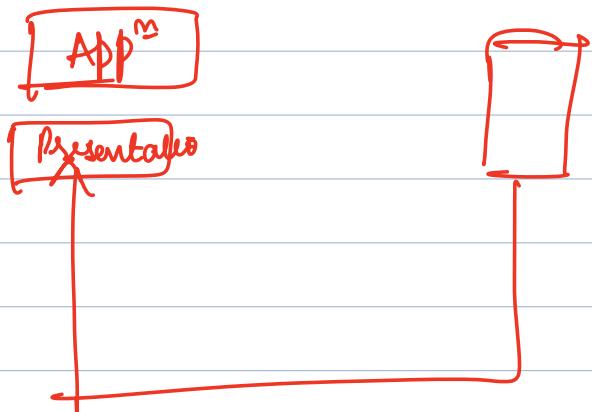
$\boxed{b c \underline{d} e f}$



present the data in a way  
it will be sent over  
N/W

how it will be understood  
by app<sup>n</sup>





### ③ Session



maintaining a session

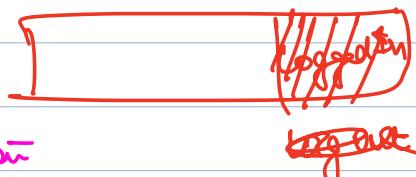
→ storing some data

about user interaction  
with the system to mentor

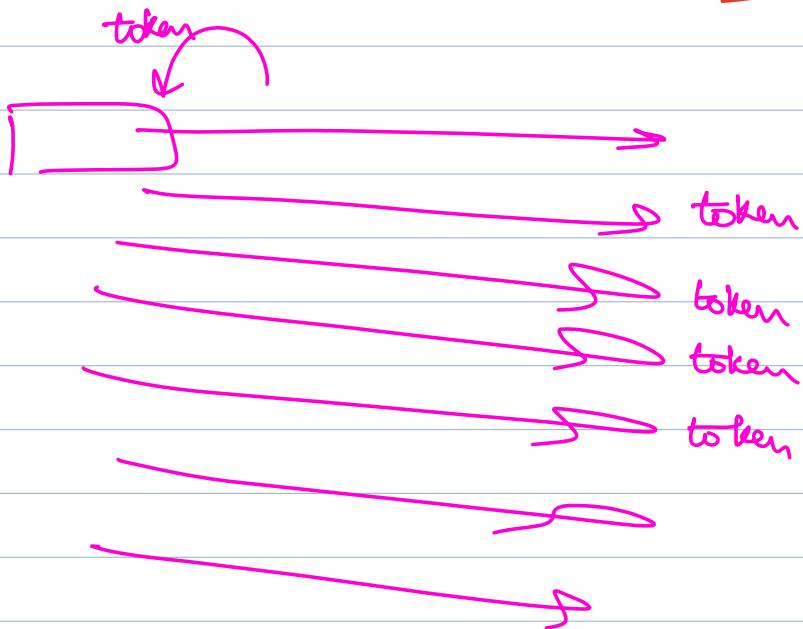
Avoid need of

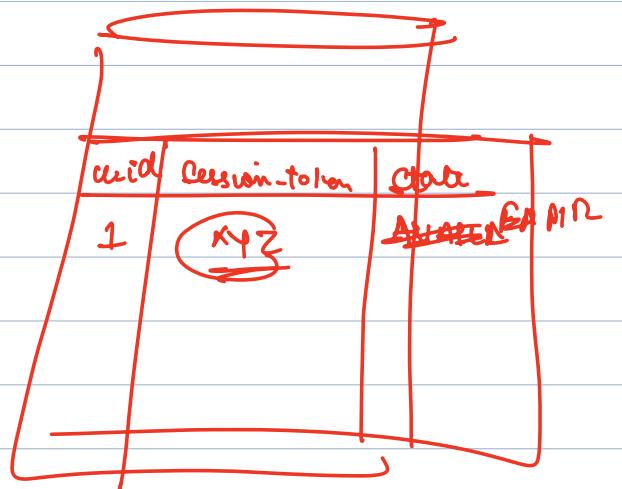
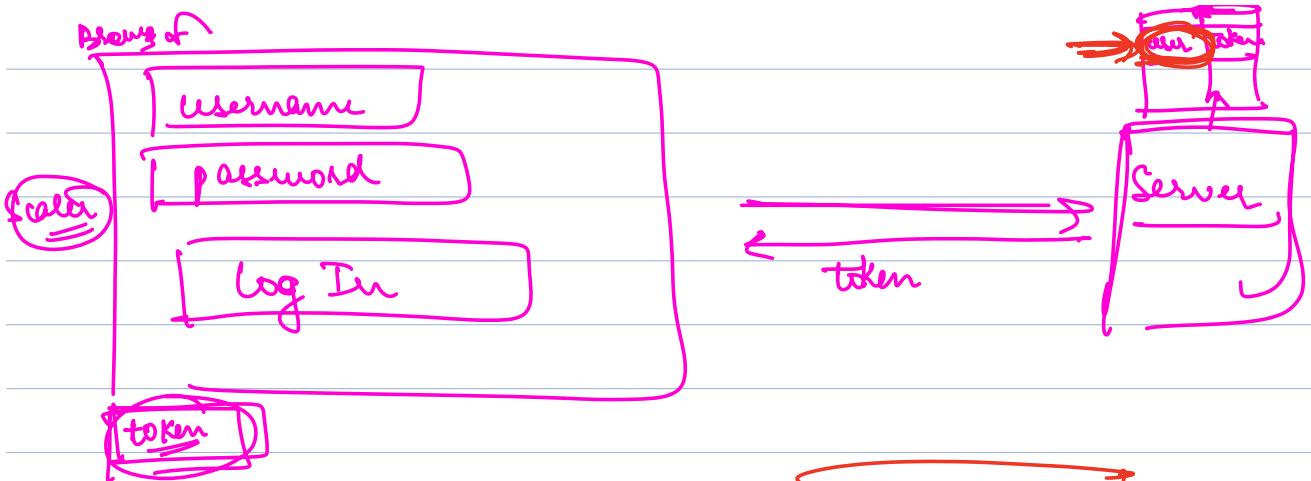
redundant activities

getTA



token





### Server

Username →  
Password

- ① Check if username and pass is correct
- ② it generate a big random string and stores it in database for that user

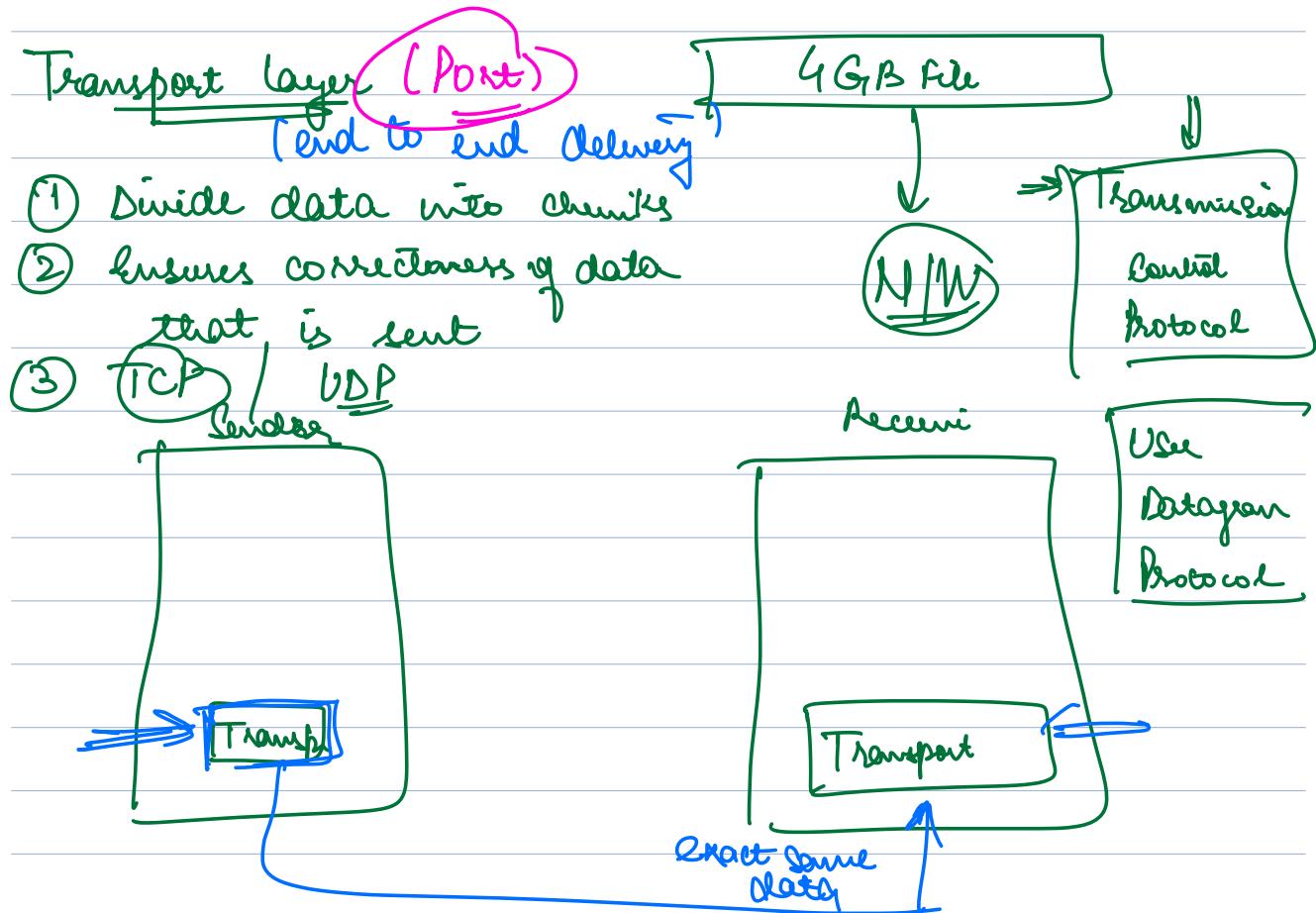
Session

A table named "Session" is shown with the following structure and data:

user_id	token	state	expire_at
1	xyz	<del>EXPIRED</del>	—
2	abc	ACTIVE	-

- ③ in future whenever you come please come with token so that I can identify you

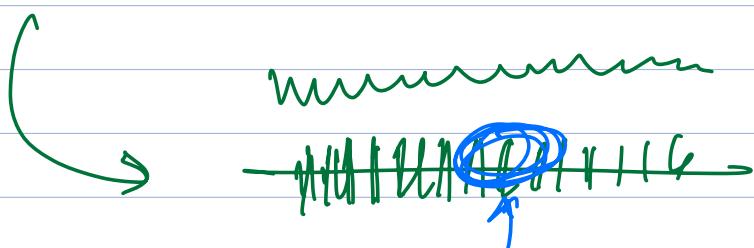
→ Share My Session



Checksums are used to validate if the data is same.

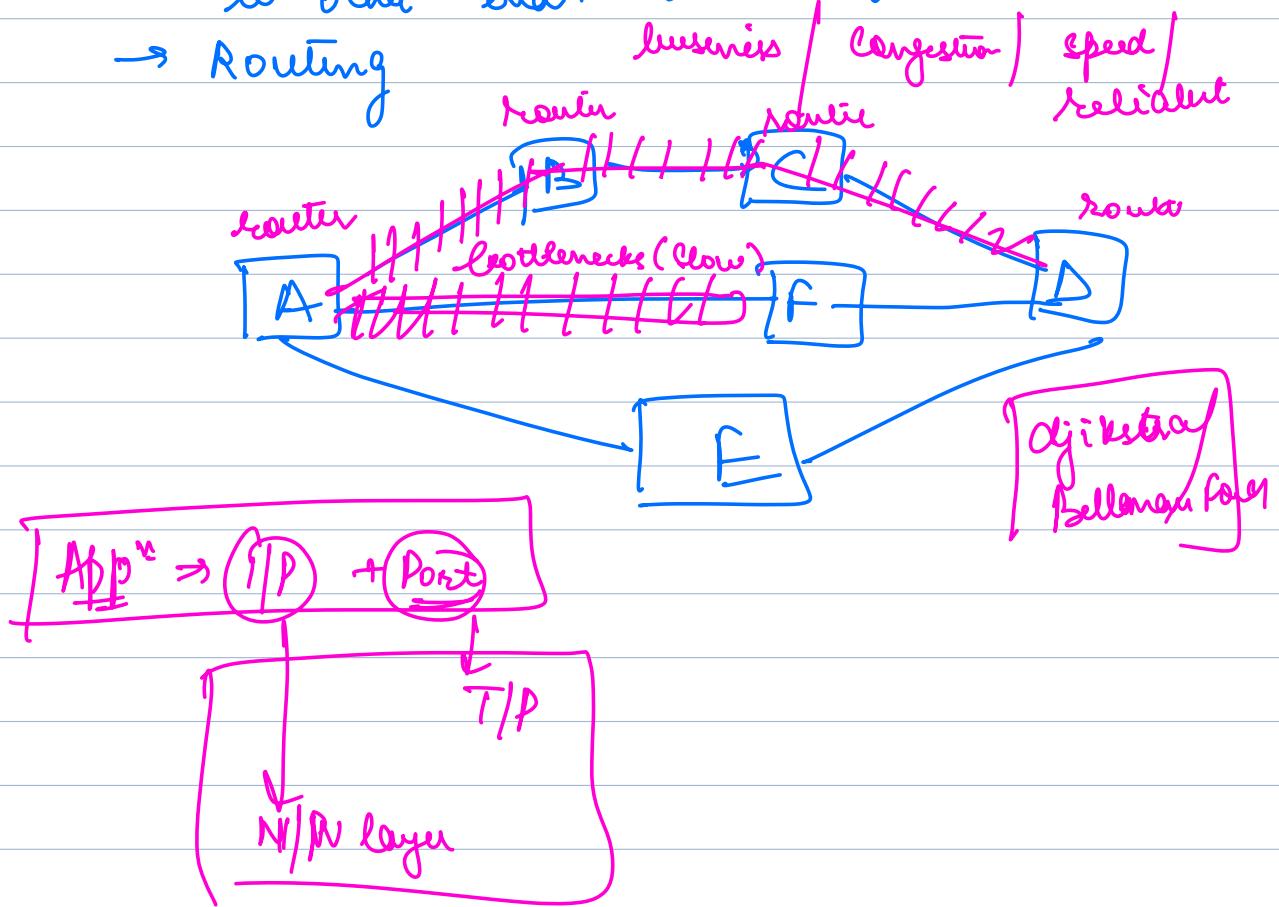
(CRC)

Cyclic Redundancy Check



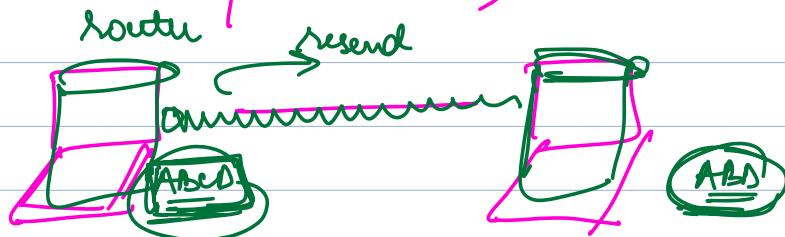
## N/W Layer (IP address)

- facilitates transfer of data from one end to other end.
- Routing



## Data link layer

- comm G/w one hop to other (w/w 2 hosts)



→ Error Correction / Detection

## Physical layer

→ H/W layer

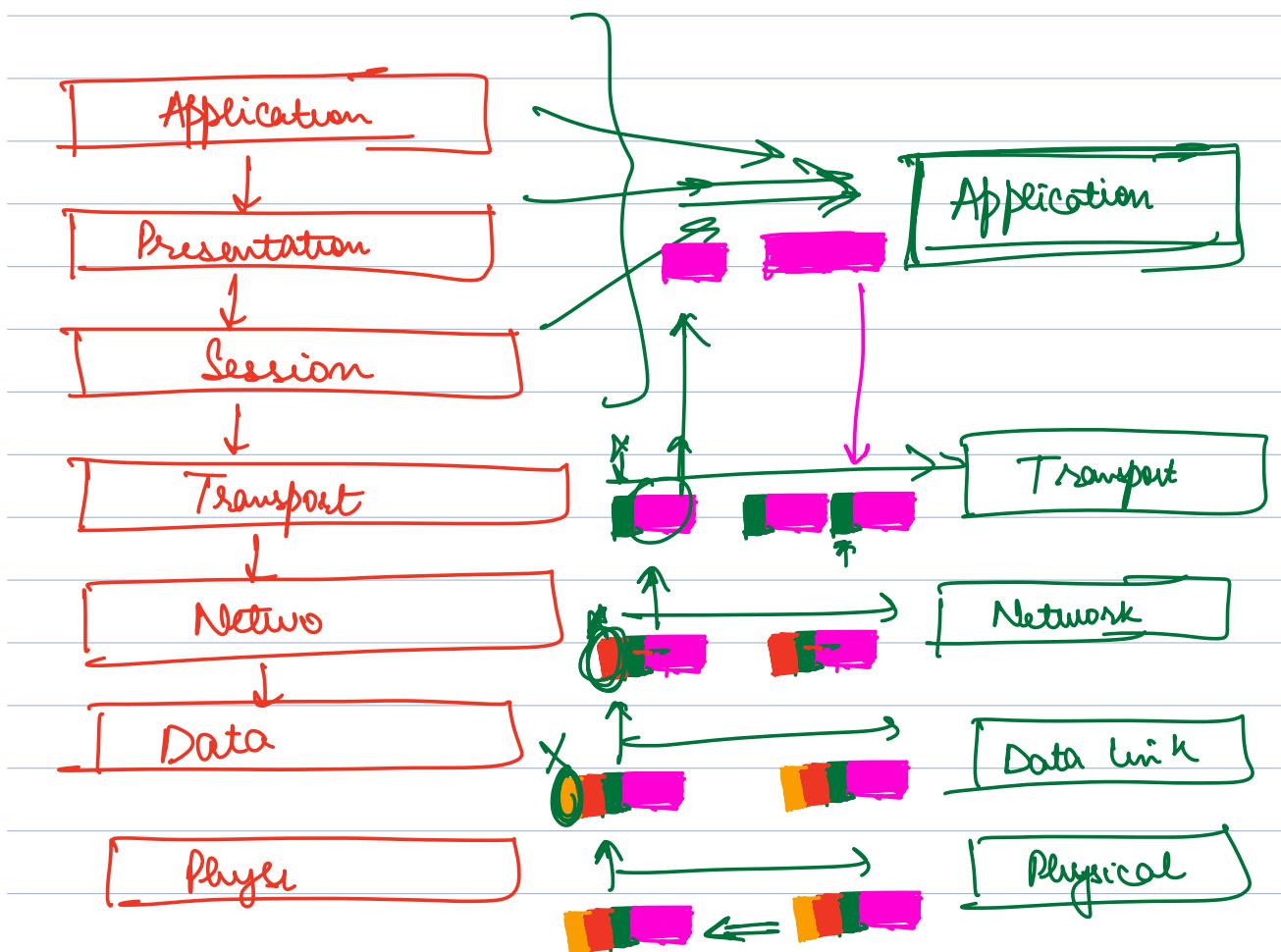
→ Medium of transferring data

→ Ethernet / WiFi / OFC

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(TCP/IP Model)

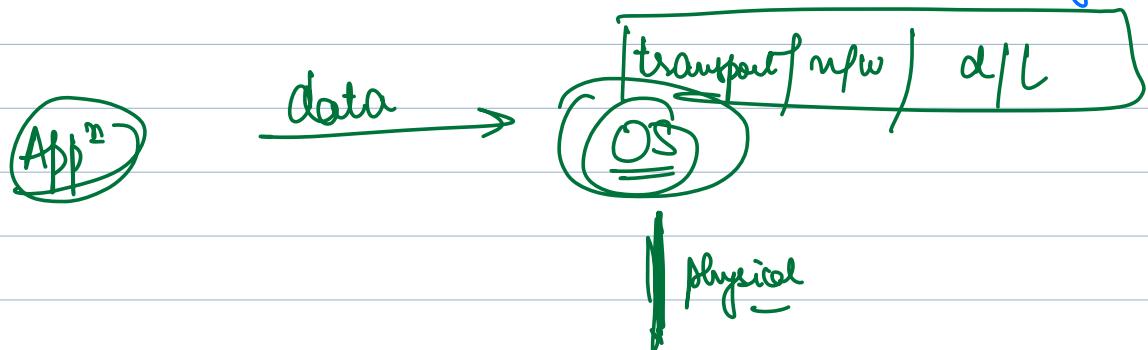
5 layers



Every layer ① gets data from the previous layer

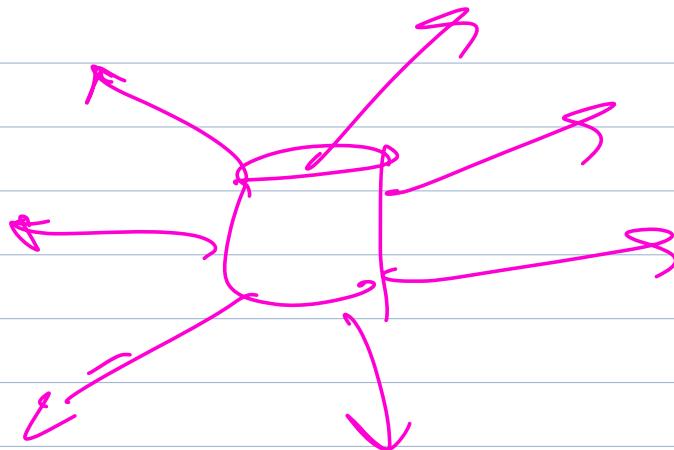
Header → ② attaches info to the data that will help it do its work

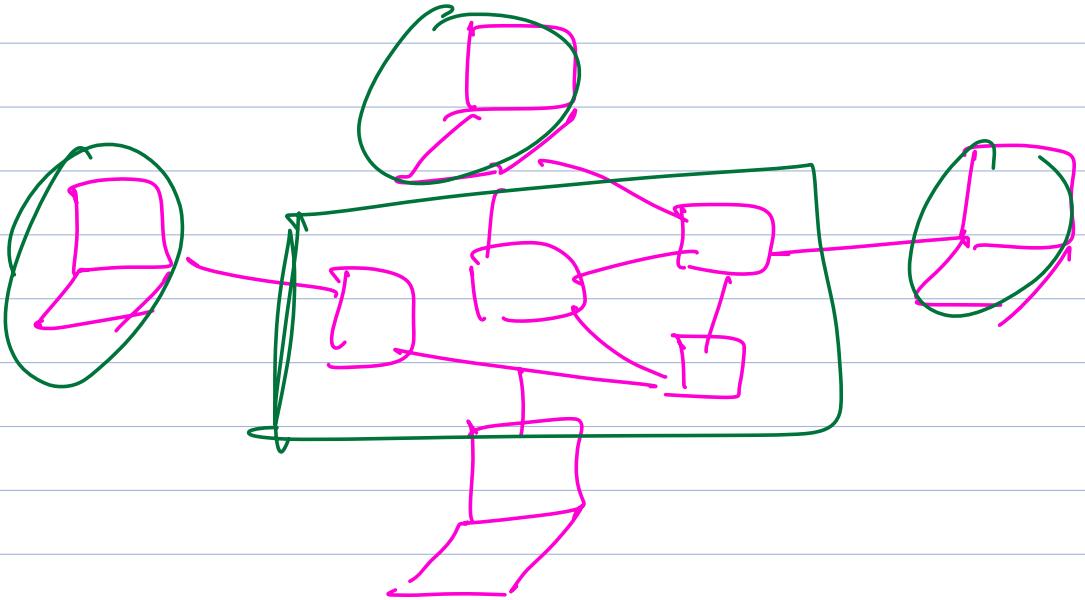
③ Sends the data to lower layer



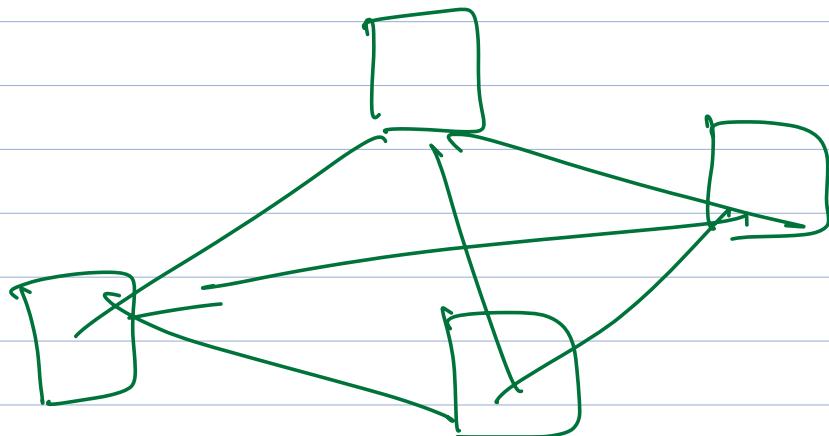
| How internet is able to scale

- Small but fast core
- Intelligent end devices





TCP | IP | HTTP



Django  
Spring Boot