

Will start at 9:10 PM

System Design

Agenda

① What is HLD

② Case Study : Del.icio.us

↳ How internet works

↳ Vertical Scaling / Horizontal Scaling

↳ Load Balancers

↳ How they work

What is HLD

↳ Problem Solving Module

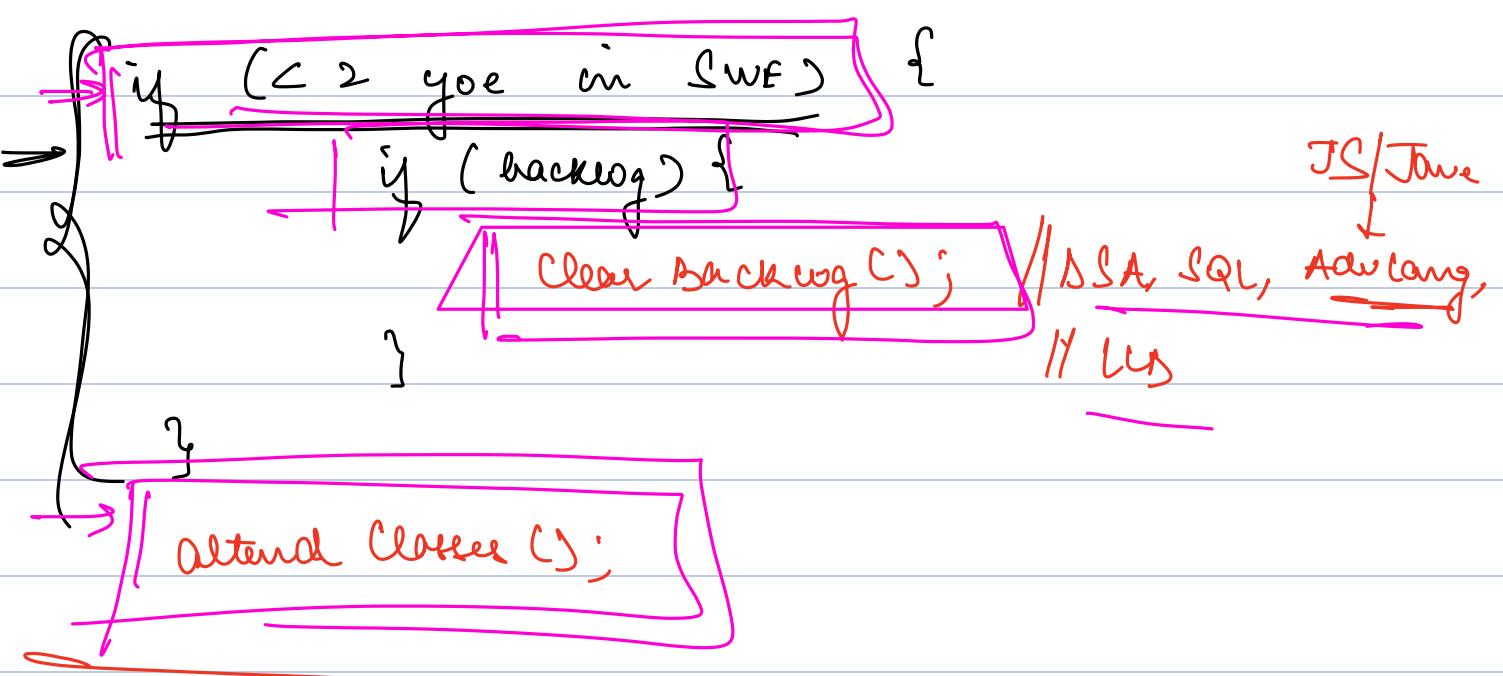
↳ NOT an implementation module.

↳ NO CODE / TOOL
Microservices

e.g. Kafka, ~~NB~~, Service Discovery

↳ Implementing them in

⇒ Backend Project Module.



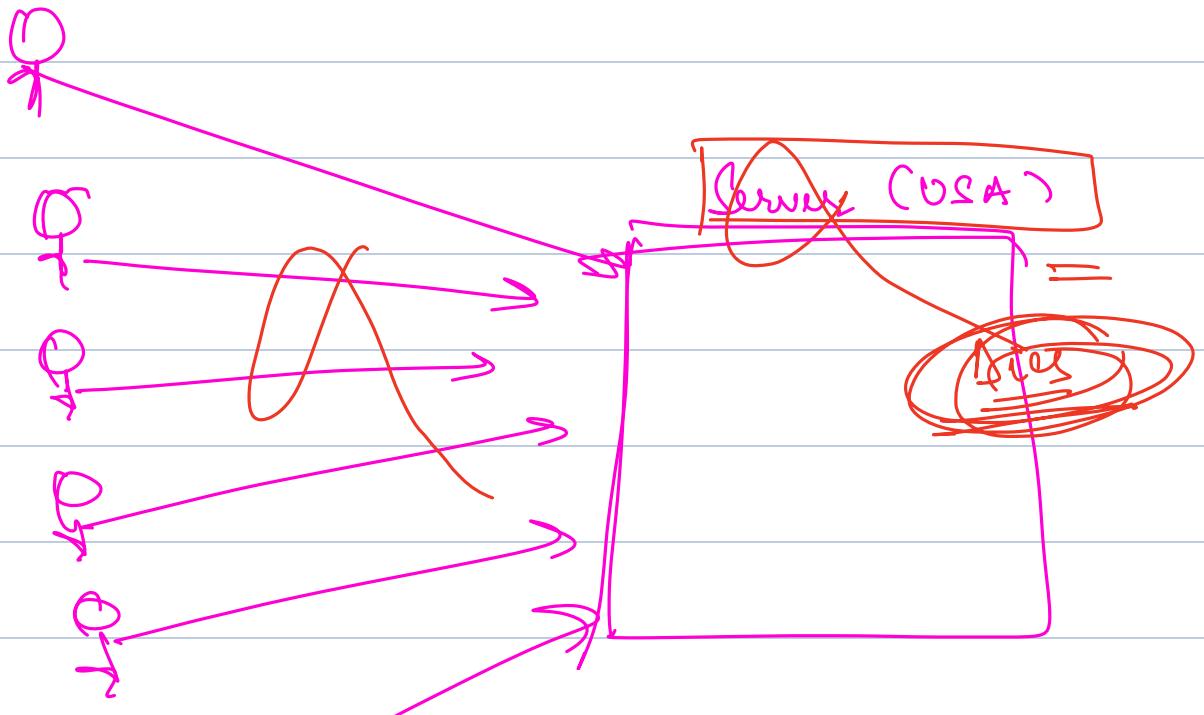
- 1.) No private messages
- 2.) Go through pre-reads
- 3.) Be patient

SOLID, Design Patterns

Only for b/E

What is HCD

→ High
level
design.



Why Not?

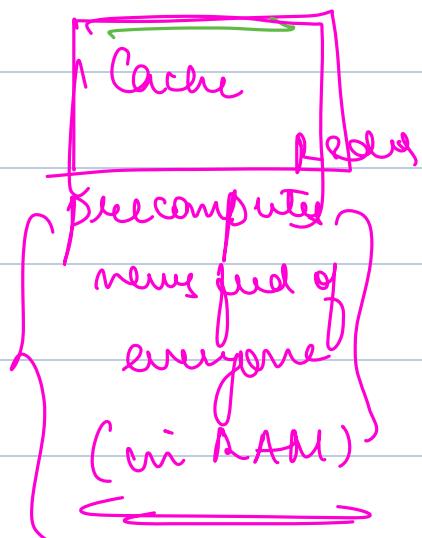
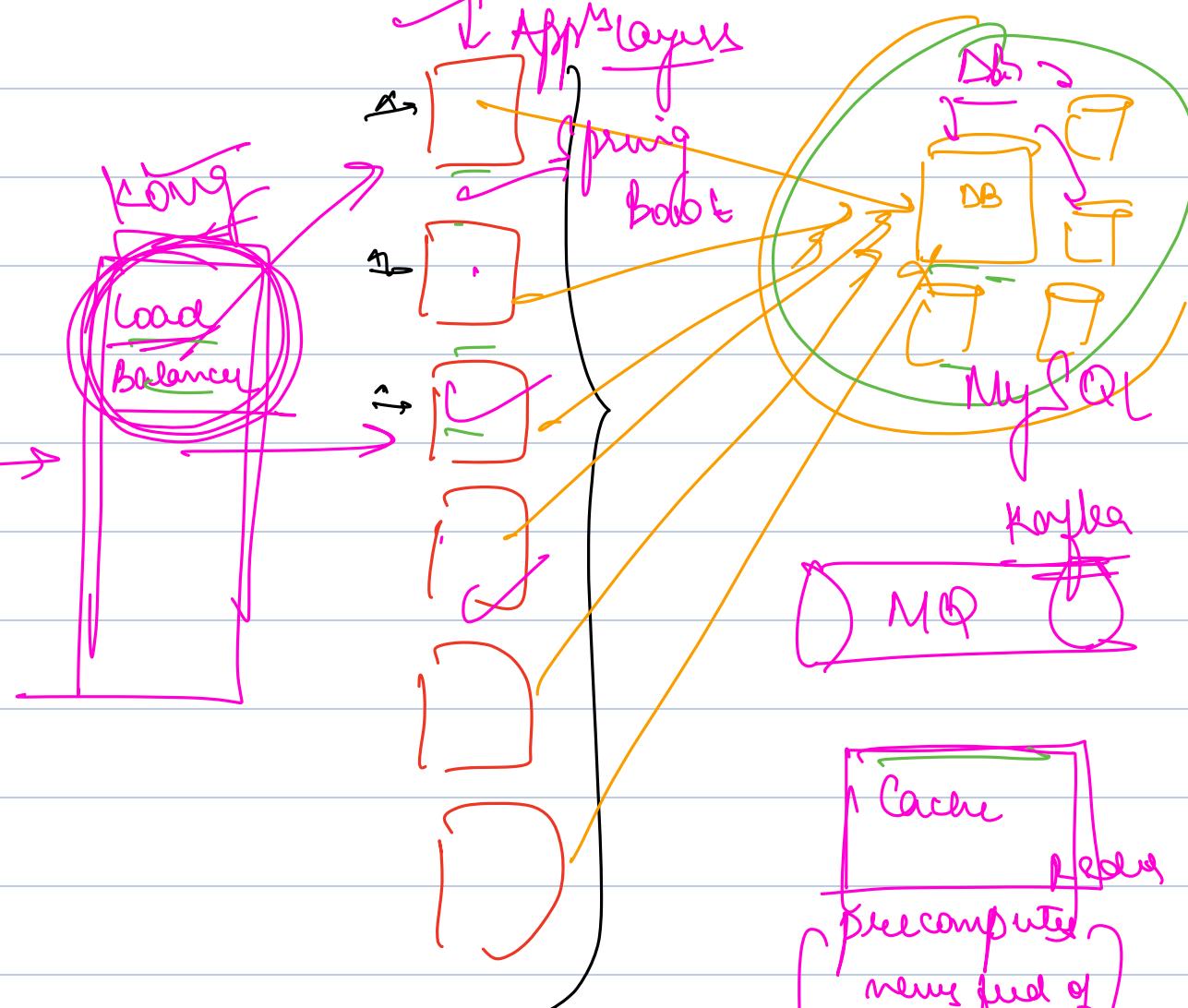
- 1.) Bottleneck
- 2.) Slow
- 3.) SPOF



Single Point
of Failure.

1000 PB

101



FLD
Design and interaction of diff infra
layers that work together to

make an app^m handle desired scale

at desired efficiency

of buses

System Design 101

⇒ dee.icio.us

(CN: Computer Networks)

CS161

↳ College Student in
2003

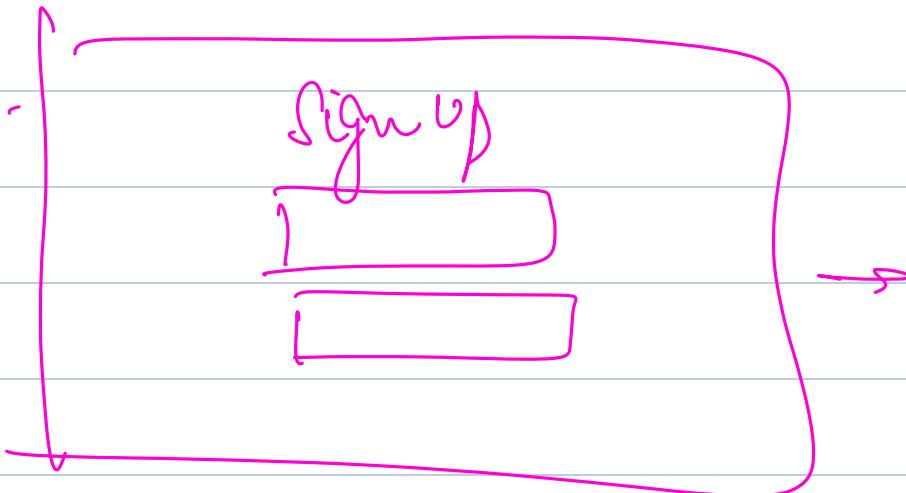
↳ Internet Explorer

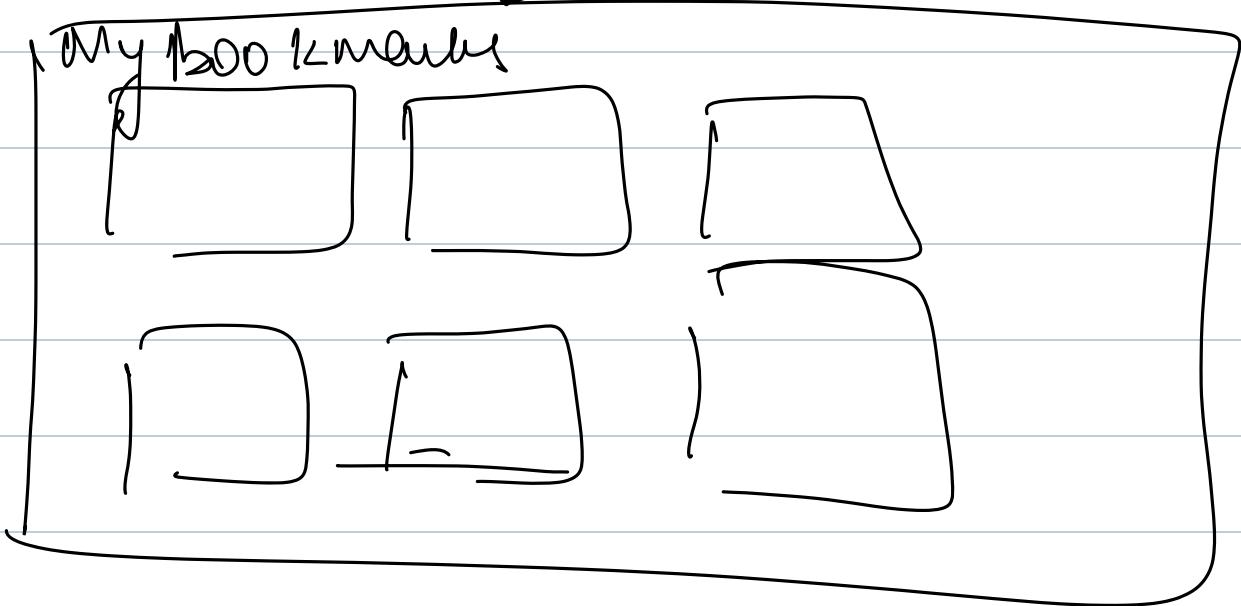
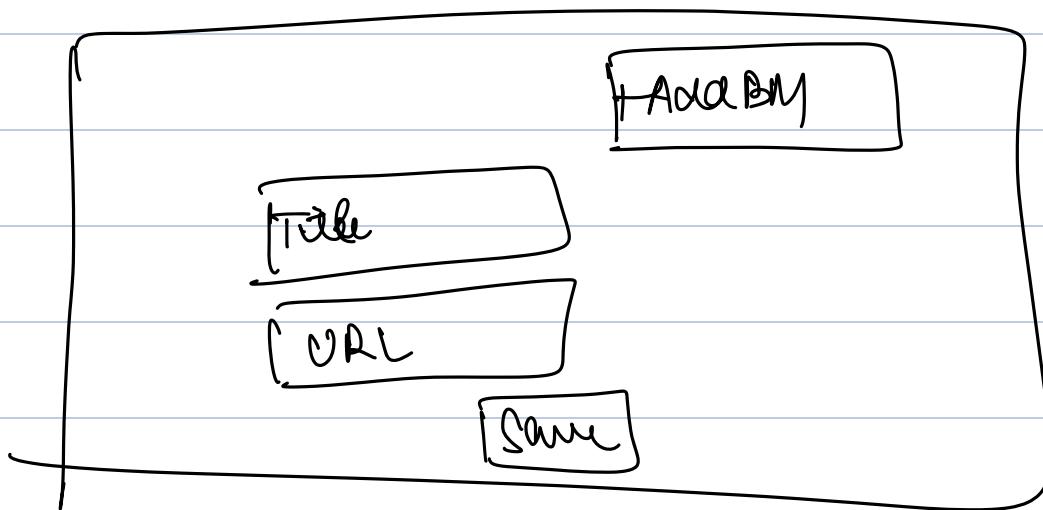
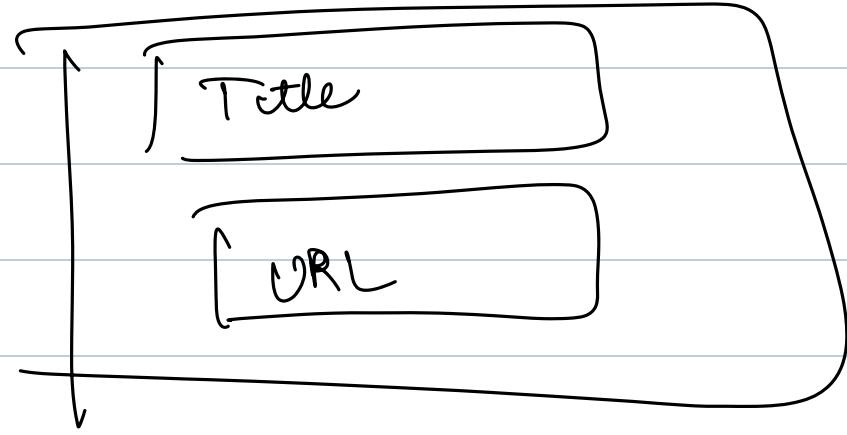
↳ No Bookmark Feature

- 0) Login/Signup
- 1) Save Bookmarks
- 2) fetch Bookmarks

30 Million Dollars

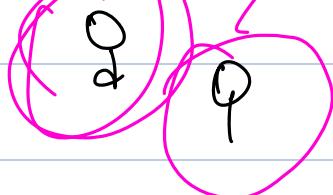
(Half a billion Dollars!)



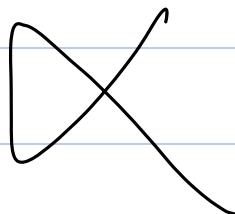




Wrote code of website on his laptop.



Will the general public
be able to use it



⇒ No one else will be able
to access other than him

~~Why general public not able to access?~~

How internet works

Curious: Sender and receiver address

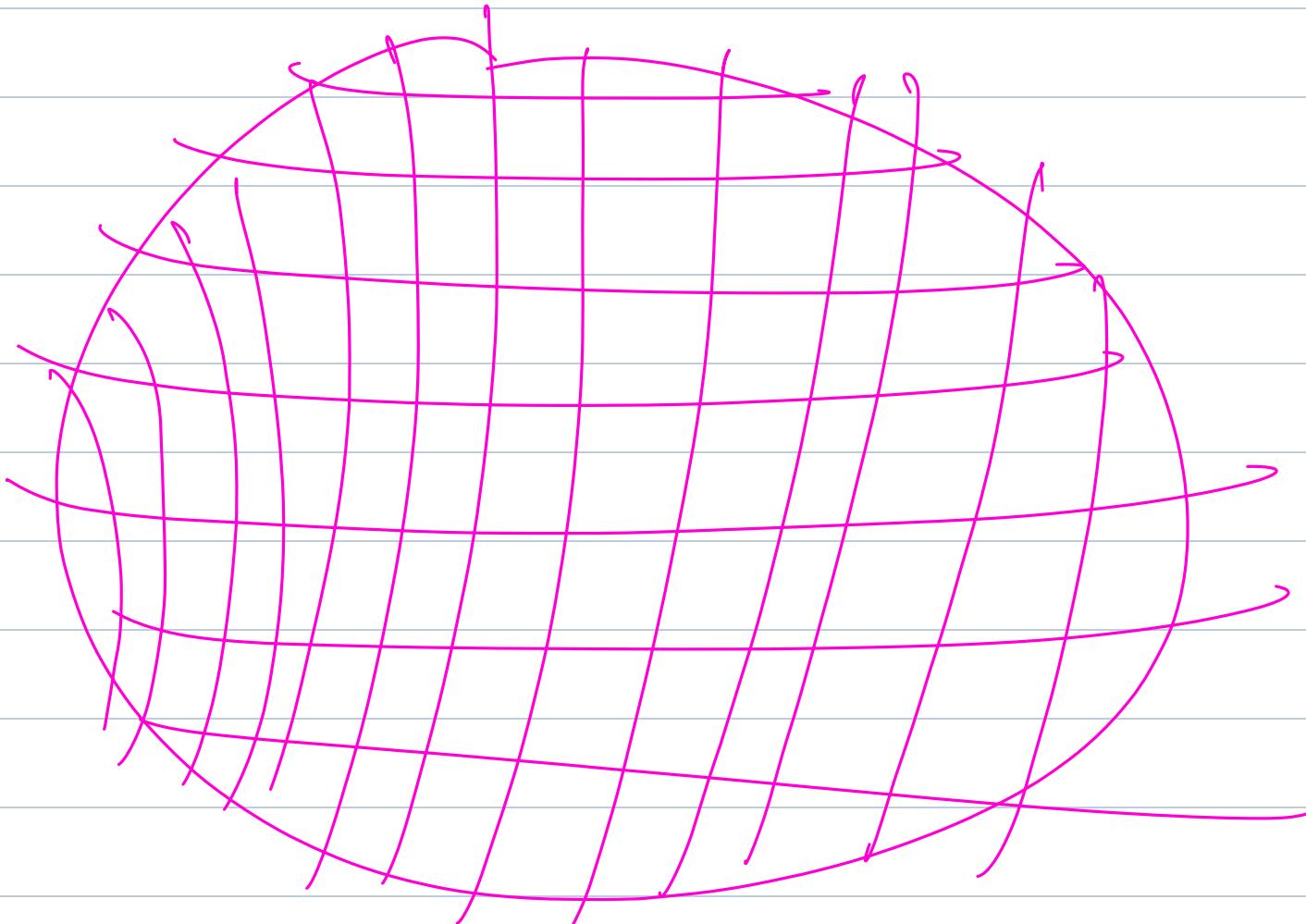
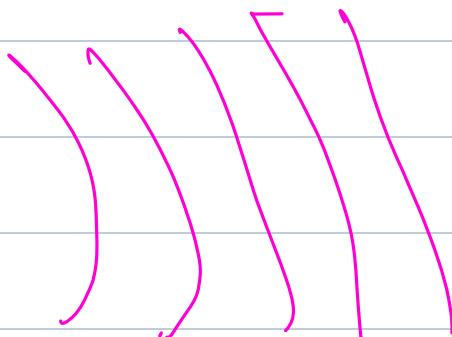
del.icio.us



- ⇒ Unfortunately computer can't handle ambiguity.
- ⇒ At the end computer only understand Bits 0/1

exact address \rightarrow (lat, long)
go to (131.418, 129.345)

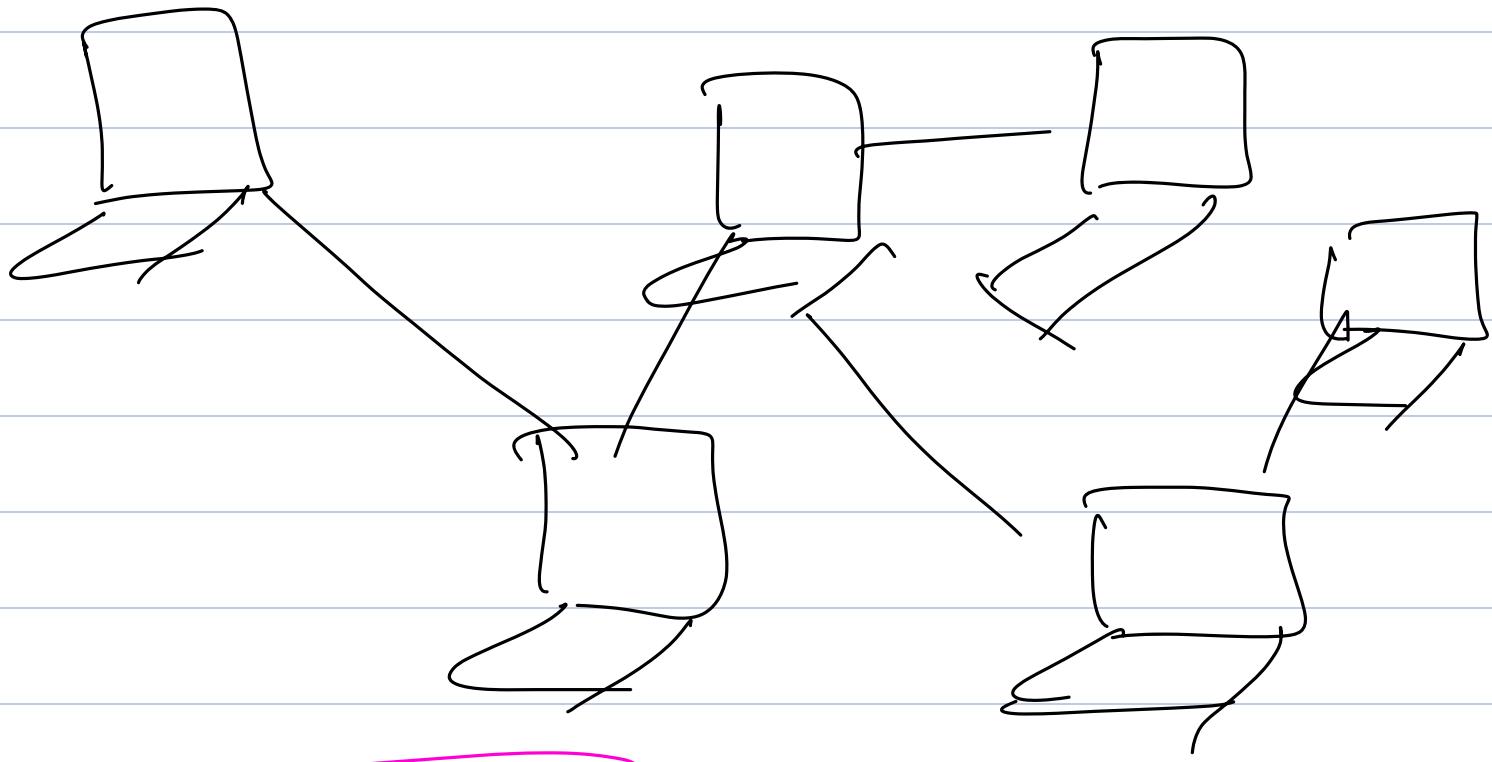
Currently (122.83, 31.72)



Internet also gives unique addresses to every machine connected on internet

IP Address

(Internet Protocol address)



[0 - 255]

IP Address \Rightarrow 32 Bit Number.



[0 - 255] . [0 - 255] . [0 - 255] . [0 - 255]

[192 . 168 . 1 . 1]

2^{32} \rightarrow (1 Billion) diff i/p and

of machines on Internet > much much greater

IPv4 \rightarrow 32 Bit $\approx 4B$

$2^{50} e^m$
 1. IP v6 : 128 Bits \rightarrow half of # atoms on planet

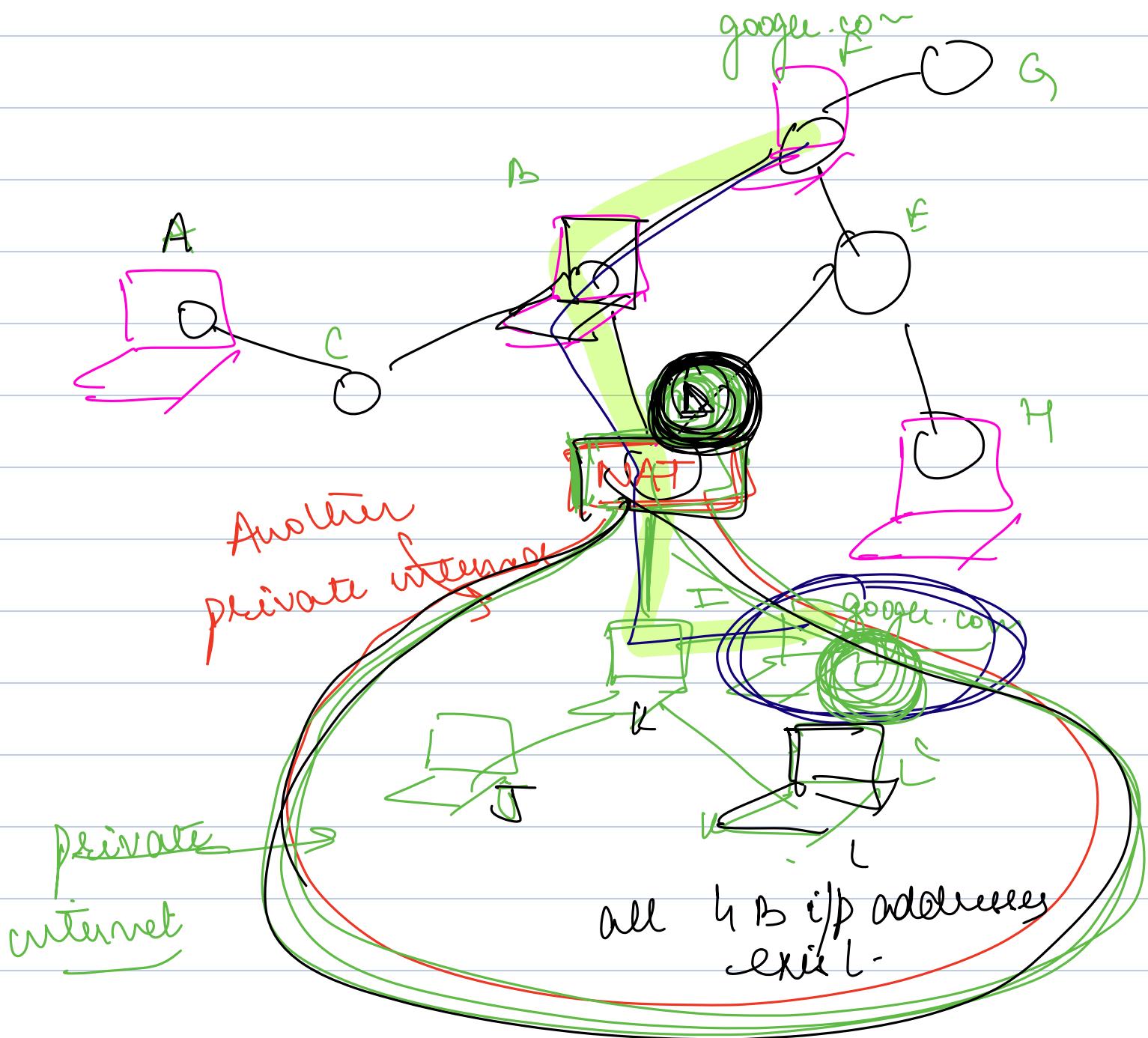
1000000000000000000000000000000000000
 000000000000
 $\left[10^{50} \right]$ $\left[50 \text{ zeroes} \right]$

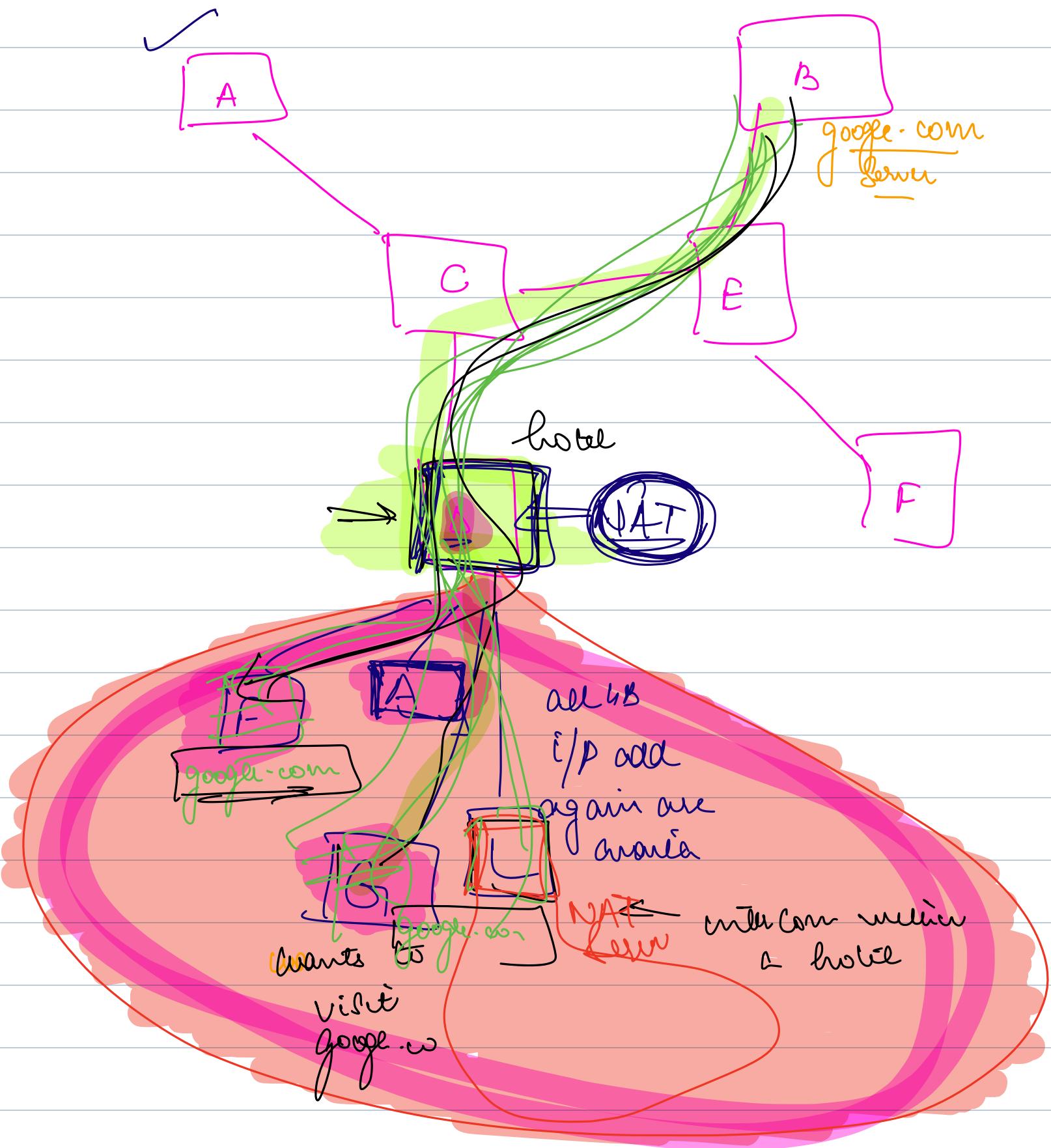
10^{80} atoms on planet

2.) NAT

(N/W address translator)

↳ allows you to create an internet within an internet





10⁸

4B IP addresses
≥ 4B devices

I CAN organize
which distribute
IP addresses

⇒ On wholesale via
auction

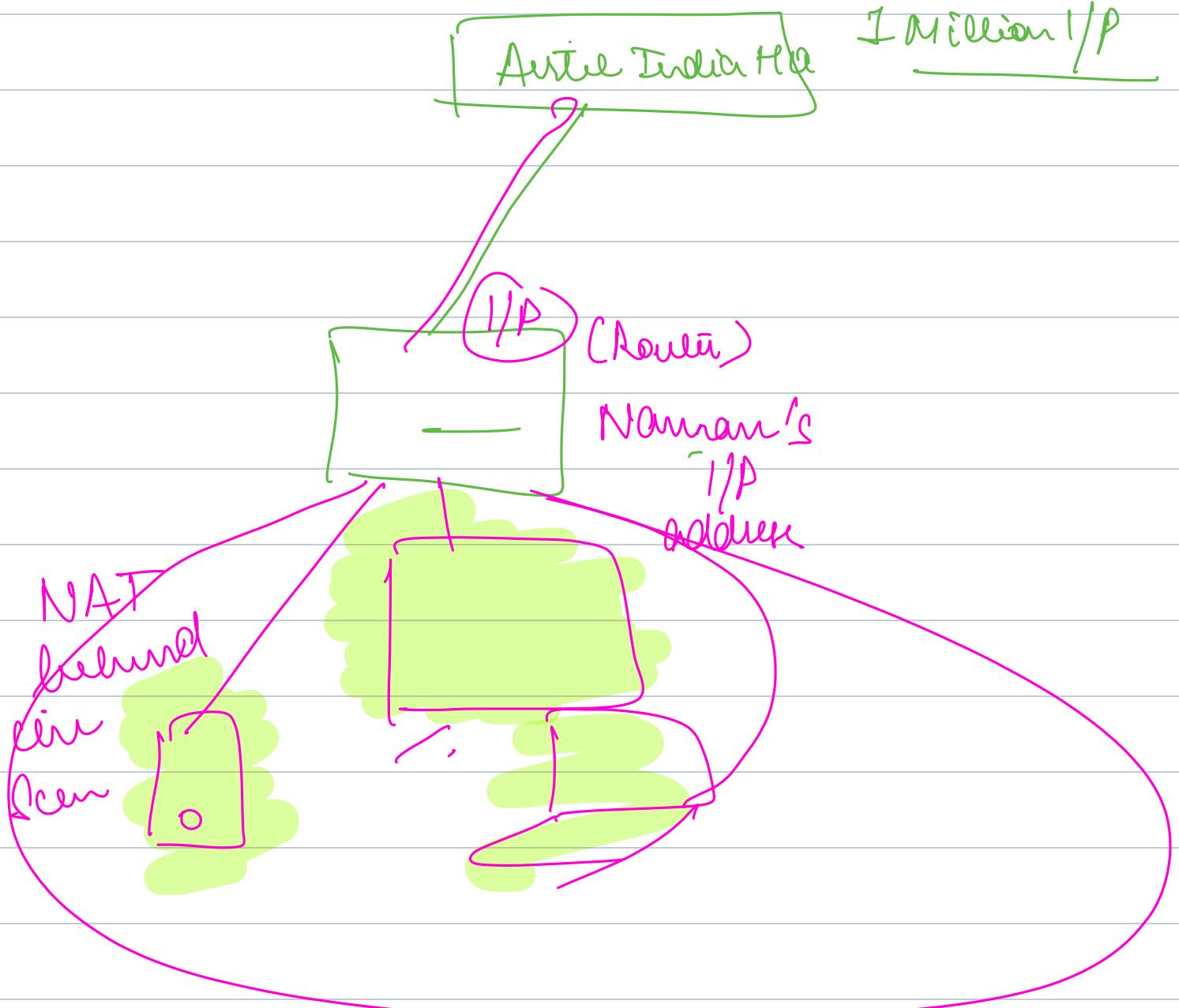
10.41. xxx. xx

ISP 2Bn \$ollar

Cloud Companies

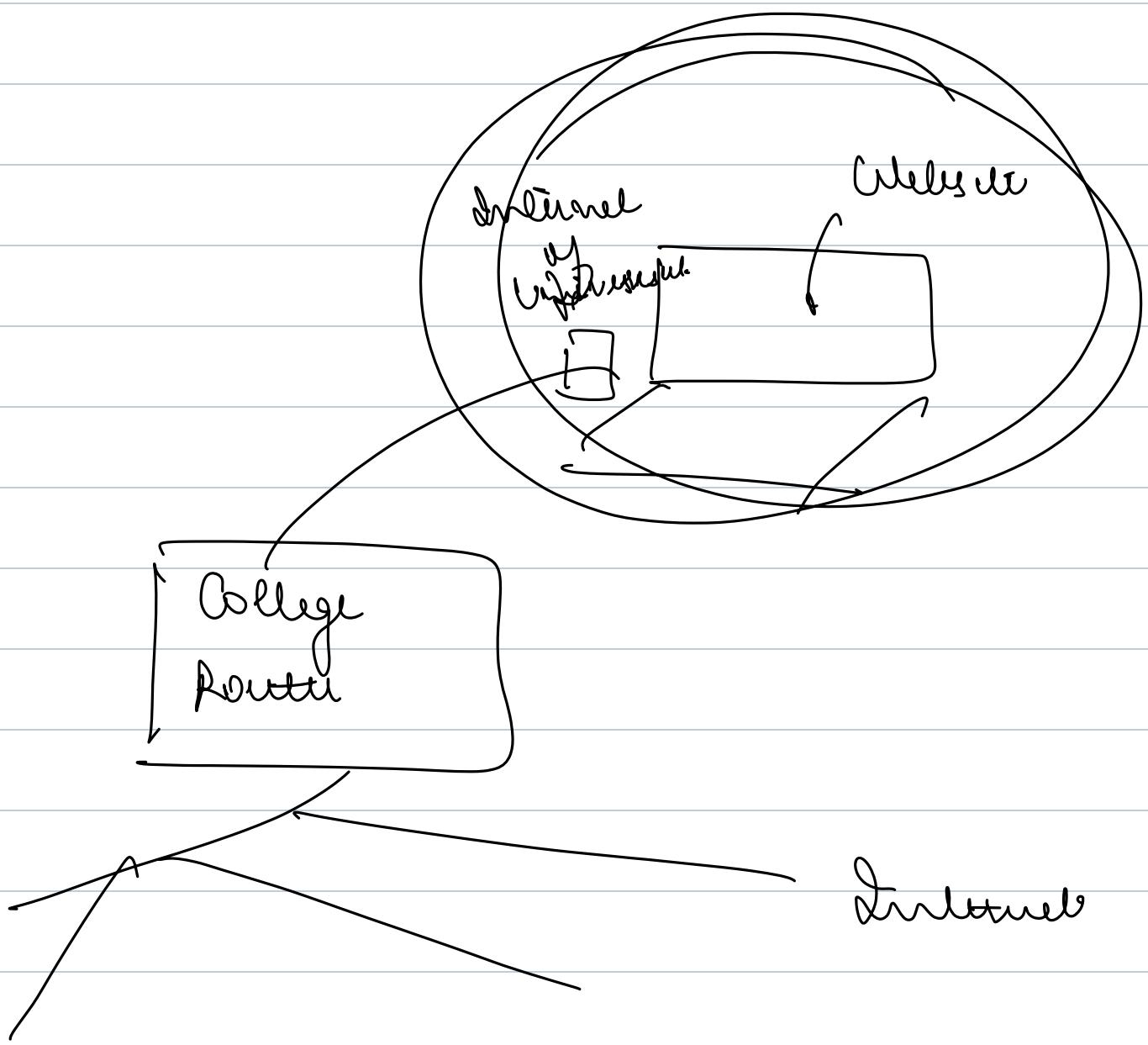
ZIP

every user
of JIO

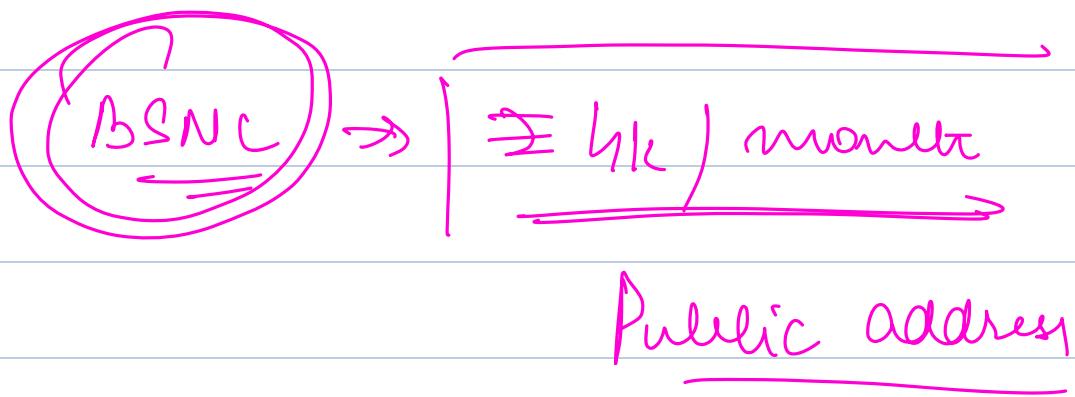


youtube.com

History

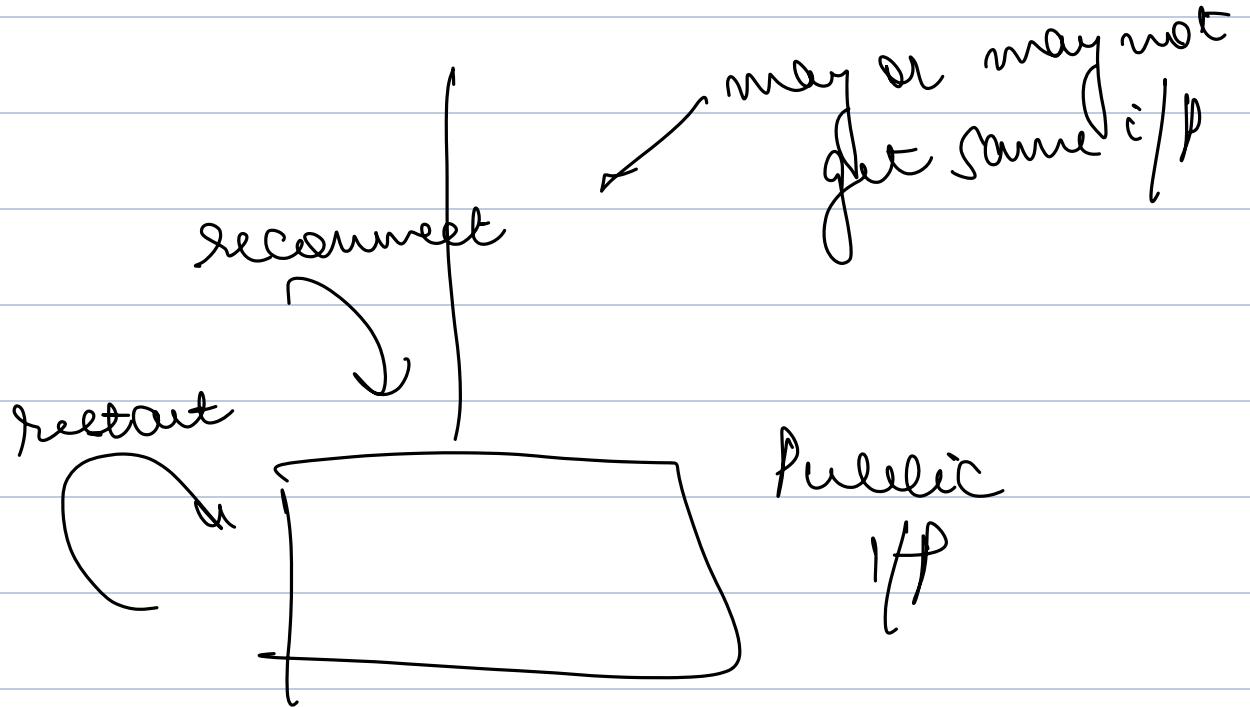


We can't access from public
because behind a NAT

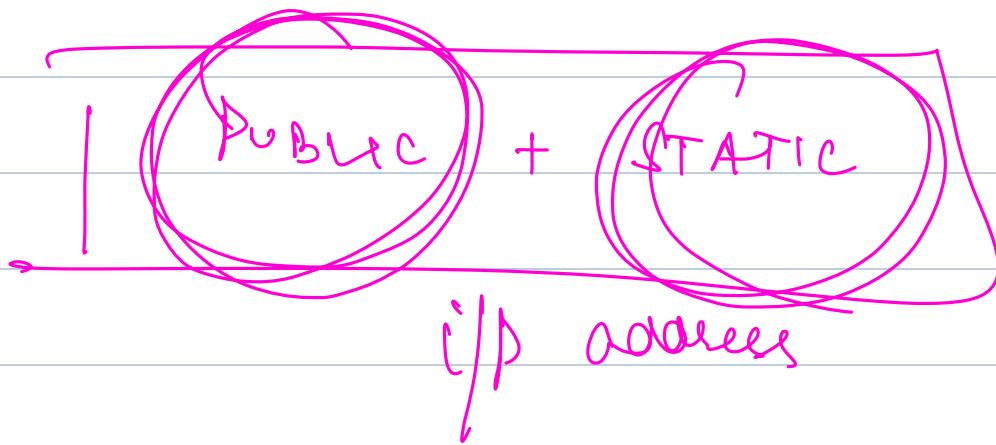


Static and Dynamic I/P addresses

When a device is offline, can't
reassign its I/P add to someone
else.



To host a website, we need to have a





google.com \Rightarrow 141.250.193.164

fb.com \Rightarrow 137.241.82.93

insta.com \Rightarrow 82.71.39.47

- \Rightarrow Internet works on numbers but we humans are terrible in remembering numbers
- \Rightarrow In mobile \Rightarrow contact app

