Right time to start system design => prob solve + CS fund. dormancy

17 March 2022

18/8/24

3] High Level Design - Basics

HIGH LEVEL DESIGN - 101.

| Anshuman sir

(2004-2005)

Story :- delicious company. → Journey → Explain

delicious — started on laptop

- add bookmark (userid, siteurl)
- getAllbookmark (userid).

Not regular organization — Which still earns revenue but they end up spending revenue

ICANN { Central Authority → ICANN (Non-profit)
- It's maintain the list of all register domains with their owner.

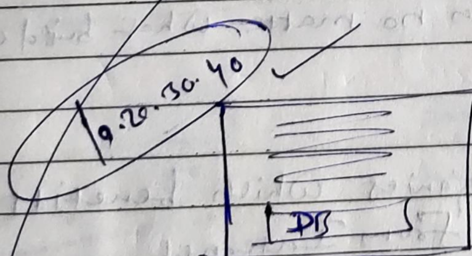
domain name	owner name	Expiry	IP Address
google.com	Larry Page	—	10.20.30
anshuman.com	Anshuman	--	40

registered, when buy domain.

Browser | delicious.

10.20.30.40

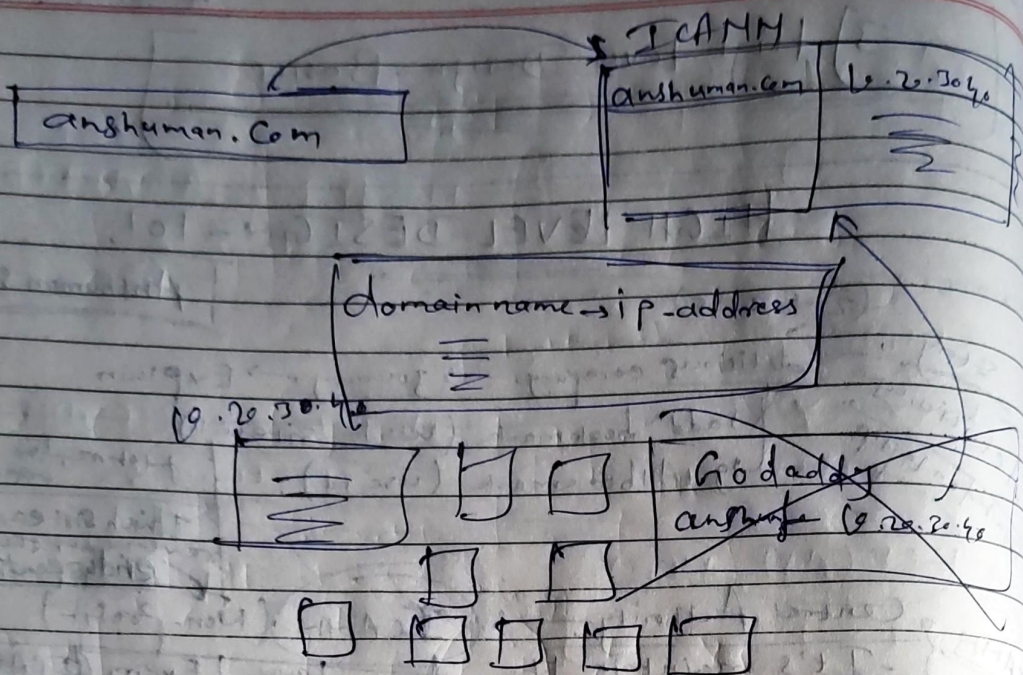
GoDaddy.com
- anshuman.com
- pay $
- change entry → 10.20.30.40
- errorcode.



- Machines need mapping of domain names to IP Address.

domain.com

namecheap.com



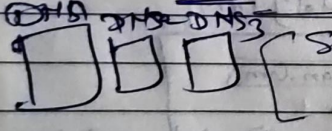
Domain Name Server (DNS)

- DNS can communicate to ICANN to check any update simultaneously & keep update themselves.

Q.1 Who pays & maintains DNS machines?

Airtel

1. Internet Service provider



Step 1: Go to DNS machine and fetch dname → ip.

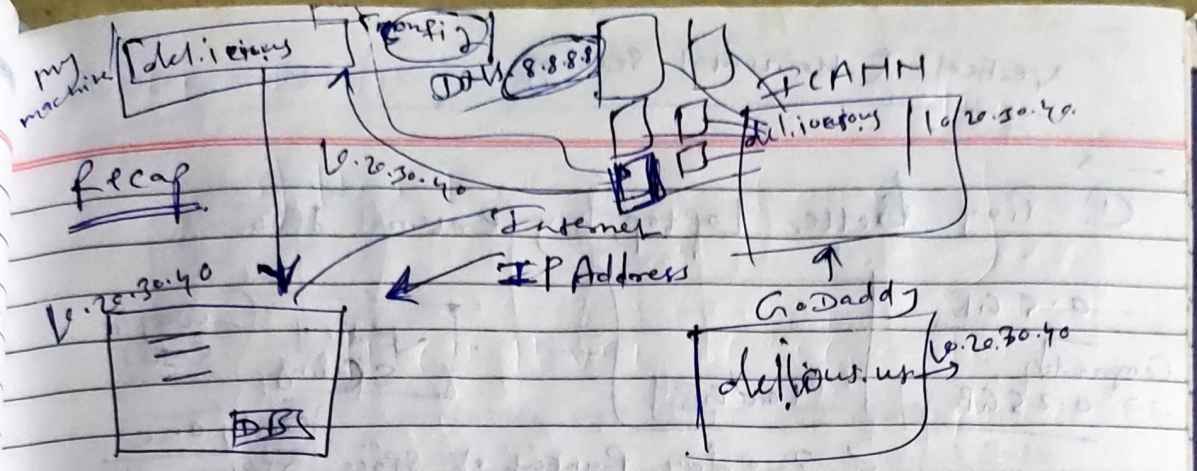
⇒ If Step 1 slow then no matter what build all becomes slow.

2. ~~large~~ The Companies which benefits large traffic from Internet

Google → 8.8.8.8, 8.8.4.4 (Fast)

CloudFlare → 1.1.1.1

Default Isp



IP Address :-

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

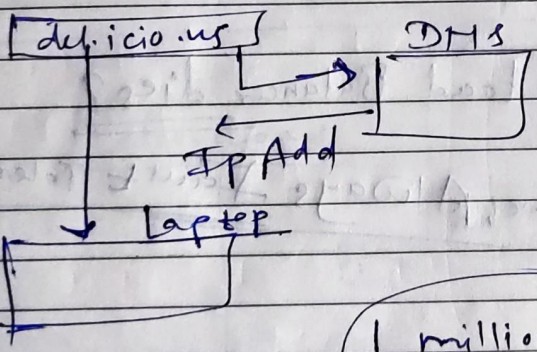
→ IPv4

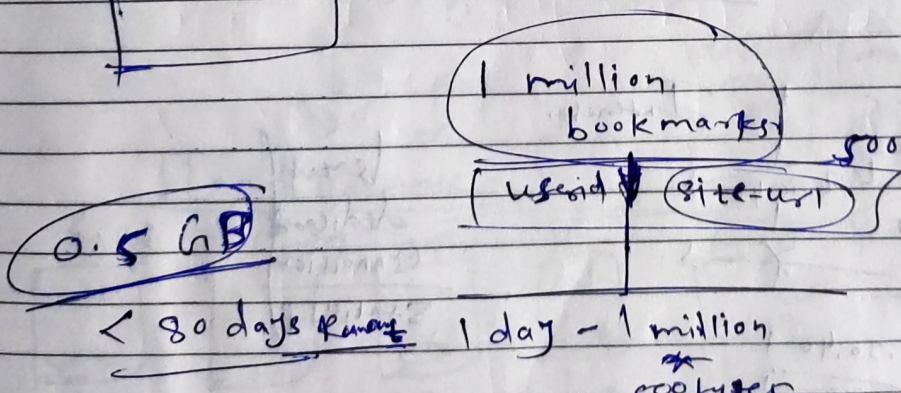
→ IPv6

8 bits

1 byte

0-255



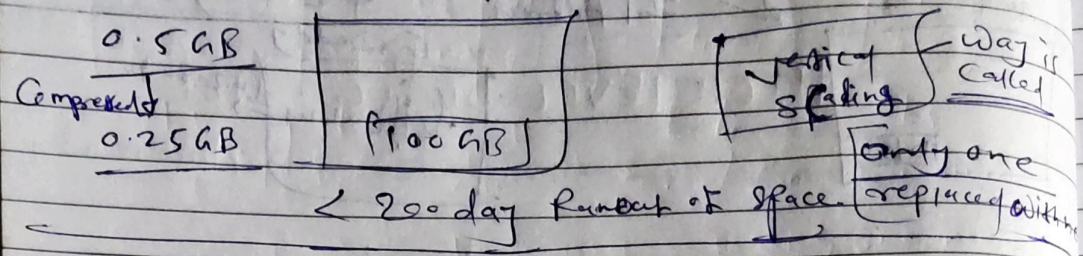


① Buy better laptop, by HDD

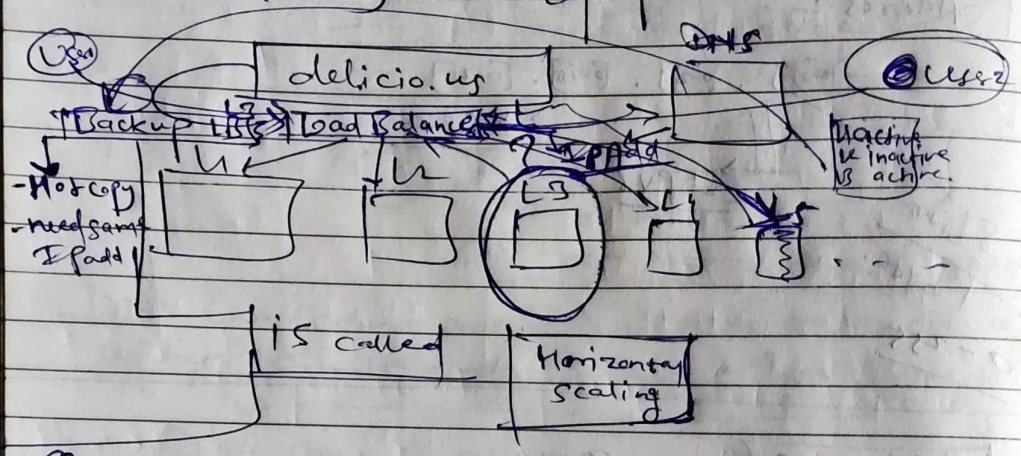
Vertical & Horizontal Scaling.

→

① Buy better laptop, buy external HDD.

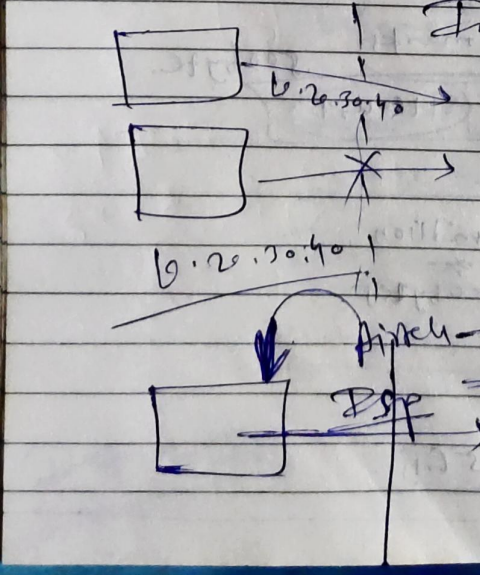


② Go & Buy more laptops.

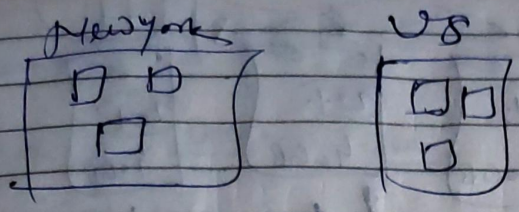


Q. What happens if Load Balancer dies?

Assume, Always Fault Tolerent.

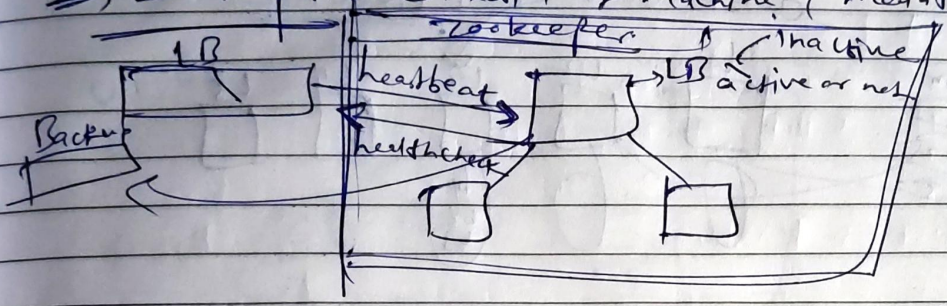


Machines always dies

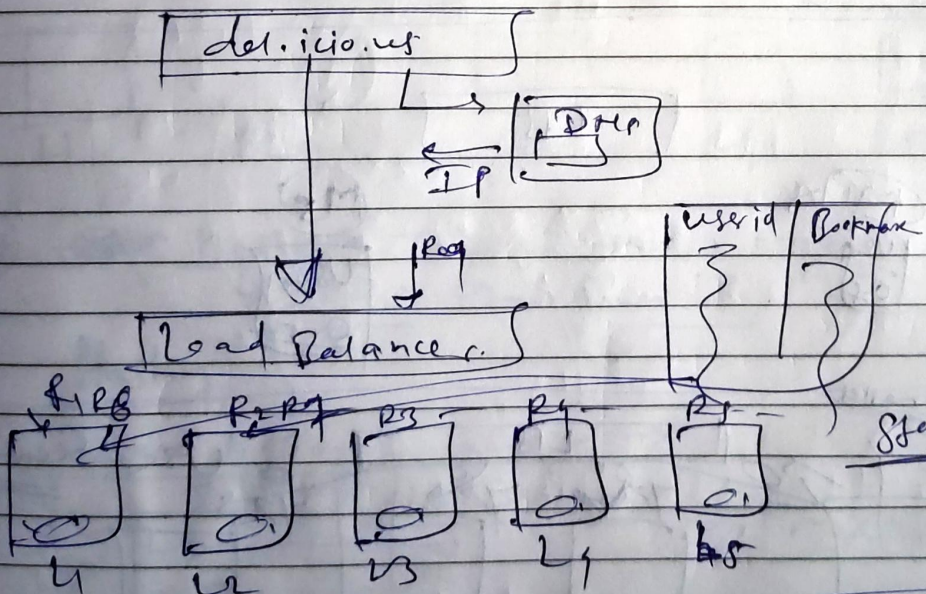


→ All loadbalancer are down even though are in diff location is a rare or (0.1%) case.

→ Zookeeper → Collection of machine & maintains state.

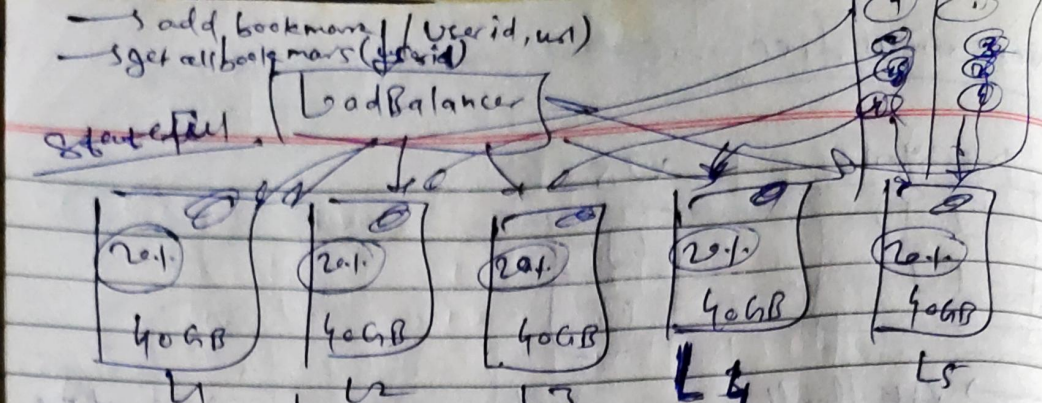


→ kafka is used Zookeeper internally.



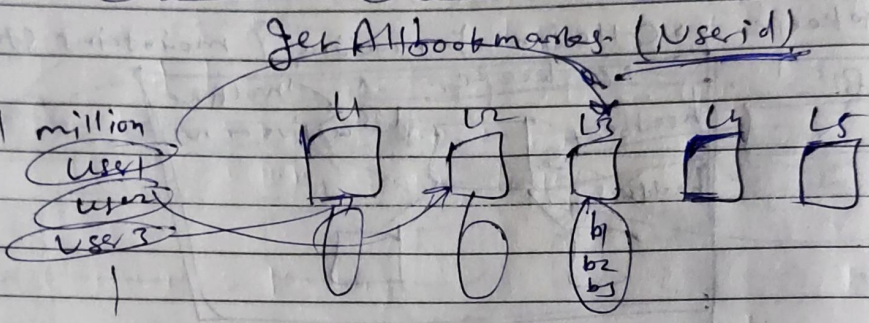
Userid = user1	Users	Bookmarks
	User 1	User1
	User 2	User2
	User 3	User3
	User 16	User16

→ add bookmarks (userid, url)
→ get allbookmarks (userid)



Good Approach ... Time Consuming

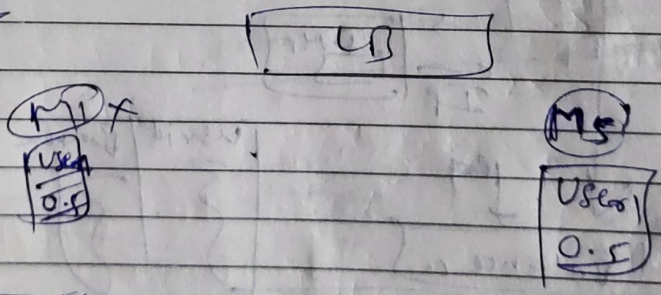
⇒ Good way → is to request go to only one machine



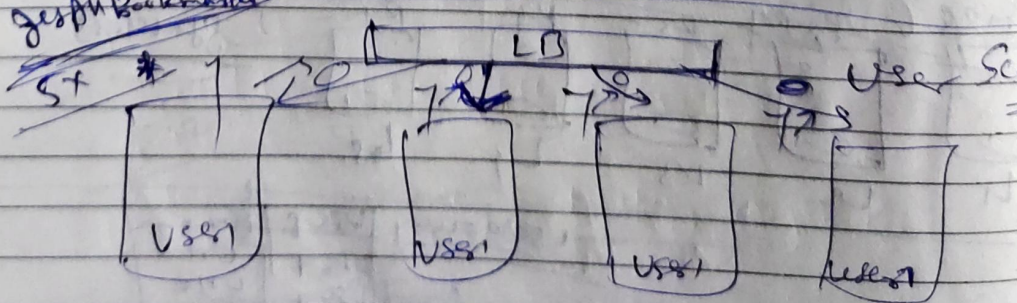
⇒ This process of splitting data Sharding

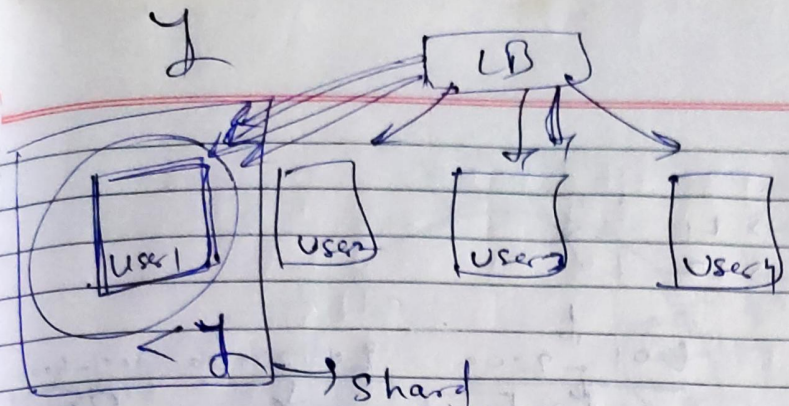
⇒ Choosing key is sharding key

Pinjarsa

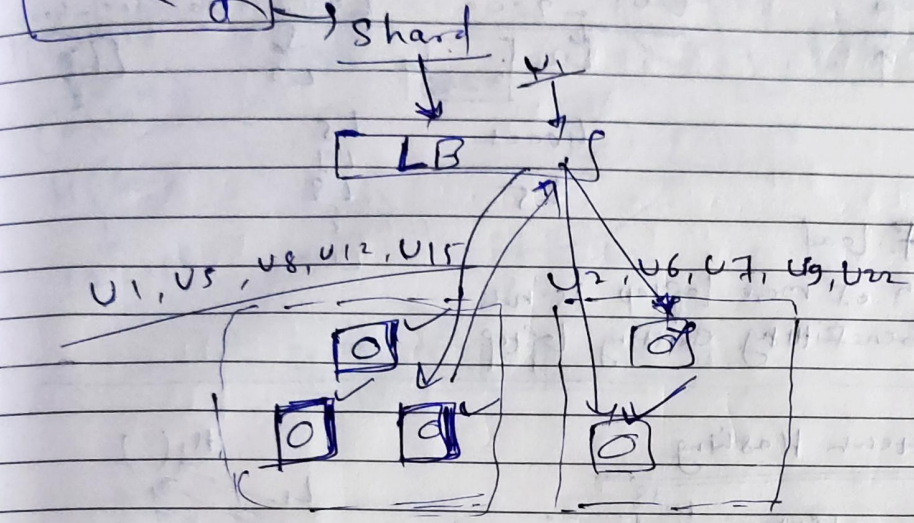


getAllBookmarks





Scenario 2



① ~~Sol~~ Hashtable, Table of userid → laptop
↳ BAD : Slow down LB

② Hashing

Userid % No. of laptops →

	5 laptops	6 laptops
12	2	0
15	0	3
16	1	4
21	1	3
25	0	1
24	4	0
28	3	4

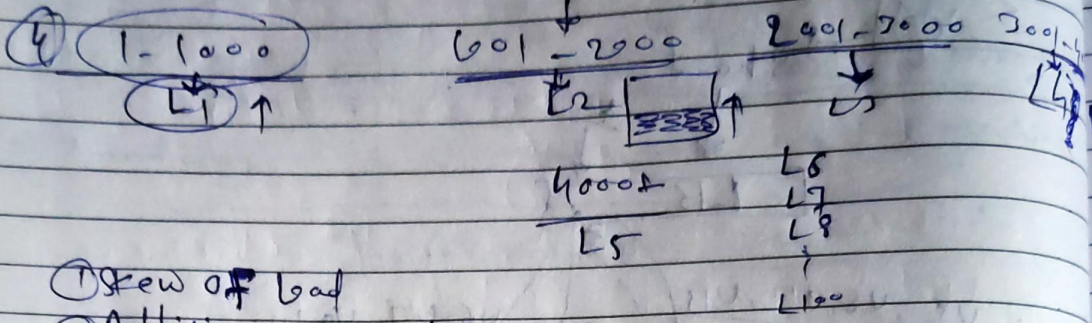
0, 1, 2, 3, 4, 5

It's inefficient when no. of laptops change.

③ Geo location :-

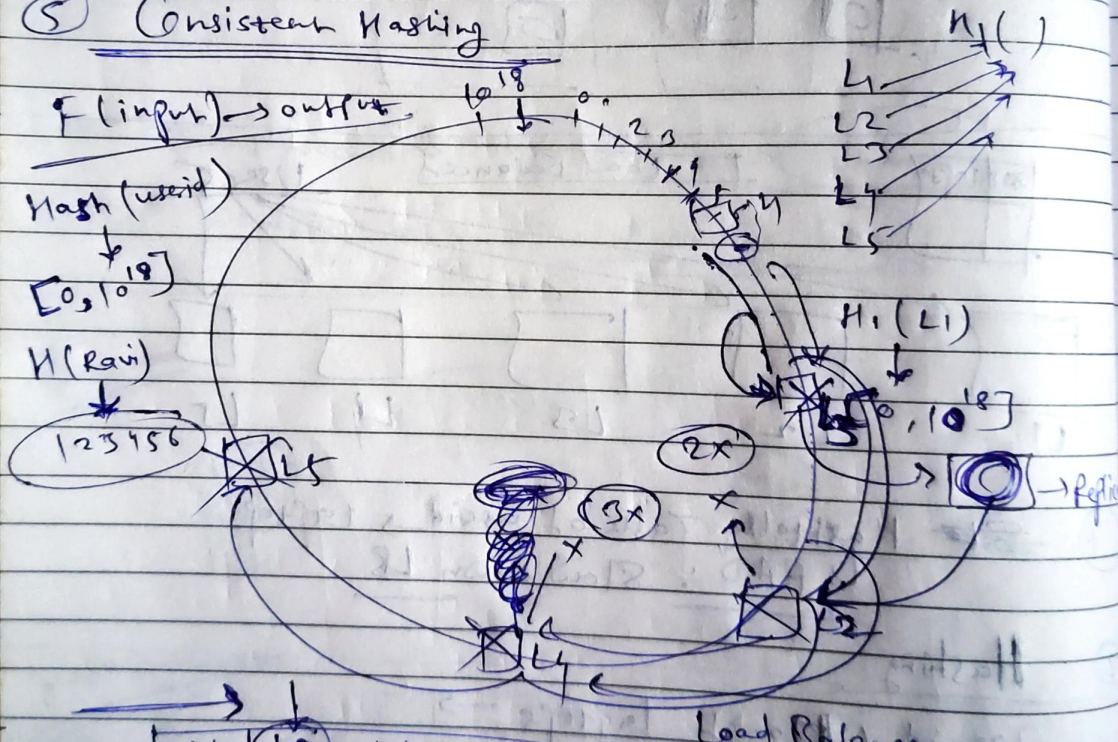
India → L1
US → L2

④

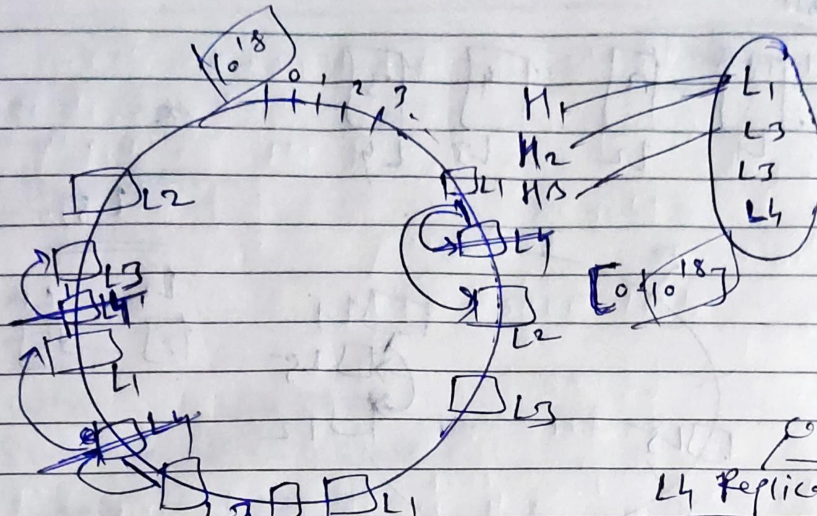


① Skew of load
② Addition of more laptop is not benefitting existing laptop

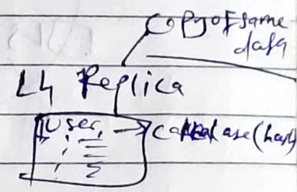
⑤ Consistent Hashing

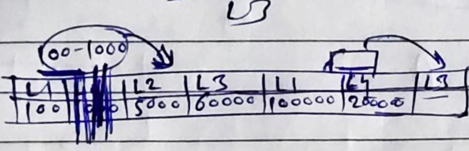


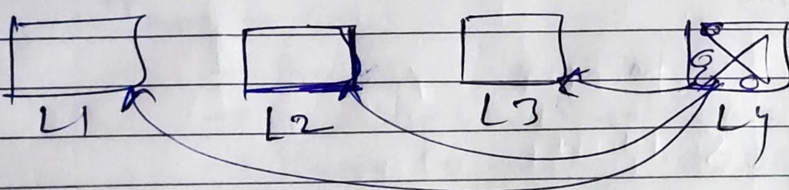
⇒ Original Consistent Hashing might not worked.



H (userid)
↓
$[0, 10^{18}]$
H (Ravi)
↓
123456







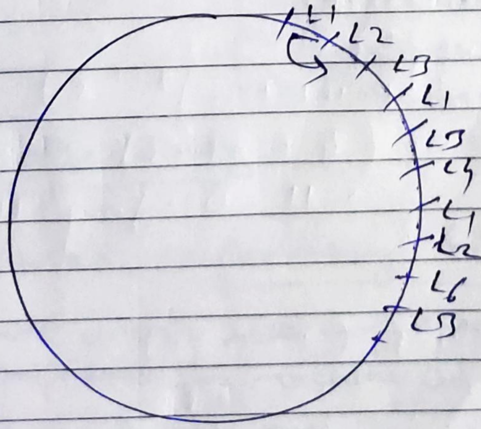
H (L1) → x
H (L2) → x

H_1
H_2
H_3

$\frac{1}{10^{18}}$

L1
H_1(L1) H_2(L2) H_3(L1)

L2
H_1(L2) H_2(L2) H_3(L2)



Doubt