Agenda.

→ Intro to System Design & Computer Networks.

LLD vs HLD.

↓

structure of your codebase.

Designing DB Schema.

Design Patterns.

HLD.

→ Architecture of App^n.

→ Machines

→ Scaling

Staff Engineer @ Google.

↳ Given a file containing strings, sort the strings in dictionary order.

↳ sort fun^n.

Catch! Size of the file : 50 PB.

$$1PB = 1000 \ TB.$$
$$1TB = 1000 \ GB.$$

$50 \times 1000 \times 1000$ GB.

50×10^{6} GB.

⇒ Simple problems becomes challenging at Scale!.

Del·icio·us Case Study.

↳ 2003.

↳ Internet Explorer.

Youtube : 2004
Aws : 2006
Chrome : 2008.

Joshua.

↳ Del·icio·us

↳ Bookmarking Website.
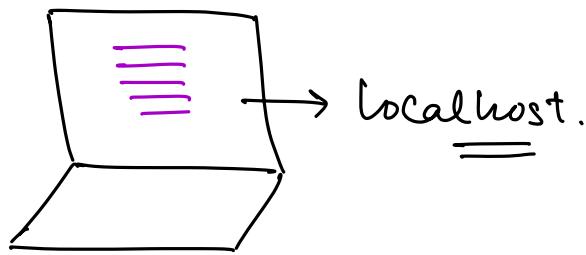
MVP.

↳ Minimum Viable Product

→ SignUp | Login | Logout.
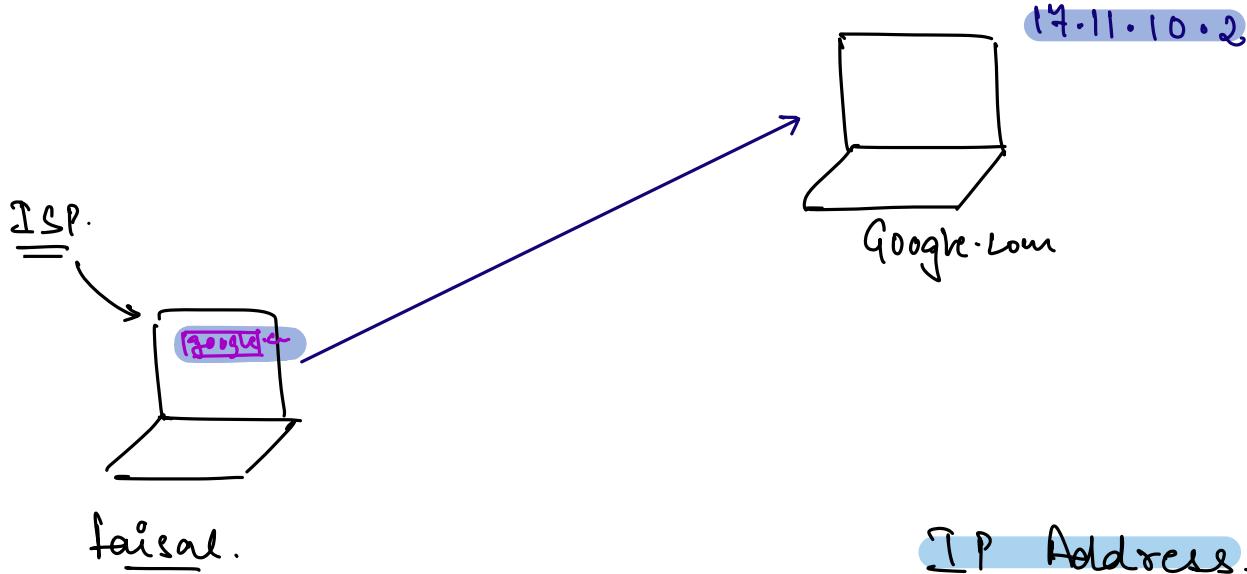
→ Store bookmarks for a user.

→ get the bookmarks

→ Localhost.

How Internet Works. ?

J10

ISP.

faisal.

17.11.10.2

Google.com

ICANN.

IP Address.

IPV4   IPV6.

A·B·C·D   ↳ 128 bits

[0~255] 2^{128}

86.

Public IP
(vs)
Private IP
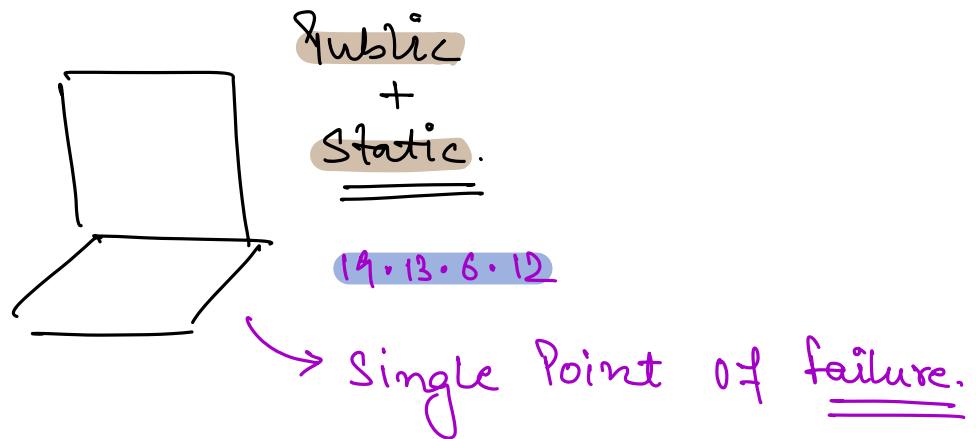
Public IP {   32b.
   4Billion
   2Billions.

Dynamic IP.
(vs)
Static IP

Public
+
Static.

19.13.6.12

→ Single Point of failure.
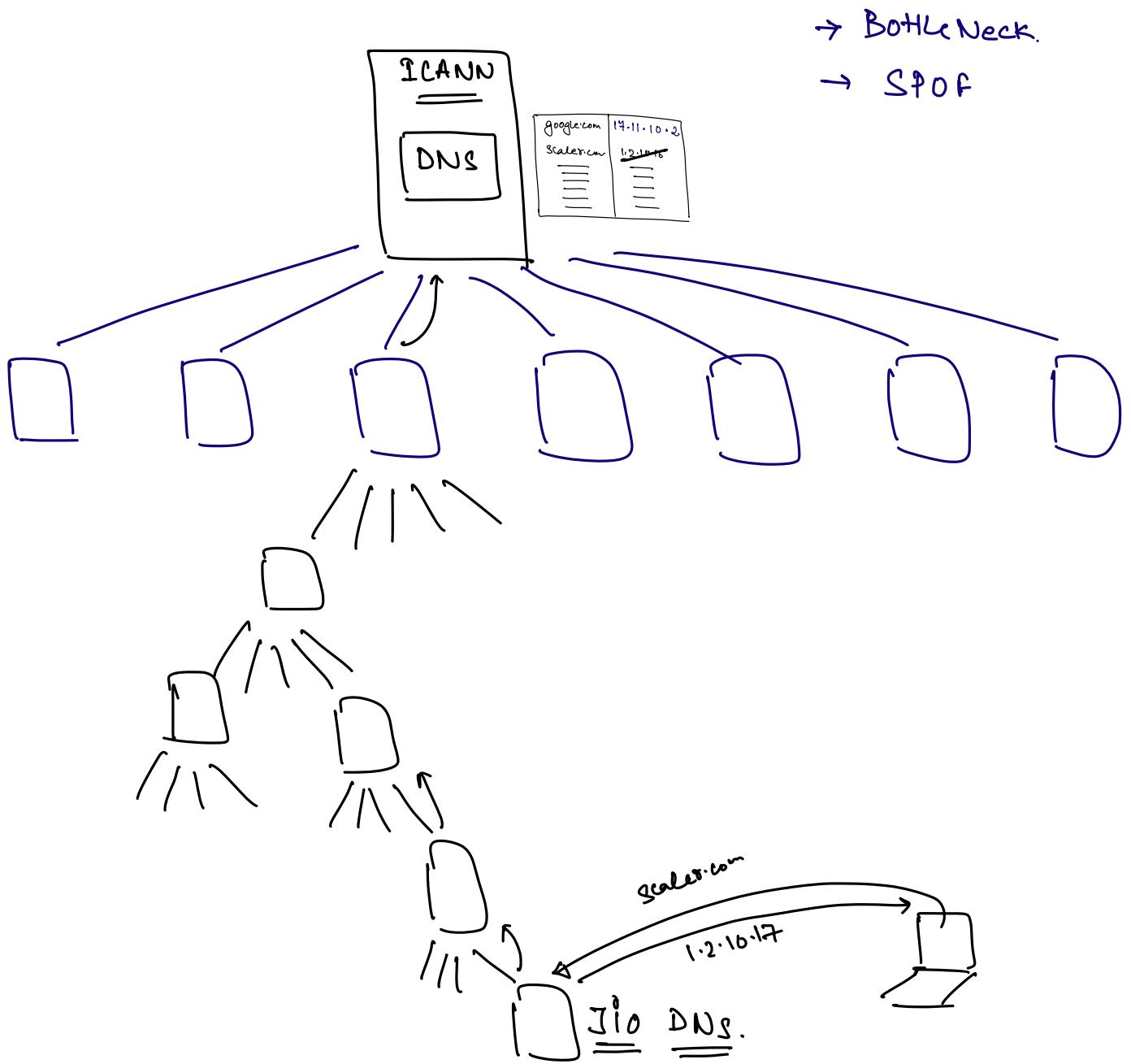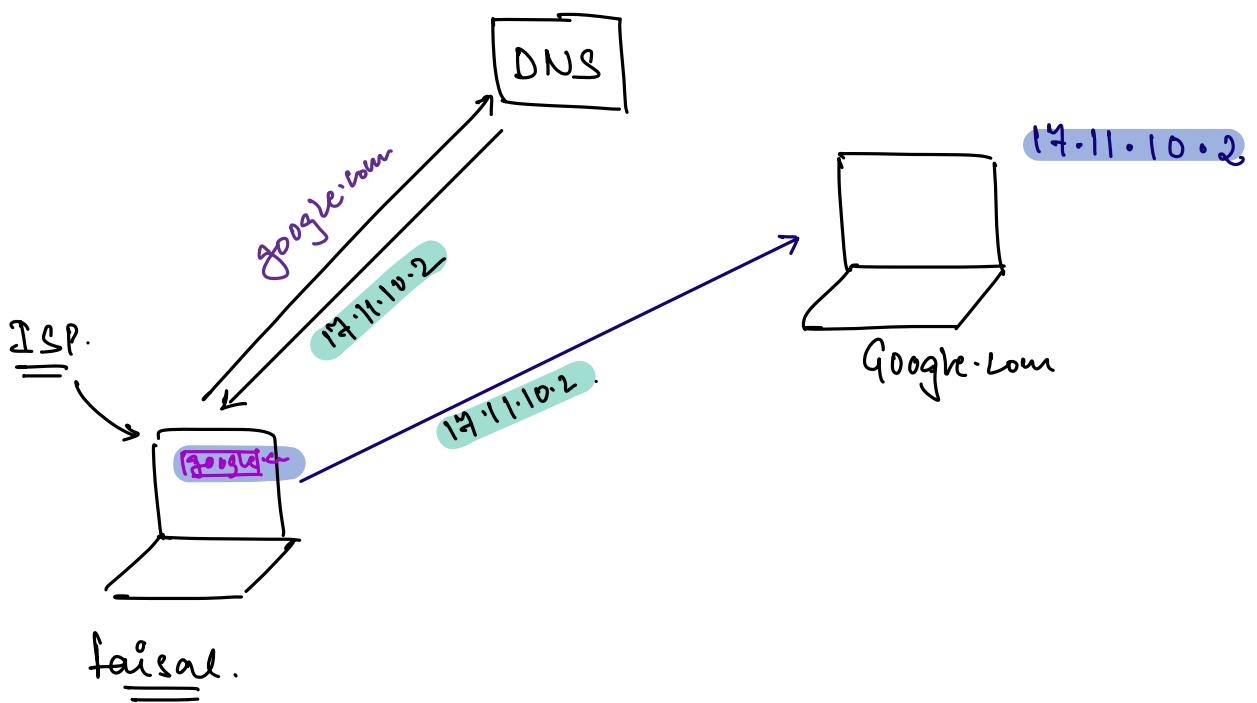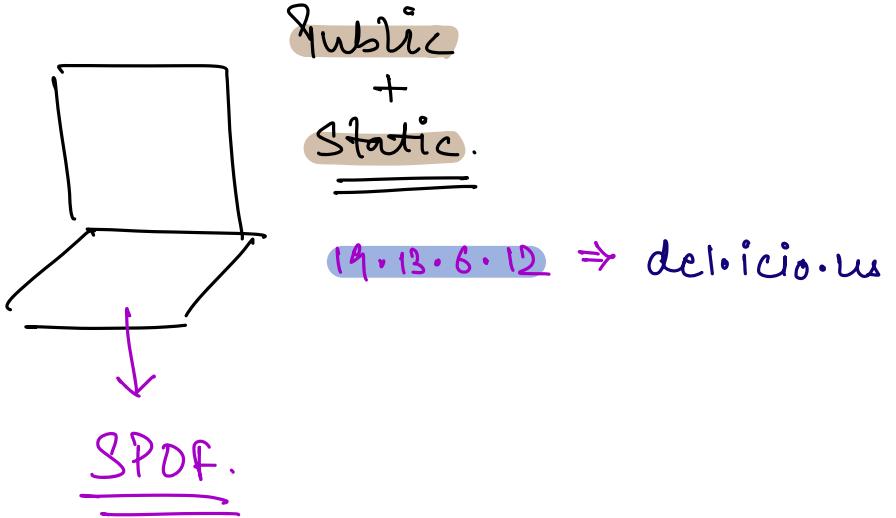
Domain Name. Server.

google.com	17.11.10.2
scaler.com	1.2.10.16

→ Mapping b/w Domain & the IP address.

DNS

17.11.10.2

ISP.

google.com

17.11.10.2

Google.com

google.com

17.11.10.2

faisal.

ICANN

DNS

google.com | 17.11.10.2
scaler.com | 1.2.10.16

→ BOTTLE NECK.

→ SPOF

scaler.com

1.2.10.17

Jio DNS.

Public
+
Static.

$19.13.6.12 \Rightarrow$ delicio.us
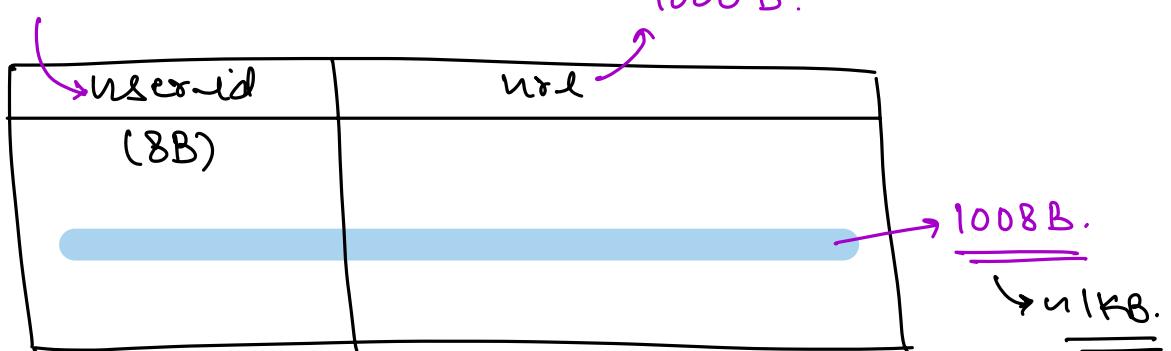
SPOF.

Server.

→ 128 MB RAM

→ 40GB HDD

→ 2 Core

bookmarks

8 Bytes ⇒ long
4Bytes ⇒ int

1000 B.

userid (8B)	url
	1008B.

~ 1KB.
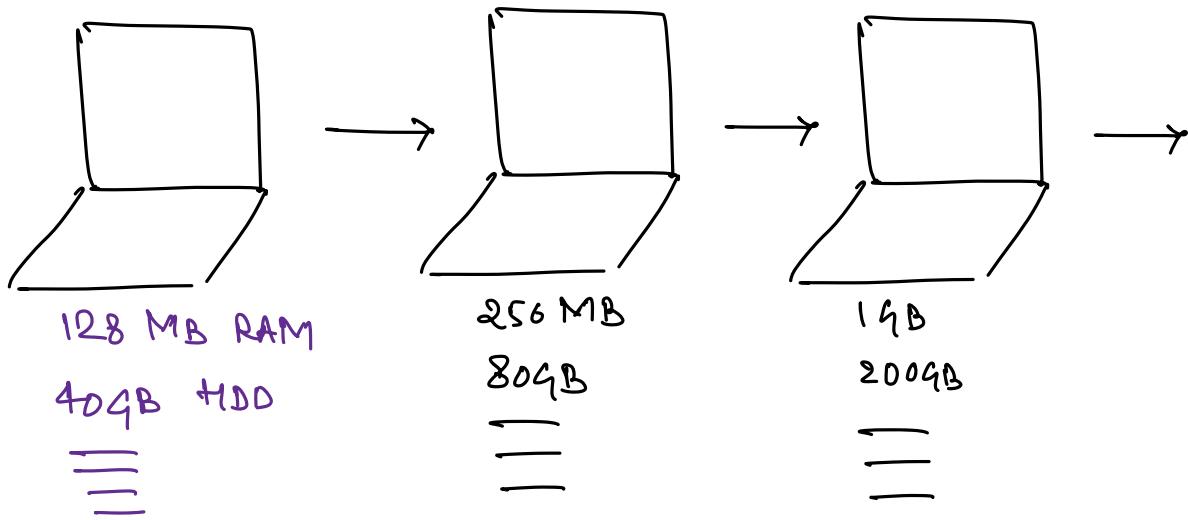
4Bytes ~ Range 2 Billion

⇒ 1M Bookmarks / Day.

⇒ Storage $= 10^6 \times 10^3$ Bytes

$= $ 1GB / Day

Scaling

Vertical Scaling

128 MB RAM   256 MB   1GB
40GB HDD   80GB   200GB
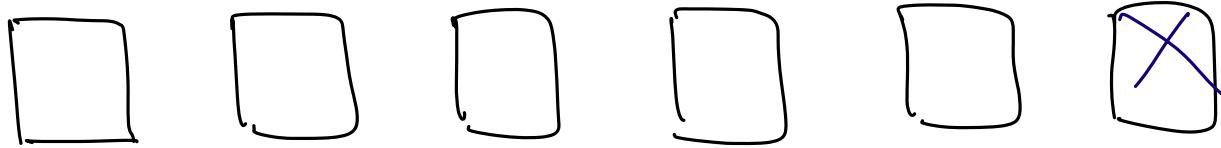
→ limitation (Can't be scaled infinitely)

→ SPOF.

Horizontal Scaling.

→ Practically we can scale infinitely
→ No SPOf.

⇒ Distributed System.