Long Url ⟶ Short Url

www.[illegible].com → www.tinyurl.com/[illegible]

redirect

→ Usr Can have custom

→ Limited Time Span

Capacity Estimation & Constraints

Traffic → Our System will be read heavy

100 : 1
read : write

Assume 500M Url shortning per month

read → 500M * 100 = 500,000,000,000
= 50B

Query: 500M * (30 * 24 * 3600)

~ 200/s (New URL Shortning)

Read Operations

200 * 100 = 20000 = 20K/s

Storage Estimation: 5 year Estimation

500M * 12 * 5

500 * 60

= 30000M { 100 Million = 1 Billion

= 30B

Assume each object will be 500 bytes

30B * 500byte

15000Bbytes

= 15TB

Band Width Assumption

500 byles Ask

Write Estimation

200 * 500 = 100000

= 100KB/S

Read : Total Outgoing Data

20K * 500 = ~10 MB/S

Memory Estimation

We have cache hot requests

→ We take 80-20 rule means 80% requests are from 20% url

20k Per Second

So Per day = 20k × (3600 sec × 24)

= ~ 1.7 Billion

We need 20% of 1.7 Billion

Per object size = 500 byte

$\frac{20}{100} = .2$

$= .2 * 1.7\,B * 500 = \sim 170\,GB$

There will be alot duplicate requests

So our actual usage less than 170 GB.

Conclusion

High Level Estimation

New Url → 200/S

Url redirection → 20K/S

Incoming Data → 100KB/S

Outgoing Data → 10MB/S

Storage for 5years → 15 TB

Memory for cache → 170 GB