**Functional Requirements:**

1) System should be able to create a custom and unique URL which is short enough to copy and paste

2) User should be able to select the custom URL

3) User should be redirected to actual URL when accessed

4) User should be able to specify the expiry time

**Non-functional Requirement:**

1) Highly Available

2) URL redirection should happen in real-time with minimal latency

3) Shortened URLs should not be predictable

**Capacity Estimation:**

The system is read intensive. If we assume that read : write ratio is 100 : 1, then

If number of writes(URL shortening) per second = 200, then number of reads per second = 200 \* 100 = 2K/s.

Number of writes per day = 200 \* 24 \* 60 \* 60 ~= 17.2 M

Number of reads per day = 17.2 \* 100 = 1B

Number of writes per month and year = 17.2 \* 30 = 516 M and 516 \* 12 ~ 6.2B

Number of reads per month and year = 1B \* 30 = 30 B and 30B \*12 = 36Billion

If we assume each URL is of 500 Bytes, then storage required for 1 Year = 6.2 Billion \* 500 = 3TB

**Systems APIs:**

1) Generate Short Url

generateUrl(url, expiry\_date, custom\_url)

2) Delete Url

delete(custom\_url)

3) Redirect Url

redirect(custom\_url)

**Database:**

User

user\_id

name

emailId

Custom\_URL

url\_id

original\_url

custom\_url

expiry\_date

user\_id

**High System Design:**

