Back of envelop estimation :

- while system designing, we should ask the system Load / constrains and on basis of that we design our system
- keeping only the necessary components and only of desired size.

⇒ BOE estimation derives our decision for system design.

Consideration :

→ Rough (T-shirt) size estimation

→ Do don't spend much time

→ Keep the assumption value simple.

✱ Cheat sheet :

	Traffic	Storage
3 Zero	Thousand	KB
6 Zero	Million	MB
9 Zero	Billion	GB
12 Zero	Trillion	TB
15 Zero	Quadrillion	PB

ASCII
char → 2 byte
long/double → 8 byte
Img → 300 KB

(6)
⇒ x Million user *
y MB data
(6) 6+6 = (12) TB
x y TB storage

3 things we would need :

→ No. of servers
→ RAM
→ Storage

→ also take care of Trade Off (CAP)

estimation of faceBook:

Traffic Estimation:

Total user : 1 Billion

DAU : 25% of total user = 250 Million user

For Example: Read & write OPS: 5 + 2 = 7 operation
(5) (2)

$$\frac{(250\text{ million DAU} \times 7\text{ Queries PPD})}{\text{Seconds in day} = 60\times60\times24} \approx 18\text{K query per sec}$$

Storage Assumption: - every user does 2 post

each (250 char) = 500 Byte * 2 = 1KB

10
~~each~~ percent user upload image
ex. well (300 kB)

$250^{M} * 1kB + \frac{250\times10}{100} M * 300kB \approx 8$ TB per day

5 years =

5×365 days

⇓

← for 5 years

1825 day ~ 2000 days & 8TB per day

⇒ Storage need is approx

16 PB

RAM estimation : for each user last 5 post in cache

1 post = 500 Byte

5 Post = 2500 Byte ~ 3 KB

250 Million * 3 KB = 750 GB of cache

1 Machine = 75 GB

then

10 Machines

Latency : 95% of req under 500 ms

18 K queries/sec.

2 req per sec per thread

1 server = 50 Thread ⇒ 50 * 2 = 100 req per sec

⇒ 180 application server.

⊛ check for CAP requirements.