Social Media System Design

(Facebook ,
Instagram,
Linked in)

Functional Requirements:

1) post (video or Image)
2) Add a friend
3) Like, share, comment
4) See user's Timeline
5) See friend's Timeline
6) See HomePage Timeline
7) Activity Log
8) Searching

Non-Functional Requirements:

1) Read Heavy System
2) Fast Rendering
3) Fast Posting
4) Lag is ok (when user posts)
5) Access Pattern

6) Highly Available (Savandra)
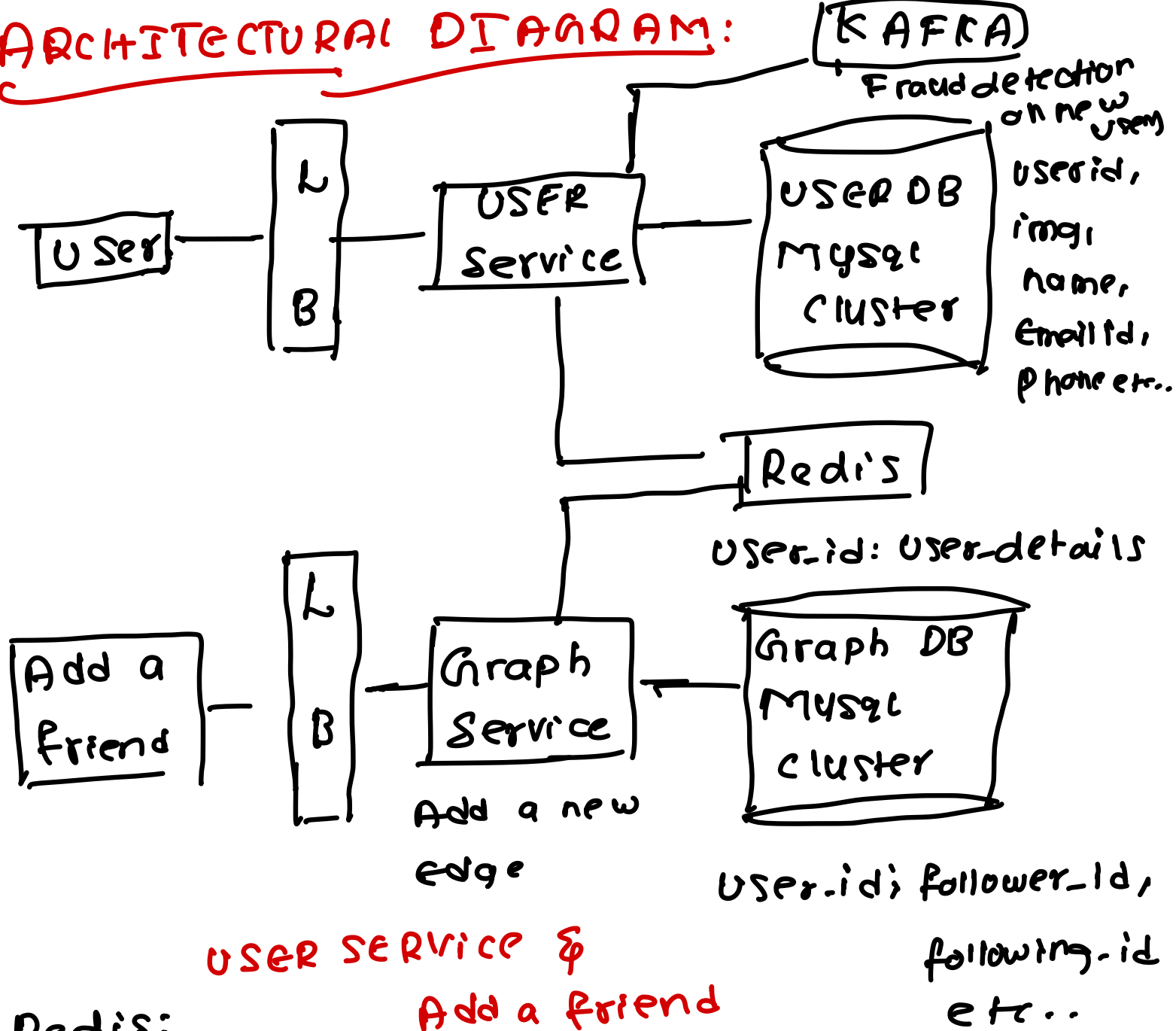
Scale:

Daily Active users: 2 B/day (Women)

Monthly Active users: 4.5 B/month

posts per min: 200 k/min

Likes per min: 500 k

Shares: 250 k

ARCHITECTURAL DIAGRAM:

KAFKA

Fraud detection on new users

USER DB Mysql Cluster

userid, img, name, Email id, Phone etc..

User ── L B ── USER Service ── USER DB Mysql Cluster

Redis

userid: user-details

Add a Friend ── L B ── Graph Service ── Graph DB Mysql cluster

Add a new edge

user-id; follower_Id, following-id etc..
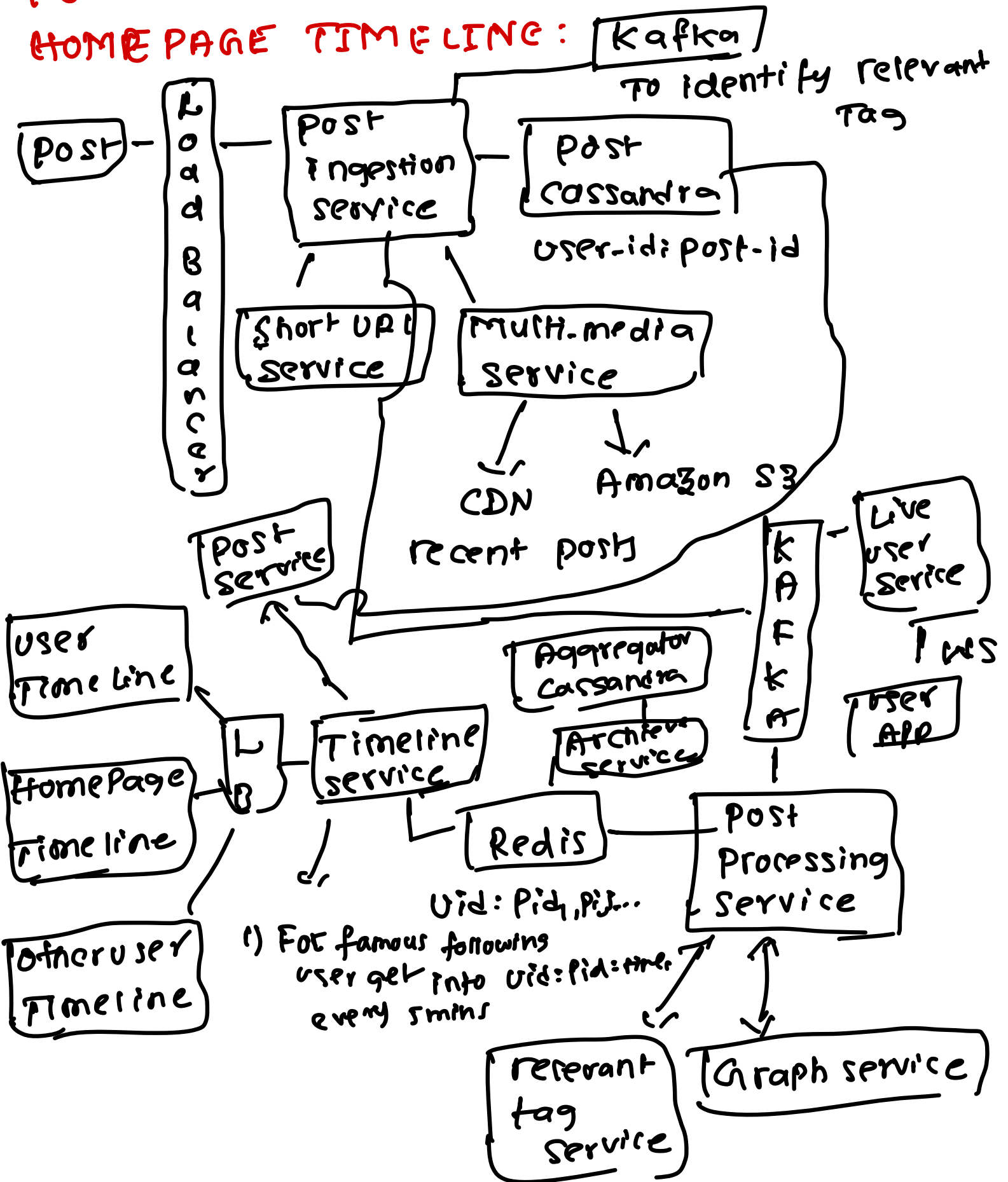
USER SERVICE & Add a friend

Redis:

1) user-id: user-details

2) user-id: [following-list] (friends)

3) user-id: Last seen

4) user-id: relevant tags

5) user-id: type

USER TYPES:

1) Famous

2) active

3) Live

4) passive

5) In-active

POST, USERTIMELINE, FRIEND'S TIMELINE, HOMEPAGE TIMELINE:

Kafka

To identify relevant Tag

Post — Load Balancer — Post Ingestion Service — Post Cassandra

user-id: post-id

Short URL Service

Multi-media Service

CDN

recent posts

Amazon S3

Post Service

User Timeline

Home Page Timeline

Other user Timeline

LB

Timeline Service

Aggregator Cassandra

Archieve service

KAFKA

Live user Service

WS

User App

Redis

Post Processing Service

Uid: Pid, Pid...

1) For famous following user get into Uid: Pid: time every 5mins

relevant tag service

Graph service

Like, Comment, Share, Searching, Analytics:

Like — [L B] — Like Service — LikDB Mysql cluster

Userid: Pid:

Like Service — Redis

Pid: count

Comment — [L B] — Comment Service — Comment DB Mysql cluster

Comment Service — KAFKA

KAFKA — Spark streaming cluster — User Activity Log service — Cassandra

Spark streaming cluster — Spark Jobs

Spark Jobs — KAFKA

KAFKA — User Relevant tag

KAFKA — Relevant Ad Generator

Relevant Users recommendation