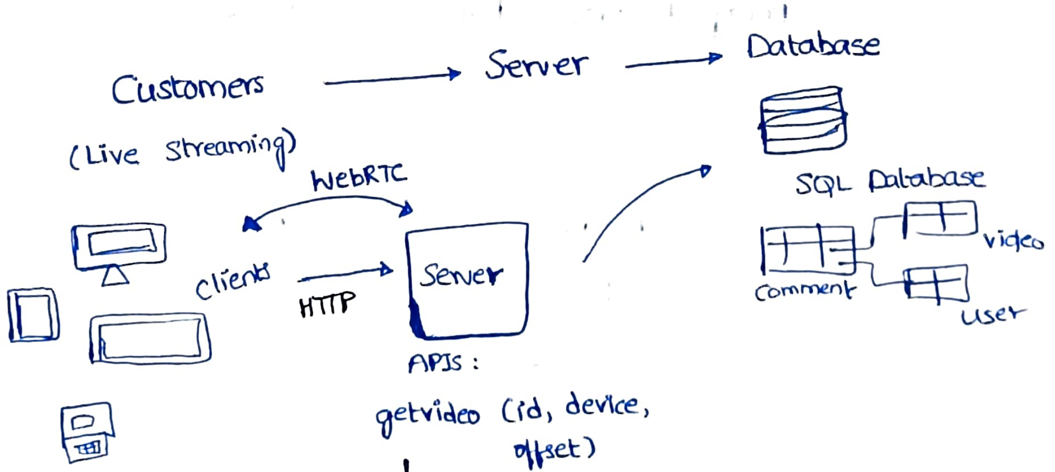
System Design

- Large Scale Distributed Systems.
- Design Patterns : General, Reuseable solution to a commonly occuring problem within a given context in software design.
- Example of Live Streaming :

① Define requirement from the user perspective.
② Reduce the features to data definitions.
③ Define some end points for data transfer b/w client & server.
④ None of the services fail in case of an outage.
⑤ Extensibility, Scalabity & Modularity.
⑥ Testing.

$\underbrace{\hspace{20em}}_{\text{Main Features To Design A System.}}$



APIs :

getvideo (id, device, offset)

↳ Frame [ ]

post Comment (id, data, author, video)

TCP Rotocol : Reliable Protocol

UDP Rotocol : Real time efficient protocol

- Each DB has its own protocol to talk with serve. Here, Question is which DB we should use ?

HDFS , Vimeo , Amazon S3

↳ For Video

- For Structure Text we can use SQL / PostgreSQL

unstructure ⟶ NOSQL

1080p
720p
480p
144p

RAW Video

HOW ??

Divide Raw Video into different video segments like (10 – 20s) & Do Changes.

↓

Map Reduce Function / Service

Reduce

Compress

1080 → 480

Enhance

720 → 1080

- [MPEG - DASH / HLS] For (Client → Server)

- some data we will have some chache is server. every time we will not querie the required information.

- CDN for (client - server)
  - ↳ content delievery network

For Low Level System Design

↳ ① Draw Use Case Diagram

① play a video from a timestamp

② go back to video and watch from left-off ~~at~~ time stamp

③ View at max quality allowed by network & device

④ Have non stop play when watching videos

① — HTTPDASH

② play (user, video, ts)
   video stamp

③ seek (user, video)
   timestamp

④ getVideoFrame (user, video, ts)
   Videostamp

①, ②, ③, ④ ⇒ video consuming service

② Class diagram

States

Behaviours

Data an object needs to perform behaviours

Video

Frames [ ]
Meta Data

getFrame ( )

User

ID
Name
Email

getID( )

Watched Video

ID
Video-ID
User-ID
seek_timestamp

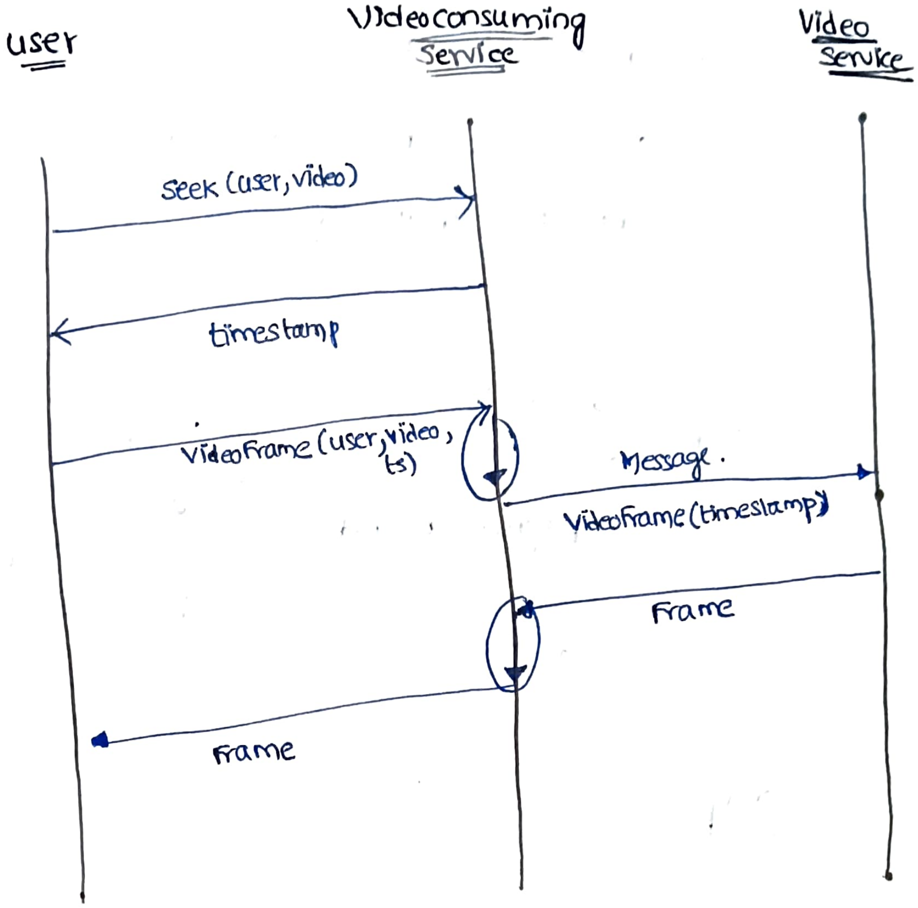
get ID( )

Video Consuming Service

watched Videos [ ]
watched Videos

get VideoFrame (user, video, ts)
seek (user, video)

③ Sequence Diagram



M. Shree Roy