Experiment No: 04

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Subject Name: System Design

Aim:

To design a scalable OTT (Over-The-Top) platform similar to Netflix or Amazon Prime that allows users to register, subscribe to plans, search and stream movies and TV shows in multiple resolutions, and receive personalized recommendations by identifying functional and non-functional requirements and defining system APIs.

Objective:

- Understand the architecture of a large-scale OTT video streaming platform.
- Identify functional requirements such as user onboarding, subscriptions, search, and video play-back.
- Identify non-functional requirements including scalability, availability, and low latency streaming.
- Analyze CAP theorem trade-offs in OTT platforms.
- Design RESTful APIs for subscription management and video streaming.

Procedure:

- Platform Research and Entity Identification
- User Flow and Requirements Analysis
    - Client
    - Subscription
    - Video
    - Video Metadata (Thumbnails, Description)
    - Recommendation Engine
- RESTful API Design
    - User Registration API: POST /user/register
    - User Login API: POST /user/login
    - Update User Profile API: PUT /user/update
    - Get Subscription Plans API: GET /get-subscription-plans
    - Subscribe to Plan API: POST /subscription
    - Search Video API: GET /search?q={movie_name}
    - Get Video Metadata API: GET /video/{video_id}
    - Play Video API: GET /play/{video_id}
- Scalability and Performance Modelling
- CAP Theorem and Trade-off Analysis

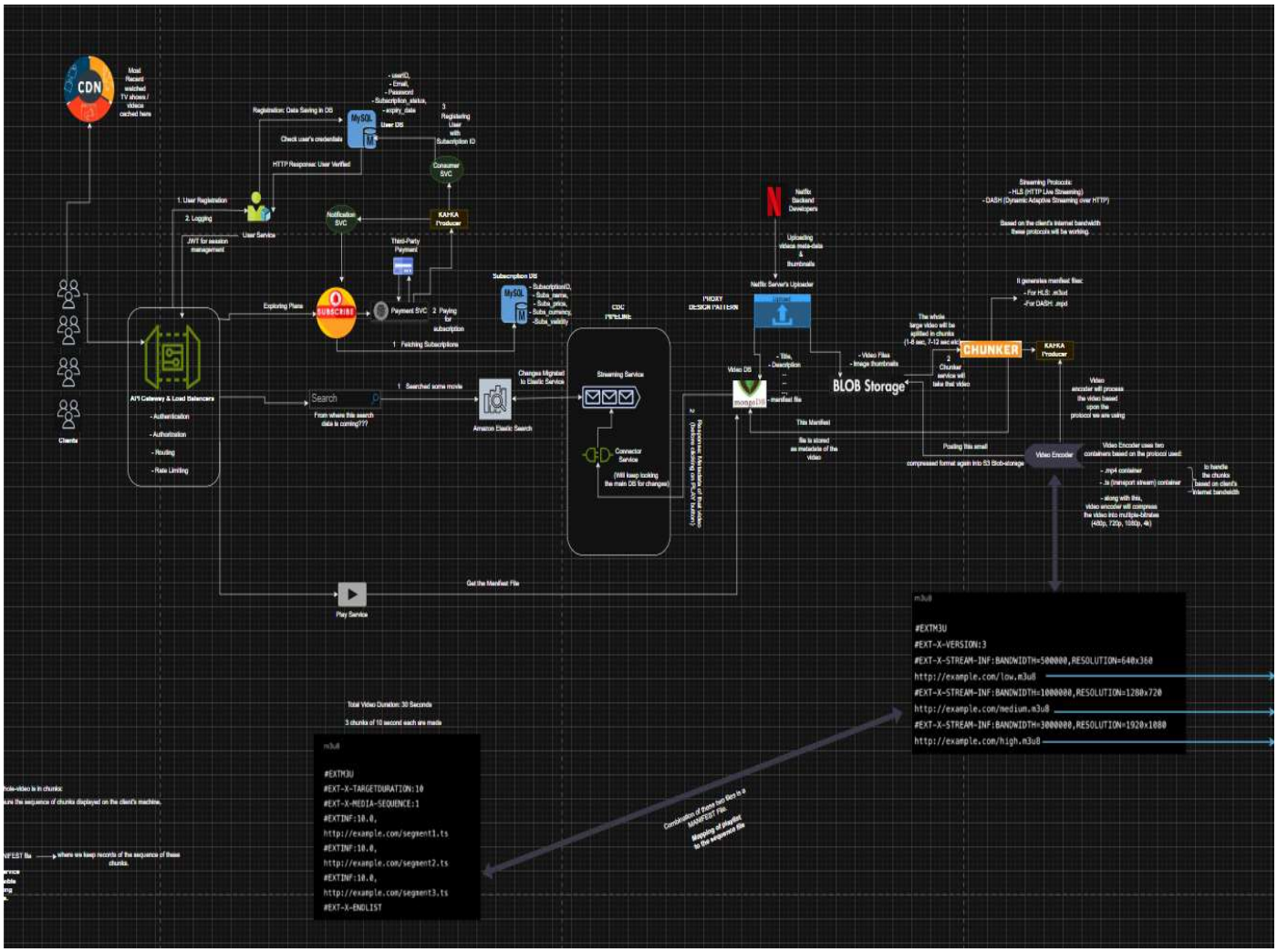
Functional Requirements:

- Clients should be able to create an account on the OTT platform.
- After successful login, clients should be able to choose and manage subscription plans.
- Clients should be able to search for movies or TV shows by title or name.
- Clients should be able to stream videos in multiple resolutions (480p, 720p, 1080p, 4K).
- Clients should receive recommendations for movies and TV shows (Optional).

Non-Functional Requirements:

- Scalability to support 200-300 million users with approximately 20,000 videos.
- High availability for video streaming services.
- Availability over consistency for video playback, and strong consistency for payments and subscriptions.
- Streaming latency between 50-80 ms with minimal buffering.
- Horizontally scalable architecture using CDN and distributed systems.

High Level Design: -



Outcome:

- Designed a scalable OTT video streaming platform.
- Identified functional and non-functional requirements.
- Designed RESTful APIs for user onboarding, subscriptions, search, and video playback.
- Understood scalability and CAP theorem trade-offs in OTT systems.