MTCS-103(Theory)

Assignment 2

Disney+ Hotstar Parallel Design

Reg. No: 23361

Parallel Processing

Introduction

Before diving into the designing of Disney+ Hotstar parallelly, let us first look at the general idea and key components required for designing the platform.

Some Key Components that should be kept in mind are as follows:

- Content Ingestion: Content Ingestion: Ingest and organize content into a content management system (CMS). This includes the encoding of video content into different formats, the creation of metadata, and the storage of video content in a scalable storage infrastructure.
- User Management: User management should be such that users should be able to log in , create accounts, and manage all their subscriptions.
- Search and Recommendations: This should be based on the history, preferences and any other factors.
- Content Delivery: A Content Delivery Network should be built such that it should be able to distribute the content throughout the world.
- Adjustment of video quality(based on viewer's internet connection)
- User Interface(web, mobile, smart tv applications)
- Revenue Collection(from subscription plans)

- User behavior analysis
- Scalable: High loads should be handled anytime or majorly during popular events.
- Security
- Regular Update.

Designing Using Fosters Methodology:

1) Partitioning
    a) Content Partitioning: Depending on various criteria, a large library of content can be divided:
        - Genre: group the contents based on different genres such as action, drama, comedy, etc.
        - Language: Data or the videos can also be partitioned based on the language of its origin
        - Region: Partitioning based on Geographical Location such that regional preferences can be preferred
    b) User Data Partitioning: User Management should be ensured while doing partitioning of user data like:
        - User Profiles: Profiles should be segmented based on user preferences and history of the content the user viewed
        - Data Authentication: Handling user logins and secure authentication
        - Subscription Data: Subscriptions should be organized(monthly, yearly, or premium plans)
2) Communication:
    a) Content Delivery Communication: Optimization should be done on the communication channels within the Content Delivery Network
        - Load Balancing: Load balancing techniques should be implemented for distributing content delivery tasks across the CDN's edge servers
        - Caching: Caching strategies should be employed such that it stores frequently requested content which is near to the user for reduction of latency
    b) User Management Communication: This is very essential for user management components:

- Registration of the User: Communication channels should be implemented for the registration of channels and creation of profiles
- Authentication: Secure communication for user logins and authentication processes.

3) Agglomeration:
    a) Content Aggregation: Contents can be aggregated so the user experience can be improved and discovery of the content can be done fast.
        - Curated Playlist: Creation of playlists like "Recommended for You," "Trending," and "New Releases" to help users discover content.
        - Collections: Aggregation can also be done based on content by franchises or series(such as Marvel Cinematic Universe or popular TV shows)
    b) User Data Aggregation: aggregation of user behavior data can lead to better content recommendations:
        - Personalized Recommendations: user preferences can be analyzed, history viewing and also interactions to provide personalized content recommendations.
        - Trend Analysis: Aggregation on user behavior data so that viewing trend and user engagement patterns can be identified
4) Mapping
    a) Resource Allocation and Content Mapping: Content to server resource should be efficiently mapped which is crucial for content streaming:
        - Content Popularity: Popular contents should be mapped to high-capacity servers such that it ensures uninterrupted streaming for in-demand titles
        - Geographical Mapping: Content based on geographical location should be mapped to optimize content delivery and latency reduction.
    b) Load Balancing Mapping: To ensure resource optimization, effective load balancing should be maintained:
        - Even Distribution: User requests should be allocated evenly across server resources so that overloading can be prevented and maximizing of system performance can be achieved

- Fault Tolerance: Fault tolerance mechanisms should be implemented in load balancing to ensure system reliability

c) Authentication and user data mapping: robust mapping of user data to the servers should be ensured
    - Redundancy: data redundancy should be implemented to prevent data loss in case of server failures.
    - Security Mapping: Map user authentication data so that severs can be secured with encryption and authentication measures

By applying the Foster's Design Methodology to Disney+ Hotstar, it ensures that the platform is well-organized , scalable, and efficient. By using this methodology, various aspects of the designing factors can be optimized, like resource utilization, streaming communication, enhancing the user experience, and ensuring the reliability and performance of the platform, which is very important for a high-traffic video streaming service like Disney+ Hotstar.