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Cloud Application Development Assignment

Concept Note:-

Building a scalable video streaming Web App:-

The objective of this project is to create a basic video streaming web app that leverages the power and scalability of cloud services.

Objectives:-

- To develop a cloud-based web application that allows users to browse and stream videos .
- To support multiple video formats including MP4, AVI, and others.
- To provide an intuitive and user-friendly interface for browsing and streaming videos.
- To leverage cloud services to provide scalable and reliable video streaming.

The video streaming web app would require cloud services for reasons such as:

- Video streaming can generate a large amount of traffic, and cloud services can easily scale up or down to accommodate spikes in traffic.
- The cloud offers high availability and disaster recovery capabilities, ensuring that your video content is always available to your users.
- Cloud services can deliver video content to users around the world, providing a global audience for the content.

Literature Review:-

Over the past decade, cloud computing has emerged as a preferred solution for delivering video content, offering several advantages over traditional video delivery systems(such as such as analog cable, terrestrial broadcast, and physical media). In this literature review, we will explore the current state of video streaming in the cloud and evaluate the benefits of using cloud services for video delivery.

1. "A survey on cloud-based video streaming services" by Xiangbo Li, Mahmoud Darwich, Mohsen Amini Salehi and Magdy Bayoumi: This paper discusses the processes to deliver a raw captured video to viewers' devices. It elaborates processes such as video encoding, transcoding, packaging, encryption, and delivery processes. It further talks about the challenges that need to be overcome in order for advancement in cloud video streaming.

2."Performance Analysis of Video On-demand and Live Video Streaming using Cloud based Services" by Ujash Patel: This paper introduces an approach to develop video analysis on Video-On-Demand Streaming and Live Video Streaming using cloud-based services and analyzes the impact of Quality of Experience , cost, and bandwidth on the cloud to achieve the best user experience for video streaming.

3."Point Cloud Video Streaming: Challenges and Solutions" by Zhi Liu,Xianfu Chen and Yusheng Ji:Point cloud video has been widely used by augmented reality (AR) and virtual reality (VR) applications as it allows the end-users to have an interactive experience. The research paper discusses about the challenges and proposes solutions to wireless transmission systems of point cloud video, which is the most favored way to represent volumetric media.

4."Cloud-Based Interactive Video Streaming Service" by Mohsen Amini Salehi :The proposed research provides a cloud-based video streaming engine that enables interactive video streaming. Interactive Video Streaming Engine (IVSE) is generally used and video stream providers can customize it by defining their own interactive services depending on their requirements.

5."A Framework For Video Streaming and Sharing of Video in Clouds" by M Kiran Mayee and M Mamatha :In this paper a new video framework is proposed to be developed , labeled as AMES-Cloud, which is divided into two main parts: AMoV (adaptive mobile video streaming) and ESoV(Efficient social video sharing).

6."Review on Cloud Computing Application in P2P Video Streaming" by Nur Wahidah Bt Ab Wahid:The cloud computing system performance may deteriorate with increasing number of users and become worse when the traffic on cloud systems increase. This is because cloud computing's centralised architecture can lead to network traffic congestion and a blockage in the cloud servers. Peer-to-peer (P2P) architecture is proposed to rectify such shortcomings. This

paper's goal is to discuss the most recent advancements in cloud computing-based peer-to-peer video streaming.

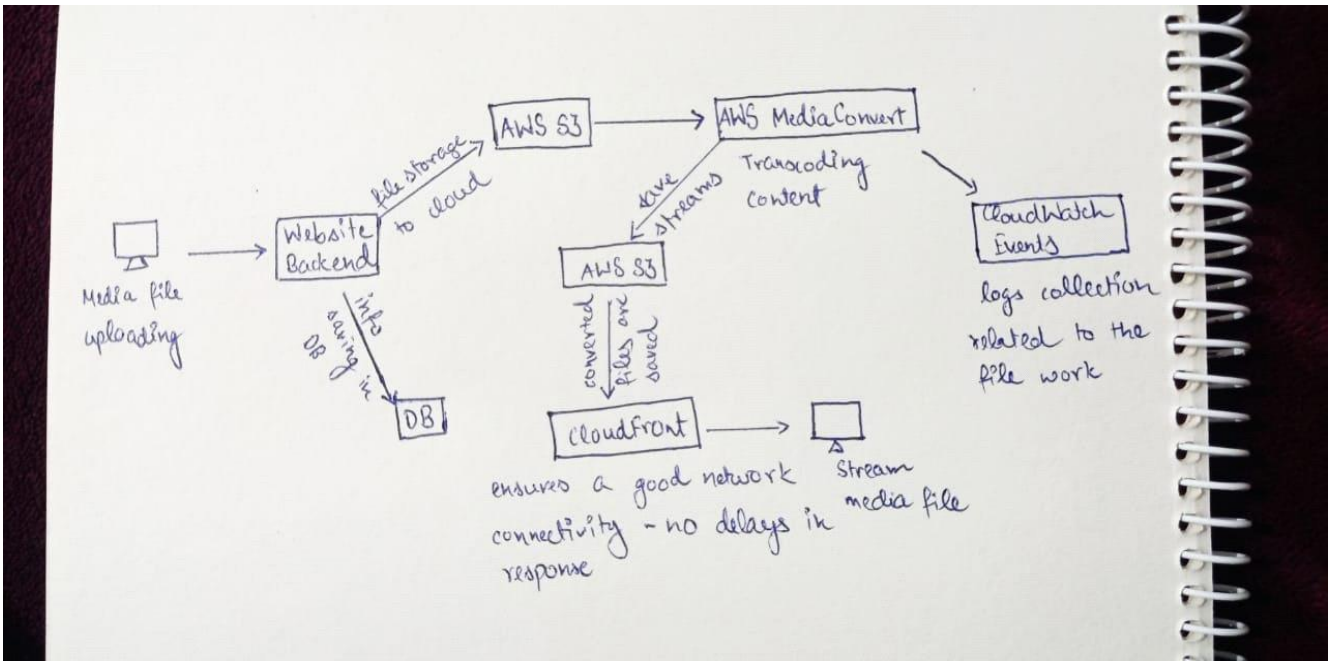
7."Comparing Cloud Content Delivery Networks for Adaptive Video Streaming" by Chen Wang, Hyong Kim and Andal Jayaseelan : This paper is a comparative study of the content delivery network(CDN) services of different cloud service providers including AWS CloudFront, Azure Verizon CDN and google cloud CDN by setting quality of experience(QoE) as a metric.

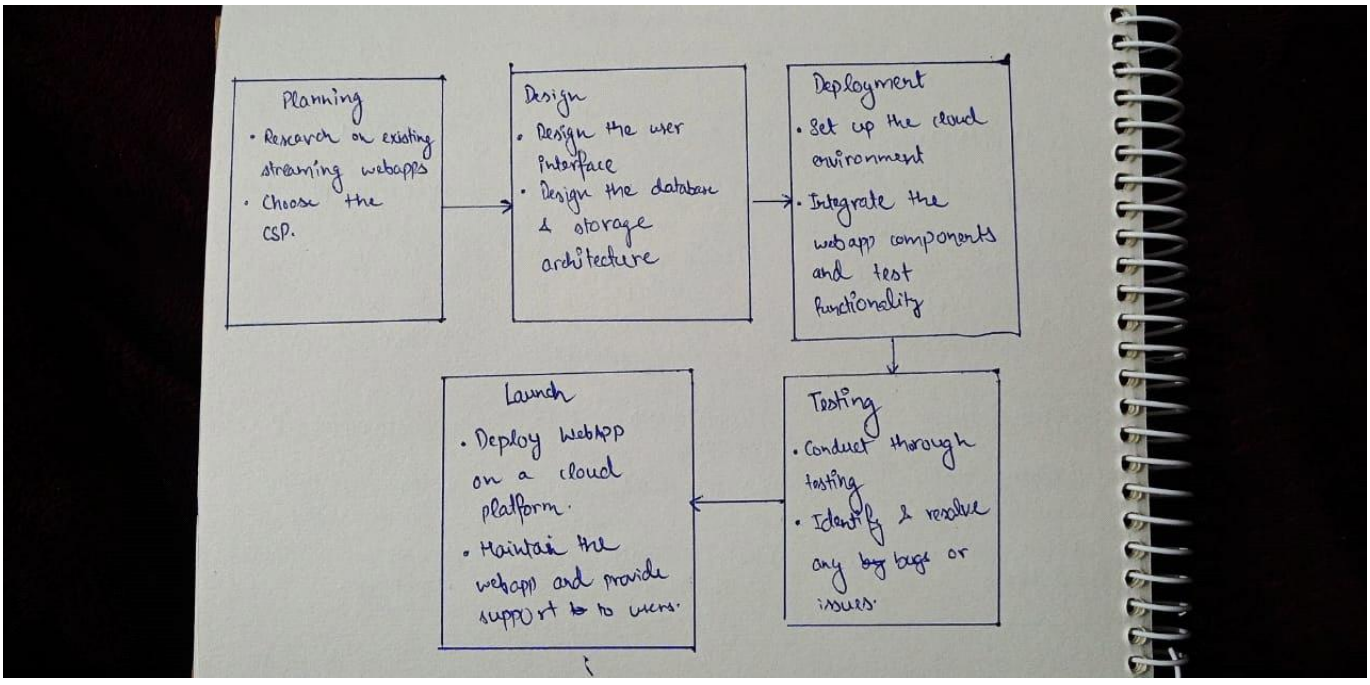
8."Video streaming processing using fog computing" by Saba Fouad and Rana Fareed Ghani: Fog computing is extending of cloud service, it's an intermediary layer between cloud and end user, it aims to provide services close to the user onto the network edge. This study proposes an architecture to reduce the limitation in video outflowing by implementing fog computing to deliver very lower latency and real-time communication, and weighted round robin algorithm for scheduling streaming tasks in a fog computing environment.

9."Quality of Service (QoS): Measurements of Video Streaming" by Hui He: In this the QoS of different standard video file formats on social clouds is measured; they vary from each other in resolution, audio/video bitrate, and storage size.

10."SQP: Congestion Control for Low-Latency Interactive Video Streaming" Devdeep Ray, Connor Smith and Teng Wei: This paper presents the design and evaluation of SQP, a congestion control algorithm (CCA) for video streaming applications that high-bitrate compressed video with very low frame delay to stream.

Flowchart:-


AWS S3
AWS MediaConvert
file storage to cloud
Transcoding content
save streams
Website Backend
Media file uploading
AWS S3
CloudWatch Events
logs collection related to the file work
info saving in DB
converted files are saved
DB
cloudfront
Stream media file
ensures a good network connectivity - no delays in response


Planning
• Research on existing streaming webapps
• Choose the CSP.
Design
• Design the user interface
• Design the database & storage architecture
Deployment
• Set up the cloud environment
• Integrate the webapp components and test functionality
Testing
• Conduct thorough testing
• Identify & resolve any bug bugs or issues.
Launch
• Deploy WebAPP on a cloud platform.
• Maintain the webapp and provide support to to users.