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05/05

ASSIGNMENT NO. 1
Advance Devops

Q1. Use S3 bucket and host Video Streaming

Ans: To host video streaming using Amazon S3 bucket you can create a scalable and cost-effective solution by utilizing S3 for video storage and AWS CloudFront as a content Delivery Network (CDN) to efficiently stream video to users.

Steps to Host Video Streaming with S3 bucket:

(1) Create an S3 bucket
Store video files (MP4, WebM etc) in an S3 bucket. set appropriate permissions to allow access to videos via CloudFront.

(2) Upload Videos:
upload your videos to the S3 bucket. Ensure the files are publicly accessible if necessary, or restrict access based on user roles.

(3) Enable S3 Static Website Hosting (optional):
If you want users to access a website along with streaming content, enable static website hosting for your S3 bucket.

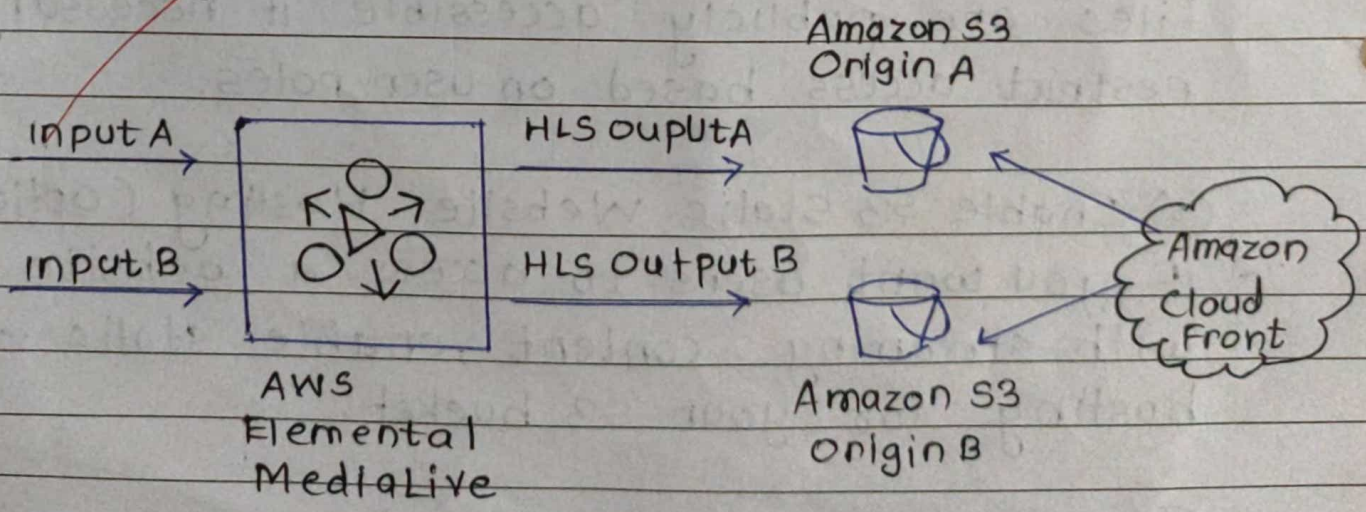
(4) Configure AWS CloudFront:
Create a CloudFront distribution with the S3 bucket as the origin. Cloudfront caches your video content at edge locations worldwide,

reducing latency for users.

(5) Setup permissions:
Set bucket policies or IAM roles to secure your S3 bucket from unauthorized access, ensuring only CloudFront can fetch content.

(6) Streaming optimization:
You can transcode videos using AWS Elastic Transcoder to support multiple resolutions & formats..
Use chunk-based streaming to provide smooth streaming to users with varying bandwidth.

(7) Custom Domain and SSL (Optional)
Integrate a custom domain for your cloudfront distribution and use an SSL certificate for secure streaming.



Q(2) Discuss BMW and Hot Star case Studies using AWS.

Soln BMW Case study using AWS

Ans: Background: BMW is a leading automotive manufacturer known for its luxury vehicles, while Hotstar (now known as Disney+Hotstar) is a popular streaming platform in India, offering a variety of content including movies, TV shows and live sports. Both companies have utilized AWS to drive innovation improve customer experiences & optimize their operations

BMW's use of AWS

(1) Connected vehicles and Data Analytics

BMW has been at the fonefront of integrating technology into their vehides. By leveraging AWS, they can collect and analyze vast amount of data from their connected cars. This includes: ① vehical performance data ② Driver Behaviour

Benefits:

① Predictive maintenance: Aws enables BMW to use machine learning algorithms to predict when a vehicle needs servicing, reducing downtime and improving customer satisfaction.

(2) Scalability and Cost Management

BMW utilizes AWS scalable infrastructure to

handle varying workloads, especially during product launches on events.

Benefits:

① Cost efficiency: BMW can scale resources up or down based on demand, ensuring they only pay for what they use.

② Global Reach: Aws's global infrastructure allows BMW to deploy applications closer to their customers, reducing latency and improving service delivery.

Hotstar's Use of AWS

① Content Delivery and streaming Services
Hotstar relies heavily on AWS to manage its massive content library and delivery of high quality streaming experiences to millions of users.

⊙ Aws Cloudfront: Hotstar uses Aws's Content Delivery Network (CDN) to deliver content quickly and efficiently ensuring minimal buffering and downtime during peak times such as major sports events.

Benefits:

· Scalability: During events like the IPL user traffic can spike dramatically. Aws allows Hotstar to scale resources dynamically

to handle these spikes without comparomising performance.

· Global Content Reach: Aws enables Hotstar to distribule content across multiple regions, ensuring that users worldwide can access their services seamlessly.

(2) Data Aanalytics for User Engagement: Hotstar leverages AWS data analytics tools to gather insights about user behaviour, content performances and viewing patterns.

· AWS Redshift and Athena: These services help Hotstar analyze large datasets to improve content recommendations and user engagement strategies.

Benefits:
⊙ Personalized Content Recommendations
⊙ Targeted Advertising

challenges and Solutions:
while both BMW and Hotstar have seen significant benefits from using AWS they also face challenges:

① Data Security and Compliance: Protecting user data
② Cost management: As usage scales, manage

costs can become challenging

Conclusion:
The integration of Aws into BMW and Hotstar operations demonstrates how cloud computing can drive innovation, improve customer experiences and enhance operational efficiency.

Q(3) why Kubernetes and advantages and disadvantages of Kubernetes. Explain how adidas Uses Kubernetes.

Soln: Kubernetes is an open-source container orchestration platform designed to automate deploying, scaling, and managing containerized applications. It abstracts the underlying infrastructure, allowing developers to focus on writing code rather than managing servers.

Advantages of Kubernetes:
(1) Scalability: Kubernetes can automatically scale applications up or down based on demand, ensuring optimal resource use.

(2) High Availability: It provides mechanisms for self-handling, meaning if a container fails, Kubernetes can automatically restart or replace it.

(3) Load Balancing : Kubernetes can distribute network traffic evenly across containers, improving application performance and reliability.

(4) Declarative Configuration: Users can define the desired state of applications using YAML files making deployments reproducible and version-controlled.

(5) Portability : Kubernetes can run on any cloud or on-premises infrastructure making it easier to move applications between enviroments.

Disadvantages of Kubernetes:

(1) complexity : The learning curve can be steep due to its many components and abstractions, requiring more expertise to manage effectively.

(2) Overhead : Running Kubernetes introduces additional resource overhead, which might not be justified for smaller applications

(3) Configuration Management: Manage configuration can become complicated, in larger environments.

(4) Debugging Challenges : Debugging issues in a distributed system can be more difficult

than in traditional, monolithic architecture.

How Adidas use Kubernetes:

Adidas has adopted Kubernetes to enhance its development and operational efficiencies. Here's how they utilize it:

(a) Microservices Architecture: Adidas leverages Kubernetes to manage its microservice, enabling them to develop, deploy and scale services independently.

(b) Devops Practices: Kubernetes supports Adidas Devops practices allowing for continuous Integration and continuous delivery (CI/CD) pipelines. The facilitates frequents updates and rapid iteration on their applications.

(c) Resource Optimization: By using Kubernetes Adidas can efficiently manage cloud resources, reducing costs while ensuring that applications are responsive to user demand, especially during peak shopping seasons.

(d) Enhanced Collaboration: Kubernetes fosters collaboration between development and operations teams by standardizing deployment processes and improving visibility into application performances.

(e) Global scaling: with a worldwide presence Adidas uses Kubernetes to deploy applications across multiple regions seamlessly ensuring consistent performances for customers everywhere

Q(4) what are Nagios and explain how Nagios are used in E-services

Soln: Nagios is an open-source monitoring system that enables organisations to monitor their IT infrastructure, including servers, networks and applications. It provides real-time monitoring and alerting capabilities to ensure that critical systems are running smoothly and any issues are promptly addressed.

Key features of Nagios:

① monitoring: Tracks network services (HTTP, SMTP, POP3, FTP etc) server resources (CPU, memory, disk usage) and application performance

② Alerts: Sends notifications (via email, SMS, or other methods) when thresholds are breached or services are down.

③ Reporting: Provides historical reports for performance analysis and capacity planning.

④ Customization: Offers plugins to expand functionality and supports integration with third party

systems for automation.
⑤ Scalability: Capable of monitoring large-scale environments.

Use of Nagios in E services:
In E services such as web-based systems or applications, Nagios is used to ensure the availability and performance of critical services. It can monitor the health of web servers, databases, API's and other infrastructure components detecting issues like high response times, system downtimes, or overloads. By doing this, Nagios helps in:
① Minimizing Downtime: Real-time monitoring helps detect and rectify service failures promptly ensuring continuous service availability.

② Proactive Issue Resolution: It alerts administrators before performance degradation affects the user experience enabling them to act preemptively.

③ Service-Level Agreement (SLA) Compliance: By tracking uptime and service quality, Nagios assists businesses in meeting their service-level commitments.

④ Security Monitoring: Detects abnormal behaviour or unauthorized access attempts by monitoring logs and user activities.
Overall, Nagios is widely used in E services to ensure seamless operation and a consistent user experience.