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1. Video Streaming using S3 Bucket.

Step 1 : Set up your S3 Bucket.

1. (a) Sign in to AWS Management Console
- (b) Navigate to S3 & click on "Create Bucket".
- (c) Name your bucket (eg my-video-streaming-bucket) and choose a region.
- (d) Ensure the bucket name is unique across all of S3

2. Configure Bucket Permissions

- (a) Set up the bucket to be private to secure your content
- (b) Use AWS Identity & Access Management (IAM) to create a user with permissions to access S3
- (c) optionally, configure a bucket policy or access control lists (ACLs) if you want public access for streaming.

~~Step 2 : Configure Bucket Permissions :~~

Step 2 : Upload your video files.

1. Upload Video files

- (a) In S3 bucket, click on "Upload" and choose video files
- (b) Consider using formats like MP4 for better compatibility with streaming.

2. Set Metadata for streaming (optional)

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Step 3 : ~~to~~ Step up Video Streaming :

1. Use Amazon CloudFront

- (a) Set up a CloudFront distribution to serve your video content more efficiently.
- (b) Point the CloudFront origin to your S3 bucket.
- (c) Configure caching ~~beh~~ behaviours based on ~~re~~

2. Set protocol

- (a) Choose whether to use HLS (HTTP live streaming) or DASH (Dynamic Adaptive Streaming over HTTP).
- (b) Use AWS Media Convert to convert your video files into streaming-compatible formats if ~~nece~~

Step 4 : Integrate Video Player

1. Select a video player.

- (a) Choose a web video player that supports streaming (eg video.js, JW Player).

2. Embed the player.

- (a) Use HTML to embed the video player on your website.
- (b) ~~Set~~ the source of the video to your CloudFront URL or S3 URL.

Step 5 : Test your setup

1. Test video playback :

Access website & play video to ensure everything ~~is~~ works correctly.

Discuss BMW & Hot Star case studies using AWS.

BMW Case Study on AWS

BMW used AWS to accelerate innovation, enhance customer experiences and create data-driven services. Their use case centers on the BMW Connected Drive & BMW Cloud Data Hub.

Key Components

1. BMW Connected Drive :
Connected Services : AWS allows BMW to offer real-time connected services (including in-car navigation, telematics & driver assistance).
2. Data Processing : BMW uses AWS to process millions of requests daily, analysing large amounts of data generated by vehicles in real-time.
3. Scalability : The use of Amazon S3, Amazon EC2, and other AWS services enable BMW to scale infrastructure based on growing number of connected vehicles.

2. BMW Cloud Data Hub :

1. Global Data Platform : BMW built its Cloud Data Hub on AWS to consolidate, manage & analyse vehicles & user data across the globe.
2. Amazon S3 & Amazon Redshift :
BMW uses Amazon S3 for scalable storage & Amazon Redshift for analysing vast datasets related to vehicle performance.

Benefits :

1. Reduced Development Time
2. Global Scale & Availability
3. Cost-effectiveness.

Hotstar (Disney + Hotstar) : Case Study on AWS

Hotstar, one of India's largest streaming platforms, used AWS to stream high definition of video to millions of concurrent users especially during live events such as IPL cricket matches. Their main challenge was scalability during the events, where millions of users could be streaming simultaneously.

Key Components :

1. Scalability During peak events

• Elastic Compute (Amazon EC2) :
Hotstar uses Amazon EC2 for elastic, scalable computer power, especially during peak streaming events like IPL cricket matches.

2. Auto Scaling :

AWS auto scaling allows Hotstar to dynamically adjust its infrastructure based on user demand.

2. Content Delivery Using Amazon EC2.

1) Global CDN: Hotstar uses Amazon Cloudfront to deliver video content worldwide, ensuring low latency & high throughput.

2) Edge Locations: By caching content at AWS edge locations across the globe, Hotstar can reduce the load on its servers & deliver content more efficiently.

3. Data Analytics & ML

(a) Amazon Kinesis: Uses ~~am~~ this to monitor real time viewing statistics & engagement metrics during live streams.

(b) Amazon S3 & Redshift:

Hotstar ~~uses~~ stores user data and analytics in Amazon S3 and processes this data using Amazon Redshift to derive insights on viewer preferences.

Benefits:

- 1) Handling Massive Traffic
- 2) Low Latency Streaming
- 3) Faster Time to Market
- 4) Improved User Exp Experience.

Q.2. Why Kubernetes ?
 Kubernetes (often abbreviated as K8s) is an open-source platform designed to automate deploying, scaling and operating containerized applications. Containers help package applications and their dependencies ensuring consistency across environments. Kubernetes takes containerization further by orchestrating the containers, making it easier to manage large scale distributed systems.

Advantages :

1. Scalability : It allows horizontal scaling of containerized applications, making it easy to handle fluctuating workloads & large-scale deployment.
2. Portability : Kubernetes is platform-agnostic meaning applications can run on any cloud provider.
3. Self Healing : Kubernetes automatically monitors the health of nodes & containers, restarting failed containers & redistributing workloads to ensure service continuity.
4. Automation : Kubernetes automates various operational tasks such as container scheduling, scaling & load balancing reducing manual intervention & simplifying management.

Disadvantages :

1. **Complexity** : Kubernetes has a steep learning curve & requires considerable expertise to manage effectively. The system is complex especially for small teams or beginners in container orchestration.
2. **Overhead** : Running Kubernetes adds operational overhead, requiring significant resources to maintain infrastructure like control planes, nodes & networks.
3. **Monitoring & Debugging** : Debugging issues in Kubernetes can be difficult due to its distributed nature.

How Adidas uses Kubernetes ?

Adidas, the global sportswear company adopted Kubernetes as a part of its digital transformation journey strategy, especially to modernize its ~~ecom~~ e-commerce platform and build a cloud-native infrastructure.

Here's how Adidas uses Kubernetes :

1. **Microservices architecture** :-

Adidas moved from a monolithic application architecture to microservices using ~~for~~ Kubernetes. This allows them to develop, deploy & scale individual services independently.

2. Scalability -

Addidas' e-commerce platform experiences high traffic during product launches or sales. Kubernetes helps scale applications on-demand by automatically increasing or decreasing resources based on traffic load.

3. Cloud Native & Multi-Cloud Strategy

Addidas uses Kubernetes to maintain cloud-native infrastructure. This abstraction layer helps them be cloud-agnostic, allowing deployments across multiple cloud providers.

Q.4. What is Nagios?

Nagios is an open-source monitoring tool designed to track performance, availability, and health of IT infrastructure, including servers, network devices, applications & services. It helps administrators identify & resolve issues before they affect end users ensuring continuous service availability.

Key features :

- 1) Monitoring of infrastructure
- 2) Alerts
- 3) Reporting & logs
- 4) Plugins

How Nagios is used in E-services ?

E-services refer to digital platforms / services over the internet such as e-commerce platforms, online banking or cloud-based applications.

1. Monitoring Service Availability :

(a) Service Uptime monitoring - It continuously monitors the availability of e-services like web servers (eg. Apache, nginx)

(b) Web Application monitoring - For e-services, Nagios checks critical components.

2. Network Monitoring

(a) Tracking network health - It monitors network devices (routers, switches, etc) - bandwidth, usage & response time to ensure good network performance.

3. Performance Monitoring

4. Security Monitoring

5. Alerting & Notification Systems.

