

ADVANCE DEVOPS

Assignment 1

Q1.]

Use S3 bucket and host Video Streaming

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To use Amazon S3 bucket for video streaming, we need to use S3 buckets as a container and CloudFront as a Content Delivery Network (CDN).

Step 1: Set up Amazon S3 bucket

- 1.) Search for S3 on the Services section. Click on it, then click on create bucket. This will direct you to the bucket creation page. Here, give a name to your bucket. It is better to block all public access so that unauthorized people do not use the video. Maintaining the other options as default, click on create bucket.
- 2.) The bucket has been created. ~~Now we need to add our video in this bucket.~~ For that, click on the name of the bucket. This will redirect you to the objects screen which shows ~~the objects of your bucket.~~ click on Upload. Here, select add files. An MP4 extension file is needed as we need to host a video. Select upload.

Step 2: Set up CloudFront.

- 1.) As the video is being uploaded. Search for CloudFront on the services tab and open it in a new tab.
- 2.) On the left pane, under security, you will find origin access. Click on it, then click on identities. Click on create origin access identity.

Now go back to Distributions on the left pane and click on Create a Cloudfront distribution.

- 3) Here in origin field, select the S3 bucket where video is uploaded. Under origin access, select legacy access identities. Select the identity you have created. Under bucket policy, select Yes, Update bucket policy. Create Distribution.

Step 3: Accessing the hosted video.

- 1) Once the distribution is deployed, copy the domain name of your distribution.
- 2) Now go to S3 bucket and click on its Name. Find the Key, copy that.
- 3) Combine the Domain name of the distribution and the key of the video to make your final link of the video that is streamed.

<domain name of distribution>/<key of video>

Q2] Discuss BMW and HotStar case studies using AWS.

→ BMW Case Study

• Challenge:

BMW needed to process and analyze data from over 14 million connected vehicles to enhance customer experience and improve vehicle performance.

• Solution:

- Implemented AWS IOT Core to securely connect and manage vehicle data streams.
- Used Amazon S3 to store massive amounts of vehicle telemetry data.
- Leveraged Amazon Kinesis for real time data processing & analytics.
- Employed Amazon SageMaker for developing ML models to predict maintenance needs.

• Long-term Impact:

- BMW's cloud based approach allowed them to release new features 80% faster than before.
- The company was able to offer personalized services like usage based insurance and remote diagnostics.
- BMW reported a significant improvement in customer service / satisfaction due to proactive maintenance alerts & personalized service.

• Specific Incident and Results:

- In 2019, BMW launched its BMW CarData Platform, powered by AWS.

→ Hotstar Case Study

• Challenge:

Hotstar needed to handle massive concurrent viewership during live cricket events, particularly the Indian Premier League (IPL).

• Solution:

- Utilized Amazon EC2 with Auto Scaling to dynamically adjust compute resources.
- Implemented Amazon CloudFront for global content delivery.
- Used Amazon DynamoDB for low-latency data access and caching.
- Leveraged AWS Lambda for serverless compute functions.

• Long Term Impact:

- Hotstar reported a 50% reduction in infrastructure costs.
- The platform's ability to handle massive scale led to the 300% year on growth in user engagement.
- Hotstar became India's largest premium streaming platform, with over 300 Million Active Users by 2020.

• Specific Incident and Results:

During the 2019 IPL Final:

- Hotstar achieved a record breaking 18.6 Million concurrent viewers.
- Achieved 99.99% availability rate during peak load.
- They used a microservices architecture with over 150 services running on Amazon ECS (Elastic Container Service).

Q3) Write about Kubernetes and advantages and disadvantages of Kubernetes. Explain how Adidas uses Kubernetes.

→ Kubernetes is an open source container orchestration platform that automates the deployment, scaling, and management of containerized applications.

Advantages:

- 1) Scalability: Easily scale applications up or down.
- 2) Self Healing: Automatically restarts failed containers.
- 3) Load Balancing: Distributes network traffic.
- 4) Automated Rollouts and Rollbacks: Simplifies updates.
- 5) Secret and configuration management: Securely manages information.

Disadvantages:

- 1) Complexity: Steep learning curve.
- 2) Resource Intensive: Requires significant computational resources.
- 3) Security Challenges: Requires careful configuration to ensure security.
- 4) Networking Complexity: Can be challenging to set up and troubleshoot.

- Adidas migrated from monolithic architecture to microservices.
- Adopted Kubernetes for container orchestration.
- Implemented on Google Cloud Platform (GCP).

- Used Kubernetes Engine (GKE) for managed Kubernetes clusters.
- Implemented Istio for service mesh capabilities.
- Utilized Prometheus and Grafana for monitoring and observability.

- Key Results:
 - Reduced Deployment time from 3-4 hours to 10-15 minutes
 - Scaled to handle 4,000 order per second during Black Friday sales.

Q4.] What are Nagios and explain how Nagios are used in E-services?

→ ~~Server~~ Nagios is an open-source monitoring system that helps organizations identify and resolve IT infrastructure problems before they affect critical business processes.
How is Nagios used in E-services:

1.) Server Monitoring:

- Tracks server health, uptime and performance
- Alert administrators to potential issues.

2.) Network Monitoring:

- Monitors network devices and bandwidth usage.
- Helps identify bottlenecks or failures.

3.) Application Monitoring:

- Check the status and performance of web applications, databases etc.
- Ensure services are running correctly.

4.) Reporting: Generates reports on system availability & performance.

By implementing Nagios, providers can manage their infrastructure.