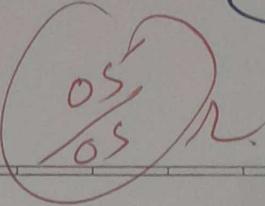


## Assignment NO: 1



- Q.1) Use S3 bucket and Host video streaming.  
→ To use Amazon S3-bucket for video streaming, we need to use S3 bucket as a container and CloudFront as a Content Delivery Network (CDN).

Step 1:- Set up Amazon S3 bucket.

- 1) Go to S3 Bucket creation option and click on create bucket. Name the bucket. Block all public access to restrict unauthorized people do not use the video.
- 2) Keep the other options as default.
- 3) Then click on bucket name and then add your video with .mp4 extension using the upload button.
- 4) Select the file to be uploaded using the Add files. Select the video and Add. then scroll down and click on Upload.

Step 2:- Set up Cloudfront as CDN

- 1) While video is being uploaded, search for CloudFront on services tab and open it in one tab.
- 2) On the left pane, under security, you will find origin access. Click on it, then click on Identities (Legacy). Click on Create Origin access identity.
- 3) Dialog box will pop-up give the identity name and click on create.
- 4) Now, go back to distributions on left pane and

click on Create a CloudFront distribution.

- 5) Now in Origin field select the S3 bucket where the video is uploaded. In origin access identities select the identity of type Legacy access. And in Origin access identities, select the identity that you have created then select bucket policy as Yes, update the bucket policy.
- 6) In default cache behaviour under viewer select Redirect HTTP to HTTPS making the hosting secure.
- 7) Select enable security protections in web application firewall. Keep remaining options as default and click on Create Distribution.

### Step 3:- Accessing the hosted video

- 1) After successful deployment of distribution, copy the domain name of your distribution.
- 2) Now, go to the S3 bucket and click on its name. Click on the name of the video you have uploaded. There you will find a 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.  
 $\langle \text{domain name of distribution} \rangle / \langle \text{key of video} \rangle$

Q.2) Discuss BMW and Hotstar (Disney+hotstar) case studies using AWS.

→ BMW Case Study Using AWS:-

Overview: BMW leverages AWS to drive its digital transformation, focusing on connected car services, data analytics, and autonomous driving technologies. AWS provides BMW with the scalability, global infrastructure, and advanced services needed for innovation and customer satisfaction.

Key points:-

1) Connected car platform (CCP):

- BMW uses AWS to power its connected car platform, enabling real-time navigation, vehicle-to-cloud communication, remote diagnostics, and over-the-air software updates.
- The platform handles data from millions of vehicles globally, allowing BMW to offer a seamless customer experience.

2) Data-Driven Insights:-

- BMW uses AWS analytics tools like Amazon Kinesis and AWS Lambda to collect, process, and analyze real-time data from vehicles.

- The data helps BMW predict maintenance needs, improve vehicle performance, and enhance customer safety.
- AWS's data management capabilities help BMW innovate faster and provide more personalized vehicle services.

### 3) Autonomous Driving Development:-

- AWS enables BMW to run high-performance simulation and develop AI models for autonomous driving.
- Services like Amazon SageMaker accelerate the training and deployment of machine learning models.
- AWS's cloud computing power reduces the time required for testing and simulation of autonomy driving technologies.

### 4) Global Infrastructure & Scalability:-

- BMW uses AWS's global infrastructure to ensure their applications and services are available to customers around the world with minimal latency.
- The scalability of AWS allows BMW to easily expand their services to new markets without worrying about infrastructure constraints.

### 5) Security & compliance:-

- AWS provides BMW with a secure environment that complies with global regulations on data privacy and cybersecurity.
- This ensures that BMW can safely handle sensitive vehicle and customer data.

Impact:- BMW's partnership with AWS helps them accelerate digital innovation, lower operational costs, and deliver cutting-edge vehicle services, such as real-time diagnostics and autonomous driving technologies.

### Hotstar (Disney+ hotstar) Case study using AWS:-

Hotstar, one of the largest video streaming platforms, turned to AWS to manage the enormous traffic spikes during live sports and entertainment events. AWS helped Hotstar ensure scalability, content delivery and cost optimization to meet user demand during high-traffic events like the Indian Premier League (IPL).

## Key points:-

### 1) Scalability for High-Traffic Events:

- Hotstar faced traffic spikes during major live events, especially sports, where millions of users watched concurrently.
- AWS services like Amazon EC2, Auto Scaling and Elastic Load Balancing allowed Hotstar to dynamically scale their infrastructure based on traffic, supporting over 25 million concurrent users.

### 2) Content Delivery at Scale:-

- AWS's Amazon CloudFront, a global content delivery network (CDN), ensured that Hotstar delivered high-quality streaming with low latency across India and other regions.
- CloudFront optimized content delivery for both live and on-demand video, enhancing the viewer experience.

### 3) Real-Time Data Analytics:-

- Hotstar used AWS's analytics services like Amazon Redshift, Amazon Kinesis, and

Amazon EMR to analyze real-time user behavior and video consumption patterns.

- This data allowed Hotstar to offer personalized recommendations, improve content delivery, and optimize ad targeting.

#### 4) Cost Optimization:-

- AWS's pay-as-you-go model allowed Hotstar to efficiently manage cloud costs, scaling infrastructure during peak traffic and reducing costs during off-peak times.
- Hotstar benefited from AWS's Spot Instances, which helped reduce costs by utilizing spare cloud capacity.

#### 5) Fault Tolerance and Availability:-

- AWS provided a robust, fault-tolerant infrastructure ensuring 99.9% uptime even during high demand events.
- Services like Amazon RDS and Amazon S3 ensured data reliability and accessibility during streaming.

### 6) Security & Compliances:-

- AWS provided a secure infrastructure that adhered to regional compliance requirements for user data privacy, helping Hotstar protect sensitive user information.

Impact: Hotstar successfully scaled its platform to manage millions of concurrent users during major events, delivering a smooth streaming experience with minimal buffering. AWS's infrastructure allowed Hotstar to handle peak loads, optimize operational costs, and improve viewer engagement through data-driven personalization.

Q. 3) Why 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. It is widely used because of its ability to manage containers efficiently across multiple environments, including on-premises, hybrid, and cloud infrastructure.

### Advantages:-

- 1) Scalability: Automatically adjusts based on traffic demands.
- 2) Portability: Runs across different cloud and on-prem environments.
- 3) Automation: Handles deployments and scaling with minimal manual intervention.
- 4) High Availability: Self-healing capabilities ensure uptime.
- 5) Efficient Resource Use: Optimizes hardware utilization.
- 6) Rolling Updates: Allows seamless updates without downtime.

## Disadvantages:-

- 1) Complexity: Steep learning curve for setup and management.
- 2) Overhead: Can add complexity and resource demands.
- 3) Operational Expertise: Requires significant operational knowledge to manage at scale.
- 4) Resource-Intensive: Kubernetes itself uses substantial resources.
- 5) Limited for Stateful Apps: Managing persistent storage can be complex.

## Adidas Uses Kubernetes:-

~~Adidas uses Kubernetes to modernize its infrastructure and scale its operations, especially during high-traffic periods such as product launches and global marketing campaigns.~~

~~Key aspects of their Kubernetes adoption include:~~

### 1) Scalability:-

~~Adidas uses Kubernetes to automatically scale their e-commerce platform during traffic spikes ensuring a seamless shopping experience even during major events like product launches.~~

## 2) Microservices Architecture:

Adidas shifted from monolithic applications to a microservices architecture, with each service running in independent containers managed by Kubernetes. This modular approach allows for easier scaling, updates, and management of individual components like payments, inventory, and user profiles.

## 3) Multi-Cloud strategy:

Kubernetes enables Adidas to deploy across multiple cloud providers, such as AWS and Google Cloud, avoiding vendor lock-in and taking advantage of the best cloud services available for different workloads.

## 4) Resilience:-

Ensures high availability by automatically restarting failed containers.

## 5) Cost optimization:-

Dynamically allocates resources based on demand, reducing infrastructure costs.

6) Global Reach: Deploys services globally, ensuring fast delivery for users worldwide.

#### Impact:-

Kubernetes helps Adidas handle high-traffic events efficiently, improve resource usage, and maintain reliable global service delivery. It has become a key tool in their digital transformation, helping them remain competitive in the fast-moving retail industry.

Q. 4) What are Nagios and explain how Nagios are used in E-services?

→ Nagios:

Nagios is an open-source monitoring tool used to monitor systems, networks, and infrastructure. It provides alerts and notifications on issues like downtime, slow performance, or critical errors across servers, networks, and applications. Administrators use it to detect and fix problems before they affect end users, ensuring high availability and performance.

#### Key features of Nagios:

- 1) Monitoring: Monitors applications, services, and network protocols.
- 2) Alerts: Sends alerts via email, SMS or other methods when issues arise.
- 3) Scalability: Can monitor thousands of hosts and services.
- 4) Reporting: Provides reports on uptime, performance and potential issues.

5) Plugins: Extensible with plugins to monitor specific services or metrics.

6) Customizable Dashboards: Offers real-time dashboards for easy monitoring.

Nagios is used in E-Services:-

In E-services (electronic services), such as online platforms, banking services, e-commerce, and cloud services, Nagios plays a crucial role in ensuring smooth operations. Here's how it's used:

### 1) Website and Application Monitoring:

- Nagios monitors the uptime and performance of e-services like websites, customer portals, and online applications.
- It checks critical components such as response times, service availability, and transaction performance, alerting teams if issues are detected.

### 2) Infrastructure Monitoring:

- Nagios continuously monitors the servers, database, and network devices that support e-services.
- In case of server downtime, database errors, or network failures, Nagios sends alerts to

prevent outages from affecting customers.

### 3) Security Monitoring:-

- For e-services dealing with sensitive data (e.g. e-commerce, online banking), Nagios can monitor for security breaches, unauthorized access attempts, and other anomalies.

### 4) Resource Usage and Load Balancing:-

Nagios monitors resource usage like CPU, memory, and disk space, ensuring that e-services have enough capacity to handle user traffic.

### 5) User Experience Monitoring:-

Nagios can simulate user transactions, like placing an order or completing a form, to check that end-users can interact with e-services without errors or delays. This helps ensure a smooth user experience.

### 6) Service-Level Agreement (SLA) Compliance:-

E-service providers often have SLAs that promise specific uptime or performance metrics. Nagios helps tracks SLA compliance by providing real

time data on service availability and downtime.

### 7) Custom plugins for specific E-service Needs:-

Nagios supports plugins to monitor custom services or applications. E-service providers can develop specific plugins to monitor key components unique to their platforms.

### Impact:-

~~Nagios helps e-services maintain high availability, secure operations, and optimal performance. By proactively detecting issues, Nagios minimizes downtime and ensures customer satisfaction in critical online services.~~