

## Advance DevOps Assignment-1

Q1) Use S3 bucket and host video streaming.

Ans-a) Setup on 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, now name the bucket.
- 2) Maintain the other options as default, click on create bucket.

After 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.

Select add files. An mp4 extension file is needed as we need to host a video.

b.) Setup CloudFront

- 1) As the video is being uploaded. Search for CloudFront on the services tab and open it in new 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. Give the identity a name and click on create.
- 3) Go back to distributions on the left pane and click on create CloudFront distribution.
- 4) Here, in origin field, select the S3 bucket where the video is uploaded. Under Origin Access, select legacy access identities. Here under Origin access identities, select the identity that you have created. Under bucket policy, select Yes, update bucket policy.

In default cache behaviour, under viewer, select redirect HTTP to HTTPS. Under web application firewall select enable security protects to provide a layer of security.

5.) Keep remaining options as default and click on create distribution.

C.) 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. Click on the name of your 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.



Q2- Discuss BMW and Hotstar case studies using AWS.

Ans - BMW

~~BMW~~ BMW group, a global automobile manufacturer, faced the challenge of needing to enhance customer experiences, improve vehicle performance, create a more streamlined software development process. With over 100 million vehicle on the road, they require a scalable infrastructure to support telematics, big data and analytics solutions, while maintaining high reliability and security.

Soln

Solution: BMW adopted AWS to create their BMW cloud Data Hub which centralises data from their vehicle and manufacturing plants. By leveraging services like Amazon S3 for storage, AWS ~~IoT~~ <sup>IOT</sup> core for connecting millions of devices, and Amazon SageMaker for machine learning, BMW built a robust cloud ecosystem. This allowed them to collect, process and analyse vehicle data ~~in~~ in real-time to optimise maintenance schedules, improve vehicle safety and offer new services to customers.

Key AWS Services used:-

- Amazon S3 - To store vast amounts of data generated by BMW vehicle
- AWS IOT core - For connecting and managing millions of devices and vehicle sensors.
- Amazon SageMaker - To build, train and deploy machine learning models that analyse vehicle performance data.

- Amazon Kinesis - For real time data streaming from connected cars.
- AWS Lambda - For serverless execution of backend processes.

### • Hotstar

Hotstar a leading video streaming platform in India, faced the challenge of scaling their infrastructure during high traffic events like the Indian Premier League (IPL). The goal was to handle unpredictable spikes in traffic without compromising performance, ensuring low latency streaming and optimising costs during off-peak times.

Solution - Hotstar adopted AWS to build a scalable reliable and cost efficient infrastructure. They utilized Amazon EC2 instances for compute power, Amazon S3 for content delivery, and Amazon Route 53 for traffic management. During live events like IPL matches, Hotstar leveraged Amazon Auto Scaling to dynamically adjust their server capacity based on demand, allowing them to handle millions of concurrent viewers seamlessly.

Key AWS services used:-

- Amazon EC2 - For elastic compute capacity to handle high spikes in traffic.



- Amazon Cloud Front - To deliver content with low latency to viewers worldwide.
- Amazon S3 - To store video content and make it easily accessible across the globe.
- Amazon Route 53 - For routing traffic based on geographic locations and balancing the loads.
- AWS Lambda - For automating backend processes without managing servers.

### Key Takeaways

- Scalability - AWS enabled BMW to connect millions of cars and Hotstar to stream content to millions of users during peak events.
- Real-time processing - BMW and AWS to analyse vehicle data in real time, while Hotstar managed traffic surges during live sports events.
- Cost efficiency - AWS pay-as-you-go model helped both companies optimise cost, using resources only when needed.
- Innovation - BMW improved vehicle performance through predictive analytics & Hotstar delivered seamless streaming to millions of users during high demand event.

Q3) Why Kubernetes and advantages and disadvantages of Kubernetes. Explain how adidas uses Kubernetes.

Ans - Kubernetes is a powerful open source platform for automating the deployment, scaling and management of containerised applications. It provides the framework to run distributed system resiliently, handling scheduling, load balancing and failover.

while managing container lifecycle -

Advantages:-

- 1.) Scalability - Kubernetes can automatically scale applications up or down based on demand ensuring resource utilization.
- 2.) High Availability - By distributing workloads across multiple nodes, Kubernetes ~~also~~ ensures that applications remain available even if a node fails.
- 3.) Portability - Applications can run consistently across multiple environments, such as on premise or across different cloud providers.
- 4.) Self-healing - Kubernetes automatically restarts failed containers, replaces them and reschedules them when nodes die, and kills containers that don't respond to health check.

Disadvantages:-

- 1.) Complexity - Kubernetes has a steep learning curve making initial setup and management challenging.
- 2.) Resource Intensive - Running Kubernetes clusters ~~often~~ require significant system resources, which may not be suitable for small scale applications.
- 3.) Operational overhead - Managing Kubernetes clusters, especially in large deployments, requires a lot of expertise and operational effort.
- 4.) Security risks - Misconfigurations can expose containers to security vulnerabilities and Kubernetes itself needs constant monitoring for potential security issues.



Adidas uses Kubernetes to power its e-commerce platform and support continuous delivery. By leveraging Kubernetes, Adidas ensures that its platform can handle large volumes of traffic, especially during peak shopping events like Black Friday. Adidas benefits from Kubernetes auto scaling feature to adjust resource usage in real time based on traffic demands. Additionally, the platform's high availability ensures Adidas can maintain service uptime even during system updates or unexpected failures.

Q4.) what are Nagios and explain how Nagios are used in E-services?

Ans- Nagios is a widely used open-source monitoring tool designed to ensure the continuous availability and performance of IT infrastructure, including networks, services, applications and services. In the context of E-services, where uptime, security and performance are crucial, Nagios provides several benefits:-

- 1.) Monitoring Uptime - Ensuring continuous availability of e-services like web servers and databases by alerting administrators in case of downtime.
- 2.) Performance tracking - Monitoring CPU, memory and network performance to prevent bottleneck and ensure smooth operations.
- 3.) Error detection - Identifying issues such as server crashes, crashes or application failures and notifying administrators in real time for quick resolution.

- 4.) Security monitoring - Tracking security incidents, such as unauthorized access or unusual traffic to safeguard e-services.
- 5.) Automated responses - Triggering scripts to fix certain issues automatically, reducing downtime and improving efficiency.

Overall Nagios helps maintain reliable, high performing and secure e-service environments.

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