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Roll-no:-53

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Advance DevOps - Assignment 1

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Q1) Use S3 bucket & host video streaming?

Ans) To host a video streaming project we need to use AWS service like S3 and cloudfare.
Amazon S3 offers object storage designed to store and retrieve any amount of data from anywhere on the web.
Cloudfare is a ~~content~~ content delivery network (CDN) service within AWS, that has lot of edge location around the world.

Step-1) Create a S-3 bucket, update bucket policy ~~note~~ → Enable bucket versioning.
~~Step-2)~~ - Navigate to the S3 service and click on create bucket.
- Configure the bucket.
  - Choose the unique name for the bucket.
  - select the region.
  - Disable 'block all public access'. Since we want the video to be publicly accessible.
  - Click create bucket.

Step-2) upload video files to the S3 bucket
- Once the bucket is created, go into the bucket and click upload.
- upload your video file, S3 supports various video formats like MP4, MOV & MKV

Step-3) Set permissions for public access.

- If your video is to be publicly accessible.
- Go to the permissions tab of the S3 bucket
- Edit the bucket policy and add a policy to allow public access. Here's an example of policy

```
{
"version": "2012-10-17",
"statement": [
  {
    "effect": "Allow",
    "Principal": "*",
  "Action": "S3:GetObject",
  "Resource": "arn:aws:S3:::your-bucket-name/*"
  }
]
}
```

This will allow public read access to objects in your bucket.

Step-4):- Set up static Website Hosting.
- Go to the 'Properties' tab of your S3 bucket.
- Scroll down to the 'static web hosting' section.
- Enable static website hosting and specify an index document (if you have an HTML file for users to access the video)
- You will get a 'Bucket website endpoint' that can be used as the URL to access the video on your website.

Step-5): Now click on the bucket endpoint and your video will be streamed onto the webpage.

Now you have streamed video on S3 bucket.

Q2) Discuss BMW & Hotstar case study using AWS.

a)

Ans) The BMW group has used AWS to transform it's data management and analytics capability. By migrating it's on-premises data lake to AWS, the company has been able to process approx. 10 terabytes of data daily from over 1.2 million vehicles.

This mitigation allowed BMW group to create a centralized cloud Data Hub (CDH) that integrates anonymized data from various sources.

- Scalability & Flexibility :-
  By using AWS services like aws S3 for data storage, Aws lambda for serverless computing, BMW can scale their applications globally without being limited by infrastructure.
- Security and compliance :-
  ~~By using~~ AWS services help BMW maintain strict security and compliance regulations, including GDPR, ensuring that customer data is secure.

b) Hotstar Case Study using AWS :-

Hotstar, India's largest streaming platform uses AWS for its live streaming and video-on-demand services. Here's how AWS played a crucial role :-

- Handling massive scale for live events :- One of Hotstar biggest challenges was scaling its infrastructure to handle peak traffic

during popular live-streamed events like the IPL cricket matches. In, 2019, Hotstar achieved a record of 25.3 billion concurrent viewers for an IPL match, made possible by AWS's scalability.

- Elastic Load Balancing and EC2 :- Hotstar utilizes Amazon EC2 instances to scale compute resources dynamically. Elastic load Balancing (ELB) helps distribute incoming traffic across multiple instance, allowing Hotstar to handle millions of users simultaneously during peak times.
- Serverless Architecture - Hotstar uses AWS Lambda to run code without provising or managing servers, which helps in scaling automatically for peak usage, particularly during live sporting events.

(Q3) Why kubernetes and Advantages, Disadvantages of kubernetes. Explain How adidas uses kubernetes!

Ans) kubernetes (often abbriviated as K8s) is an open-source container orchestration platform developed by google that automates the development, deployment scaling, and management of containerized application
Why kubernetes?

Kubernetes solves many challenges faced by developers and generations teams when managing large-scale, complex containerized applications.

1. Automated Scaling → kubernetes can automatically scale applications up and down based on traffic and resource needs, ensuring efficients use of instrastructure.
2. Self-healing → K8s monitors the ~~he~~health of containers and automatically replaces or restarts them if they fail.
3. Declarative Configuration → kubernetes allows for declarative infrastructure management, where users define the desired state of the applications (like how many containers should be running) and K8s ensures it is maintained.
4. DevOps Integration → Kubernetes fits well into modern CI/CD pipelines and supports advanced use cases like blue-green deployment and canary releases.

Advantages:-

1. Scalability → Automatically scales application horizontally based on load and resources needs, ensuring optimal performance under varying conditions.

(2) High availability → Built-in load balancing and failover capabilities ensure that services remain available even if some instances go down.

(3) Efficient Resource Management → K8s allocates resources dynamically based on workload requirement optimizing infrastructure usage.

Disadvantages →

(1) Complexity → kubernetes has a steep learning curve, and managing a kubernetes cluster can be complex, especially for smaller teams or less experienced users.

(2) Resource intensive → Running a kubernetes cluster requires significant computational resources making it potentially overkill for smaller applications or team.

How Adidas Uses kubernetes →

(1) Multi-cloud strategy — Adidas deploys kubernetes in a multi-cloud environment, utilizing both Google cloud Platform (GCP) and AWS this flexibility helps adidas avoid vendor lock-in while ensuring they can deploy services across different regions and data centres for better performance and availability.

→

(2) CI/CD Integration → Kubernetes is tightly integrated into Adidas CI/CD pipeline, allowing the company to alternate deployments run tests and deliver new feature faster.

Q4) What are nagios and explain how Nagios are used in E-services?

Ans) Nagios is an open source monitoring tool designed for IT infrastructure monitoring. It helps organisations monitor network device, servers, applications, and services to ensure they operate optimally and to detect potential issues.

How Nagios are used →
E-services, which include online platforms offering electronic services such as e-commerce websites, online banking, government portals and other web-based applications.

(1) Server and Applications monitoring →
Nagios monitors server metrics like CPU load, memory etc.

(2) Networking Monitoring →
e-services rely heavily on uninterepted network connectivity.

(3) Database Monitoring →
Nagios ensures that databases are running and it checks for performance.