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04/05

Ad. DevOps

Assignment - I

Q.-1 Use S3 bucket and host Video Streaming

→ You can use Amazon S3 to host & stream video content efficiently. Here's how you can achieve video streaming with S3

Steps :

Step1 - Create an S3 Bucket

- login to AWS console
- Navigate to S3 create a new bucket & set permissions to make the content public restricted based on your needs.

Step2 Upload Vide. File

- upload the video file to bucket
- ensure that you set proper permissions so the video can be accessed publicly or by authorized users

Step 3 Enable Static website hosting

- In the S3 bucket enable static website hosting from the bucket properties This gives u a URL where users can access the video

Step 4 Use Amazon CloudFront (Optional)

- CloudFront is CDN that improves video streaming by caching videos closer to users.
- create a cloudfront distribution point it to your S3 bucket & use URL for video delivery.

Step 5 Set appropriate MIME type

- ensure that correct MIME types are set for your video files in S3 to enable smooth playback.

Step 6 Embed Video on Webpage

```
<video controls>
    <source src="https://<your-bucket-name>.s3.amazonaws.com/video.mp4"
    type="video/mp4">
    your browser does not support the video tag.
</video>
```

* Benefits

- Scalability - it scales with demand making it ideal for handling multiple users streaming videos.
- Security - Use AWS identity and access management & S3 bucket policies to controll access
- Global reach - pairing with cloud front ensures fast content delivery across the globe.

This steps provides a simple & scalable solution for hosting video streaming content on AWS. using S3

Teacher's Sign.:

Q.2 Discuss BMW & Hotstar case studies using AWS

→ I BMW case study using AWS

Overview: BMW uses AWS for building its connected car platform, which provides services like navigation, remote services, driving assistance to millions of vehicle. AWS enabled BMW to scale their services globally while ensuring low latency & secure data transmission

* Key AWS services Used :

1) Amazon S3 (Simple Storage Service) - For storing large data of vehicles like sensors information & event logs
2) Amazon EC2 (Elastic Compute Cloud) - To power the back end systems systems that process data from connected vehicles.
3) AWS Lambda - For serverless computing to run code in response to events such as vehicle data processing, without managing servers
4) Amazon RDS (Relational Database Service) - For managing structured vehicle data securely & reliably
5) AWS IoT Core - For handling the communication between vehicles & the cloud in real-time.

* Impact :

1) Scalability - It allowed BMW to quickly scale as they added more vehicles & services globally
2) Security - BMW leveraged AWS's security features like encryption to ensure that vehicles data remained secure.
3) Innovation - BMW was able to use AWS to develop innovative services such as over the air updates & real-time vehicles monitoring Improving UX.

Teacher's Sign.:

II Hotstar Case Study Using AWS :

* Overview :

Hotstar a leading streaming platform, used AWS to handle massive traffic spikes during live-stream events like cricket matches & popular TV shows. AWS helped them scale up dynamically to handle millions of concurrent viewers.

* Key AWS Services :

1) Amazon Cloudfront - For content delliviry reducing latency and smoth streaming experience, even during high traffic.
2) Amazon S3 - For storing vast amount of media content & data of user
3) AWS Lambda - For serverless backend such as log processing
4) Amazon EC2 Auto Scaling - Automatically scalled the backend server infrastructure to meet spikes in demand, especially during the events
5) Amazon RDS & DynamoDB - For managing structured & unstructured data in highly available & scalable way.

* Impact :

1) Scalability - Hotstar could scale its infrastructure to support over 25 mill concurrent viewers during major events like IPL cricket matches.
2) Cost Efficiency - with AWS pay-as-you-go model Hotstar managed costs effectively only scaling when needed
3) Global reach - AWS allowed Hotstar to serve content seamlessly across diffrent regions with minimal latency.
4) Reliably - AWS robust architecture ensured Hotstar maintained a smooth streaming experience even during peak traffic times.

Teacher's Sign.: _____

Q.3 Why kubernetes, advantages & disadvantages, Explain how adidas uses kubernetes

→ Kubernetes is a container orchestration platform that automates the deployment, scaling and management of containerized applications. Its ideal for managing complex, distributed applications in modern architecture like microservices providing flexibility across cloud or on-prem environments

* Why use kubernetes?

1) Automated Scaling
2) Self handling
3) Roling updates
4) platform agnostic
5) Efficient resource management
6) Microservices - family

* Advantages of kubernetes

1) Scalability - Automatically adjusts resources based on application demand
2) Portability - Can run on multiple cloud platform and on premises offering flexibility
3) Self - Handling - Restarts failed containers maintaining high availability
4) Rolling updates - Facilitates smooth applications updates without downtime
5) Service Discovery - Automatically balances traffic across containers

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* Disadvantages of Kubernetes :

1) Complex Setup - It can be challenging to setup & manage.
2) Resource Deemand - Requires significant infrastructure, especially for smaller teams.
3) Steep learning curve - Understanding concepts like pods and services takes time.
4) Cost Running large scale kubernetes environments can be expensive
5) Network complexity - kubernetes has a complicated networking model that can be challenging to configure and troubleshoot

* How Amazon Uses Kubernetes

- Amazon adopted kubernetes to modernize its infrastructure and improve its e-commerce platform Their legacy system was monolithic & difficult to scale, so they transitioned to microservices architecture where kubernetes played a key role in managing these microservices efficiently

- Key area where Adidas uses kubernetes

1) Scalability - kubernetes autoscales resources during high-traffic events like Black Friday
2) Microservices Management - Adidas manages its microservices with kubernetes enabling faster updates & better services
3) Global reach - kubernetes ensures smooth performance across global regions

- Impact

1) Improved Performance - Faster & more reliable during high demand periods
2) Flexibility : Supports continous deployment & updates with minimal downtime

Kubernetes allows adidas to handle large-scale traffic efficiently, improve system agility & enhance global service delivery.

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What are Nagios and explain how Nagios are used in E-Services ?

Nagios is an open source monitoring tool used to monitor systems networks and infrastructure. It provides alerts for issues such as server outages performance degradation or service failure. By continously monitoring critical IT infrastructure Nagios ensures that potential problems are identified & resolved before they impact end users.

* Key Features

- monitoring : monitors services (HTTP, FTP, SMTP), applications Servers, networks devices & databases
- alerting : Sends alerts (via emails, SMS) when issues arise, like system failure or resource threshold being accressed
- customizability : highly configurable, with support for custom plugins
- Reporting : provides reports & insights into system health & performance metrics over time.
- helps you detect network errors
- relatively scalable
- good log & database system
- informative & attractive UI
- Utilizes topology to determine dependencies
- support for implementing redundant monitoring hosts.

* How Nagios is used in E-services

E-services such as online platforms & digital services rely heavily on uninterrupted performance. Nagios is used to ensure the availability & the reliability of these services by monitoring their infrastructure in real-time.

- Uses Cases in E-Services :

1) Service monitoring - monitors key services for availability & triggers alerts if they go down.
2) Performance Monitoring - Tracks server & application performance
3) Network monitoring - monitors network devices & bandwidth to detect & address connectivity issues
4) Security Monitoring - Identifies unauthorized access or abnormal traffic
5) Database Health : Ensures databases are functional & detects issues like slow queries or connection failures

- Impact in E-Services

1) Proactive Issue resolution - enables teams to resolve issues before they affect users
2) Improved Uptime - Helps maintain continuous service availability through constant monitoring
3) Better resource management - Optimizes system usage by monitoring resources in real time

Nagios plays crucial role in maintaining the reliability performance and security of e-services helping organizations ensure seamless service delivery.

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