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Adv DevOps Assignment 1.

Q.1. Use S3 bucket and host video streaming.

→ To use Amazon S3 bucket for video streaming, we need to use S3 buckets as a container and cloudfront as a content Delivery network.

Step 1: Set up Amazon S3 bucket

1) Select create a S3 bucket. This will direct you to bucket creation page. Here, give it a name
2) Block all public access and kepp other options as default.
3) The bucket has been created. Now we need to add our video in this bucket. click on upload. Here add files with mp4 ctension.
4)

Step 2: Set up cloud front.

1) As the video is being uploaded. Search for Cloudfront on the services tab and open it in new tab.

2) On the left plane, under security, click on origin access. Then click on identities. create new origin access identity.

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3) Go back to distributions on the left plane and click on cloudfront distribution.

4) Select S3 bucket where video is uploaded. Here, under Origin access identities, select the identity that you have created. Under bucket policy, select Yes and update.

5) In default cache behaviour, under viewer, select redirect HTTP to HTTPs making the hosting secure. Enable security protections to provide a layer of security. and 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. Click on the name of the video you have uploaded. There you will find a key. copy it.

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.

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Q.2. Discuss BMW and Hot Star case studies using AWS.

→ Overview:

BMW is a leading automative manufacturer known for its luxury vehicles, while Hotstar is a popular streaming platform in India, offering a variety of content, including movies, TV shows and live sports. Both companies have utilized AWS to drive imovation, improve customer experiences and optimize their operations.

BMW's Use of AWS

1. Connected Vehicles and Data Analytics.

BMW has been at the ~~fronfront~~ of integrating technology into their vehicles. By leveraging AWS, they can collect and analyze vast amounts of data from their connected cars. The data includes:

- Vehicle Performance Data: Monitoring engine performance, fuel efficiency and maintenance needs.
- Driver Behaviour: Understanding how drivers interact with their vehicles, which can lead to personalized services and safety features.

Benefits:

- Predictive Maintenance: AWS enables BMW to use machine learning algorithms to predict when a vehicle needs servicing, reducing downtime & improving customer features.
- Enhanced Customer Insights: By analyzing driving patterns, BMW can tailor marketing strategies and develop features that resonate with their customers.

2. Scalability and cost management.

BMW utilizes AWS's scalable infrastructure to handle varying workloads, especially during product launches or events.

- Cost efficiency: BMW can scale resources up or down based on demand, ensuring they only pay for what they use.
- Global Reach: AWS's global infrastructure allows BMW to deploy applications closer to their customer's, reducing latency and improving service delivery.

Hotstar's Use of AWS.

1. Content Delivery and streaming services

Hotstar relies heavily on AWS to manage its massive content library and deliver high quality streaming experiences to million of users

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- AWS CloudFront: Hotstar uses AWS's Content Delivery Network (CDN) to deliver content quickly and efficiently, ensuring minimal buffering and downtime during peak times, such as major sports events.

Benefits:

- Scalability: During events like the IPL (Indian Premier League), user traffic can spike dramatically. AWS allows Hotstar to scale resources dynamically to handle these spikes without compromising performance.
- Global Content Reach: AWS enables Hotstar to distribute content across multiple regions, ensuring that users worldwide can access their services seamlessly.

2. Data Analytics for User Engagement:

Hotstar leverages AWS data analytics tools to gather insights about user behavior, content preferences and viewing patterns.

- AWS Redshift and Athena: These services help Hotstar analyze large datasets to improve content recommendations and user engagement strategies.

Benefits:
- Personalized Content Recommendations: By analyzing viewing habits, Hotstar can suggest relevant content to users, enhancing their viewing experience.
- Targeted Advertising: Insights gathered from user data enable Hotstar to serve more targeted ads, increasing ad revenue and improving user satisfaction.

challanges and solutions

While both BMW and Hotstar have seen significant benefits from using AWS, they also face challanges:

1. Data security and compliance: Protecting user data and adhering to regulations is paramount, especially in the automotive and streaming industries.
- Solution: Both companies utilize AWS's robust security features such as encryption, identity and access management (IAM) and compliance certificates.

2. Cost Management: As the usage scales, managing costs can become challanging.
- solution: Implementing AWS Cost Explorer and using AWS Budgets helps both companies monitor and optimize their cloud expenditure.

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Conclusion:

The integration of AWS into BMW and Hotstar's operations demonstrates how cloud computing can drive innovation, improve customer experiences and enhance operational efficiency. BMW's focus on connected vehicles and predictive maintenance aligns with their commitment to luxury and performance, while Hotstar's use of AWS for streaming and data analytics exemplifies the future of entertainment in a highly competitive landscape.

By leveraging AWS's scalability, data analytics and global infrastructure, both companies are well structured to meet the evolving need of their customers and stay ahead of the competition.

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Q.3. Why Kubernetes and advantages and disadvantages of Kubernetes. Explain how adidas uses Kubernetes.

→ What is Kubernetes?

Kubernetes is an open source container orchestration platform designed to automate the deployment, scaling and management of containerized applications. Originally developed by Google, it has become a standard for managing cloud-native applications & micro services architecture.

Advantages:

① Automated Deployment & scaling: facilitates easy deployment and scaling of applications based on demand.

② Self-Healing: Automatically restarts or replaces failed containers, ensuring high availability.

③ Load Balancing: Distributes traffic across containers for optimal resource use.

④ Declarative Configuration: Allows users to define application states using YAML / JSON files.

⑤ Multi-cloud support: Can run on various cloud platforms and on premises.

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Disadvantages:

① Complexity: Steep learning curve and operational challanges, especially for beginners.

② Resource overhead: Can require significant computational resources.

③ Network challanges: Confguring networking can be complex.

④ frequent updates: Rapid evolution can lead to compatibility issues.

How Adidas uses Kubernetes.

① Microservices Architecture

Adidas has adopted a microservices architecture to enable agility and faster delivery of features. Kubernetes allows Adidas to manage these microservices effectively. Each microservice can be developed, deployed and scaled independently, leading to quicker iterations and improved responsiveness to market demands.

② Scalability and Performance

During high traffic events, Adidas can use Kubernetes to scale its applications automatically based on user demand. For example, during Black Friday sales, Kubernetes can help ensure that the e-commerce platform remains responsive, handling large volumes of simultaneous transactions without downtime.

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③ Continuous Deployment & continuous Integration
Adidas employs CI/CD pipelines and Kubernetes plays a crucial role in this process. By integrating Kubernetes with their CI/CD tools, Adidas can automate testing and deployment.

④ devOps Collaboration
Kubernetes supports a DevOps culture at Adidas, allowing development and operational tasks to work closely together. The platform's ability to automate many operational tasks reduces the burden on the operations team, enabling them to focus on more strategic initiatives.

Conclusion:
Kubernetes is a powerful tool for organizations looking to streamline their applications deployment and management processes. Adidas's implementation of Kubernetes exemplifies how companies can leverage this technology to enhance agility, improve scalability and foster collaboration between development and operations teams.

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

→ Nagios is an open source monitoring system that enables organizations to monitor their IT infrastructure, including servers, networks, and applications. It provides real-time insights into the status of various components.

Key features of Nagios

① Host and service monitoring: Nagios monitors the availability and performance of hosts (servers, devices) and services (applications, processes)

② Alerts and notifications: sends alerts via email or SMS when issues arise, ensuring prompt attention.

③ Customizable Dashboards: Offers virtual dashboards to represent the health of IT resources at a glance.

④ Extensibility: Supports plugins that can extend its functionality, allowing monitoring of custom applications or services.

⑤ Historic Data: Records historical data for performance trends and analysis.

How Nagios is Used in E-Services

① Infrastructure Monitoring: E-services providers use Nagios to monitor servers and network devices, ensuring uptime and reliability. This is critical for maintaining service availability for users.

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② Applications Performance Monitoring: Nagios can monitor servers and network devices, ensuring uptime and reliability. This is critical for maintaining service availability for users. It can track response times, database queries, and application errors, ensuring that services remain efficient.

③ Proactive Issue Resolution: By setting thresholds for various metrics, Nagios can alert administers before issues become critical. For instance, if CPU usage exceeds a certain percentage, Nagios can trigger alerts to prevent server overload.

④ Capacity Planning: Historical data collected by Nagios helps e-service providers understand usage patterns and plan for future growth. This is essential for scaling resources effectively as user demand increases.

⑤ Compliance and Reporting: Many e-service organizations must adhere to compliance standards. Nagios provides logs and reports that can assist in demonstrating compliance with operational standards and regulations.