

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

⇒ Step 1:- Set up Amazon S3 bucket.

(i) Search for S3 on the services section. Click on it then click on create bucket. This will direct you to the bucket creation page. Here, give a name to your bucket.

(ii) After creating the bucket, add the video to this bucket. Click on the name of the bucket, this will redirect you to Object screen. Click on upload.

(iii) Select the required mp4 file and upload it.

(iv) This will start the uploading process.

Step 2:- Set up CloudFront

(i) Search for CloudFront on services tab. Open it in a new tab.

(ii) On the left pane, under security, click on origin access. Here, go to identities (Legacy). Create an origin access identity.

(iii) Go back to distributions and create a CloudFront distribution.

(iv) In the origin field → select the S3 bucket where video is uploaded.

Under origin access, select legacy access identities.

Select the identity that has been created.

Click on Yes, update bucket policy.

In default cache behavior, under viewer, select Redirect HTTP to HTTPS.

Under Web Application Firewall, select Enable security protections.

Create the distribution. This will deploy it.

Step 3 - Accessing the hosted video:-

- (i) Once the distribution is deployed, copy its domain name.
- (ii) Go to the video set in the bucket where it is uploaded. Click on its name. Copy the key of the video.
- (iii) On your address URL bar, use the link as `2 domain name / key of video.`

Thus, we have deployed a video on an S3 bucket using a Content Distribution Network (CDN) :- cloudflare.

Q. 2 Discuss BMW and Hotstar case studies using AWS.
⇒ BMW

• Overview:

BMW utilizes Amazon Web Services (AWS) to power its connected car platform, delivering a suite of digital services such as real-time traffic updates, remote vehicle control and diagnostic capabilities.

AWS supports BMW's global infrastructure, enabling the management of millions of vehicles.

• Key points:-

1) Scalability: BMW uses Amazon Elastic Kubernetes Service to manage and scale its microservices-based architecture which powers the Connected Car platform. This setup efficiently supports over 20 million connected vehicles, handling billions of daily data requests. Kubernetes ensures that the platform can scale in real-time, based

on traffic demand, which is crucial for global operations and high-availability systems.

2) Data Analytics: BMW leverages AWS's data services, such as Amazon S3 for storage, Amazon EMR for big data processing and Amazon Athena for querying to analyze enormous amounts of vehicle and user data. This real-time analysis helps BMW derive actionable insights, enhancing vehicle services like predictive maintenance and performance monitoring.

3) Security: Security is paramount in BMW's architecture especially when dealing with sensitive vehicle and user data. AWS Identity and Management and AWS Key Management Service are employed to securely manage access controls and encryption.

4) Supply Chain Transparency: To improve traceability and transparency of the supply chain, BMW has built the PartChain Platform on Amazon EKS and blockchain technology. This system ensures that parts and materials used in BMW vehicles are sourced responsibly, allowing for full traceability from supplier.

5) Cost optimization: BMW uses Amazon EC2 Auto Scaling to adjust compute capacity based on real-time demand, preventing over-provisioning and reducing operational costs.

6) Employee and Upskilling and Innovation: AWS plays a pivotal role in training BMW's workforce. BMW aims to upskill 5,000 engineers and certify 2,000 employees in cloud services, like machine learning and data analytics.

7) Cloud Data Hub :- The BMW Cloud Data Hub, powered by AWS, serves as a central platform for collecting, processing, and analyzing vehicle data. This hub supports BMW's broader strategy of building electric and autonomous vehicles.

Through Aug, BMW accelerates the development of electric and autonomous vehicles and enhances digital customer services, aligning with its long-term strategy for a connected, efficient, and sustainable automotive ecosystem.

HOTSTAR:

• Overview..

Disney + Hotstar is popular Indian subscription streaming service owned by Star India, a subsidiary of The Walt Disney Company India. By March 2020, Hotstar had over 300 million active users. In April 2020, Hotstar integrated with Disney +, combining its infrastructure with Disney's global streaming services.

• Services.

1) Amazon Route 53:- At port 53, the AWS provides the DNS services to its applications. It easily and effectively connects the EC2 instances or Amazon S3 buckets, and it also provides the routing information to the outer side of the AWS infrastructure.

2) Amazon EC2:- It provides scalability and reusability to the computing capacity in AWS cloud. Which makes less, to hardware, and more to developing, and deploying

applications to the cloud. Various instances for CPU, memory, network, and storage are available as per need.

3) Amazon CloudFront :- Low latency and high transfer speed of 5700 Gbps for Hotstar is somehow possible through cloudfront as it provides Content Delivery Network (CDN) services. Any user can directly use the cloud front who is familiar with other services of AWS.

4) Amazon S3 :- Storing the data and fetching them as per the need is the advantage of AWS services.

To store, retrieve or analyse millions of data from anywhere at anytime can be possible with the AWS S3. As the 5700 Gbps bandwidth the Hotstar is providing the live match to the millions of Indian public.

Q.3 Why Kubernetes. 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 designed to manage large clusters of containers efficiently.

Advantages:-

1) Automation →

2) Scalability: Easily scales applications horizontally and vertically based on real-time demand.

3) Portability: Allows applications to be moved seamlessly between environments.

4) Resilience: Offers self-healing capabilities, replacing failed containers without downtime.

5) Efficient Resource Usage: Manages resources efficiently, leading to better hardware utilization.

6) Ecosystem: Large community support and integrations with DevOps tools like Jenkins.

~~Disadvantages:-~~

1) Complexity: Kubernetes has a steep learning curve and can be difficult to set up and manage.

2) Overhead: Can introduce overhead in terms of computing and operational costs, requiring more resources for orchestration.

3) Security Management: While powerful, Kubernetes requires strong expertise to ensure proper security configurations.

- (i) For adidas, the digital race was hindered by a cumbersome and slow infrastructure setup.
- (ii) This sluggish pace was at odds with the company's innovative spirit and market demands.
- (iii) In an arena where speed and adaptability are crucial, these delays were more than just operational hindrances.
- (iv) Faced with these challenges, Adidas turned to Kubernetes.
- (v) The decision to adopt Kubernetes was rooted in its ability to provide a flexible, scalable and efficient way to manage containerized applications.
- (vi) It was not just a technological overhaul but a cultural shift.
- (vii) Embracing a developer-centric approach, Adidas focused on empowering its engineers with the tools and autonomy they needed.
- (viii) This involved streamlining processes, adopting agile methodologies, and ensuring continuous delivery and integration.
- (ix) The transformation was comprehensive, affecting everything from how teams collaborated to how applications were deployed.
- (x) Within 6 months, Adidas' entire e-commerce platform was running on Kubernetes.
- (xi) This lead to a 50% reduction in load time for their e-commerce site and an increase in deployment frequency from every 4-6 weeks to 3-4 times a day.

Q.4] What is Nagios and explain how Nagios is used in E-services?

→ (1) Nagios is an open-source monitoring system that helps organizations to monitor their IT infrastructure, including servers, network devices, and applications. It helps ensure that systems are running smoothly by providing real-time monitoring, alerting, and reporting capabilities. Nagios can detect issues such as downtime, performance degradation, and configuration errors, allowing administrators to respond proactively to potential problems.

- How Nagios is used in E-services

1) Infrastructure Monitoring: Nagios continuously monitors servers, databases, and network devices in an e-service environment to ensure they are operational. This includes checking the availability of web servers, database servers and other critical components.

2) Performance Monitoring: It tracks various performance metrics such as CPU load, memory usage, disk space, and network traffic. This data helps e-service providers maintain optimal performance and scalability.

3) Alerting and Notifications: Nagios can send alerts via email, SMS, or other communication methods when it detects issues. This enables rapid response to outages or performance problems, minimizing downtime and service disruption.

4) Service Monitoring: It monitors specific e-services such as web applications, API's and email servers to ensure they are functioning correctly. Nagios can check the status of these services and ensure they are responsive.