Adv-devops. D15C-52

Assignment - 1 05/05

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

→ Steps to host video on AWS S3 bucket

1) Download any sample video into the internet

2) Now break the whole video into smaller segments so that it can be easily transmitted over the network.

3) To make smaller chunks we would ffmeg tool. The general syntax is ffmpeg -i <video-name> -profile:v baseline -level 3.0 -start_number 0 -hls_time 3.5 -hls_list_size 0 -f hls output.m3u8

4) Ensure you download the ffmpeg before executing above command.

5) After that create a new S3 bucket, name it and allow public access.

6) Now, change the bucket policy so that anyone can access budket objects

7) We also need to setup cops policy so that any endpoint can request for resources of bucket

8) After setting up all necessary configurations, we need to upload video segments that we had created previously.

9) Create a new folder named 'hls' inside bucket and upload all the video segments in it

10) Now we could create a simple HTML document that would be hosted on S3 bucket so that video can be ~~plugg~~ played.

11) HTML file would contain the link of the main playlist of video segments

12) Open the link provided inside object properties

13) The video will start streaming

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(Q.2) Discuss BMW and Hotstar case studies using AW

→ BMW:

It's a leading luxury automobile manufacturer, has adopted AWS to revolutionize its operations and enhance customer experiences. The company leverages AWS for its connected car platform, which collects and analyses data from millions of vehicles on the road. This enables BMW to offer features like predictive maintenance, real-time traffic information and over-the-air software updates. Additionally, BMW utilizes AWS for cloud-based development and testing, allowing for faster innovation cycles and improved collaboration among its global teams.

Implementations of BMW on AWS:

- Connected Car Platforms: BMW uses IoT services to collect and analyze data from millions of connected vehicles. This enables predictive maintainence and realtime traffic information.
- Machine Learning: BMW employs AWS's machines learning capabilities for - Quality control in manufacturing.
  - Personalized marketing and autonomous driving research.
- Challenges faced by BMW: In managing data from millions of connected vehicles, accelerating software development and deployment, enhancing manufacturing efficiency and quality control
- Solutions: BMW then implemented cloud-based development environments for faster iterations and global collaboration. Utilized the AWS analytics and machine learning for predictive environments

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Hotstar:

Hotstar, one of India's largest streaming platform, relies heavily on AWS to manage its immense scale and deliver high-quality content to the million-users. The platform uses AWS elastics compute and storage services to handle massive spikes in viewership, particularly during popular live events like cricket matches. This scalable infrastructure allows Hotstar to serve over 25 million concurrent views during peak times. It leverages Amazon's cloudfront for content delivery, ensuring low-latency video streaming across its global user base. By using AWS comprehensive suite of services Hotstar has not only improved its ability to handle enormous user loads but also reduced it's infrastructure costs by 50%.

Key Aspects of Hotstar AWS Usage

1. Handling Massive Traffic: During the cricket events like IPL, Hotstar serves millions of concurrent viewers. It enables Hotstar to scale it's infrastructure dynamically to meet these traffic spikes. AWS services like Amazon EC2, S3 and cloudfront are crucial in handling such large-scale traffic.
2. Content Delivery with Low Latency: It uses Amazon Cloudfront, a global delivery network (CDN), to distribute content with low latency across geographic
3. Real-time Analytics: Hotstar uses AWS's big data services, including Amazon EMR and Amazon Redshift to gain the real-time insights into viewer
4. Also Uses Amazon Kinesis for capture & processing of video stream

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behaviour and engagement.

4. Cost Optimization: AWS flexible pricing and elastic allow Hotstar to optimize costs, only scaling resources during high-traffic events and scaling them down during normal operations.

Challenges faced by Hotstar and using AWS as solution

- Managing Traffic Spikes During Live Events
- Real-time video Transcoding for Multiple Devices
- Price Optimization with AWS usage
- User-friendly interface without less traffic

(Q.3) Why Kubernetes and advantages and disadvantages of Kubernetes. Explain How Adidas Uses Kubernetes

→ Kubernetes is an open-source container orchestration platform designed to automate the deployment, scaling, and management of containerized applications. Containers allow developers to package their applications with all dependencies, ensuring consistency across various environments. However, managing containers across different machines can be complex. Kubernetes simplifies this by offering a framework to run distributed systems robustly. It ensures that your applications run in the desired state, scales them based on the demand and manages failovers and updates seamlessly.

Advantages.

1) Scalability: Kubernetes automatically scales applications up or down based on the Internet's demand. Horizontal scaling is smooth and managed by platform

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2) Self-healing: It can automatically restart failed containers, replace them, and kill those that don't respond to user-defined health checks

3) Load-balancing and service discovery: Kubernetes distributes network traffic to ensure that the deployment is stable; and it can find containers without the need for additional service-discovery mechanisms

4) Automated rollbacks & rollouts: If something goes wrong, Kubernetes can automatically roll back the change.

5) Efficient-resource utilization: It helps the optimizing the use of infrastructure resources by efficiently scheduling and managing workloads.

Disadvantages:

1) Complexity: setting up and managing Kubernetes clusters can be sometimes challenging especially for smaller teams or less experienced developers.

2) Learning curve: The platform has a steep learning curve and requires expertise in container orchestration

3) Overhead: Running Kubernetes may introduce additional resource overhead, as it explains that it requires the nodes to run the Kubernetes components in addition to your containers.

4.) Maintainence: Keeping Kubernetes up-to-date and secure requires regular maintenance which can be time-consuming

- Adidas Using Kubernetes:
Adidas adopted Kubernetes to streamline it's operations in handling microservices and containerize workloads. The way that Kubernetes operate using the Adidas environment may be mentioned in certain format:

1) Scalability for Global Operations: Adidas has a vast e-commerce platform that requires handling traffic spikes during product launches and promotions. Kubernetes allows Adidas to scale it's applications dynamically based on demand, ensuring a seamless customer experience even during high traffic periods.

2) Microservices Architecture: Adidas has moved to a microservices architecture for it's applications. Kubernetes helps manage these microservices by simplifying deployment.

3) Continuous Integration (CI): It operates on pipelines that Kubernetes play crucial role. It enables fast and frequent deployments, reducing the time it takes to introduce new features to platform

4) Cloud-Based Deployment: It operates on the 'Hybrid Cloud model' leveraging multiple cloud providers and on-premise data centers. It enhances the flexibility and cost optimization.

5) By leveraging Kubernetes, the Adidas has been able to manage to build a scalable, reliable and efficient infrastructure.

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4) What are Nagios and how Nagios are used in E-Services?

→ - About Nagios: It is an Open source IT System monitoring tool. It was designed to run on the Linux operating system and can monitor devices running Linux, Windows and Unix.

- Nagios Software runs periodic checks on critical parameters of application, network and server resources. For example, Nagios can monitor memory use, disk use and microprocessor load, as well as the number of currently running processes and log files. Nagios also scrutinizes the services such as various protocols: SMTP, POP3, HTTP and other network protocols.

- It initiates the active checks, while passive checks come from external applications connected to the monitoring tool.

- Based on the parameter and thresholds defined, Nagios can send out alerts if critical levels are reached. An authorization system enables administrators to restrict access.

- Runs on both agent-based and Agentless configurations. Agentless monitoring use existing to emulate an agent. Examples of Nagios agents include Nagios Remote Data Processor (NRDP), Nagios Cross Platform Agent and NSClient++

• E-Services usage of Nagios :

1) Monitoring availability:

It leverages the email services and Nagios checks

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if the server is reachable and whether it can send and receive emails, helping to ensure consistent email delivery.

2) Performance check:
- Response Time tracking is done by Nagios for different E-services like web Pages, API's or database queries.

3) Alerting and Notification:
Nagios can be configured to send real-time alerts (email, SMS) when an E-service goes down or when resource usage crosses critical thresholds. This helps the IT team quickly respond to issues before they affect users.

4) Custom Plugin Support-
Nagios supports custom plugins, allowing businesses to monitor specific parameters or conditions for their E-services.

5) SLA Tracking (Service Level Agreement):
In E-Services, organizations often have SLA's that guarantee a certain level of uptime or performance. Nagios can monitor these metrics and provide reports to ensure that SLA's are met.

6) Fault Detection & Resolution:
Nagios can not only detect issues but can also trigger automated scripts to restart services, clear cache, or take another remedial actions thus minimizing downtime for E-services.

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