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Adv Devops
Assignment 1

Q1 Use S3 bucket and host Video streaming.

→ Steps to host video streaming on S3 bucket:

- Prerequisites: Register and configure a custom domain with Route 53.

Before we start, it is recommended to register and configure a custom domain (For example: example.com) with Route 53 so that you can configure your CloudFront distribution to use a custom domain name later.

Without custom domain name, S3 video is publicly accessible and hosted through CloudFront at a URL that looks similar to following:

https://CloudFront distribution domain name / Path to an S3 video.

- Step 1: Create an S3 bucket

Sign in to AWS console and open Amazon S3

Choose Buckets > Create Bucket

Enter Bucket name (For example: tutorial-bucket)

Choose Region.

For Block Public Access setting for this bucket keep default settings.

For remaining settings, keep default settings.

Click on Create Bucket.

- Step 2: Upload a video to the S3

In the Bucket list, choose the name of bucket that we created in step 1 (For example: tutorial-bucket) to upload your file to.

On the Object tab for your Bucket, choose Upload.
On the upload page, under Files and Folders, choose Add Files.
Choose file to upload and then choose Open.
Choose Upload.

- Step 3: Create a CloudFront origin access identity
From AWS console, now open CloudFront service.
Under security section, choose Origin access.
Under identities tab, choose Create origin access identity and enter a name. (For example: S3-OA
Click on Create.
- Step 4: Create a cloudFront distribution
(a) Create a CloudFront distribution.
Choose Distributions > Create Distribution.
In origin section, Origin domain select the domain name which starts with the name of S3 bucket created in step1.
For origin access, choose Legacy access identity.
Under origin access identity choose origin access identity created in step 3. (For example: S3-OAI)
Under Bucket Policy, choose Yes, update Bucket policy.
In Default cache behaviour > Viewer Protocol policy.
choose Redirect HTTP to HTTPS.
Keep the remaining setting set to default.
Click on create distribution.
(b) Review the bucket Policy.
- Step 5: Access the video through the Cloud Front distribution

Go to Distribution.
Find Distribution by matching S3 origin name and copy the domain name from domain name column. open a new tab and paste the copied domain name.
Return to previous tab. select the bucket created in step 1 and choose video object created in step 2. Copy key from object overview.
In new tab append / and paste key to domain name.

Step 6: Configure your CloudFront distribution to use your custom domain name

(a) Request SSL certificate
(b) Add alternate domain name to your Cloud Front distribution
(c) Create DNS record to route traffic from alternate domain name to your CloudFront distribution's domain nam
(d) Check whether IPV6 is enabled for your distribution and create another DNS record.

Step 7: Access the S3 video through the CloudFront distribution with custom domain name

Distribution > Find distribution > Copy alternate domain name > paste domain name in new tab.
S3 > Find path to S3 video > Return to tab domain/<S3 Videopat
Access video at https:// CloudFront_domain/S3_video_path.

Step 8: View data about request recieved by your CloudFront distribution (Optional step)

Hence, video streaming is hosted successfully using S3 bucket with the help of CloudFront service.

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Q2: Discuss BMW and Hotstar case study using AWS

→ BMW group, headquatered in Munich, Germany is a global manufacturer of premium automobiles and motorcycle.

The company needed to more easily scale its data to support the growing demands of internal and external stakeholders. As data wasn't easily accessible and spread across, BMW's innovation was slowed down by its own IT infrastructure. Hence, BMW needed to develop a solution agile enough to support both data needs and allow company to move quickly to address its customer demand.

The BMW Group rearchitectured its on-premises data to AWS cloud, creating Cloud Data Hub (CDH) that integrates anonymised data from vehicle sensor and other sources. Using AWS services like S3, Athena, Kinesis Firehose, Glue, BMW streamlined data management and enabled scalable agile operations for data engineers. This setup allowed teams to maintain their own DevOps process.

The company uses this data to monitor vehicle health indicators such as check controls errors to identify potential issues across vehicle lines. This enables the BMW group to leverage fleet data ingested, collected and refined from CDH to better resolve issue, even before they impact customers.

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Hotstar is an Indian subscription video on-demand streaming service owned and operated by star India, a subsidiary of The Walt Disney Company India.
In 2019, during ICC World Cup semi-Final between India and New Zealand, Hotstar set a new record of 25.3 million viewers.
On the game day, the first spike witnessed was from 1.5M to 15M, as India started batting. Then, in between it between it was usual (10-12M), then Dhoni came to bat, and again sudden spike was noticed in traffic, taking it to 25.3M viewers. But then Dhoni got out, and suddenly there was drastic viewers drop to <1M viewers.
The very first challenge was handling 25.3M viewers and secondly, when users dropped off the match, some users returned to homepage and started exploring content. That leads to increase in load on homepage service.
Hotstar does not use traditional autoscaling from AWS because of insufficient capacity error and step size autoscaling group. They build their own scaling scaling strategy.
At the backend side, Hotstar uses Amazon Route 53 and Amazon CloudFront services for video streaming.

Q3 Why Kubernetes and advantages and disadvantages of Kubernetes. Explain how adidas uses kubernetes

→ Imagine you have a bunch of different programs running on your computer. They need to work together, and sometimes you want to run more copies of a program when things get busy. This can be hard to do manually. That's where Kubernetes comes in.

Advantages of Kubernetes

(a) Scalability
(b) Resource efficiency
(c) High Availability
(d) Portability
(e) self healing
(f) Flexibility

Disadvantages of Kubernetes

(a) complex
(b) High Learning curve
(c) Performance Overhead
(d) complex security model
(e) Dependency on external services
(f) Infrastructure requirement.

HOW ADIDAS USES KUBERNETES?

Adidas is a globally renowned sportswear and athletic footwear company headquatered in Germany. In recent years, Adidas team was happy with its software from technology perspective but accessing tools was problem. For instance, just to get a developer VM you had to send request form, give purpose, give title of project, who's responsible, etc. The best case is you got your machine in half an hour and worst case is half a week or sometimes a week.

They found solution with containerization, agile development, continuous delivery and cloud native platform that includes Kubernetes and Prometheus. Just six months after project began, 100% of Adidas commercial site was running on Kubernetes. Load time was reduced by half. Releases went from every 4-6 weeks to 3-4 times a day. With 4000 pods, 200 nodes and 80000 builds per month Adidas is now running 40% of its most critical, impactful system on its cloud Native platform.

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

→ Nagios is powerful monitoring system that enables organizations to identify and resolve IT infrastructure problems before they affect critical business process.

HOW NAGIOS IS USED IN E-SERVICES:

E services S.R.L is an innovative energy company offering solution in monitoring, VoIP, call centers and IT solutions. E-services SRL chose to partner with Nagios and became the official representative of Nagios XI in Paraguay.

To set up a monitoring system across Paraguay, one would have to carefully consider monitoring bandwidth, setting up different levels of support for hosts that are only being watched, a high availability system with a failover system, and a system that can be accessed from afar.

Nagios provided E-services and ANDE with real time solutions, including -

(i) A centralized monitoring system for their entire infrastructure, easing the SysAdmin workload.
(ii) Helpful and intuitive statistics that simplifies decision making and aid trouble-shooting.
(iii) Easy to understand graphic and displays.
(iv) Excellent availability, thanks to the mirrored servers with the failover system.