Homework 5

This homework assignment aims to prepare you for your final and will show your understanding in the lecture.

1. Prepare a written report (approximately 8-10 pages) addressing the following tasks:

a. EC2:

- Explain the process of launching an EC2 instance, including the selection of an appropriate Amazon Machine Image (AMI), instance type, and storage configuration.
- Describe the different pricing models available for EC2 instances (On-Demand, Reserved, and Spot instances) and the factors to consider when choosing the appropriate model.
- Demonstrate how to connect to your EC2 instance using SSH and perform basic management tasks, such as installing software and updating the operating system.

b. Databases:

- Compare and contrast the different database services offered by AWS (e.g., Amazon RDS, Amazon DynamoDB, Amazon Aurora) and explain the use cases for each.
- Describe the process of creating an Amazon RDS instance, including the selection of the database engine, instance class, and storage configuration.
- Explain how to connect to your Amazon RDS instance and perform basic database operations, such as creating tables, inserting data, and running queries.

c. Security:

- Discuss the AWS shared responsibility model and explain the security measures you would implement to protect your AWS resources, such as EC2 instances and databases.
- Describe how to configure AWS Identity and Access Management (IAM) to manage user access and permissions to your AWS resources.
- Explain the role of AWS Security Groups and how they can be used to control inbound and outbound traffic to your EC2 instances.

d. Containers:

- Explain the concept of containerization and the benefits of using containers in the cloud.
- Describe the process of building and deploying a Docker container to AWS using Amazon Elastic Container Service (ECS) or Amazon Elastic Kubernetes Service (EKS).
- Discuss the differences between ECS and EKS and the factors to consider when choosing between the two services.

e. Monitoring:

- Describe the various monitoring and logging services offered by AWS, such as Amazon CloudWatch and AWS CloudTrail.
- Explain how to set up CloudWatch alarms to monitor the health and performance of your AWS resources, such as EC2 instances and Amazon RDS databases.
- Discuss the importance of monitoring and logging in the context of cloud-based applications and how they can help with troubleshooting and incident response.

f. Storage:

- Compare and contrast the different storage options available in AWS, such as Amazon S3, Amazon EBS, and Amazon EFS.
- Explain the use cases and characteristics of each storage service, and provide recommendations on when to use each one.
- Demonstrate how to upload, download, and manage files in an Amazon S3 bucket.

g. API Gateway:

- Describe the purpose and functionality of AWS API Gateway, and explain how it can be used to expose your AWS resources as APIs.
- Demonstrate the process of creating an API Gateway endpoint, configuring the necessary integrations (e.g., Lambda functions, HTTP proxies), and testing the API.
- Discuss the benefits of using API Gateway, such as authentication, throttling, and monitoring, and how they can improve the overall API management experience.

h. Networking:

- Explain the concept of Amazon Virtual Private Cloud (VPC) and its importance in the AWS ecosystem.

- Describe the process of creating a VPC, including the configuration of subnets, route tables, and network ACLs.
- Demonstrate how to connect your EC2 instances and other AWS resources within a VPC, and how to establish connectivity between your VPC and on-premises resources (e.g., using a VPN or AWS Direct Connect).

i. Boto3 Library:

- Explain the purpose and functionality of the Boto3 library, which is the AWS SDK for Python.
- Demonstrate how to use Boto3 to interact with AWS services programmatically, such as creating an EC2 instance or managing an S3 bucket.
- Provide a code example that uses Boto3 to perform a specific task, such as listing all the EC2 instances in a particular region.

2. Include relevant diagrams, code snippets, and screenshots to support your explanations.

3. Provide a conclusion that summarizes your key learnings and insights from the homework assignment.

Good luck with your homework!

Extra;
Make 2-3 sentences comment for the following questions about me so I can improve myself in future; Have this answers in printed paper and bring it to class whenever you can attend the class in our remaining lectures. Do not add your name to the paper. It should be anonymous. Feel free to be positive or negative.

- The clarity and organization of the lecture materials
- The relevance and practical applicability of the topics covered
- Responsiveness to student questions and concerns
- The overall effectiveness of the instructor in facilitating the students' learning experience
- Any other comments

GL HF!

Eren Akbaba