Assignment - 6.2

Exploring AWS Services

* Key AWS Services for IT Infrastructure and Software Development

1. Amazon Elastic Compute Cloud (Amazon EC2)

   - Description: Amazon EC2 provides resizable compute capacity in the cloud, allowing users to quickly scale computing resources as needed.
   - Use Cases: Hosting web applications, running backend servers, batch processing, and scientific computing.
   - Benefits: Flexibility to choose instance types, scalability, pay-as-you-go pricing model, and integration with other AWS services.
   - Challenges: Managing instances, optimizing costs, and ensuring security configurations.

2. Amazon Simple Storage Service (Amazon S3)

   - Description: Amazon S3 is an object storage service that offers industry-leading scalability, data availability, security and performance.

- Use Cases : Backup and restore, archiving, data lakes, big data analytics, and content distribution.
- Benefits : Durability, availability, scalability, security and cost-effectiveness.
- challenges : Managing storage costs, ensuring data security, and handling data lifecycle policies.

3. Amazon Relational Database Service (Amazon RDS)
   - Description : Amazon RDS makes it easy to set up, operate, and scale a relational database in the cloud.
   - Use Cases : Database management for web applications, data warehousing, and backend databases for enterprise applications.
   - Benefits : Automated backups patching, scaling and replications; supports multiple database engines (MYSQL, Postgre SQL, SQL Server, etc.).
   - challenges : Cost management, database performance tuning, and handling complex migrations.

4. AWS Lambda
   - Description : AWS Lambda lets you run code without provisioning or managing servers. You pay only for the compute time you consume.

- Use Cases: Event-driven computing, real-time file processing, data validation and API backend services.
- Benefits: No server management, automatic scaling, pay-per-use, and integration with other AWS services.
- Challenges: Cold start latency, limited execution duration, and complexity in managing large-scale serverless architectures.

5. Amazon DynamoDB
   - Description: Amazon DynamoDB is a fast and flexible NoSQL database service for single-digit millisecond performance at any scale.
   - Use Cases: Real-time bidding, gaming, IOT applications, and mobile applications.
   - Benefits: Fully managed, scalable, high performance, and integrated with other AWS services.
   - Challenges: Pricing complexity, designing optimal table schemas, and handling large-scale data migrations.

6. Amazon Virtual Private Cloud (Amazon VPC)
   - Description: Amazon VPC enables you to launch AWS resources in a logically isolated virtual network that you define.
   - Use Cases: Secure application hosting, hybrid cloud deployments, and compliance with security standards.

- Benefits: Network isolation, control over network configuration, secure communication, and easy integration with on-premises networks.
- Challenges: Complex network configurations, managing network security, and troubleshooting connectivity issues.

7. Amazon Elastic Kubernetes Service (Amazon EKS)
   - Description: Amazon EKS makes it easy to deploy, manage, and scale containerized applications using Kubernetes.
   - Use Cases: Microservices architecture, CI/CD pipelines, and scalable web applications.
   - Benefits: Managed Kubernetes services, integration with AWS services, scalability, and high availability.
   - Challenges: Managing Kubernetes clusters, cost optimization and ensuring security.

8. AWS CloudFormation
   - Description: AWS CloudFormation gives developers and systems administrators an easy way to create and manage a collection of related AWS resources.
   - Use Cases: Infrastructure as Code (IaC), automated provisioning, and version control of infrastructure.
   - Benefits: Repeatable deployments, version control, automation and integration with CI/CD pipelines.

- Challenges: Learning the syntax, managing large templates, and debugging deployment issues.

(9) AWS identity and Access Management (IAM)

- Description: AWS IAM enables you to manage access to AWS services and resources securely.
- Use Cases: User management, Secure access to resources, and compliance with security policies.
- Benefits: Granular access control, secure authentication, and policy management.
- Challenges: Managing complex policies, ensuring least privilege access, and auditing user actions.

(10) Amazon CloudWatch

- Description: Amazon CloudWatch provides monitoring and observability of AWS resources and applications.
- Use Cases: Resource monitoring, application performance tracking and alerting.
- Benefits: Real-time monitoring, automated actions, integration with other AWS services and custom metrics.
- Challenges: Managing metric costs, setting up effective alerts, and handling large volumes of data.