AWS FUNDAMENTALS

INTRODUCTION

Amazon Web Services (AWS) is a comprehensive cloud computing platform that offers a wide range of services to individuals and organizations. It provides a flexible, scalable, and cost-effective solution for building and deploying applications in the cloud. AWS has revolutionized the way businesses operate, enabling them to innovate faster, reduce costs, and improve efficiency.

CORE AWS CONCEPTS

1. **Cloud Computing:** Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

   - **On-Demand Self-Service:** Users can access computing resources on-demand without requiring long-term contracts.
   - **Rapid Elasticity:** Resources can be scaled up or down quickly to meet changing demands.
   - **Measured Service:** Users pay only for the resources they consume, based on a pay-as-you-go model.

2. **AWS Global Infrastructure:**
   - A vast network of data centers located worldwide, providing low-latency access to services.
   - Regions: Geographic areas with multiple Availability Zones.
   - Availability Zones: Isolated locations within a region, each with independent power, cooling, and networking.

KEY AWS SERVICES

- **Compute Services:** AWS offers a wide range of services to meet diverse business needs. Here's a deeper dive into some of the key services:

  A) **Amazon EC2 (Elastic Compute Cloud):**
     - Provides scalable computing capacity in the form of virtual machines (instances).
     - Offers a variety of instance types to suit different workloads, from general-purpose to high-performance computing.
     - Provides options for both on-demand and reserved instances.

  B) **AWS Lambda:**
     - A serverless computing service that allows you to run code without provisioning or managing servers.

- Ideal for event-driven applications and microservices architectures.
- Automatically scales to handle varying workloads.

- **Storage Services:**

  A) Amazon S3 (Simple Storage Service):
  - Object storage service for storing and retrieving any amount of data, from any device, anywhere.
  - Highly durable and scalable, with built-in security features.
  - Often used for data lakes, backups, and website hosting.

  B) Amazon EBS (Elastic Block Store):
  - Block-level storage volumes designed for use with EC2 instances.
  - Offers various performance tiers to meet different workload requirements.
  - Used for boot volumes, databases, and other applications that require persistent storage.

- **Database Services:**
  - **Amazon RDS (Relational Database Service):**
    - **Fully Managed:** Simplifies database administration tasks like provisioning, patching, and backups.
    - **Wide Range of Engines:** Supports popular engines such as MySQL, PostgreSQL, MariaDB, Oracle, and SQL Server.
    - **High Availability and Scalability:** Ensures continuous availability and the ability to handle varying workloads.
    - **Enhanced Security:** Offers robust security features like encryption at rest and in transit.

- **Networking and Content Delivery:**

  A) Amazon VPC (Virtual Private Cloud):
  - Create isolated, private networks within AWS.
  - Configure subnets, route tables, network access control lists (NACLs), and security groups.
  - Establish private connectivity between VPCs and on-premises networks using AWS Direct Connect or VPN connections.

  B) Amazon CloudFront:
  - A global content delivery network (CDN) service that delivers web and mobile content with low latency.
  - Caches content at edge locations, reducing latency and improving performance.
  - Supports HTTP, HTTPS, and RTMP protocols.
  - Offers features like custom error pages, origin shielding, and access controls.

- **Security, Identity, and Compliance:**

  A) AWS IAM (Identity and Access Management):
  - **Centralized User Management:** Create and manage users, groups, and

roles to control access to AWS resources.

- **Fine-Grained Permissions:** Define specific permissions for users, groups, and roles, limiting their access to only necessary resources.
- **Multi-Factor Authentication (MFA):** Enhances security by requiring users to provide two or more forms of identification.
- **Role-Based Access Control (RBAC):** Assigns permissions based on roles, ensuring appropriate access levels for different users.
- **AWS Key Management Service (KMS):**[6] Helps you manage and control the use of cryptographic keys.

BENEFITS OF USING AWS

- **Cost-Effectiveness:** Pay-as-you-go pricing model and the ability to scale resources up or down as needed.
- **Scalability:** Easily scale your applications to handle increased demand.
- **Reliability:** AWS's infrastructure is highly reliable and fault-tolerant.
- **Security:** Robust security features to protect your data and applications.
- **Global Reach:** Deploy applications globally with low latency.
- **Innovation:** Continuous innovation and introduction of new services.

CONCLUSION

AWS offers a powerful and flexible platform for building and deploying applications in the cloud. By understanding the core concepts and key services, you can leverage the full potential of AWS to achieve your business goals.