AWS BASICS - NOTES

MODULE 1: Introduction to AWS

What is AWS
- AWS (Amazon Web Services) is a comprehensive and widely adopted cloud platform.
- Offers over 200 fully-featured services from data centers globally.
- Key services include computing power (EC2), storage options (S3), and networking capabilities (VPC).
- AWS provides scalable, reliable, and low-cost cloud infrastructure solutions.

Why AWS
- Provides a scalable and cost-effective platform for building applications.
- Supports a wide range of applications, including web hosting, data storage, and machine learning.
- High availability and fault tolerance with a global infrastructure.
- Security and compliance certifications ensuring data protection.

MODULE 2: AWS Account and Initial Setup

Creating an AWS Account
- Visit the AWS website and sign up for a new account.
- Enter billing information and verify email and phone number.
- Secure the root user account with multi-factor authentication (MFA).

AWS Management Console
- The web interface to access and manage AWS services.
- Provides dashboards and monitoring tools for various services.
- Allows easy navigation and management of resources.

AWS Regions and Availability Zones
- AWS infrastructure is divided into Regions and Availability Zones (AZs).
- Each Region is a separate geographic area with multiple, isolated locations known as AZs.
- Selecting the right Region is crucial for latency, compliance, and availability.

MODULE 3: AWS Compute

Introduction to EC2

- Amazon Elastic Compute Cloud (EC2) provides scalable computing capacity in the AWS cloud.
- Allows users to launch virtual servers, known as instances, on demand.
- Ideal for a wide range of applications, from small-scale to enterprise-level workloads.

Access EC2 Instance
- Launch an EC2 instance from the AWS Management Console.
- Connect to the instance using SSH for Linux or RDP for Windows.
- Use key pairs for secure authentication.

EC2 Instance Types
- General Purpose: Balanced compute, memory, and networking resources (e.g., t2.micro).
- Compute Optimized: Ideal for compute-bound applications (e.g., c5.large).
- Memory Optimized: Suitable for memory-intensive applications (e.g., r5.large).
- Storage Optimized: High disk throughput and IOPS (e.g., i3.large).

Security Groups
- Virtual firewalls controlling inbound and outbound traffic for instances.
- Define rules to allow or deny specific traffic.
- Essential for securing EC2 instances.

On-demand, Reserved, and Spot Instances
- On-demand: Pay per hour with no long-term commitment.
- Reserved: Significant savings for committing to one or three years.
- Spot: Use spare capacity at a reduced price, suitable for flexible workloads.

Elastic Beanstalk
- Easy-to-use service for deploying and scaling web applications.
- Supports multiple languages and platforms, such as Java, .NET, PHP, Node.js, Python, Ruby, and Docker.
- Automatically handles the deployment, from capacity provisioning to load balancing.

MODULE 4: AWS Identity Access Management

IAM Users
- Creating and managing IAM users for accessing AWS resources.
- Assign specific permissions to users based on their role.
- Use IAM policies to define permissions.

IAM Groups

- Group users and manage their permissions collectively.
- Simplifies administration by assigning policies to groups.
- Add or remove users from groups as needed.

MODULE 5: AWS Storage

Amazon Simple Storage Service (S3)
- Object storage service offering scalability, data availability, security, and performance.
- Store and retrieve any amount of data from anywhere.
- Use cases include backup, archiving, and big data analytics.

S3 Buckets
- Containers for storing objects (files).
- Organize data within buckets.
- Configure bucket policies and permissions for data access control.

Versioning in S3
- Keep multiple versions of an object in the same bucket.
- Protects against accidental overwrites and deletions.
- Enables recovery of previous versions of objects.

Storage Classes
- S3 Standard: General-purpose storage with high availability.
- S3 Intelligent-Tiering: Optimizes costs by moving data between two access tiers.
- S3 Standard-IA: Infrequent access with lower cost.
- S3 One Zone-IA: Lower-cost option for infrequently accessed data, stored in a single AZ.
- S3 Glacier: Low-cost storage for long-term data archiving.
- S3 Glacier Deep Archive: Lowest-cost storage for archiving data that is rarely accessed.

MODULE 6: AWS Databases

AWS Databases
- Managed database services offering ease of use, scalability, and high performance.
- Includes relational databases, NoSQL databases, and data warehousing.

Relational Databases
- Structured data organized in tables with predefined schemas.
- Examples: MySQL, PostgreSQL, Oracle, and SQL Server.

RDS

- Amazon Relational Database Service (RDS) simplifies database management tasks.
- Supports multiple database engines: MySQL, PostgreSQL, MariaDB, Oracle, and SQL Server.
- Automates backups, software patching, monitoring, and scaling.

NoSQL Databases
- Designed for unstructured data, offering flexible schemas.
- Examples: DynamoDB for key-value and document data models.

DynamoDB
- Fully managed NoSQL database service for single-digit millisecond performance.
- Scales automatically to handle large volumes of data and traffic.
- Supports both key-value and document data models.

Create Table in DynamoDB
- Define table name, primary key, and optionally, secondary indexes.
- Configure read and write capacity units.

Queries on DynamoDB
- Use queries to retrieve data based on primary key attributes.
- Scans allow retrieving data based on non-key attributes.
- Best practices include using indexes and optimizing queries for performance.

MODULE 7: AWS Networking

Introduction to VPC
- Amazon Virtual Private Cloud (VPC) allows users to create isolated networks within AWS.
- Provides complete control over network configuration, including IP address ranges, subnets, route tables, and gateways.

Subnets
- Subdivisions of a VPC's IP address range.
- Can be public (accessible from the internet) or private (internal network).

Route Tables
- Control traffic routing within a VPC.
- Define routes for different destinations (e.g., internet gateway, NAT gateway).

Private Subnets
- Subnets that are not directly accessible from the internet.
- Typically used for databases and application servers.

Jump Server
- An instance used to connect to other instances in private subnets.
- Acts as a gateway for secure access.

NAT via EC2 Instance
- Network Address Translation (NAT) using an EC2 instance.
- Allows instances in private subnets to access the internet.

NAT Gateway (Network Address Translation)
- Managed NAT service that provides scalable and highly available internet access.
- Easier to set up and manage compared to NAT instances.