- Features of AWS
- Global Infrastructure – Regions and Availability Zones
- Accessing the AWS Platform
- AWS Services overview
- Compute and Networking Services
- Storage and Content Delivery
- Database Services
- Management & Governance
- Security, Identity & Compliance
- Application Services
- Container Services

Features of AWS

- Flexibility
  - Support wide range programming models, languages, and operating systems.
  - Support different RDS, NoSQL database, Cache servers
  - Support Serverless and Container based models
- Cost-effective
  - AWS provides no
    - upfront investment
    - long-term commitment
    - or minimum spend.
  - You can scale up or scale down as the demand for resources increases or decreases
- Simple and Per hour billing
  - Per Hour billing
  - Billing Dashboard in AWS is very simple

- Scalable and elastic
- Secure
  - provides customers with end-to-end security and end-to-end privacy
  - AWS incorporates the security into its services
  - AWS maintains confidentiality, integrity, and availability of your data which is the utmost importance of the aws
- Experienced
  - Amazon has become a global web platform that serves millions of customers, and AWS has been evolved since 2006, serving hundreds of thousands of customers worldwide.
- Stability and Trusted Vendor

Regions and Availability Zones

- Regions
  - Physical location around the world where Amazon cluster data centers
  - Each AWS Region consists of multiple, isolated, and physically separate AZ's within a geographic area
  - Each AZ has independent power, cooling, and physical security and is connected via redundant, ultra-low-latency networks.
  - AWS infrastructure Regions meet the highest levels of security, compliance, and data protection.
  - 27 Launched Regions
  - 5 Announced Regions
  - https://aws.amazon.com/about-aws/global-infrastructure/

- Availability Zones
  - An Availability Zone (AZ) is one or more discrete data centers with redundant power, networking, and connectivity in an AWS Region.
  - All AZs in an AWS Region are interconnected with high-bandwidth, low-latency networking, dedicated metro fiber providing high-throughput, low-latency networking between AZs.
  - All traffic between AZs is encrypted.

Accessing the AWS Platform

- To access AWS Cloud services
  - AWS Management Console
  - AWS Command Line Interface (CLI)
  - AWS Software Development Kits (SDKs).

- The **AWS Management Console** is a web application for managing AWS Cloud services. Access using the web browser.

- The AWS **Command Line Interface** (CLI) is a unified tool used to manage AWS Cloud services. With just one tool to download and configure, you can control multiple services from the command line and **automate** them through scripts.

- The AWS **Software Development Kits** (SDKs) provide an application programming interface. The SDKs provide support for many different programming languages

AWS Services overview

- **Compute and Networking Services**
  - AWS provides a variety of compute and networking services. This section offers a high-level description of the core computing and networking services.
- **Amazon Elastic Compute Cloud** (Amazon EC2)
  - It is a web service that provides resizable compute capacity in the cloud.
  - You can select from a variety of operating systems and resource configurations (memory, CPU, storage, and so on) that are optimal for the application profile of each workload.
  - Virtual Machine (https://aws.amazon.com/ec2/instance-types/)
- **Amazon Virtual Private Cloud** (Amazon VPC)
  - Provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network.
  - You have complete control over the virtual environment, including selection of the IP address range, creation of subnets, and configuration of route tables and network gateways.
  - In addition, organizations can extend their corporate data center networks to AWS by using VPN connections or AWS Direct Connect.

Compute and Networking Services…

- **Elastic Load Balancing**
  - Automatically distributes incoming application traffic across multiple Amazon
  - EC2 instances in the cloud.
- **Auto Scaling**
  - Auto Scaling allows organizations to scale Amazon EC2 capacity up or down automatically according to conditions defined for the particular workload
- **AWS Lambda**
  - It is a zero-administration compute platform for back-end web developers that runs your code for you on the AWS Cloud.
  - AWS Lambda runs your back-end code on its own AWS compute fleet of Amazon EC2 instances across multiple Availability Zones in a region, which provides the high availability, security, performance, and scalability of the AWS infrastructure.

Compute and Networking Services…

- **AWS Elastic Beanstalk**
  - It is the fastest and simplest way to get a web application up and running on AWS.
  - Developers can simply upload their application code, and the service automatically handles all the details, such as resource provisioning, load balancing, Auto Scaling, and monitoring.
- **AWS Direct Connect**
  - It allows organizations to establish a dedicated network connection from their data center to AWS.
- **Amazon Route 53**
  - It is a highly available and scalable Domain Name System (DNS) web service.

Storage and Content Delivery

- AWS provides a variety of services to meet your storage needs, such as Amazon Simple Storage Service, Amazon CloudFront, Amazon Elastic Block Store, EFS, S3 Glacier, Storage Gateway.
- **Amazon Simple Storage Service** (Amazon S3)
  - It provides developers and IT teams with highly durable and scalable object storage that handles virtually unlimited amounts of data and large numbers of concurrent users.
  - Amazon S3 provides cost effective object storage for a wide variety of use cases, including backup and recovery, big data analytics, disaster recovery and content distribution.
- **Amazon Glacier**
  - It is a secure, durable, and extremely low-cost storage service for data archiving and long term backup.
  - To keep costs low for customers, Amazon Glacier is optimized for infrequently accessed data where a retrieval time of several hours is suitable.

Database Services

- AWS provides fully managed relational and NoSQL database services, and in-memory caching as a service and a petabyte-scale data warehouse solution.
- **Amazon Relational Database Service** (Amazon RDS)
  - It provides a fully managed relational database with support for many popular open source and commercial database engines. It's a cost-efficient service that
  - allows organizations to launch secure, highly available, fault-tolerant, production-ready databases in minutes.
- **Amazon DynamoDB**
  - It is a fast and flexible NoSQL database service for all applications that need consistent, single-digit millisecond latency at any scale.
  - It is a fully managed database and supports both document and key/value data models.
  - Its flexible data model and reliable performance make it a great fit for mobile, web, gaming, ad-tech, Internet of Things, and many other applications.

Database Services…

- **Amazon Redshift**
  - It is a fast, fully managed, petabyte-scale data warehouse service that makes it simple and cost effective to analyze structured data.
  - Amazon Redshift provides a standard SQL interface that lets organizations use existing business intelligence tools.
- **Amazon ElastiCache**
  - It is a web service that simplifies deployment, operation, and scaling of an in-memory cache in the cloud.
  - The service improves the performance of web applications by allowing organizations to retrieve information from fast, managed, in-memory caches

Management & Governance

- **Amazon CloudWatch**
  - It is a monitoring service for AWS Cloud resources and the applications running on AWS.
  - It allows organizations to collect and track metrics, collect and monitor log files, and set alarms.
- **AWS CloudFormation**
  - It gives developers and systems administrators an effective way to create and
  - manage a collection of related AWS resources, provisioning and updating them in an orderly and predictable fashion.
  - AWS CloudFormation defines a JSON-based or YML based templating language that can be used to describe all the AWS resources that are necessary for a workload.

Management & Governance

- **AWS CloudTrail**
  - It is a web service that records AWS API calls for an account and delivers log files for audit and review.
  - The recorded information includes the identity of the API caller, the time of the API call, the source IP address of the API caller, the request parameters, and the response elements returned by the service.
- **AWS Systems Manager**
  - It gives you visibility and control of your infrastructure on AWS. Systems Manager provides a unified user interface so you can view operational data from multiple AWS services and allows you to automate operational tasks across your AWS resources

Security, Identity & Compliance

- AWS provides security and identity services that help organizations secure their data and systems on the cloud.
- **AWS Identity and Access Management** (IAM)
  - It enables organizations to securely control access to AWS Cloud services and resources for their users.
  - Using IAM, organizations can create and manage AWS users and groups and use permissions to allow and deny their access to AWS resources.
- **AWS Key Management Service** (KMS)
  - It is a managed service that makes it easy for organizations to create and control the encryption keys used to encrypt their data and uses Hardware Security Modules (HSMs) to protect the security of your keys.
  - AWS KMS is integrated with several other AWS Cloud services to help protect data stored with these services.

Security, Identity & Compliance

- **AWS Directory Service**
  - It allows organizations to set up and run Microsoft Active Directory on the AWS Cloud or connect their AWS resources with an existing on-premises Microsoft Active Directory.
  - Organizations can use it to manage users and groups, provide single sign-on to applications and services, create and apply Group Policies, domain join Amazon EC2 instances, and simplify the deployment and management of cloud-based Linux and Microsoft Windows workloads.
- **AWS Certificate Manager**
  - It is a service that lets organizations easily provision, manage, and deploy

  SSL/TLS certificates for use with AWS Cloud services.
  - With AWS Certificate Manager, organizations can quickly request a certificate, deploy it on AWS resources such as Elastic Load Balancing or Amazon CloudFront distributions, and let AWS Certificate Manager handle certificate renewals.

Security, Identity & Compliance

- **AWS Web Application Firewall** (WAF)
  - It helps protect web applications from common attacks and exploits that could affect application availability, compromise security, or consume excessive resources.
  - AWS WAF gives organizations control over which traffic to allow or block to their web applications by defining customizable web security rules.
- **AWS Shield**
  - It is a managed Distributed Denial of Service (DDoS) protection service that safeguards applications running on AWS.
  - AWS Shield provides always-on detection and automatic inline mitigations that minimize application downtime and latency, so there is no need to engage AWS Support to benefit from DDoS protection.

Application Services

- **Amazon API Gateway**
  - It is a fully managed service that makes it easy for developers to create, publish, maintain, monitor, and secure APIs at any scale.
  - Organizations can create an API that acts as a "front door" for applications to access data, business logic, or functionality from back-end services.

- **Amazon Simple Notification Service** (Amazon SNS)
  - It is a web service that coordinates and manages the delivery or sending of messages to recipients.
  - In Amazon SNS, there are two types of clients. publishers and subscribers—also referred to as producers and consumers.

Application Services

- **Amazon Simple Email Service** (Amazon SES)
  - It is a cost-effective email service that organizations can use to send transactional email, marketing messages, or any other type of content to their customers.
  - Amazon SES can also be used to receive messages and deliver them to an Amazon S3 bucket, call custom code via an AWS Lambda function, or publish notifications to Amazon SNS.
- **Amazon Simple Queue Service** (Amazon SQS)
  - It is a fast, reliable, scalable, fully managed message queuing service. Amazon SQS makes it simple and cost effective to decouple the components of a cloud application.

Container Services

- **Elastic Container Registry**
  - It is a fully managed container registry that makes it easy to store, manage, share, and deploy your container images and artifacts anywhere
- **Elastic Container Service**
  - It is a fully managed container orchestration service.
- **Elastic Kubernetes Service**
  - It gives you the flexibility to start, run, and scale Kubernetes applications in the AWS cloud or on-premises.
  - Amazon EKS helps you provide highly-available and secure clusters and automates key tasks such as patching, node provisioning, and updates.