AWS Basics – Introduction, Regions, Availability Zones, and Core Services

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1. Introduction to AWS

Amazon Web Services (AWS) is the world's most widely adopted cloud platform, offering on-demand IT resources over the internet with **pay-as-you-go pricing**.

Instead of investing heavily in physical data centers and servers, organizations can use AWS to:

- Quickly **provision resources**
- **Scale up or down** based on demand
- Pay only for what they use

Key benefits of AWS:

- Global availability
- Reliability & scalability
- Security & compliance
- Cost-effectiveness
- Wide range of services (200+ services)

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2. AWS Global Infrastructure

AWS resources are deployed across a global network of data centers to provide **high availability, fault tolerance, and low latency**.

Key Components:

1. **Regions**
    - A **Region** is a **geographic location** where AWS has multiple data centers.
    - Example: `us-east-1` (N. Virginia), `ap-south-1` (Mumbai).
    - Each Region is isolated from others for fault tolerance.
2. **Availability Zones (AZs)**
    - Each Region consists of **2 or more AZs** (physically separate data centers).
    - AZs are connected by **low-latency, high-bandwidth networking**.
    - They provide **high availability** by allowing workloads to be distributed.
3. **Edge Locations**

- Data centers in major cities used by **Amazon CloudFront (CDN)** to deliver content faster.

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3. AWS Region & AZ Examples

- **Asia Pacific (Mumbai) – ap-south-1** → 3 AZs
- **US East (N. Virginia) – us-east-1** → 6 AZs
- **Europe (London) – eu-west-2** → 3 AZs

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4. Core AWS Services

AWS offers services across multiple domains. Some of the most widely used categories:

4.1 Compute

- **EC2 (Elastic Compute Cloud):** Virtual servers to run applications
- **Lambda:** Run code without provisioning servers (serverless)
- **ECS / EKS:** Container services for Docker & Kubernetes

4.2 Storage

- **S3 (Simple Storage Service):** Object storage for files, backups, big data
- **EBS (Elastic Block Store):** Persistent block storage for EC2
- **Glacier:** Long-term archival storage

4.3 Networking

- **VPC (Virtual Private Cloud):** Private network within AWS
- **Route 53:** DNS and domain name management
- **CloudFront:** Global Content Delivery Network (CDN)

4.4 Database

- **RDS (Relational Database Service):** Managed SQL databases (MySQL, PostgreSQL, Oracle, etc.)
- **DynamoDB:** Fully managed NoSQL database
- **Redshift:** Data warehouse for analytics

4.5 Security & Identity

- **IAM (Identity & Access Management):** Manage users, roles, and permissions

- **KMS (Key Management Service):** Encryption key management

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5. Advantages of AWS

1. **Global Reach** → 30+ Regions, 100+ AZs worldwide
2. **Elasticity & Scalability** → Scale resources automatically
3. **Pay-as-you-go Pricing** → No upfront hardware cost
4. **High Security** → Compliance with ISO, SOC, HIPAA, etc.
5. **Innovation Speed** → Rapid release of new services and features