

Amazon Web Services (AWS) – Overview & Key Concepts

AWS (Amazon Web Services) is a secure cloud services platform offering compute power, storage, databases, networking, machine learning, and more, on-demand and pay-as-you-go.

◆ 1. Fundamentals of AWS

• Cloud Computing Models:

- **IaaS** (Infrastructure as a Service): e.g., EC2
- **PaaS** (Platform as a Service): e.g., Elastic Beanstalk
- **SaaS** (Software as a Service): e.g., AWS Marketplace tools

• Global Infrastructure:

- **Regions:** Geographical areas (e.g., US-East-1)
- **Availability Zones (AZs):** Data centers within regions
- **Edge Locations:** Used by services like CloudFront for low-latency content delivery

- **Free Tier:** Limited AWS services are free for 12 months (e.g., EC2, S3, Lambda).
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◆ 2. Compute, Storage & Networking

✓ Compute Services:

- **EC2 (Elastic Compute Cloud):** Virtual servers for running applications
- **Elastic Beanstalk:** Automatically deploys apps (PaaS)
- **Auto Scaling:** Automatically increases or decreases EC2 instances
- **ECS/EKS:** Container services for Docker and Kubernetes
- **Lambda:** Serverless computing – run code without managing servers

✓ Storage Services:

- **S3 (Simple Storage Service):** Object storage for files, backups, static websites
- **EBS (Elastic Block Store):** Block-level storage for EC2 instances
- **EFS (Elastic File System):** Scalable file storage, shared across instances
- **Glacier:** Low-cost archival storage

✓ Networking Services:

- **VPC (Virtual Private Cloud):** Isolated network within AWS

- **Route 53:** DNS and domain registration
 - **CloudFront:** Content Delivery Network (CDN) for global content caching
 - **Elastic Load Balancing (ELB):** Distributes traffic across multiple EC2 instances
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◆ 3. Databases & Serverless

✓ Databases:

- **RDS (Relational Database Service):** Managed SQL databases (MySQL, PostgreSQL, Oracle, etc.)
- **Aurora:** High-performance MySQL/PostgreSQL-compatible database
- **DynamoDB:** NoSQL database with fast performance
- **Redshift:** Data warehousing and analytics
- **ElastiCache:** In-memory caching using Redis/Memcached

✓ Serverless Services:

- **AWS Lambda:** Event-driven, serverless compute
- **API Gateway:** Manage and deploy APIs for serverless apps
- **Step Functions:** Orchestrate multiple AWS services using workflows

- **EventBridge:** Event bus to connect services using events
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◆ 4. DevOps, Monitoring & Security

✓ DevOps:

- **CodeCommit:** Source control (Git)
- **CodeBuild:** Continuous integration (CI)
- **CodeDeploy:** Automated deployment
- **CodePipeline:** CI/CD pipeline orchestration

✓ Monitoring & Logging:

- **CloudWatch:** Monitoring and alerting for AWS resources
- **CloudTrail:** Logs all API activity in AWS for auditing
- **X-Ray:** Debugging and tracing distributed applications

✓ Security Services:

- **IAM (Identity and Access Management):** Manage users, groups, roles, and permissions
- **KMS (Key Management Service):** Create and manage encryption keys
- **AWS Shield:** DDoS protection

- **WAF (Web Application Firewall):** Protect against web exploits
- **Secrets Manager & Parameter Store:** Securely store credentials and configuration data