

AWS Core Services — Quick Notes

1. VPC (Virtual Private Cloud)

- A private, isolated network within AWS.
- You define IP ranges, subnets, route tables, and gateways.
- Enables secure communication between AWS resources.
- Key components: Subnets, Route Tables, Internet/NAT Gateways, Security Groups, NACLs.

2. ALB (Application Load Balancer)

- Distributes incoming traffic across multiple targets (EC2, containers, Lambda).
- Works at **Layer 7 (Application layer)** — routes based on URL, headers, or path.
- Supports HTTPS, sticky sessions, and WebSockets.
- Essential for scaling web apps and microservices.

3. Route 53

- AWS's scalable **DNS (Domain Name System)** service.
- Connects user requests to AWS resources (like EC2, S3, ALB).
- Supports domain registration, health checks, and routing policies (simple, weighted, latency-based, etc.).

4. EC2 (Elastic Compute Cloud)

- Provides resizable virtual machines (instances) in the cloud.
- Choose instance types for CPU, memory, storage, and networking needs.
- Use Auto Scaling and Load Balancing for high availability.
- Pay only for what you use (On-Demand, Reserved, or Spot).

5. ECS (Elastic Container Service)

- AWS's container orchestration service for Docker containers.
- Manage clusters of EC2 instances or use **Fargate** for serverless containers.
- Handles deployment, scaling, and load balancing for containerized apps.

6. EKS (Elastic Kubernetes Service)

- Managed Kubernetes service.
- AWS handles the control plane — you manage the worker nodes or use Fargate.
- Integrates with IAM, CloudWatch, and ALB.
- Simplifies running production-grade Kubernetes clusters.

7. Lambda

- **Serverless compute** — run code without provisioning servers.
- Triggered by events (S3 upload, API Gateway, DynamoDB stream, etc.).
- Billed only for compute time (milliseconds).
- Supports multiple languages (Python, Node.js, Java, etc.).

8. S3 (Simple Storage Service)

- Object storage for files, backups, static websites, and data lakes.
- Scalable, durable (11 nines), and secure.
- Lifecycle policies for cost optimization (Standard, IA, Glacier).
- Supports versioning and cross-region replication.

9. RDS (Relational Database Service)

- Managed relational database service (MySQL, PostgreSQL, MariaDB, Oracle, SQL Server, Aurora).
- Handles backups, patching, and scaling.
- Multi-AZ for high availability; Read Replicas for performance.
- Great for transactional workloads.

10. CloudWatch

- Monitoring and observability service.
- Collects logs, metrics, and events from AWS resources.
- Set alarms, dashboards, and automated responses.
- Helps troubleshoot performance issues and optimize costs.

11. IAM (Identity and Access Management)

- Manages access and permissions for AWS users and services.
- Create **Users, Groups, Roles, and Policies**.
- Enforce **least privilege** and enable **MFA** for security.
- Integrates with SSO and external identity providers.