Cloud Service Models

1. **IaaS (Infrastructure as a Service)**: Provides the basic building blocks for IT infrastructure (e.g., EC2).
2. **PaaS (Platform as a Service)**: Allows users to deploy applications without managing underlying infrastructure (e.g., Elastic Beanstalk).
3. **SaaS (Software as a Service)**: Fully managed software applications (e.g., AWS Managed Services).

Shared Responsibility Model

- **AWS's Responsibilities**: Security of the cloud infrastructure (e.g., data centers, networking).
- **Client's Responsibilities**: Security within the cloud, such as data management, IAM (Identity and Access Management), and application-level security.

AWS Global Infrastructure

AWS's infrastructure is divided into:

- **Regions**: Geographic areas (e.g., us-east-1).
- **Availability Zones (AZs)**: Isolated data centers within each region.
- **Edge Locations**: Locations used for content delivery (e.g., CDN services).

Key AWS Service Categories

- **Compute Services**: EC2 (VMs), Lambda (serverless), ECS (containers).
- **Storage Services**: S3 (object storage), EBS (block storage), EFS (file storage).
- **Database Services**: RDS, DynamoDB, Aurora (relational), and others.
- **Analytics Services**: Athena (querying S3 data), Redshift (data warehousing), EMR (big data processing).
- **ML and AI**: SageMaker (machine learning), Rekognition (image analysis).

EC2 (Elastic Compute Cloud)

EC2 provides scalable virtual computing in the cloud. It offers:

- **Elasticity**: Ability to scale compute resources up or down.
- **AMIs (Amazon Machine Images)**: Pre-configured system images for EC2 instances.
- **Integration**: Works with other AWS services like S3 and RDS.
- **Lifecycle**: EC2 instances go through various states, including launch, stop, terminate, and reboot.
- **Data Storage**: EC2 integrates with storage services like S3, EFS, and EBS.
- **Common Use Cases**: Web hosting, data processing, machine learning, and disaster recovery.

Lambda (Serverless Computing)

Lambda allows event-driven, serverless computing. Features include:

- **Event-Driven Execution**: Lambda functions are triggered by AWS events.
- **Runtime Support**: Supports multiple languages (e.g., Python, Java, Node.js).
- **Scalability**: Automatically adjusts to demand.
- **Cost-Efficiency**: You pay only for the time the function executes.

Key Takeaways

- AWS offers a wide range of services that cover almost every aspect of cloud computing.
- The **Shared Responsibility Model** is crucial for understanding the security framework within AWS.
- **EC2** is versatile and scalable for virtual computing workloads, requiring more management of the infrastructure.
- **Lambda** abstracts infrastructure management, offering a cost-effective, serverless way to run code.
- Both **EC2** and **Lambda** are vital for data analytics and engineering tasks within the AWS ecosystem.