**IAM :** Identity Access Management

* IAM role is set of permissions in AWS
* IAM is allowed and denied for users and applications AWS Services

Why IAM :

1. Access Management: It Controls access to AWS resources securely by assigning permissions.
2. Secure Temporary Access : IAM roles provide temporary access to AWS resources using security tokens.

**Where is IAM Used?**

1. AWS EC2: An EC2 instance can assume an IAM role to access resources like S3 or DynamoDB without storing credentials.
2. AWS Lambda: Lambda functions can use IAM roles to read or write to S3 buckets, interact with RDS databases, or call other AWS services.
3. AWS ECS/EKS: Containers running on AWS ECS or EKS can assume roles to manage resources securely.
4. AWS API Gateway: Secures API endpoints using IAM roles for authentication and authorization.
5. AWS Cross-Account Access: Access resources in another AWS account using IAM roles without creating multiple users.
6. Data Access: Grant applications permissions to read from or write to AWS services like S3, SNS, or SQS using IAM roles.

**EC2 : Elastic Compute Cloud**

* Amazon Ec2 is web service provided by AWS that offers virtual servers in cloud.
* EC2 allows to run application on virtual machines called instances without having to invest in physical hardware.

**Features:**

* **Scalable compute capacity** : can quickly launch or terminate instances when need.
* **Flexible instance types :** We can choose from various instance types optimized for compute, memory or storage.
* **Elasticity** : Easily scale up or down to handle traffic demands using Auto Scaling.
* Pay-As-You-Go : Pay Only for compute capacity use.
* Security : Used IAM roles to control acess.

**Why Use EC2:**

* Host Websites and applications.
* Run development and testing environments.
* Perform data analysis and processing.
* Deploy machine learning models.

**How EC2 Works**

1. **Launch an Instance**: Choose an Amazon Machine Image (**AMI**), which contains the OS and software configuration.
2. **Choose Instance Type**: Select the compute capacity (CPU, memory, storage).
3. **Configure Network and Security**: Set up VPC, assign IPs, and define security group rules.
4. **Connect and Manage**: Access the instance using SSH (Linux) or RDP (Windows).
5. **Monitor and Scale**: Use **CloudWatch** to monitor performance and set up Auto Scaling.