Cloud Computing and Amazon EC2

What is Cloud Computing?

- Cloud computing refers to the on-demand delivery of IT resources such as compute power, storage, and applications via the internet through a cloud services platform like AWS. It follows a pay-as-you-go pricing model.

- Users can access these IT resources provided by a cloud provider like AWS through a web interface.

- **Key Concepts:**

    1. **On-Demand:** Instantly access the resources you need whenever required.

    2. **Scalable:** Adjust the configuration (e.g., CPU, RAM) up or down based on your needs.

    3. **Pay-as-You-Go:** Pay only for the resources you actually use, with no upfront costs.

Amazon EC2 (Elastic Compute Cloud)

- **EC2** is a popular AWS service that allows you to quickly launch virtual servers, known as instances, with your required configuration within minutes.

- You can modify the configuration, such as CPU and RAM, even after launching the instances, without needing to stop them.

- EC2 is widely used in companies for a variety of purposes.

Key Components of EC2:

1. **AMI (Amazon Machine Image):**

   ○ An AMI is an operating system image in AWS. AWS offers a selection of predefined operating systems for both Windows and Linux. You must choose an OS from AWS's provided list; external OS imports are not allowed.

2. **Instance Type:**

   ○ Here, you select the combination of CPU cores and RAM. AWS offers optimized pairs to provide the best possible performance. These combinations are referred to as instance types.

3. **EBS (Elastic Block Storage):**

   ○ EBS is a virtual hard disk that you attach to your instances. You can choose the size and number of volumes you need. EBS can store both the operating system and additional data, such as media files and documents.

   ○ **Object Storage:** Stores files like MP3s, MP4s, pictures, and documents.

   ○ **Block Storage:** Stores the operating system and databases.

4. **Tag:**

   ○ A tag is a meaningful name assigned to an EC2 instance for identification purposes.

5. **Security Groups:**

   - Security groups manage the ports that allow traffic to and from your instance. A port is like a door to your instance, with a total range of 0 - 65535 available. Each port has specific uses:

     - **RDP (3389):** Used to access Windows servers.

     - **SSH (22):** Used to access Linux servers.

     - **HTTP (80) and HTTPS (443):** Used for web traffic.

   - Other ports are available for specialized purposes, which can be discussed in more advanced sessions.

6. **Key Pair:**

   - A key pair acts as a security measure, similar to a password. By default, you receive a .pem (Privacy-Enhanced Mail) key file. To access a Windows instance, this .pem file must be converted into a password, as Windows instances support password-based access only.

Best Practices:

- After completing your tasks, it's advisable to either stop or terminate your instance. Stopping the instance allows you to start it again later, whereas terminating it will permanently delete the instance.

By understanding these concepts and components, you can effectively use cloud computing and EC2 services to meet your IT needs in a scalable, cost-effective, and secure manner.