**CLOUD COMPUTING**

**Cloud Computing** is the on-demand delivery of IT resources over the internet with pay-as-you-go pricing. Instead of buying, owning and maintaining physical data centers and servers, you can access technology services, such as computing, power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services (AWS).

Organizations of every type, size, and industry are using the cloud the cloud for a wide variety of use cases, such as data backup, disaster recovery, email, virtual desktops, software development and testing, big data analytics, and customer-facing web applications. For example, healthcare companies are using the cloud to develop more personalized treatments for patients. Financial services companies are using the cloud to power real-time fraud detection and prevention. And video game makers are using the cloud to deliver online games to millions of players around the world.

**Benefits of Cloud Computing :**

**Agility :** The cloud gives you access to a broad range of technologies so that you can innovate faster and build nearly anything that you can imagine.

**Elasticity :** The cloud can scale the resources up or down to instantly grow and shrink capacity as your business needs change.

**Cost Savings :** The cloud allows you to trade fixed expenses (such as data centers and physical servers) for variable expenses, and only pay for IT as you consume it.

**Deploy globally in minutes :** Cloud can expand new geographic regions and deploy globally in minutes.

**Components of AWS :**

1. Compute Services:

**Amazon EC2 (Elastic Compute Cloud):** It is a web service that provides resizable compute capacity in the cloud. It allows users to run virtual servers, known as “instances”, on-demand. EC2 instances can be quickly provisioned and configured to meet the varying computing needs of application.

**AWS Lambda**: It allows you to run code without the need to provision or manage servers. It is commonly used for tasks like data processing, real-time file processing, image resizing, and handling backend logic for web and mobile application.

2. Storage Services:

**Amazon S3 (Simple Storage Service):** It is widely used for a variety of use cases, including data backup and archiving, content distribution, application data storage, and as a foundation for building scalable and reliable cloud applications.

**Amazon EBS (Elastic Block Store):** It is a scalable block storage service provided by AWS. It is designed for use with Amazon EC2, providing persistent block-level.

**3. Database Services:**

Amazon RDS (Relational Database Service): Managed relational database service supporting various database engines.

Amazon DynamoDB: Fully managed NoSQL database service for fast and predictable performance with seamless scalability.

**4. Networking Services:**

Amazon VPC (Virtual Private Cloud): Allows you to create isolated networks within the AWS cloud.

Amazon Route 53: A scalable and highly available domain name system (DNS) web service.

**5. Security and Identity:**

AWS IAM (Identity and Access Management): Manages access to AWS services and resources securely.

AWS Key Management Service (KMS): Helps create and control encryption keys used to encrypt data.

**6. Management Tools:**

Amazon CloudWatch: Monitors AWS resources and applications, providing data and actionable insights.

AWS CloudFormation: Enables you to define and provision AWS infrastructure as code.

**7. Application Integration:**

Amazon SQS (Simple Queue Service): Fully managed message queuing service.

Amazon SNS (Simple Notification Service): Fully managed publish/subscribe messaging service.

**AMAZON EC2:**

Amazon Elastic Compute Cloud (Amazon EC2) provides virtual machines where you can host the same kinds of applications that you might run on a traditional on-premises server.

It provides secure, resizable compute capacity in the cloud. EC2 instances can support a variety of workloads. Common uses for EC2 instances include, but are not limited to:

•Application servers

•Web servers

•Game servers

•Mail servers

•Media servers

•Catalog servers

•File servers

•Computing servers

•Proxy servers

**AMAZON EC2 COMPONENTS :**

**Amazon Machine Images (AMIs):**

Preconfigured templates for your instances that package the components you need for your server (including the operating system and additional software).

**Instance types:**

Various configurations of CPU, memory, storage, networking capacity, and graphics hardware for your instances.

**Key pairs:**

Secure login information for your instances. AWS stores the public key and you store the private key in a secure place.

**Instance store volumes:**

Storage volumes for temporary data that is deleted when you stop, hibernate, or terminate your instance.

**Amazon EBS volumes:**

Persistent storage volumes for your data using Amazon Elastic Block Store (Amazon EBS).

**Regions, Availability Zones, Local Zones, AWS Outposts, and Wavelength Zones:**

Multiple physical locations for your resources, such as instances and Amazon EBS volumes.

**Security groups:**

A virtual firewall that allows you to specify the protocols, ports, and source IP ranges that can reach your instances, and the destination IP ranges to which your instances can connect.

**Elastic IP addresses:**

Static IPv4 addresses for dynamic cloud computing.

**Tags:**

Metadata that you can create and assign to your Amazon EC2 resources.

Virtual private clouds (VPCs):

Virtual networks you can create that are logically isolated from the rest of the AWS Cloud. You can optionally connect these virtual networks to your own network.