

ASSIGNMENT-3

Q1 Discuss the following AWS services in brief.

i) EC2 :-

- Amazon EC2 stands for Elastic Compute Cloud which provides scalable computing capacity in the Amazon web services (AWS) cloud.
- Using Amazon EC2 eliminates your need to invest in hardware up front, so you can develop and deploy applications faster.
- You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage.
- Amazon EC2 enables you to scale up or down to handle changes in requirement or spike in popularity, reducing your need to forecast traffic.

* Following are the features of Amazon EC2:

- Virtual computing environment, known as instances.

- Various configurations of CPU, memory, storage & networking capacity for your instances, known as instance type.
- Persistent storage volumes for your data using Amazon Elastic Block Store (Amazon EBS), known as Amazon EBS volumes.
- A firewall that enables you to specify the protocols, ports & source IP ranges that can reach your instances using security groups.
- Metadata, known as tags, that you can create and assign to your Amazon EC2 resources.

2) Elastic Beanstalk:

- AWS Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS.
- You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring. At the same time, you retain

full control over the AWS resources powering your application and can access the underlying resources at any time.

- There is no additional charge for Elastic Beanstalk - you pay only for the AWS resources needed to store and run your applications.

* Benefits :

- Fast and simple to begin :
- Elastic Beanstalk is the fastest & simplest way to deploy your application on AWS. You simply use the AWS Management Console, a Git repository or an integrated development environment (IDE) such as Eclipse or Visual Studio to upload your application.
- Impossible to outrun :
- Elastic Beanstalk automatically scales your application up and down based on your application's specific need using easily adjustable Auto Scaling settings. For example, you can use CPU utilization metrics to trigger Auto Scaling actions.

- Developer productivity:

- Elastic Beanstalk provisions and operates the infrastructure and manages the application stack (platform) for you so you don't have to spend the time or develop the expertise to keep the underlying platform running your application up-to-date with the latest patches and code updates.

- Complete resource control:

- You have the freedom to select the AWS resources, such as Amazon EC2 instance type and processor type to run the workload on that are optimal for your application. You also retain full control over the AWS resources powering your application.

3) IAM:

- AWS Identity and Access Management (IAM) provides fine-grained access control across all of AWS. With IAM, you can specify who has access to which services and resources, and under what conditions. With IAM policies, you manage permissions to your workflow and systems to ensure least-privilege permissions.

→ IAM is a feature of your AWS account and is offered at no additional charge.

4) ELB :

→ ELB stands for Elastic Load Balancing which is a load-balancing service for Amazon Web Services (AWS) deployments. ELB automatically distributes incoming application traffic and scales resources to meet traffic demands.

→ ELB helps an IT team adjust capacity according to incoming application and network traffic. Users enable ELB within a single availability zone or across multiple availability zones to maintain consistent application performance.

→ Historically, load balancing divides the amount of work that a computer has to do among multiple computers so that users, in general, get served faster. ELB offers enhanced features including:

- Detection of unhealthy Elastic Compute Unit (EC2) instances.
- Spreading instances across healthy channels only.
- Flexible cipher support.

- Centralized management of Secure Sockets Layer (SSL) certificates.
- Optional public key authentication.
- Support for both IPV4 and IPV6.

5) S3 :

→ Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance. Businesses of all sizes and industries can use Amazon S3 to store and protect any amount of data for a range of use cases, such as data lakes, websites, mobile applications, backup and restore, archive enterprise applications, IoT devices, and big data analytics. Amazon S3 provides management features so that you can optimize, organize, and configure access to your data to meet your specific business, organizational, and compliance requirements.

6) EBS :

→ Amazon Elastic Block Store (Amazon EBS) provides block level storage volumes for use with EC2 instances. EBS volumes behave like raw,

unformatted block devices. You can mount these volumes as devices on your instances. EBS volumes that are attached to an instance are exposed as storage volumes that persist independently from the life of the instance. You can create a file system on top of these volumes, or use them in any way you would use a block device (such as hard disk). You can dynamically change the configuration of a volume attached to an instance.

* Features of Amazon EBS:-

- o You can create an EBS volume in a specific Availability Zone, and then attach it to an instance in that same Availability zone. To make a volume available outside of the Availability zone, you can make a snapshot and restore that snapshot to a new volume anywhere in that Region.
- o You can make point-in-time snapshots of EBS volumes, which are persisted to Amazon S3. Snapshot protect data for long-term durability, and they can be used as the starting point for new EBS volumes. The same snapshot can be used to instanciate as many volumes as you wish.

7) FSx for Lustre

- FSx for Lustre makes it easy and cost-effective to launch and run the popular, high-performance Lustre file system. You use Lustre for workloads where speed matters, such as machine learning, high performance computing (HPC), video processing, and financial modeling.
- The Open-Source Lustre file system is designed for applications that require fast storage - where you want your storage to keep up with your compute. Lustre was built to solve the problem of quickly and cheaply processing the world's ever-growing datasets. It's a widely used file system designed for the fastest computers in the world.
- As a fully managed service, Amazon FSx makes it easier for you to use Lustre for workloads where storage speed matters. FSx for Lustre eliminates the traditional complexity of setting up and managing Lustre file systems, enabling you to spin up and run a battle-tested high-performance file system in minutes. It also provides multiple deployment options so you can optimize cost for your needs.

8) Glacier:

- Amazon S3 Glacier is a secure, durable and extremely low-cost Amazon S3 storage class for data archiving and long-term backup.
- With S3 Glacier, customers can store their data most effectively for months, years or even decades. S3 Glacier enables customers to offload the administrative burdens of operating and scaling storage to AWS, so they don't have to worry about capacity planning, hardware provisioning, data replication, hardware failure detection and recovery, or time-consuming hardware migration. ~~For free~~

- S3 Glacier is one of the many different storage classes for Amazon S3. ~~For a~~

9) SageMaker:

- Amazon SageMaker is a cloud machine-learning platform that was launched in November 2017. SageMaker enables developers to create, train, and deploy machine learning models in cloud. SageMaker also enables developers to deploy ML models on embedded systems and edge devices.

- SageMaker enables developers to operate at a number of levels of abstraction when training and deploying machine learning models. At its highest level of abstraction, SageMaker provides pre-trained ML models that can be deployed as-is. In addition, SageMaker provides a number of built-in ML algorithms that developers can train on their data.
- Further, SageMaker provides managed instances of TensorFlow and Apache MXNet where developers can create their own ML algorithms from scratch.
- Regardless of which level of abstraction is used, a developer can connect their SageMaker-enabled ML models to other AWS services, such as the AmazonDB database for structured data storage, AWS Lambda for offline batch processing, or Amazon Kinesis for real-time processing.
- A number of interfaces are available for developers to interact with SageMaker. First, there is a Web API that remotely controls a SageMaker server instance.

10) Amazon Rekognition:-

- Amazon Rekognition makes it easy to add image and video analysis to your application using proven, highly scalable, deep learning technology that requires no machine learning expertise to use. With Amazon Rekognition, you can identify objects, people, text, scenes, and attributes in images and videos as well as detect any inappropriate content.
- Amazon Rekognition also provides highly accurate facial analysis and facial search capabilities that you can use to detect, analyze, and compare faces for a wide variety of user verification, people counting, and public safety use cases.
- With Amazon Rekognition custom labels, you can identify objects and scenes in images that are specific to your business needs. For example, you can build a model to classify specific machine parts on your assembly line or to detect unhealthy plants.
- Amazon Rekognition history labels takes care of the model development heavy lifting for you, so no machine learning experience is required. You simply need to supply images of objects or scenes you want to identify. & the service handles

the rest.

11) SNS :-

→ Amazon CloudWatch uses Amazon SNS to send email. First, create and subscribe to an SNS topic. When you create a CloudWatch alarm, you can add this SNS topic to send an email notification when the alarm changes state.

12) SES :-

→ Amazon Simple Email Service (SES) is a cost-effective, flexible, and scalable email service that enables developers to send mail from within any application. You can configure Amazon SES quickly to support several email use cases, including transactional, marketing, or mass email communications. Amazon SES's flexible IP deployment and email authentication options help drive higher deliverability and protect sender reputation, while sending analytics measure the impact of each email. With Amazon SES, you can send email securely, globally and at scale.

13) Lambda :-

→ With AWS Lambda , you can run code without provisioning or managing servers . You pay only for the compute time that you consume there's no charge when your code isn't running . You can run code for virtually any type of application or backend service all with zero administration . Just upload your code and Lambda takes care of everything required to run and scale your code with high availability . You can set up your code to automatically trigger from the other AWS services or call it directly from any web or mobile app .

14) RDS :-

→ Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database in the cloud . It provides cost-efficient and resizable capacity while automatically handling time-consuming administration tasks such as hardware provisioning, database setup, patching and backups . It frees you to focus on your applications so you can give them the fast performance, high availability, security and compatibility they need .

→ Amazon RDS is available on several database instance types - optimized for memory, performance or I/O - and provides you with six familiar database engines to choose from, including Amazon Aurora, PostgreSQL, MySQL, MariaDB, Oracle Database and SQL Server. You can use the AWS Database Migration Service to easily migrate or replicate your existing database to Amazon RDS.

15) Cloud9:

→ AWS Cloud9 is a cloud-based integrated development environment (IDE) that lets you write, run, and debug your code with just a browser. It includes a code editor, debugger, and terminal. Cloud9 comes repackaged with essential tools for popular programming languages, including JavaScript, Python, PHP, and more, so you don't need to install files or configure your development machine to start new projects. Since your Cloud9 IDE is cloud-based, you can work on your projects from your office, home or anywhere using an internet-connected machine. Cloud9 also provides a seamless experience for developing serverless applications, enabling you to easily define resources, debug, and switch between local and remote execution of serverless applications.

16) Logins :-

→ Amazon Logins Federated Identities is a web service that delivers signed temporary credentials to mobile devices and other untrusted environments. It uniquely identifies a device and supplies the user with a consistent identity over the lifetime of an application.

→ Using Amazon Logins Federated Identities, you can enable authentication with one or more third-party identity provider (Facebook, Google or login with Amazon) or an Amazon Logins user pool, and you can also choose to support unauthenticated access from your app. Logins delivers a unique identifier for each user and acts as an OpenID token provider trusted by AWS Security Token Service (STS) to access temporary, limited-privilege AWS credentials.

17) VPC :-

→ Amazon Virtual Private Cloud (Amazon VPC) gives you full control over your virtual networking environment, including resource placement, connectivity and security. Get started by setting up your VPC in the AWS service console. Next, add resources to it such as Amazon Elastic Compute Cloud (EC2) and Amazon Relational Database Service (RDS) instances. Finally, define

how your VPCs communicate with each other across accounts, Availability zones, or AWS Regions. Ex -

18) Route 53:

- Amazon Route 53 is a highly available and scalable cloud Domain Name System (DNS) web service. It is designed to give developers and businesses an extremely reliable and cost effective way to route end users to Internet applications by translating names like www.example.com into the numeric IP addresses like 192.0.2.1 that computers use to connect to each other. Amazon Route 53 is fully compliant with IPv6 as well.
- Amazon Route 53 effectively converts user requests to infrastructure running in AWS - such as Amazon EC2 instances, Elastic Load Balancing load balancers, or Amazon S3 buckets - and can also be used to route users to infrastructure outside of AWS. You can use Amazon Route 53 to configure DNS health checks, then continuously monitor your application's ability to recover from failures and control application recovery with Route 53 Application Recovery Controller.