

St. Francis Institute of Technology, Mumbai-400 103

Department Of Information Technology

A.Y. 2024-2025

Class: TE-ITA/B, Semester: V

Subject: **Advanced DevOps Lab**

Experiment – 1: To create a free tier AWS account.

1. **Aim:** To understand benefits of cloud infrastructure and create a free tier AWS account.
2. **Objectives:** After study of this experiment, the student will be able to
 - Understand basic cloud computing concepts
 - Create a free tier AWS account.
3. **Lab objective mapped : ITL504.1:** To understand the fundamentals of Cloud Computing and be fully proficient with Cloud based DevOps solution deployment options to meet your business requirements.
4. **Prerequisite:** creating account on web app.
5. **Requirements:** Computer, Windows operating system, Internet Connection, web browser, credit card details.
6. **Pre-Experiment Theory:**

Cloud computing definition:

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models.

Essential Characteristics:

On-demand self-service. A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Broad network access. Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g. mobile phones, tablets, laptops, and workstations).

Resource pooling. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth.

Rapid elasticity. Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

Measured service. Cloud systems automatically control and optimize resource use by leveraging a metering capability¹ at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

Service Models:

Software as a Service (SaaS). The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited userspecific application configuration settings.

Platform as a Service (PaaS). The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider.³ The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.

Infrastructure as a Service (IaaS). The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

Deployment Models:

Private cloud. The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Community cloud. The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Public cloud. The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Hybrid cloud. The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

Cloud Computing Providers:

- AWS,
- Azure,
- Google Cloud

7. Laboratory Exercise

A. Procedure:

To create an AWS account:

1. Open the Amazon Web Services home page
2. Choose Create an AWS account.
3. Enter your account information, and then choose Verify email address. This will send a verification code to your specified email address.
4. Enter your verification code, and then choose Verify.
5. Enter a strong password for your root user, confirm it, and then choose Continue.
6. Choose Personal.
7. Enter your personal information.
8. Read and accept the AWS Customer Agreement
9. Choose Continue. At this point, you'll receive an email message to confirm that your AWS account is ready to use. You can sign in to your new account by using the email address and password you provided during sign up. However, you can't use any AWS services until you finish activating your account.
10. Enter the information about your payment method, and then choose Verify and Continue.
11. You can't proceed with the sign-up process until you add a valid payment method.
12. Enter your country or region code from the list, and then enter a phone number where you can be reached in the next few minutes.
13. Enter the code displayed in the CAPTCHA, and then submit.
14. When the automated system contacts you, enter the PIN you receive and then submit.
15. Select one of the available AWS Support plans.
16. Choose Complete sign up. A confirmation page appears that indicates that your account is being activated.
17. Check your email and spam folder for an email message that confirms your account was activated. Activation usually takes a few minutes but can sometimes take up to 24 hours.
18. After you receive the activation message, you have full access to all AWS services.

Walk through AWS home page:

AWS Management Console

In the image below, five controls are highlighted within the navigation bar:

1. Account information
2. Region selector
3. Service selector
4. Search box
5. AWS CloudShell



8. Post-Experiments Exercise

A. Extended Theory:

- Check details about your account, including the address, contact information, billing settings, and more. [Add a screenshot here.](#)
- Visit billing dashboard. [Add a screenshot here.](#)
- Visit AWS global infrastructure- AWS Region menu.
- Visit third highlighted menu the AWS service selector
- Visit fifth highlighted item the AWS CloudShell icon.

B. Questions:

- List advantages of Cloud Computing?(Soft copy)
- Give some examples of AWS services to be used for Advanced DevOps?(Soft copy)
- Write about AWS CloudShell(Write in Hand)

C. Conclusion:(Write in Hand)

- Write what was performed in the experiment
- Mention few applications of what was studied.
- Write the significance of the studied topic

D. References:

- NIST SP 800-145, The NIST Definition of Cloud Computing, Peter Mell Timothy Grance.
- <https://aws.amazon.com/>

Signing up for AWS account using college student id/Gmail and using username as Styris Dcruz. Setting use to Personal and ownership to Individual, also using PAN ID for verification of account and user.



Sign up for AWS

Confirm your identity [Info](#)

Name [Info](#)

Choose the name that you want to use for identity verification.

☒ Styris Dcruz

Primary purpose of account registration

Choose one that best applies to you. If your account is tied to a business, select the one that applies to your business.

Ownership type

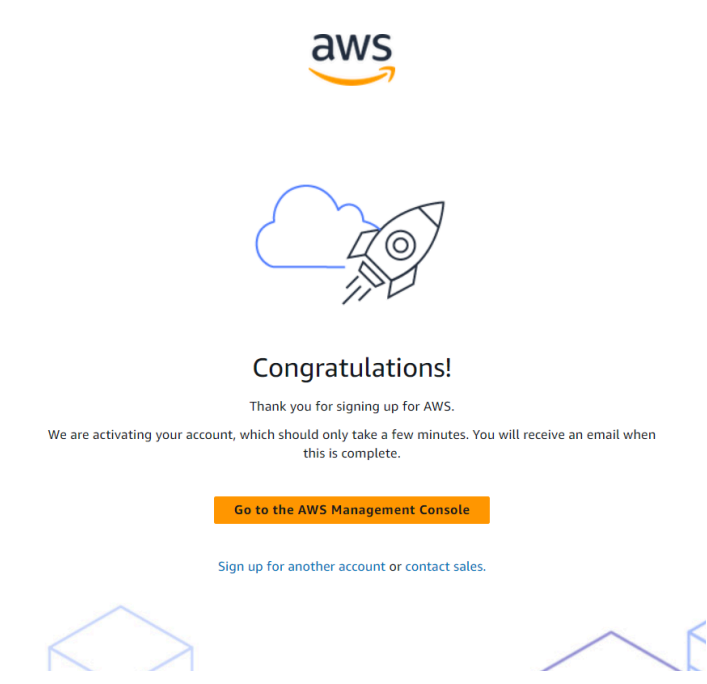
India document type [Info](#)

To verify your identity, the name on the document must match the name that you chose.

Date of birth

To use this document type, you must be at least 18 years old.

Congratulations Message showing that an AWS account was successfully created for the root user, and payment methods were verified by deducting Rs 2 from the linked bank account. (Done using debit card)



Visiting the accounts page that displays the user information and other details of the account created by the user.

Account [Info](#)

Close account

Account settings

Edit

Account ID

058264307272

Password

Account name

Styris

Contact information [Info](#)

Edit

Full name

Styris Dacruz

Company name

None

Address

Kerlai Wadi Saloli Gunnaka, 49 A Divine Grace

[Billing and Cost Management](#) > Bills

Bills [Info](#)

Download all to CSV

Print

Billing period: July 2024

Page refresh time: Monday, July 22, 2024 at 12:45:36 AM GMT+5:30

AWS bill summary [Info](#)

Total charges and payment information

Account ID

058264307272

Billing period [Info](#)

July 1 - July 31, 2024

No data

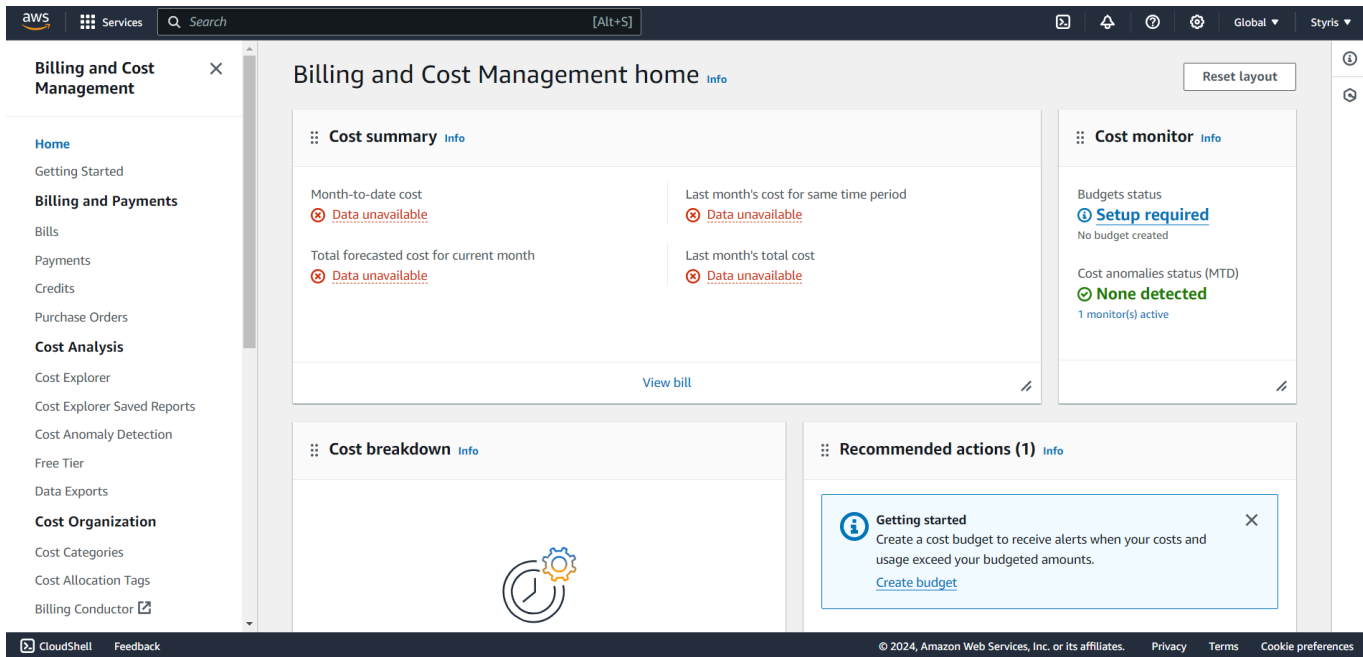
There is no data to display.

Estimated grand total:

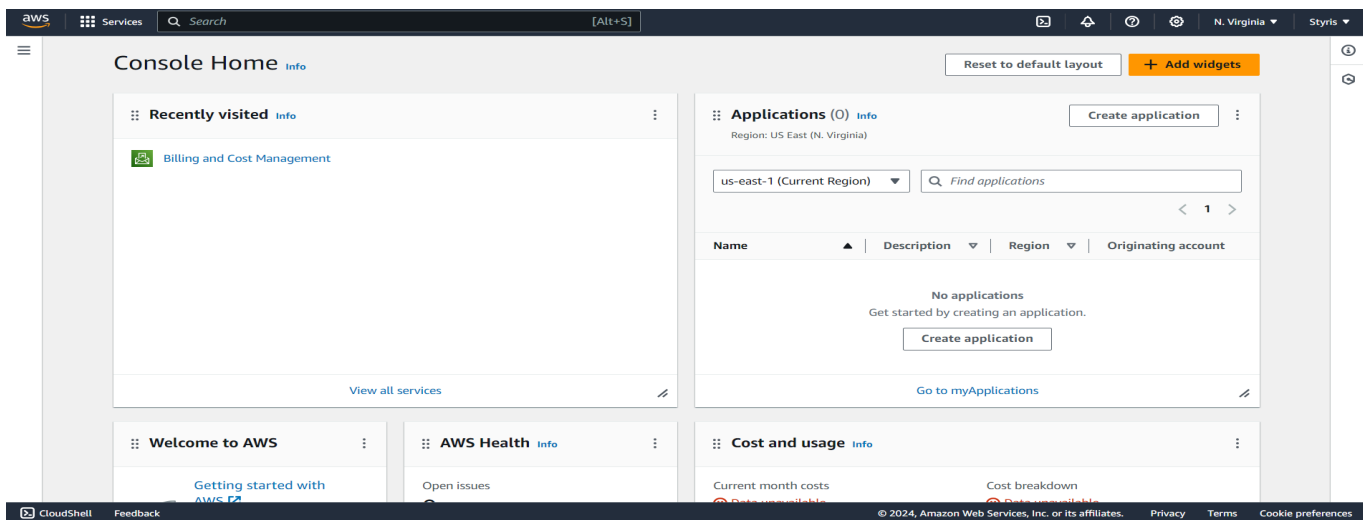
USD 0.00

Payment information [Info](#)

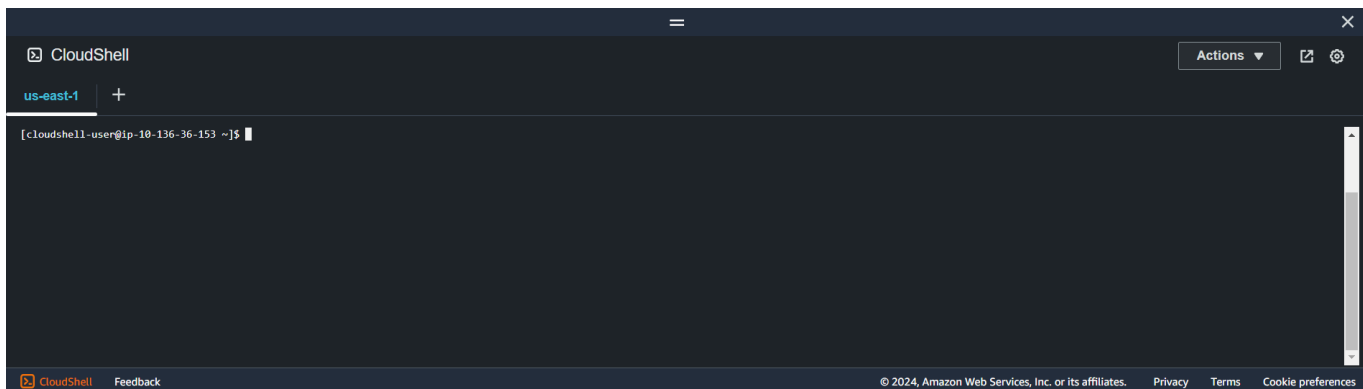
Visiting the billing and cost management home page on AWS servic, it displays what services are being used and how much is it costing the user, currently which is zero cost.



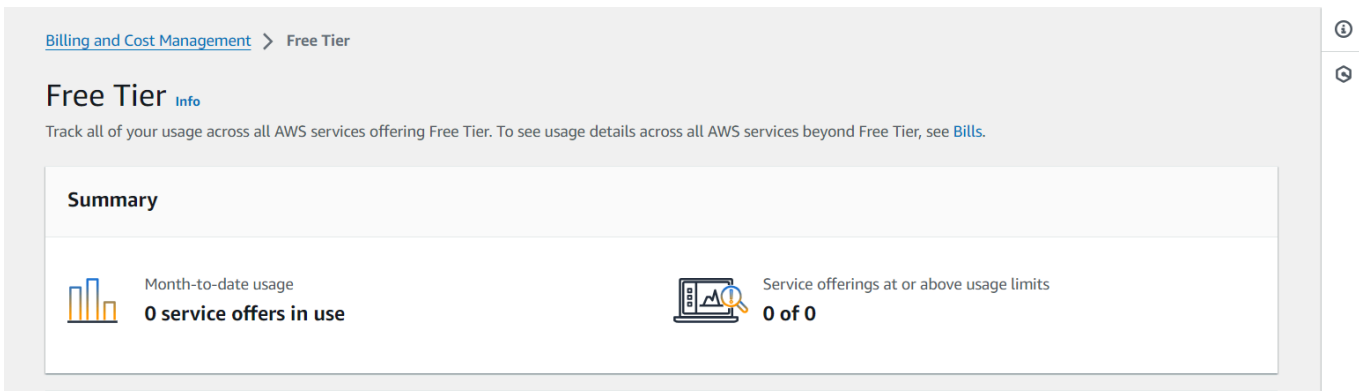
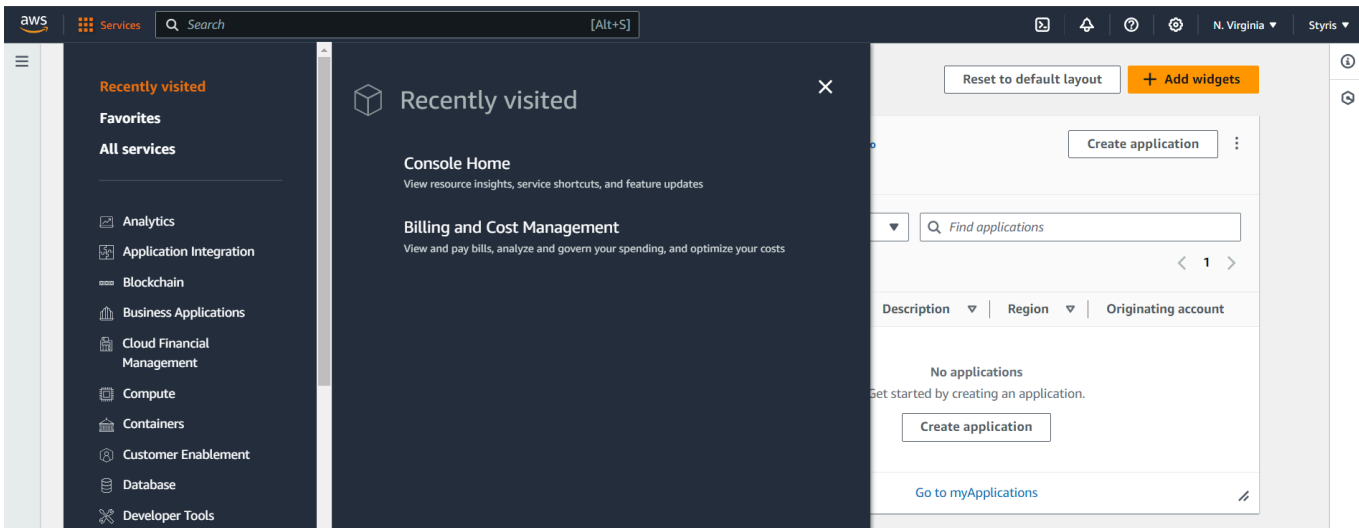
View of the AWS Management Console with location set to **US East (N. Virginia)us-east-1**, on the left it shows which services were recently visited.



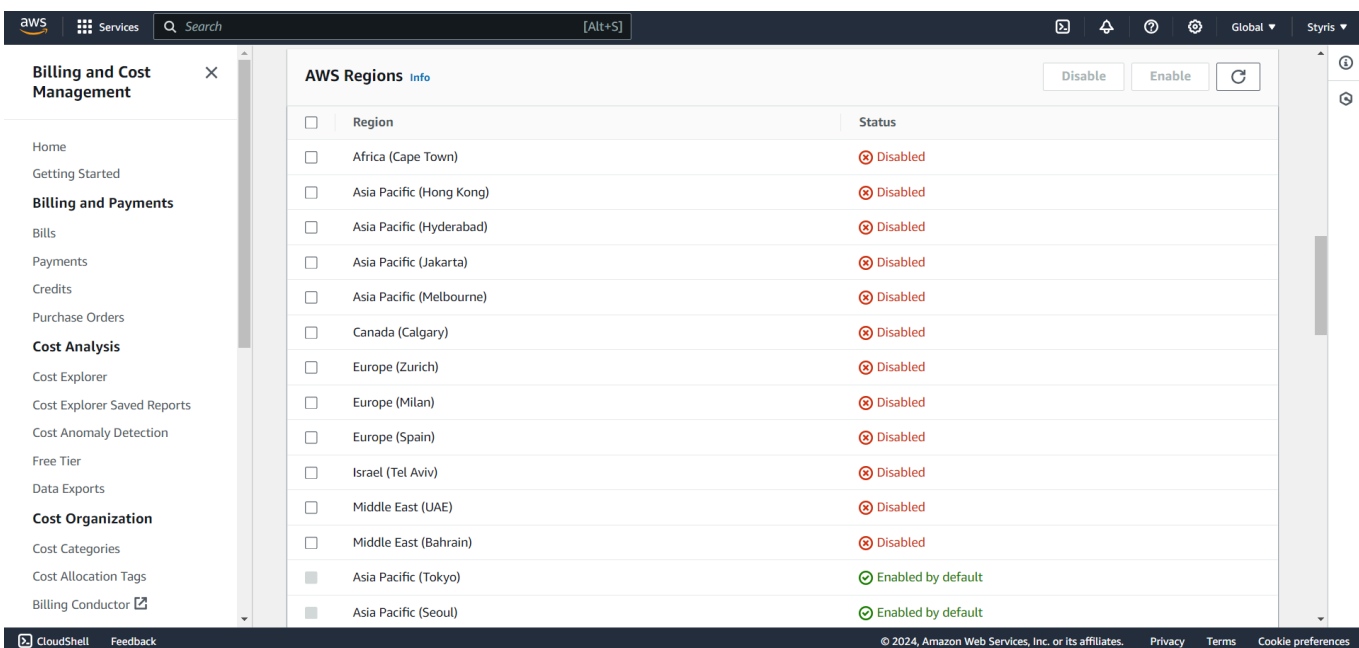
Visiting the Cloud Shell of AWS



Visiting the AWS service selector on the top left side of the panel, there are various services available some are of free tier and others paid.



Viewing the AWS region menu that shows what regions and servers are enabled and disabled for users of the account.



1. List the advantages of Cloud Computing?

⇒ Cloud Computing

- Delivers services over the internet, including storage, processing power, databases, networking, software, and analytics.
- Allows users to access these resources on-demand from a cloud provider, typically on a pay-as-you-go basis.
- Provides flexibility, scalability, and efficiency in managing IT resources.

Advantages of Cloud Computing

- **Cost Efficiency:** Reduces capital expenditure and operational expenses.
- **Scalability:** Easily scales resources up or down based on demand.
- **Accessibility:** Access applications and data from anywhere with an internet connection.
- **Flexibility:** Offers a range of services, including IaaS, PaaS, and SaaS.
- **Disaster Recovery and Backup:** Provides easy data backup and disaster recovery solutions.
- **Performance and Reliability:** Ensures services are available with minimal downtime through redundant infrastructure.
- **Automatic Updates:** Automatically updates software and services with the latest features and security patches.
- **Collaboration:** Allows multiple users to work on documents and projects simultaneously.
- **Security:** Implements strong security measures and offers compliance with various industry standards and regulations.
- **Environmental Benefits:** Reduces energy use and promotes sustainable IT practices.

2. Give some examples of AWS services to be used for Advanced DevOps?

⇒ AWS offers a wide range of services that are highly beneficial for advanced DevOps practices. Here are some key AWS services commonly used for advanced DevOps:

- **AWS CodePipeline:** Automates build, test, and deploy phases of the release process.
- **AWS CodeBuild:** Fully managed build service that compiles source code, runs tests, and produces software packages ready for deployment.
- **AWS CodeDeploy:** Automates code deployments, deploying applications to various compute services.
- **AWS CodeCommit:** Source control service that hosts secure Git repositories for source code.
- **AWS CodeStar:** Unified interface for managing software development activities, providing a dashboard for managing CI/CD pipelines, project management, and collaboration.
- **AWS CloudFormation:** Defines and provisions AWS infrastructure resources in a repeatable and predictable manner using templates.
- **AWS OpsWorks:** Configuration management service that supports Chef and Puppet to automate server configurations and deployments.
- **AWS Elastic Beanstalk:** Platform as a Service (PaaS) that handles deployment, capacity provisioning, load balancing, auto-scaling, and application health monitoring.
- **Amazon EC2 Auto Scaling:** Automatically adjusts the number of Amazon EC2 instances to handle application load.
- **AWS Lambda:** Serverless compute service that runs code in response to events and automatically manages compute resources required.