

# UNIT 5

MAY JUNE 24

## 1. Explain Google App Engine Application Life Cycle

Google App Engine (GAE) is a cloud platform by Google that allows developers to build and run web applications without managing servers. The Application Life Cycle in GAE describes the steps from writing the code to running it in the cloud.

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Google App Engine Application Life Cycle:

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### 1. Application Development:

- The developer writes the code using languages like Python, Java, or Node.js.
  - It also includes creating the app.yaml file (used to configure the app).
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### 2. Testing Locally:

- Before uploading to the cloud, the app is tested on a local machine using tools like the App Engine SDK.
  - This helps check for errors or bugs in the code.
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### 3. Deployment:

- Once the app is ready, it is deployed to Google App Engine using the gcloud command.
  - The application and all necessary files are uploaded to Google's servers.
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### 4. Application Hosting:

- Google App Engine automatically manages the servers and runs the app.
  - It provides auto-scaling, meaning it adjusts resources based on user traffic.
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### 5. Monitoring and Maintenance:

- Developers can use Google Cloud Console to monitor the app's performance.
  - They can check logs, errors, and usage reports.
  - Updates can be deployed anytime to fix bugs or add new features.
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### 6. Versioning and Rollback:

- GAE supports multiple versions of an app.
  - You can switch between versions or roll back to a previous version if needed.
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### Conclusion:

The Google App Engine application life cycle includes developing, testing, deploying, hosting, monitoring, and updating your app. It helps developers focus on coding while Google handles the rest like servers and scaling.

## 2. Explain Amazon Compute and Storage Services of AWS.

Amazon Web Services (AWS) provides different Compute and Storage services to help users run applications and store data in the cloud. These services are scalable, secure, and easy to use.

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### 1. Compute Services:

These services provide the processing power needed to run applications.

#### a) Amazon EC2 (Elastic Compute Cloud):

- Virtual servers that can run applications.
- You can choose the amount of CPU, memory, and storage you need.

- You pay only for the time you use.

**b) AWS Lambda:**

- Runs code without managing servers.
- Automatically scales based on the number of requests.
- You pay only when your code runs.

**c) Amazon Elastic Beanstalk:**

- A service to deploy and manage web applications easily.
  - It handles the server setup, scaling, and monitoring for you.
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**2. Storage Services:**

These services are used to store and manage data in the cloud.

**a) Amazon S3 (Simple Storage Service):**

- Used to store large amounts of data like files, images, and videos.
- It is secure, scalable, and offers backup options.

**b) Amazon EBS (Elastic Block Store):**

- Storage that works like a hard drive for EC2 instances.
- Best for applications that need fast access to data.

**c) Amazon Glacier (Now part of S3 Glacier):**

- Used for archiving data that is not accessed often.
  - Very low-cost storage for long-term backups.
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**Conclusion:**

AWS offers powerful compute services like EC2, Lambda, and Elastic Beanstalk to run applications, and storage services like S3, EBS, and Glacier to store data safely and efficiently. These services help businesses save time, reduce costs, and scale easily.

**3. Explain the Different Cost Models in Cloud Computing.**

In cloud computing, users pay for the services they use, like storage, computing power, and network usage. There are different cost models that define how the user is charged. These models help users choose the best pricing method based on their needs and usage.

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**1. Pay-as-you-go Model:**

- In this model, you only pay for what you use.
- If you use more resources, you pay more. If you use less, you pay less.
- Good for businesses with changing workloads.

Example: Paying only for the number of hours a server is running.

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**2. Subscription-Based Model:**

- Users pay a fixed monthly or yearly fee to use services.
- Cost remains the same even if the usage changes.
- Best for predictable and consistent workloads.

Example: Paying a monthly fee for using a cloud storage service.

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**3. Resource-Based Model:**

- Charges are based on the amount of resources used, such as CPU, RAM, bandwidth, or storage.
- The more powerful the resources, the higher the cost.

Example: Paying more for a server with high memory and faster CPU.

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**4. Tiered Pricing Model:**

- Pricing is divided into usage levels (tiers).
- The cost decreases as usage increases (bulk discount).

- Useful for businesses with growing needs.

Example: First 100 GB of storage costs more per GB than the next 500 GB.

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#### 5. Free Tier Model:

- Some cloud providers offer limited free usage of their services.
- Helps new users or students learn cloud services at no cost.

Example: AWS offers 12 months of free usage with limited features.

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#### Conclusion:

Cloud computing provides different cost models like pay-as-you-go, subscription, resource-based, tiered pricing, and free tier. These models give flexibility to users and help in managing costs based on usage and needs.

#### 4. Enlist the AWS Load Balancing Services. Also describe Elastic Load Balancer.

Load balancing in AWS helps in distributing incoming traffic across multiple servers so that no single server is overloaded. This improves performance, availability, and reliability of applications.

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##### AWS Load Balancing Services:

1. Elastic Load Balancing (ELB)
  2. Application Load Balancer (ALB)
  3. Network Load Balancer (NLB)
  4. Gateway Load Balancer (GLB)
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##### Elastic Load Balancer (ELB):

Elastic Load Balancer (ELB) is a managed service that automatically distributes incoming application traffic across multiple targets such as EC2 instances, containers, and IP addresses.

##### Main Features:

- **Automatic Scaling:** It automatically increases or decreases the number of targets based on the load.
- **Health Checks:** ELB checks the health of connected servers and routes traffic only to healthy ones.
- **Fault Tolerance:** If one server fails, ELB redirects traffic to other working servers, ensuring high availability.
- **Security Integration:** ELB works with AWS Shield and SSL certificates for secure data transfer.

##### Types of ELB:

1. **Application Load Balancer (ALB):**
    - Works at the application layer (HTTP/HTTPS).
    - Best for routing based on URL or user behavior.
  2. **Network Load Balancer (NLB):**
    - Works at the network layer (TCP/UDP).
    - Suitable for high-speed, low-latency traffic.
  3. **Gateway Load Balancer (GLB):**
    - Distributes traffic to third-party virtual appliances (like firewalls).
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#### Conclusion:

AWS provides several load balancing services to manage traffic efficiently. The Elastic Load Balancer is the main service that ensures applications stay available, responsive, and secure by distributing traffic smartly across multiple resources.

5. Write a short note on Microsoft Azure

Microsoft Azure is a cloud computing platform created by Microsoft. It provides a wide range of cloud services that help businesses and individuals store data, run applications, and manage resources over the internet instead of on local computers.

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**Key Features of Microsoft Azure:**

1. **Cloud Services**
    - Offers Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).
    - Helps users build, test, and manage apps using Microsoft's data centers.
  2. **Global Reach**
    - Has data centers all over the world, which means services are fast and available in many regions.
  3. **Supports Multiple Tools**
    - Supports different programming languages and tools like .NET, Java, Python, and Node.js.
  4. **Security and Compliance**
    - Provides strong security features like encryption, access control, and monitoring.
    - Follows many international standards like ISO and GDPR.
  5. **Scalability and Flexibility**
    - Users can increase or decrease resources (like storage or processing power) based on their needs.
    - Only pay for what they use, which saves money.
  6. **Common Services Offered**
    - Azure Virtual Machines (run Windows or Linux on cloud)
    - Azure Blob Storage (store unstructured data like images and videos)
    - Azure SQL Database (store and manage structured data)
    - Azure Active Directory (manage user logins and security)
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**Conclusion:**

Microsoft Azure is a powerful and flexible cloud platform that helps users build, manage, and deploy applications with ease. Its strong security, global network, and wide range of services make it one of the most popular cloud providers in the world.

6. Explain the different Services Provided by Google Cloud Platform (GCP)

Google Cloud Platform (GCP) is a cloud service by Google that helps users store data, run applications, and manage services using Google's global infrastructure. GCP offers many services grouped into different types to help businesses work better and faster.

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**1. Compute Services**

- These services are used to run applications and virtual machines.
  - Example:
    - Compute Engine – Lets you create and manage virtual machines.
    - App Engine – Helps you build and run apps without managing the servers.
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**2. Storage Services**

- Used to store different types of data like files, images, or databases.
  - Example:
    - Cloud Storage – Stores large files like videos and photos.
    - Cloud SQL – Stores and manages structured data using SQL databases.
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**3. Networking Services**

- Help to connect and control data movement between services and users.
  - Example:
    - Virtual Private Cloud (VPC) – Provides a private network inside GCP.
    - Cloud Load Balancing – Distributes incoming traffic to different servers to avoid overload.
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#### 4. Big Data and Analytics

- Used to process and analyze large amounts of data.
  - Example:
    - BigQuery – Analyzes large data sets very fast.
    - Dataflow – Processes and transforms data in real time.
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#### 5. Artificial Intelligence (AI) and Machine Learning (ML)

- These services allow users to build smart applications.
  - Example:
    - Cloud Vision API – Understands images (like reading text from a photo).
    - Cloud Natural Language API – Understands and analyzes human language.
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#### 6. Identity and Security Services

- Protect the system and control who can access what.
  - Example:
    - Cloud Identity and Access Management (IAM) – Gives access to only trusted users.
    - Cloud Security Command Center – Finds and fixes security risks.
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#### Conclusion:

Google Cloud Platform offers a wide range of services like computing, storage, networking, data analysis, and AI. These services help users build, run, and secure powerful cloud-based systems easily and efficiently.

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#### 7. Explain the steps to create and manage associated objects for Amazon S3 Bucket

Amazon S3 (Simple Storage Service) is a service from AWS used to store and manage files (called objects) in a space called a bucket.

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##### 1. Sign in to AWS

- Go to the AWS Management Console using your browser.
  - Log in with your AWS account.
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##### 2. Create an S3 Bucket

- Open the S3 service from the AWS Console.
  - Click on “Create bucket.”
  - Enter a unique bucket name and select the AWS region where you want the bucket.
  - Leave other settings as default or change based on your needs (like versioning, encryption).
  - Click “Create bucket.”
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##### 3. Upload Objects to the Bucket

- Click on the bucket name you just created.
  - Click “Upload”.
  - Choose files from your computer and upload them.
  - You can also set permissions and storage class while uploading.
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#### 4. Set Permissions (Access Control)

- You can choose who can read, write, or manage your objects.
  - You can set permissions using:
    - Bucket Policy
    - Access Control List (ACL)
    - IAM Roles
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#### 5. Organize Using Folders

- You can create folders inside the bucket to organize your files better (like on your computer).
  - This helps manage related files easily.
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#### 6. Manage Objects

- You can download, delete, rename, move, or change permissions of any object.
  - You can also set lifecycle rules to automatically delete or move old files to cheaper storage.
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#### Conclusion:

Creating and managing an S3 bucket is easy. Just sign in, create a bucket, upload objects, set permissions, and organize your files. Amazon S3 is useful for storing data safely and accessing it anytime over the internet.

#### 8. Describe Amazon EC2 Cloud in brief considering

i) Amazon Machine Image          ii) Amazon CloudWatch

##### Amazon EC2 (Elastic Compute Cloud)

Amazon EC2 is a cloud service by AWS that lets users run virtual servers in the cloud. These servers are called EC2 instances. You can use them to host websites, apps, or any software — just like a real computer, but on the internet.

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##### i) Amazon Machine Image (AMI)

- An Amazon Machine Image (AMI) is like a template or blueprint for creating an EC2 instance.
- It contains everything needed to launch a server:
  - An operating system (like Linux or Windows)
  - Software and applications
  - Settings and configuration
- When you start an EC2 instance, you choose an AMI to decide what your server will look like and what it can do.

Example: If you want a server with Ubuntu and Python installed, you can use an AMI that already has them.

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##### ii) Amazon CloudWatch

- Amazon CloudWatch is a monitoring tool that keeps an eye on your AWS resources, including EC2 instances.
  - It collects data like:
    - CPU usage
    - Memory and disk space
    - Network traffic
  - CloudWatch can send alerts if something goes wrong (e.g., if your server is using too much CPU).
  - It helps you understand the performance of your instances and fix problems quickly.
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#### Conclusion:

Amazon EC2 provides virtual servers in the cloud. Amazon Machine Images help launch these servers with the setup you need, and Amazon CloudWatch helps monitor and manage them efficiently.

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## 9. Explain the Microsoft Azure Cloud Services

Microsoft Azure is a cloud computing platform by Microsoft. It offers many services over the internet to help users store data, run applications, and manage IT resources without needing physical servers.

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### Main Cloud Services Provided by Microsoft Azure:

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#### 1. Compute Services

- These services are used to run applications and virtual machines.
- Example:
  - Azure Virtual Machines – Run Windows or Linux on cloud servers.
  - App Services – Host and manage web apps without handling servers.

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#### 2. Storage Services

- Used to save data, files, backups, and databases securely.
- Example:
  - Azure Blob Storage – Stores large files like images and videos.
  - Azure Disk Storage – Provides hard drive-like storage for virtual machines.

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#### 3. Networking Services

- Connects cloud services and users securely.
- Example:
  - Virtual Network (VNet) – Creates private networks inside Azure.
  - Azure Load Balancer – Distributes traffic across multiple servers.

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#### 4. Database Services

- Helps to store and manage structured data.
- Example:
  - Azure SQL Database – A cloud version of Microsoft SQL Server.
  - Cosmos DB – A fast and flexible NoSQL database service.

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#### 5. AI and Machine Learning Services

- These services are used to create smart apps.
- Example:
  - Azure Cognitive Services – Adds vision, speech, and language features.
  - Azure Machine Learning – Builds and trains machine learning models.

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#### 6. Security and Management Services

- Keeps cloud data safe and helps in monitoring.
- Example:
  - Azure Security Center – Protects against threats.
  - Azure Monitor – Checks the performance of apps and services.

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### Conclusion:

Microsoft Azure offers a wide range of cloud services like compute, storage, networking, databases, AI, and security. These services help businesses build, run, and protect applications in the cloud easily and efficiently.

## 10. Enlist Types of Cloud Platforms and Describe Any Two

### Types of Cloud Platforms:

1. Amazon Web Services (AWS)
2. Microsoft Azure
3. Google Cloud Platform (GCP)
4. IBM Cloud
5. Oracle Cloud
6. Alibaba Cloud

These platforms help users and businesses to store data, run apps, manage servers, and more — all over the internet (cloud) instead of on local machines.

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### 1. Amazon Web Services (AWS)

- AWS is a cloud platform developed by Amazon. It is one of the largest and most widely used cloud platforms in the world.
  - It offers over 200 services such as computing power, database management, storage, security, and networking.
  - Popular Services:
    - EC2 (Elastic Compute Cloud): Runs virtual machines (cloud servers).
    - S3 (Simple Storage Service): Used to store and retrieve any amount of data.
    - RDS (Relational Database Service): Helps create and manage cloud databases like MySQL, PostgreSQL, etc.
  - Why AWS is popular:
    - Highly reliable and scalable.
    - Global availability with many data centers.
    - Pay-as-you-go pricing (you pay only for what you use).
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### 2. Microsoft Azure

- Azure is a cloud computing platform from Microsoft.
  - It offers a wide range of services including virtual machines, AI tools, app hosting, and storage.
  - Popular Services:
    - Azure Virtual Machines: Lets users create and manage virtual servers.
    - Azure Blob Storage: Used for storing large files such as images and videos.
    - Azure SQL Database: A cloud-based version of Microsoft's SQL database.
  - Why Azure is useful:
    - Good integration with Windows and Microsoft tools like Office and Active Directory.
    - Strong support for hybrid cloud (mix of cloud and on-premise).
    - Focus on enterprise-level security and compliance.
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### Conclusion:

Cloud platforms like AWS and Azure are widely used to run applications, store data, and manage IT resources.

They reduce the need for physical hardware, offer flexible pricing, and help companies scale quickly and securely. Choosing the right cloud platform depends on business needs, supported services, and ease of use.

## 11. Define Amazon EBS Snapshot. Write the steps to create EBS Snapshot

### Definition of Amazon EBS Snapshot:

An Amazon EBS Snapshot is a backup of your EBS volume (Elastic Block Store).

It saves the entire data on the volume at a specific point in time. You can use the snapshot later to restore data or create a new EBS volume with the same data.



Snapshots are stored in Amazon S3, but you don't have to manage them directly.

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#### Steps to Create an EBS Snapshot:

##### Step 1: Sign in to AWS Console

- Go to <https://aws.amazon.com> and log in to your AWS account.

##### Step 2: Open the EC2 Dashboard

- In the AWS Management Console, search for and select EC2 service.

##### Step 3: Select "Volumes"

- In the EC2 dashboard, go to Elastic Block Store section and click on "Volumes."

##### Step 4: Choose the Volume

- Select the EBS volume you want to back up.

##### Step 5: Create Snapshot

- Click on "Actions" → Choose "Create Snapshot."
- Add a name and description (optional) to identify your snapshot.
- Click "Create Snapshot."

##### Step 6: View Snapshot

- Go to "Snapshots" under the Elastic Block Store section to see the status.
  - Once completed, the snapshot is ready and can be used to restore the volume if needed.
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#### Conclusion:

An EBS Snapshot is a simple way to back up your data from an EBS volume. It helps protect against data loss and allows you to easily restore or copy your data to a new volume.

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## 12. Explain the Features of Google App Engine

Google App Engine is a cloud platform provided by Google Cloud Platform (GCP).

It is used to build, run, and host web applications without managing the underlying servers.

It is a type of Platform as a Service (PaaS).

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#### Features of Google App Engine:

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##### 1. No Server Management

- You don't need to set up or manage any servers.
  - Google automatically handles all the server setup, updates, and scaling.
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##### 2. Automatic Scaling

- App Engine automatically increases or decreases resources (like CPU or memory) based on the app's traffic.
  - If more people use your app, it scales up. If usage is low, it scales down to save cost.
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##### 3. Supports Multiple Programming Languages

- App Engine supports popular languages like:
    - Python
    - Java
    - Node.js
    - Go
    - PHP and more
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##### 4. Built-in Security

- Google provides automatic security updates, firewall settings, and identity access control.
  - This helps keep the app safe from threats.
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##### 5. Easy Deployment

- You can deploy your code easily using simple commands.
  - Tools like Google Cloud SDK and Cloud Console make deployment fast and smooth.
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#### **6. Integrated with Other Google Services**

- It works well with other Google Cloud tools like:
    - Cloud Storage
    - Cloud SQL
    - BigQuery
  - This helps build more powerful and connected apps.
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#### **7. Pay-as-You-Go Pricing**

- You only pay for the resources your app uses.
  - No cost when the app is not running or under low usage.
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#### **Conclusion:**

Google App Engine is a powerful platform for hosting and running web apps without managing servers.

It provides useful features like automatic scaling, multi-language support, security, and easy deployment, which make app development faster and easier for developers.