Experiment – 5

**Aim:** To understand the benefits of Cloud Infrastructure and setup AWS Cloud9 IDE, launch AWS Cloud9 IDE and perform collaboration demonstration.

**Theory:**

**Understanding Cloud Infrastructure**

**1. Definition of Cloud Infrastructure:**

Cloud infrastructure refers to the virtualized resources (hardware and software) delivered over the internet. It includes servers, storage, databases, networking, software, and analytics, allowing users to access computing power and data storage without the need for physical hardware.

**2. Key Components:**

- **IaaS (Infrastructure as a Service):** Provides virtualized computing resources over the internet (e.g., AWS EC2).

- **PaaS (Platform as a Service):** Offers hardware and software tools over the internet (e.g., AWS Elastic Beanstalk).

- **SaaS (Software as a Service):** Delivers software applications over the internet (e.g., Google Workspace).

**Benefits of Cloud Infrastructure**

**1. Scalability:**

- Easily scale resources up or down based on demand.

- Pay only for what you use, which reduces costs during low-usage periods.

**2. Cost Efficiency:**

- No need for large upfront investments in physical hardware.

- Lower operational costs due to reduced need for maintenance and management.

**3. Accessibility:**

- Access applications and data from anywhere with an internet connection.

- Supports remote work and collaboration across geographies.

**4. Reliability:**

- High availability and redundancy features minimize downtime.

- Data is often replicated across multiple locations for disaster recovery.

**5. Security:**

- Advanced security measures, including encryption, firewalls, and compliance certifications.

- Regular updates and patches managed by cloud providers.

**Introduction to AWS (Amazon Web Services)**

**1. Overview of AWS:**

- AWS is a comprehensive cloud computing platform provided by Amazon. It offers over 200 fully featured services from data centers globally.

- Services range from computing power (e.g., EC2) to storage solutions (e.g., S3), databases (e.g., RDS), machine learning, and analytics.

**2. Key Features of AWS:**

- **Global Reach:** Data centers in multiple regions around the world for low latency and redundancy.

- **Flexible Pricing:** Pay-as-you-go model, reserved instances, and spot instances to optimize costs.

- **Rich Ecosystem:** Integration with a wide array of tools, services, and APIs.

- **Strong Security:** Built-in security controls, compliance with various standards, and customizable security settings.

**AWS Cloud9 IDE**

**1. Overview of AWS Cloud9:**

- AWS Cloud9 is a cloud-based integrated development environment (IDE) that allows developers to write, run, and debug code using just a web browser.

- It supports multiple programming languages and offers a range of built-in tools to streamline the development process.

**2. Benefits of AWS Cloud9:**

- **No Setup Required:** Immediate access to development environments without the need for local installations.

- **Collaboration:** Real-time collaboration allows multiple users to work on the same code simultaneously.

- **Integrated Terminal:** Access to a command-line interface directly within the IDE.

- **Preconfigured Environments:** Ability to use AWS services seamlessly within the IDE, including direct access to AWS Lambda, EC2, and other resources.

**Setting Up AWS Cloud9 IDE**

**Step-by-Step Setup:**

**1. Sign in to AWS Console:**

- Go to the **AWS Management Console** and sign in with your credentials.

**2. Navigate to Cloud9:**

- In the AWS Management Console, search for **Cloud9** in the services search bar.

**3. Create a New Cloud9 Environment:**

- Click on **Create environment**.

- Enter a name and description for your environment.

- Click **Next**.

**4. Configure the Environment:**

- Choose the environment settings:

- Instance Type: Select an instance type (e.g., t2.micro for lightweight tasks).

- Platform: Choose a platform (Amazon Linux or Ubuntu).

- Configure additional settings like auto-hibernation if needed.

- Click **Next**.

**5. Review and Create:**

- Review your settings and click on **Create environment**.

- Wait for the environment to be provisioned. This may take a few moments.

**6. Access the Cloud9 IDE:**

- Once set up, the IDE opens in your browser. You can start coding immediately.

**Collaboration Demonstration**

**1. Inviting Collaborators:**

- Click on the Share button in the top-right corner of the Cloud9 IDE.

- Enter the email addresses of collaborators to invite them to your environment.

- Set permissions (read/write access) for each collaborator.

- Click Invite.

**2. Collaborative Coding:**

- Collaborators can join the environment through a link sent via email.

- Multiple users can edit the same file in real-time, with changes highlighted for visibility.

- Use built-in chat and commenting features for discussions.

**3. Running Code Together:**

- Execute scripts or applications collaboratively. All participants can see the output in real-time.

- Utilize the integrated terminal for running commands or managing AWS services.

**Experiment:**