Solution BASIC - CI/CD SETUP

Problem Statement

Setup a CI/CD pipeline using the tools of your choice(or preferably the mentioned tools).
1. It should deploy a simple web application to a server on a code push to a repository.
2. The deployed web application should be reachable on any web browser.
3. Make it scalable such that when load increases the number of servers scale up and down making sure the new servers have the updated code.

To set up a CI/CD pipeline for deploying a simple web application with scalability, using AWS, Jenkins, and CodeDeploy, follow these detailed steps:

1. Prepare Your Environment

1.1. Set Up AWS Environment

1. **Create an AWS Account**: If you don't already have an AWS account, sign up at https://aws.amazon.com/.
2. **Create IAM Roles**:
    - **For EC2 Instances**: Go to the IAM console, create a new role with the necessary permissions for EC2 (e.g., EC2 instance profile with permissions for CodeDeploy, etc.).
    - **For CodeDeploy**: Create a role for CodeDeploy with policies to access EC2.
3. **Launch EC2 Instances**:
    - **Jenkins Server (EC2-1)**: Launch an EC2 instance for Jenkins.
    - **Application Server (EC2-2)**: Launch EC2 instances for the Tomcat application, which will be part of an Auto Scaling Group.
4. IN EC2-1(Jenkins Server) **Install AWS CLI**
   Command:

```
curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o "awscliv2.zip"
```

    - **Purpose:** Download the AWS CLI installer for Linux.
    - **Usage:** Execute this command to download the installation package for AWS CLI version 2.
    - **Rationale:** The AWS CLI is required for interacting with AWS services from the command line.

- **Command:**

```
sudo apt install unzip
```

    - **Purpose:** Install the unzip utility.
    - **Usage:** Run this command to install the unzip package necessary for extracting zip files.
    - **Rationale:** The downloaded AWS CLI package is in a zip format that needs to be extracted.

- **Command:**

```
unzip awscliv2.zip
```

    - **Purpose:** Extract the AWS CLI installation package.
    - **Usage:** Use this command to unzip the awscliv2.zip file.
    - **Rationale:** Extracting the package prepares it for installation.

- **Command:**

sudo ./aws/install

- **Purpose:** Install the AWS CLI.
- **Usage:** Execute this command to run the AWS CLI installer script.
- **Rationale:** This installs the AWS CLI on your system.

- **Command:**

aws configure

- **Purpose:** Configure AWS CLI with your credentials and default settings.
- **Usage:** Run this command to set up your AWS access key, secret key, region, and output format.
- **Rationale:** Essential for authenticating and interacting with AWS services through the CLI.

2. Update and Upgrade System Packages

- **Command:**

sudo apt update

- **Purpose:** Update the list of available packages and their versions.
- **Usage:** Execute this command to ensure your package list is current.
- **Rationale:** Keeps your system aware of the latest package updates and versions.

- **Command:**

sudo apt upgrade -y

- **Purpose:** Upgrade all installed packages to their latest versions.
- **Usage:** Use this command to apply all available updates to your system packages.
- **Rationale:** Ensures that all system software is up-to-date.

3. Install Java Runtime Environment

- **Command:**

sudo apt install fontconfig openjdk-17-jre

- **Purpose:** Install Java Runtime Environment and font configuration.
- **Usage:** Run this command to install Java 17 and fontconfig packages.
- **Rationale:** Required for running Java-based applications and ensuring font rendering.

4. Install Jenkins

- **Command:**

sudo wget -O /usr/share/keyrings/jenkins-keyring.asc https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key

- **Purpose:** Download and add the Jenkins repository GPG key.
- **Usage:** Execute this command to fetch the key used to sign Jenkins packages.
- **Rationale:** Validates the authenticity of Jenkins packages.

- **Command:**

echo "deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc] https://pkg.jenkins.io/debian-stable binary/" | sudo tee /etc/apt/sources.list.d/jenkins.list > /dev/null

- **Purpose:** Add Jenkins repository to your APT sources list.
- **Usage:** Run this command to include Jenkins repository in the system's package sources.
- **Rationale:** Allows installation of Jenkins using APT package manager.

- **Command:**

sudo apt-get install jenkins

- **Purpose:** Install Jenkins.
- **Usage:** Use this command to install Jenkins from the newly added repository.
- **Rationale:** Jenkins is required for CI/CD automation.

- **Command:**