Deploying a Spring Boot application to Google Cloud Platform (GCP) App Engine involves several steps. Below is a step-by-step guide:

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1. Prerequisites

- **Google Cloud Account**: Make sure you have a GCP account.
- **Billing Enabled**: Enable billing for your GCP project.
- **GCP SDK**: Install the Google Cloud SDK.
- **Maven or Gradle**: Ensure you have Maven or Gradle installed for building the Spring Boot application.

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2. Create a Spring Boot Application

1. **Generate a Spring Boot Project**: Use Spring Initializr to create a Spring Boot project.
    - Add dependencies like Spring Web and any other required modules.
    - Download and extract the project.
2. **Verify the Application**:
    - Create a REST endpoint to confirm functionality.
    - Example:
    - @RestController
    - public class HelloController {
    -     @GetMapping("/")
    -     public String hello() {
    -         return "Hello, GCP!";
    -     }
    - }

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3. Configure App Engine

1. **Create a GCP Project**:
    - Go to the Google Cloud Console.
    - Create a new project.
2. **Enable App Engine**:
    - Navigate to "App Engine" > "Dashboard".
    - Select a region and enable App Engine for your project.

3. **Install GCP SDK**: Authenticate your account:
4. gcloud auth login

Set the project:

gcloud config set project <PROJECT_ID>

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4. Prepare for Deployment

1. **Add App Engine Configuration**: In the root of your project, create an app.yaml file:
2. runtime: java11
3. instance_class: F2
4. entrypoint: java -jar target/your-spring-boot-app.jar
5.
6. env_variables:
7.   SPRING_PROFILES_ACTIVE: production
   - runtime: Specifies the runtime for the app.
   - entrypoint: Defines how to run the app.
8. **Build the Application**: Use Maven or Gradle to build the .jar file.
9. mvn clean package

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5. Deploy to App Engine

1. **Deploy the Application**: Use the following command to deploy:
2. gcloud app deploy
   - Confirm when prompted.
   - GCP will deploy the application and provide a public URL.
3. **Test the Application**: Visit the URL provided (e.g., https://<PROJECT_ID>.appspot.com) to verify the deployment.

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6. Monitor and Manage

1. **Logs**: Access application logs using:
2. gcloud app logs tail -s default
3. **Application Status**: Check the status of the application:
4. gcloud app describe

7. Additional Steps

- **Environment Variables**: Use app.yaml for environment variables.
- **Scaling**: Adjust scaling configurations (e.g., auto-scaling) in app.yaml.
- **Database Integration**: Use Cloud SQL or any other managed service for your database needs.