1. Setup Google Cloud Platform (GCP)

Create a GCP Account (if not already created)

1. Go to Google Cloud Console
2. Sign in and activate your **Free Tier** ($300 free credits for new users).

Enable Required APIs

1. Open **Google Cloud Console** and navigate to **APIs & Services** > **Library**.
2. Enable the following APIs:

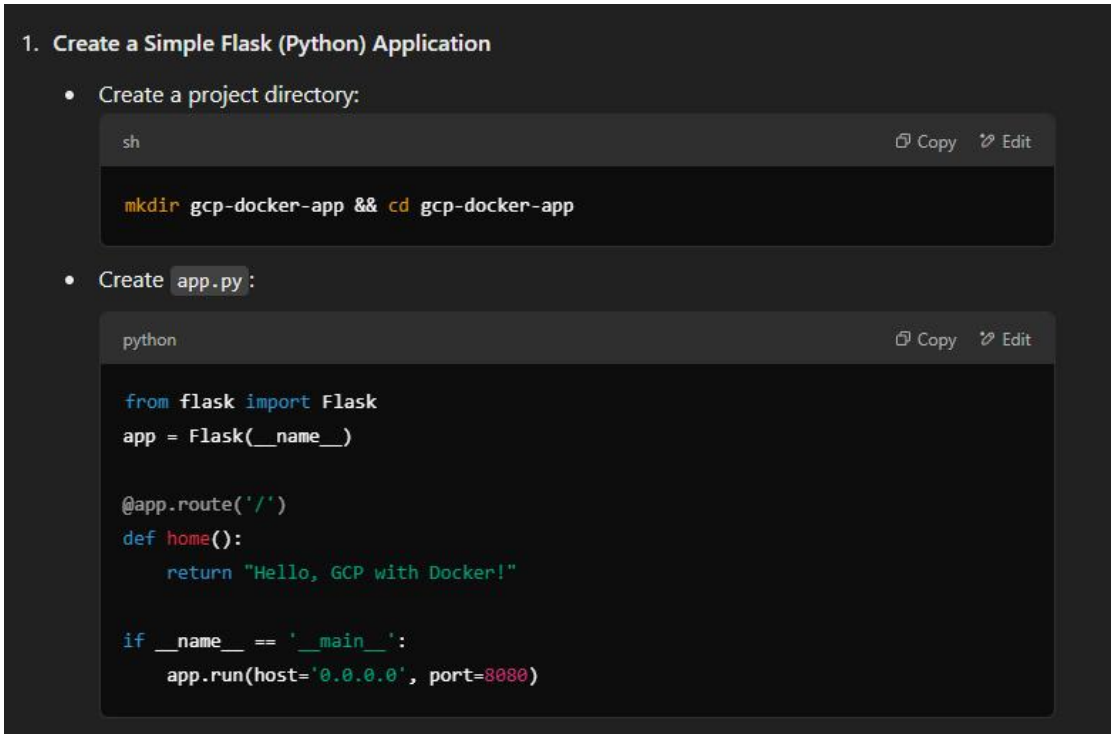
    1. **Cloud Build API**
    2. **Artifact Registry API**
    3. **Compute Engine API**
    4. **Cloud Run API** (optional, if deploying on Cloud Run)

Install and Configure gcloud CLI (if using local machine)

1. Install **gcloud SDK**: Installation Guide

2. Create and Push a Docker Application to GitHub

Create a Simple Flask (Python) Application



1. **Create a Simple Flask (Python) Application**

- Create a project directory:

sh — Copy Edit

```
mkdir gcp-docker-app && cd gcp-docker-app
```

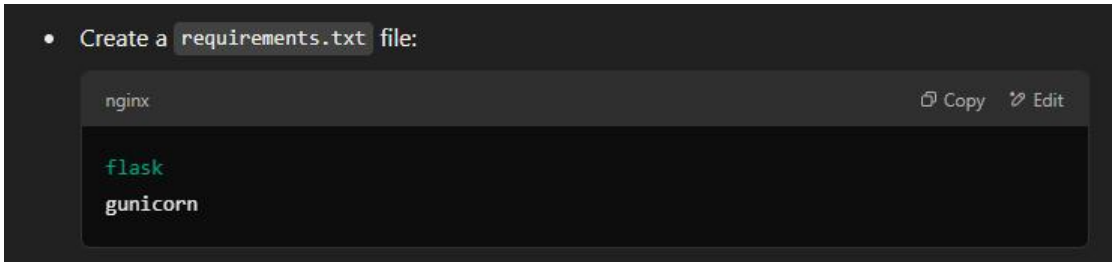
- Create `app.py`:

python — Copy Edit

```
from flask import Flask
app = Flask(__name__)

@app.route('/')
def home():
    return "Hello, GCP with Docker!"

if __name__ == '__main__':
    app.run(host='0.0.0.0', port=8080)
```



- Create a `requirements.txt` file:

nginx — Copy Edit

```
flask
gunicorn
```

Create a Dockerfile

Create a `Dockerfile` in the project directory:

dockerfile Copy Edit

```
# Use official Python image
FROM python:3.9-slim

# Set the working directory
WORKDIR /app

# Copy the project files
COPY . /app

# Install dependencies
RUN pip install --no-cache-dir -r requirements.txt

# Expose the port
EXPOSE 8080

# Command to run the application
CMD ["gunicorn", "-b", "0.0.0.0:8080", "app:app"]
```

3. **Push Code to GitHub**

- Initialize Git and push the project to a GitHub repository:

sh Copy Edit

```
git init
git add .
git commit -m "Initial commit"
git branch -M main
git remote add origin https://github.com/YOUR_USERNAME/gcp-docker-app.git
git push -u origin main
```

3. Build and Push Docker Image to GCP Artifact Registry

1. Enable Artifact Registry

```sh
gcloud services enable artifactregistry.googleapis.com
```

2. Create a Docker Repository

```sh
gcloud artifacts repositories create my-docker-repo \
    --repository-format=Docker \
    --location=us-central1
```

3. Authenticate Docker with GCP

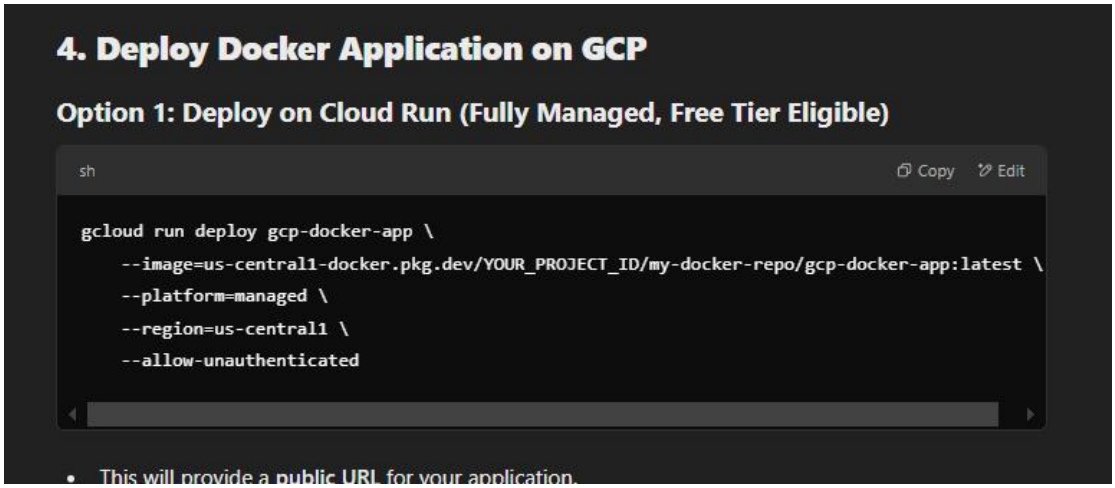
```sh
gcloud auth configure-docker us-central1-docker.pkg.dev
```

4. Build and Tag Docker Image

```sh
docker build -t us-central1-docker.pkg.dev/YOUR_PROJECT_ID/my-docker-repo/gcp-docker-app:
```

5. Push Image to Artifact Registry

```sh
docker push us-central1-docker.pkg.dev/YOUR_PROJECT_ID/my-docker-repo/gcp-docker-app:latest
```



5. Test Your Application

- If deployed on **Cloud Run**, visit the provided **Cloud Run URL**.
- If deployed on **VM**, visit http://VM_EXTERNAL_IP:8080.