**Documenting FastAPI (Python) Deployment on Ubuntu EC2 Instance**

This document explains the steps and reasons for setting up and running a FastAPI application on an Ubuntu EC2 instance.

**1. Set Up the EC2 Instance**

**Reason:**

* An EC2 instance provides a virtual machine to host and run the FastAPI application.

**Steps:**

1. **Launch an EC2 instance** with the following:
   * Ubuntu as the operating system.
   * Ensure the security group allows inbound traffic for port 8000 (or your application port).

Example rule:

* + - **Type:** Custom TCP
    - **Port:** 8000
    - **Source:** 0.0.0.0/0 (or restrict to specific IPs for security)

1. Connect to the instance using SSH:

ssh -i "your-key.pem" ubuntu@<EC2-Instance-Public-IP>

**2. Install Required Packages**

**Reason:**

* Essential system tools and Python setup are required for the FastAPI application.

**Commands:**

1. Update system packages:

sudo apt update && sudo apt upgrade -y

1. Install Python 3 and pip:

sudo apt install python3-pip python3.10-venv -y

1. Install additional libraries (e.g., database connectors):

sudo apt install unixodbc-dev -y (according to developers)

**3. Create a Virtual Environment**

**Reason:**

* To isolate project dependencies and avoid conflicts with system-wide libraries.

**Commands:**

1. Create a virtual environment:

python3 -m venv myenv

1. Activate the virtual environment:

source myenv/bin/activate

1. Confirm activation:

which python

Output should point to myenv.

**4. Install Application Dependencies**

**Reason:**

* Required libraries like FastAPI, Uvicorn, and database connectors are necessary to run the application.

**Commands:**

1. Upgrade pip:

pip install --upgrade pip

1. Install dependencies:

pip install fastapi uvicorn python-multipart pyodbc (and other required Dependencies as per requirements.txt)

1. Save dependencies (optional for reproducibility):

pip freeze > requirements.txt

**5. Deploy the FastAPI Application**

**Reason:**

* The application files need to be uploaded and executed on the EC2 instance.

**Steps:**

1. **Transfer application files** to the EC2 instance using scp:

scp -i "your-key.pem" /path/to/your/app.py ubuntu@<EC2-Instance-Public-IP>:/home/ubuntu/

1. Navigate to the application directory:

cd /home/ubuntu

1. Run the application using Uvicorn:

uvicorn app:app --host 0.0.0.0 --port 8000  
nohup uvicorn app:app --host 0.0.0.0 --port 8000 > app.log 2>&1 &

**6. Verify Security Group Configuration**

**Reason:**

* Ensure the application is accessible from the internet.

**Steps:**

1. Open the AWS Management Console.
2. Navigate to the EC2 instance's **Security Groups**.
3. Confirm there is a rule to allow traffic on port 8000.

**7. Access the Application**

**Reason:**

* To confirm the application is running and accessible.

**Steps:**

1. Open a browser or tool like curl to test the application:

curl http://<EC2-Instance-Public-IP>:8000

1. If you receive a 404 Not Found, ensure you have defined the root route (/) in your FastAPI code.

**8. Common Errors and Fixes**

**Issue: Missing Dependencies**

* **Error Message:** "Form data requires python-multipart to be installed."
* **Fix:** Install the required library:

pip install python-multipart

**Issue: Cannot Connect to Port 8000**

* **Error Message:** Timeout when accessing the application.
* **Fix:**
  1. Check the security group configuration to allow inbound traffic on port 8000.
  2. Ensure Uvicorn is running with the correct host and port:

uvicorn app:app --host 0.0.0.0 --port 8000  
nohup uvicorn FaceRecognition-FastAPI:app --host 0.0.0.0 --port 8000 > app.log 2>&1 &

**9. Stopping the Application**

**Reason:**

* Properly terminate the application to free up resources.

**Commands:**

1. Press CTRL+C in the terminal running Uvicorn.

**10. Optional: Run as a Background Service**

**Reason:**

* Keep the application running even after disconnecting from SSH.

**Commands:**

1. Install tmux or screen:

sudo apt install tmux -y

1. Start a new session:

tmux

1. Run Uvicorn inside the session:

uvicorn app:app --host 0.0.0.0 --port 8000

1. Detach the session: Press CTRL+B, then D.
2. To reattach:

tmux attach

This document provides a step-by-step guide for deploying FastAPI on an EC2 instance, ensuring clarity and simplicity for developers.