Dockerized Flask-PostgreSQL Web Application

Project Overview

This project demonstrates containerization of a Python/Flask web application with a PostgreSQL database using Docker and Docker Compose. It includes:

- Flask (Python) web server
- PostgreSQL database
- Docker containerization
- Persistent storage for database using Docker volumes
- Docker Compose orchestration

Prerequisites

- Docker
- Docker Compose
- Text editor (VS Code, Sublime, etc.)

Project Structure

```
├── Dockerfile              # Web service configuration
├── docker-compose.yml      # Orchestration setup
├── app.py                  # Flask application
└── postgres_data/          # Auto-created volume
```

Setup Steps

1. Dockerfile Configuration

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1. Clone the repository or create these files manually:

```
git clone https://github.com/abdelhamed-4A/NTI-ZeroSploit-Training.git
cd Lab2
```

Key Features:

- Uses official Python 3.9 slim image
- Installs required system dependencies
- Copies application code (`app.py`)
- Exposes port 5000 for Flask

- Configures Flask to listen on all interfaces

2. Docker Compose Configuration

File: `docker-compose.yml`

Key Components:

1. **Web Service:**
   - Builds from local `Dockerfile`
   - Maps host port `5000` → container port `5000`
   - Connects to the database using environment variables
   - Depends on the database service
2. **Database Service:**
   - Uses PostgreSQL 13 image
   - Persistent volume for data storage
   - Pre-configured credentials:
     - **User:** `appuser`
     - **Password:** `apppass`
     - **Database:** `appdb`

3. Flask Application

File: `app.py`

Functionality:

- Simple endpoint (`/`) that tests database connectivity
- Uses `psycopg2` for PostgreSQL connection
- Returns connection status message

Deployment

Command Line Execution

```
# Build and start containers
docker-compose up --build

# Stop containers (CTRL+C to stop in foreground)
docker-compose down
```

Verification

1. **Access the application:**

   ```
   http://localhost:5000
   ```

2. **Successful response:**