

Complete Guide: How to Deploy a 3-Tier Architecture Web Application on Windows

Introduction

This guide provides step-by-step instructions for deploying a simple yet functional 3-tier architecture web application on a Windows machine. The application is built using Python (Flask) for the backend, MySQL for the database, and Docker to containerize the application. On the frontend, it uses HTML, CSS, and JavaScript (JSON for data handling). This setup is a great way to explore the 3-tier architecture and how it can be applied in cloud environments like AWS.

Requirements

Before we start, make sure you have the following software installed on your Windows machine:

- Git: Version control system to clone the repository from GitHub.
- Docker Desktop: To containerize the application and manage containers.
- Python (version 3.7 or higher): For running the backend Flask application.
- MySQL: For database management.
- Visual Studio Code (or any code editor): For editing code files if needed.

Step 1: Install Prerequisites

1.1 Install Git

- Download Git from the official website: Git for Windows.
- Run the installer and use the default options.
- Verify the installation by opening Command Prompt and typing:

```
bash
git --version
```

1.2 Install Docker Desktop

- Download Docker Desktop from the official website: Docker Desktop for Windows.
- Run the installer and follow the setup instructions.
- Once installed, launch Docker Desktop.
- Verify the installation by opening Command Prompt and typing:

```
bash
docker --version
```

1.3 Install Python

- Download Python from the official website: Python for Windows.
- Run the installer and make sure to check the box that says 'Add Python to PATH.'
- Verify the installation by opening Command Prompt and typing:

```
bash
python --version
pip --version
```

1.4 Install MySQL

- Download MySQL Installer from the official website: MySQL Installer for Windows.
- Run the installer, choose the 'Developer Default' setup type, and follow the instructions.
- During installation, set up a root password and remember it; you'll need it later.
- Verify the installation by opening Command Prompt and typing:

```
bash
mysql --version
```

1.5 Install Visual Studio Code (Optional)

- Download VS Code from the official website: Visual Studio Code.
- Run the installer and follow the setup instructions.

Step 2: Clone the Repository

- Open Command Prompt and navigate to the directory where you want to store the project:

```
bash
cd path\to\your\desired\directory
```

- Clone the GitHub repository containing the project:

```
bash
git clone https://github.com/Sara951/3-tier-architecture-web
```

- Navigate into the project directory:

```
bash
cd 3-tier-architecture-web
```

Step 3: Set Up Docker Containers

- Ensure Docker Desktop is running.
- Build and start the Docker containers using docker-compose:

```
bash
docker-compose up --build -d
```
- Verify the containers are running:

```
bash
docker ps
```

Step 4: Access the Application

- Open your web browser and navigate to:

```
bash
http://localhost:8080
```

The application should be up and running!

Step 5: (Optional) Run the Flask App Locally Without Docker

- Navigate to the backend directory:

```
bash
cd backend
```

- Install Python dependencies:

```
bash
pip install -r requirements.txt
```

- Run the Flask App:

```
bash
python app.py
```

- Access the Application:

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

Step 6: Stop and Clean Up Docker Containers

- Stop the running containers:

```
bash
docker-compose down
```

- Remove all Docker containers, networks, and volumes created by docker-compose:

```
bash
docker system prune -f --volumes
```

Conclusion

Congratulations! You have successfully deployed a 3-tier architecture web application on your Windows machine. This setup serves as a foundation for managing and scaling applications using 3-tier architecture, particularly in cloud environments like AWS.

Feel free to download the app from my GitHub link: <https://github.com/Sara951/3-tier-architecture-web>