SIT323/SIT737- Cloud Native Application Development

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5.1P: Containerization of a simple web application using Docker

GitHub Link: https://github.com/AndyWanng/sit323-737-2024-t1-prac5p.git

Docker Pull Command: *docker pull sizhewang0916/sit323-task-calculator*

Code Overview:

This project is structured into four key components: auth-server, calculator-server, frontend-server, and Nginx. Each server is a microservice with its own responsibilities, environment configurations, and Dockerfile for containerization. auth-server manages authentication; calculator-server handles calculation processes; frontend-server delivers the user interface; and Nginx routes requests and serves the frontend content. All services are designed to be deployed using Docker, ensuring scalable and consistent runtime environments.

Getting Started

Prerequisites

To run this project, you'll need:

- Git
- Node.js
- Docker
- NPM

Installation

1. **Clone the repository** or download the project files to a local directory.

2. **Navigate to the project directory** in your terminal or command prompt.

Running the Service(Using docker-compose)

1. **Start the server** by running:

    docker-compose up --build

    If everything is set up correctly, you should see a message indicating that the server is running on port 80.

2. **Accessing the service**: The service can now be accessed through HTTP GET requests. You can use a web browser, Postman, or curl to make requests.

Running the Service(Using images from Dockerhub)

1. **Pulling the images from Dockerhub** by running:

    docker pull sizehwang0916/sit323-task-calculator:auth

    docker pull sizehwang0916/sit323-task-calculator:calculator

    docker pull sizehwang0916/sit323-task-calculator:frontend

    docker pull sizehwang0916/sit323-task-calculator:nginx

2. **Running the service** by running:

    docker run -d --name auth-service sizehwang0916/sit323-task-calculator:auth

    docker run -d --name calculator-service sizehwang0916/sit323-task-calculator:calculator

    docker run -d --name frontend-service sizehwang0916/sit323-task-calculator:frontend

    docker run -d --name nginx-service sizehwang0916/sit323-task-calculator:nginx

3. **Configuring the network** by running:

    docker network create my-network

    docker network connect my-network auth-service

    docker network connect my-network calculator-service

docker network connect my-network frontend-service

docker network connect my-network nginx-service

4. **Accessing the service**: The service can now be accessed through HTTP GET requests. You can use a web browser, Postman, or curl to make requests.

API Endpoints

The service exposes four endpoints, one for each arithmetic operation. The endpoints are accessed via GET requests and expect two query parameters: num1 and num2, representing the operands.

- **Addition**

  - Path: **/api/calculate/add**

- **Subtraction**

  - Path: **/api/calculate/subtract**

- **Multiplication**

  - Path: **/api/calculate/multiply**

- **Division**

  - Path: **/api/calculate/divide**

- **Exponent**

  - Path: **/api/calculate/exponent**

- **Square**

  - Path: **/api/calculate/sqrt**

- **Module**

  - Path: **/api/calculate/modulo**

Error Handling

The service provides meaningful error messages for invalid input (e.g., non-numeric values) or unsupported operations.
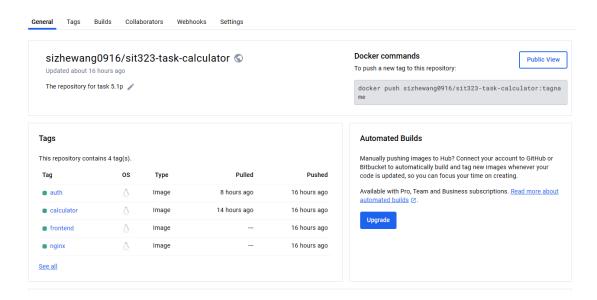
Logging

Logs are generated using Winston and are divided into console logs for info level and file logs for error and combined logs. Logs are stored in the logs directory.
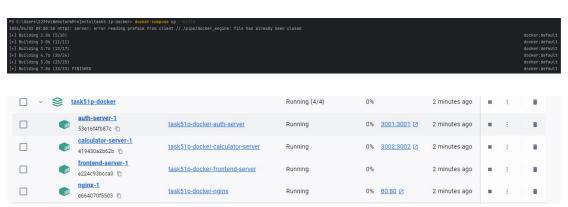
Conclusion

This document outlines the steps to set up and use the Calculator Microservice. By following the instructions provided, users can perform arithmetic operations through a REST API built with Node.js and Express.

Screenshots:

My Dockerhub repository

Using docker-compose up –build

Home page:

Welcome to Our Amazing Project

Your journey into the world of mathematics and authentication starts here.

Login / Register

Secure Authentication

Experience our secure login and registration system.

Advanced Calculator

Perform calculations with ease using our advanced calculator.