

SIT323/SIT737- Cloud Native Application Development

Name: Sizhe Wang

Student ID: 223314413

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

General

Tags

Builds

Collaborators

Webhooks

Settings

sizhewang0916/sit323-task-calculator

Updated about 16 hours ago

The repository for task 5.1p

Docker commands

To push a new tag to this repository:

`docker push sizhewang0916/sit323-task-calculator:tagname`

Public View

Tags

This repository contains 4 tag(s).

Tag	OS	Type	Pulled	Pushed
auth	linux	Image	8 hours ago	16 hours ago
calculator	linux	Image	14 hours ago	16 hours ago
frontend	linux	Image	---	16 hours ago
nginx	linux	Image	---	16 hours ago

See all

Automated Builds

Manually pushing images to Hub? Connect your account to GitHub or Bitbucket to automatically build and tag new images whenever your code is updated, so you can focus your time on creating.

Available with Pro, Team and Business subscriptions. [Read more about automated builds](#)

Upgrade

Using docker-compose up –build

```
PS C:\Users\22396\WebstormProjects\task5.1p-docker> docker-compose up --build
2024/04/03 09:00:10 http2: server: error reading preface from client //./pipe/docker_engine: file has already been closed
[+] Building 2.8s (5/20)
[+] Building 3.8s (11/11)
[+] Building 3.7s (13/17)
[+] Building 4.7s (20/24)
[+] Building 5.9s (25/25)
[+] Building 7.8s (33/33) FINISHED
docker: default
docker: default
docker: default
docker: default
docker: default
docker: default
```

	task51p-docker	Running (4/4)	0%	2 minutes ago			
	auth-server-1	Running	0%	3001:3001	2 minutes ago		
	calculator-server-1	Running	0%	3002:3002	2 minutes ago		
	frontend-server-1	Running	0%		2 minutes ago		
	nginx-1	Running	0%	80:80	2 minutes ago		

Home page:

