

CENG495 – HW2 REPORT

1. Deployment Workflow Using Docker and Docker Compose

a) Building images

- Each service has its own Dockerfile in its respective directory. Dockerfiles include instructions to build images using a Python 3.10-slim base image, set up the working directory, copy the source code and .env files, install dependencies, expose necessary ports, and define the command to run the application.

b) Configuration via docker-compose.yml

- Version: Specifies the Docker Compose file format version
- Networks: Two networks are defined, namely frontend and backend
- Services: Defines five separate services corresponding to different components of the application. Each service configuration includes the following:
 - 1- Build: Path to Dockerfile of the service
 - 2- Ports: Port mapping between the host and the container
 - 3- Networks: Specifies which network the service is attached to
 - 4- Env_file: Specifies environment files that are to be used by the service

c) Building and running the services

- Running ***docker-compose build*** would build and ***docker-compose up*** would run the services as configured.
- Each service then communicates with others on the same network and the defined ports are exposed to the host, allowing external Access where necessary.

d) Environment Variables

- The .env file included in each service configuration allows the system to manage configuration and secrets

efficiently and securely without hardcoding them into the Dockerfile or application code.

e) Management

- Docker Compose also facilitates the management of the entire application lifecycle. Commands like ***docker-compose start***, ***docker-compose stop*** and ***docker-compose down*** allow for easy starting, stopping and removing all services defined in the compose file.

2. System Arcitecture Overview

The system consists of several interacting services, each running in a Docker container.

- Auth: Manages authentication processes.
- Others: A generic service that could handle various tasks.
- Add_expense: Manages operations related to adding expenses.
- Add_expense_group: Handlles operations related to managing expense groups.
- Database: Handles database interaction

3. Decisions made & challenges encountered during the deployment process and their justifications:

- I have used Flask while developing backend and basic Javascript/HTML/CSS while developing frontend for their ease of use and debug.
- Since I have familiarity with the mongoDB tech, I also used it in this homework. I wasn't able to deploy a local database, and so instead I have used Atlas's mongodb as a service.

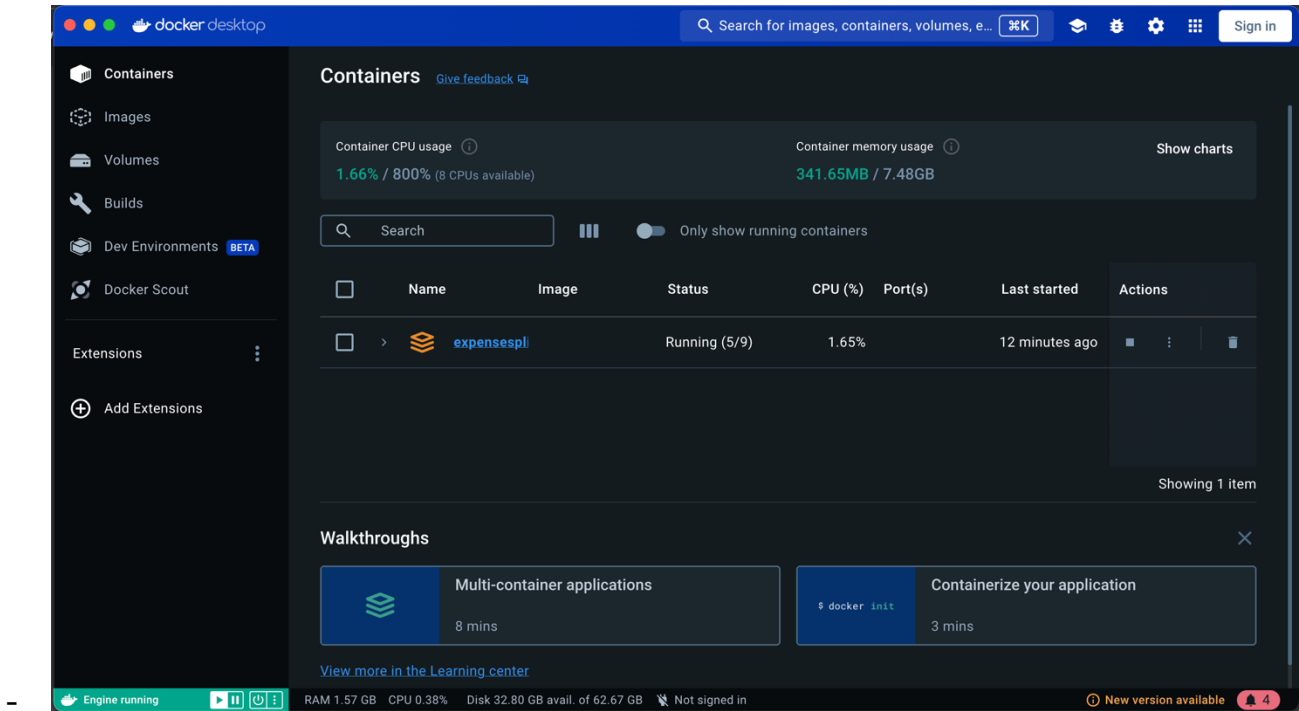
4. Screenshots of the Docker and Docker Compose usage:

```
● cw@192 expenseSplitter % docker-compose build
[+] Building 2.3s (42/42) FINISHED
=> [add_expense internal] load build definition from Dockerfile
=> => transferring dockerfile: 622B
=> [database internal] load build definition from Dockerfile
=> => transferring dockerfile: 613B
=> [add_expense internal] load metadata for docker.io/library/python:3.10-slim
=> [add_expense-group internal] load build definition from Dockerfile
=> => transferring dockerfile: 641B
=> [others internal] load build definition from Dockerfile
=> => transferring dockerfile: 606B
=> [auth internal] load build definition from Dockerfile
=> => transferring dockerfile: 601B
=> [others internal] load .dockerignore
=> => transferring context: 2B
=> [add_expense internal] load .dockerignore
=> => transferring context: 2B
=> [database internal] load .dockerignore
=> => transferring context: 2B
=> [add_expense-group internal] load .dockerignore
=> => transferring context: 2B
=> [auth internal] load .dockerignore
=> => transferring context: 2B
=> [others 1/5] FROM docker.io/library/python:3.10-slim@sha256:161d1e3deddba156d7834d15e6fe4d010b3b6f69f18ee1cfba9348e712f4a4ba
=> [add_expense internal] load build context
=> => transferring context: 567B
=> [auth internal] load build context
=> => transferring context: 408B
=> [add_expense-group internal] load build context
=> => transferring context: 573B
```

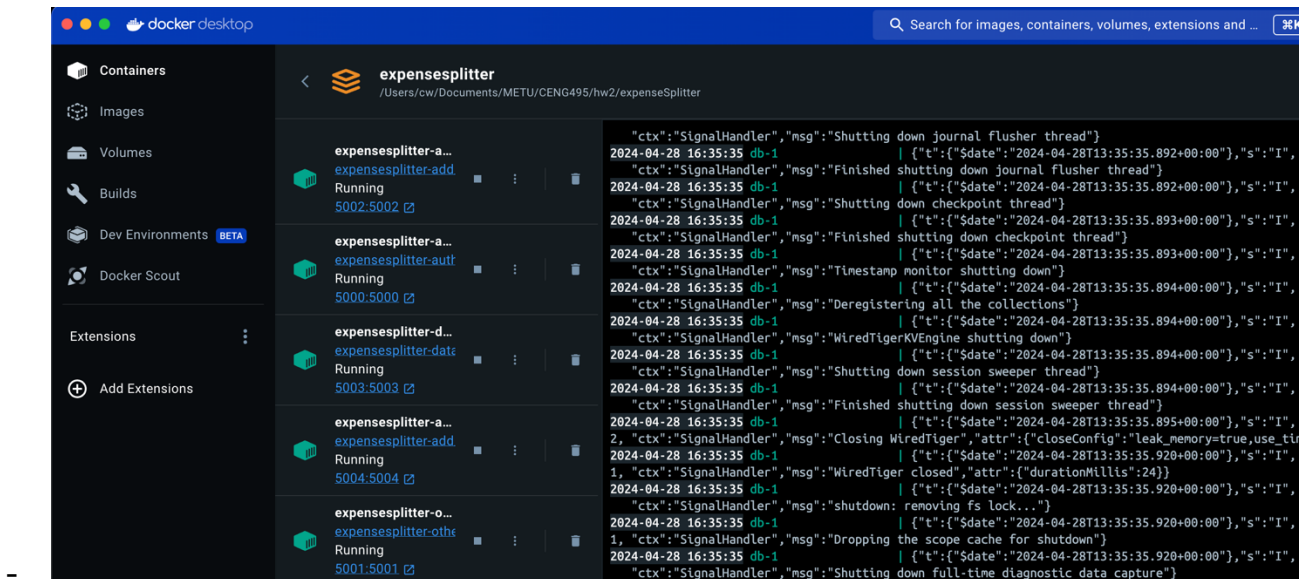
docker-compose build command

```
● cw@192 expenseSplitter % docker-compose up
WARN[0000] Found orphan containers (expensesplitter-dbdummy-1 expensesplitter-db-1 expensesplitter-dbdummy3-1 expensesplitter-dbdummy4-1) for this project. You can remove them with the --remove-orphans flag to clean it up.
[+] Running 5/0
  ✓ Container expensesplitter-auth-1          Created
  ✓ Container expensesplitter-database-1       Created
  ✓ Container expensesplitter-add_expense-group-1 Created
  ✓ Container expensesplitter-others-1         Created
  ✓ Container expensesplitter-add_expense-1     Created
Attaching to add_expense-1, add_expense-group-1, auth-1, database-1, others-1
add_expense-1      * Serving Flask app 'app'
add_expense-1      * Debug mode: on
add_expense-1      WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
add_expense-1      * Running on all addresses (0.0.0.0)
add_expense-1      * Running on http://127.0.0.1:5002
add_expense-1      * Running on http://172.28.0.4:5002
add_expense-1      Press CTRL+C to quit
add_expense-1      * Restarting with stat
add_expense-1      * Serving Flask app 'app'
add_expense-group-1 * Debug mode: on
add_expense-group-1 WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
add_expense-group-1 * Running on all addresses (0.0.0.0)
add_expense-group-1 * Running on http://127.0.0.1:5004
add_expense-group-1 * Running on http://172.28.0.3:5004
add_expense-group-1 Press CTRL+C to quit
add_expense-group-1 * Restarting with stat
add_expense-group-1 * Serving Flask app 'app'
auth-1              * Debug mode: on
auth-1              * Serving Flask app 'app'
others-1            * Debug mode: on
others-1            * Serving Flask app 'app'
auth-1              WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
auth-1              * Running on all addresses (0.0.0.0)
auth-1              * Running on http://127.0.0.1:5000
auth-1              * Running on http://172.28.0.6:5000
auth-1              Press CTRL+C to quit
auth-1              * Restarting with stat
others-1            WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
others-1            * Running on all addresses (0.0.0.0)
others-1            * Running on http://127.0.0.1:5001
others-1            * Running on http://172.28.0.5:5001
others-1            Press CTRL+C to quit
others-1            * Restarting with stat
add_expense-1      * Debugger is active!
add_expense-1      * Debugger PIN: 622-120-945
add_expense-group-1 * Debugger is active!
add_expense-group-1 * Debugger PIN: 356-025-869
auth-1              * Debugger is active!
auth-1              * Debugger PIN: 353-161-503
others-1            * Debugger is active!
others-1            * Debugger PIN: 252-026-028
database-1          Pinged your deployment. You successfully connected to MongoDB!
database-1          * Serving Flask app 'app'
database-1          * Debug mode: on
database-1          WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
database-1          * Running on all addresses (0.0.0.0)
database-1          * Running on http://127.0.0.1:5003
database-1          * Running on http://172.28.0.2:5003
database-1          Press CTRL+C to quit
database-1          * Restarting with stat
database-1          * Debugger is active!
database-1          * Debugger PIN: 212-230-481
```

docker-compose up command



Docker Desktop



Docker Desktop-2

5. Screenshots of the Localhost deployment

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The screenshot shows a web browser window with the title 'Authentication' and the URL '127.0.0.1:5001'. The page has a header with 'ExpenseSplitter' and 'Home' on the left, and 'Register/Login' on the right. The main content area contains two forms: a 'Register' form and a 'Login' form. The 'Register' form has fields for Email, Phone, Name, and Password, and a checkbox for 'Show my information publicly:'. Below the fields is a blue 'Register' button. The 'Login' form has fields for Email and Password, and a blue 'Login' button.

ExpenseSplitter Home Register/Login

Register

Email:

Phone:

Name:

Password:

Show my information publicly: ☐

Register

Login

Email:

Password:

Login

Main Page

Register

Email:

aliguner1280@gmail.com

Phone:

4343435

Name:

tunahan

Password:

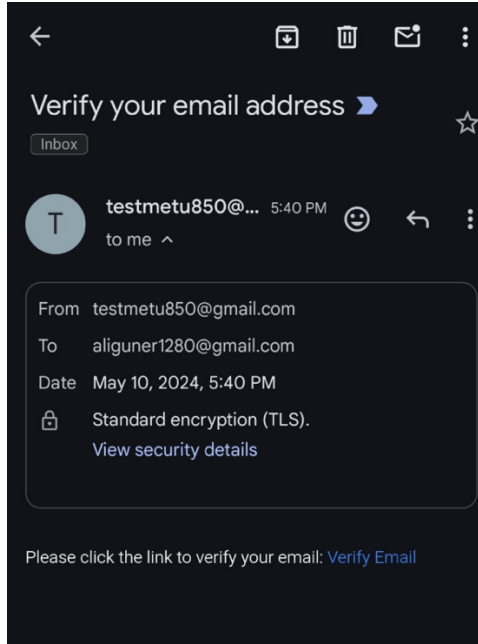
....

Show my information publicly: ☒

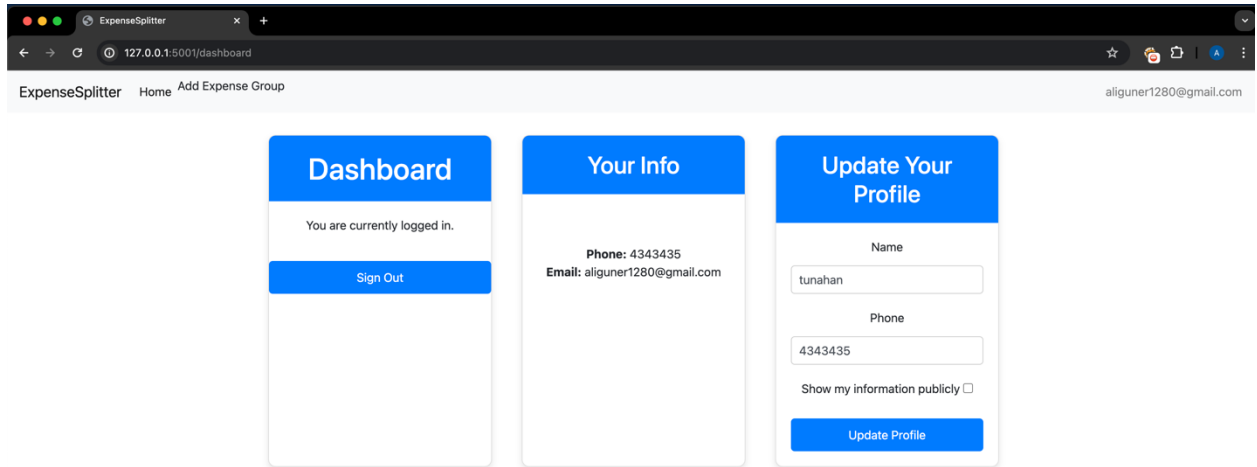
Register

Register

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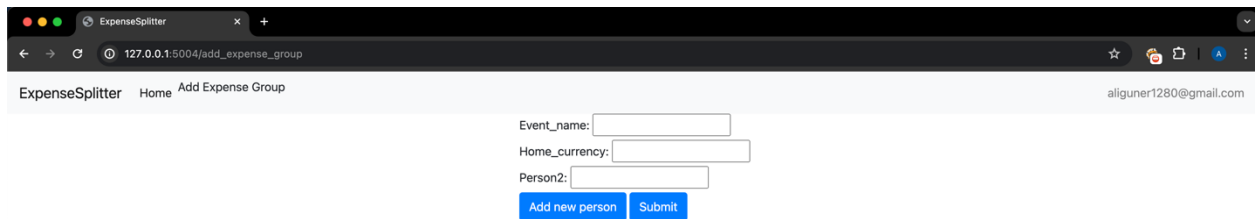
Confirmation Mail



Expense Groups

No items found.

After Login



Add Expense Group

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ExpenseSplitter

HomeAdd Expense Group

aliguner1280@gmail.com

Expense Group Details

Expense group owner:
tunahan

Event name: skydiving

Home currency: TRY

Person2: cagatay

Person3: salih

Date: 10 May 2024, 14:44

Add expense

Expenses

No items found.

Expense Management

Balance for tunahan:
is settled

Balance for cagatay:
is settled

Viewing expense group

ExpenseSplitter

HomeAdd Expense Group

aliguner1280@gmail.com

EXPENSESMONEY GIVENINCOME

paid for something:
tunahan

What for?
parachute

How much (TRY)?
12000

Split equally among everyone?

Split differently:

When?
10.05.2024

CancelAdd

Add Expense

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The screenshot shows the ExpenseSplitter application interface. At the top, there's a header with the following information: Home currency: TRY, Person2: cagatay, Person3: salih, Date: 10 May 2024, 14:44, and an 'Add expense' button. Below this is the 'Expenses' section, which contains a list of expenses. The first expense is: 'In 2024-05-10, tunahan paid for parachute amounting to 12000 TRY, splitting equally.' Below the expenses list is the 'Expense Management' section, which shows the balance for each person: 'Balance for tunahan: is owed 8000 TRY', 'Balance for cagatay: owes -4000 TRY', and 'Balance for salih: owes -4000 TRY'.

Home currency: TRY
Person2: cagatay
Person3: salih
Date: 10 May 2024, 14:44
Add expense

Expenses

Expenses
In 2024-05-10, tunahan paid for parachute amounting to 12000 TRY, splitting equally.

Expense Management

Balance for tunahan:
is owed 8000 TRY

Balance for cagatay:
owes -4000 TRY

Balance for salih:
owes -4000 TRY

View expense group after adding an expense

The screenshot shows the ExpenseSplitter application interface with the 'Add Expense Group' form. The form has three tabs: 'EXPENSES', 'MONEY GIVEN', and 'INCOME'. The 'EXPENSES' tab is selected. The form contains the following fields: 'received money for something:' (a dropdown menu with 'cagatay' selected), 'What for?' (a text input field with 'donation/grant' entered), 'How much (TRY)?' (a text input field with '4800' entered), 'Split equally among everyone?' (a radio button that is selected), 'Split differently:' (a radio button that is not selected), 'When?' (a date input field with '07.05.2024' entered), and 'Cancel' and 'Add' buttons.

ExpenseSplitter Home Add Expense Group

EXPENSES MONEY GIVEN INCOME

received money for something:
cagatay

What for?
donation/grant

How much (TRY)?
4800

Split equally among everyone?
Split differently:

When?
07.05.2024

Cancel Add

Add Income

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ExpenseSplitter

127.0.0.1:5001/item?id=663e32bcc9658163b923e6e6

Home currency: TRY

Person2: cagatay

Person3: salih

Date: 10 May 2024, 14:44

Add expense

Expenses

Income

In 2024-05-07, cagatay got money for donation/grant amounting to 4800 TRY, splitting equally.

Expenses

In 2024-05-10, tunahan paid for parachute amounting to 12000 TRY, splitting equally.

Expense Management

Balance for tunahan:
is owed 9600 TRY

Balance for cagatay:
owes -7200 TRY

Balance for salih:
owes -2400 TRY

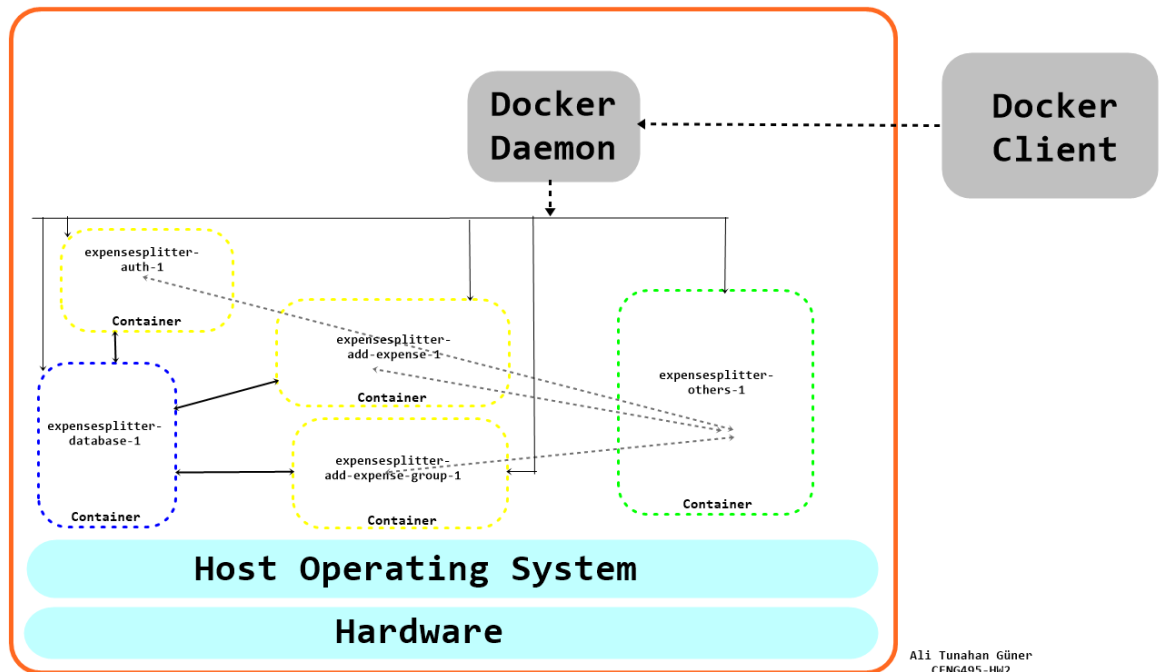
others-1 192.168.65.1 - [10/May/2024 14:38:20] "GET / HTTP/1.1" 200 -
database-1 172.28.8.6 - [10/May/2024 14:38:54] "POST /find_user_by_email HTTP/1.1" 200 -
auth-1 192.168.65.1 - [10/May/2024 14:38:54] "POST /user/signup HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:38:54] "GET /info?message=Email%20address%20already%20exists.%20Please%20register%20with%20a%20different%20email%20address.&redirect_url=http://127.0.0.1:5001/auth HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:38:55] "GET /auth HTTP/1.1" 200 -
database-1 172.28.8.6 - [10/May/2024 14:40:36] "POST /find_user_by_email HTTP/1.1" 404 -
database-1 172.28.8.6 - [10/May/2024 14:40:36] "POST /insert_user HTTP/1.1" 200 -
auth-1 192.168.65.1 - [10/May/2024 14:40:37] "POST /user/signup HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:40:37] "GET /info?message=Signup%20successful.%20Please%20verify%20your%20email%20address.&redirect_url=http://127.0.0.1:5001/auth HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:40:38] "GET /auth HTTP/1.1" 200 -
database-1 172.28.8.6 - [10/May/2024 14:40:46] "POST /find_user_by_email HTTP/1.1" 200 -
auth-1 192.168.65.1 - [10/May/2024 14:40:46] "POST /user/login HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:40:46] "GET /info?message=Email%20not%20verified&redirect_url=http://127.0.0.1:5001/ HTTP/1.1" 200 -
database-1 172.28.8.6 - [10/May/2024 14:42:25] "POST /find_user_by_email HTTP/1.1" 200 -
auth-1 192.168.65.1 - [10/May/2024 14:42:25] "POST /update_user HTTP/1.1" 200 -
database-1 172.28.8.6 - [10/May/2024 14:42:25] "GET /verify_your_email?token=InfSaMd1bnVMTI4MEBnbWpC5jb2Bi.Zj4xSA.pAvkvQRBklqNCSTAHdK7KCLIAU HTTP/1.1" 200 -
auth-1 192.168.65.1 - [10/May/2024 14:42:26] "GET /favicon.ico HTTP/1.1" 404 -
others-1 192.168.65.1 - [10/May/2024 14:42:26] "GET / HTTP/1.1" 200 -
database-1 172.28.8.6 - [10/May/2024 14:42:52] "POST /find_user_by_email HTTP/1.1" 200 -
auth-1 192.168.65.1 - [10/May/2024 14:42:52] "POST /user/login HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:42:52] "GET /info?message=Login%20successful&redirect_url=http://127.0.0.1:5001/ HTTP/1.1" 200 -
database-1 192.168.65.1 - [10/May/2024 14:42:53] "GET / HTTP/1.1" 302 -
database-1 172.28.8.5 - [10/May/2024 14:42:53] "POST /find_user_by_id HTTP/1.1" 200 -
database-1 172.28.8.5 - [10/May/2024 14:42:53] "POST /list_items HTTP/1.1" 404 -
others-1 192.168.65.1 - [10/May/2024 14:42:53] "GET /dashboard HTTP/1.1" 200 -
add_expense-group-1 192.168.65.1 - [10/May/2024 14:43:25] "GET /add_expense_group HTTP/1.1" 200 -
database-1 172.28.8.3 - [10/May/2024 14:44:12] "POST /insert_items_collection HTTP/1.1" 200 -
add_expense-group-1 192.168.65.1 - [10/May/2024 14:44:12] "POST /add_expense_group HTTP/1.1" 200 -
add_expense-group-1 192.168.65.1 - [10/May/2024 14:44:12] "GET /info?message=Expense%20group%20added%20successfully&redirect_url=http://127.0.0.1:5001/ HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:44:13] "GET / HTTP/1.1" 302 -
database-1 172.28.8.5 - [10/May/2024 14:44:13] "POST /find_user_by_id HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:44:13] "GET /dashboard HTTP/1.1" 200 -
database-1 172.28.8.5 - [10/May/2024 14:44:14] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.8.5 - [10/May/2024 14:44:15] "POST /find_user_by_id HTTP/1.1" 200 -
database-1 172.28.8.5 - [10/May/2024 14:44:15] "POST /list_expenses HTTP/1.1" 404 -
database-1 172.28.8.5 - [10/May/2024 14:44:15] "POST /find_user_by_id HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:44:15] "GET /item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
database-1 172.28.8.4 - [10/May/2024 14:44:48] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.8.4 - [10/May/2024 14:44:48] "POST /find_user_by_id HTTP/1.1" 200 -
add_expense-1 192.168.65.1 - [10/May/2024 14:44:48] "GET /edit_item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
database-1 172.28.8.5 - [10/May/2024 14:45:26] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.8.5 - [10/May/2024 14:45:26] "POST /find_user_by_id HTTP/1.1" 200 -

Backend logs-1

```
database-1 172.28.0.5 - [10/May/2024 14:45:57] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:45:57] "POST /find_user_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:45:57] "POST /list_expenses HTTP/1.1" 404 -
database-1 172.28.0.5 - [10/May/2024 14:45:57] "POST /find_user_by_id HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:45:57] "GET /item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:45:59] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:46:00] "POST /find_user_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:46:00] "POST /list_expenses HTTP/1.1" 404 -
database-1 172.28.0.5 - [10/May/2024 14:46:00] "POST /find_user_by_id HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:46:00] "GET /item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
database-1 172.28.0.3 - [10/May/2024 14:46:19] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.0.3 - [10/May/2024 14:46:19] "POST /find_user_by_id HTTP/1.1" 200 -
add_expense-1 192.168.65.1 - [10/May/2024 14:46:19] "GET /edit_item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
database-1 172.28.0.3 - [10/May/2024 14:46:54] "POST /insert_item HTTP/1.1" 200 -
add_expense-1 192.168.65.1 - [10/May/2024 14:46:54] "POST /edit_item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
add_expense-1 192.168.65.1 - [10/May/2024 14:46:54] "GET /info?message=Expense%20added%20successfully&redirect_url=http://127.0.0.1:5001/item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:46:55] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:46:55] "POST /find_user_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:46:56] "POST /list_expenses HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:46:56] "POST /find_user_by_id HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:46:56] "GET /item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
database-1 172.28.0.3 - [10/May/2024 14:47:31] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.0.3 - [10/May/2024 14:47:31] "POST /find_user_by_id HTTP/1.1" 200 -
add_expense-1 192.168.65.1 - [10/May/2024 14:47:31] "GET /edit_item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
database-1 172.28.0.3 - [10/May/2024 14:48:37] "POST /edit_item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
add_expense-1 192.168.65.1 - [10/May/2024 14:48:37] "GET /info?message=Expense%20added%20successfully&redirect_url=http://127.0.0.1:5001/item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
add_expense-1 172.28.0.5 - [10/May/2024 14:48:39] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:48:39] "POST /find_user_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:48:39] "POST /list_expenses HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:48:39] "POST /find_user_by_id HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:48:39] "GET /item?id=663e32bcc9658163b923e6e6 HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:49:09] "GET / HTTP/1.1" 302 -
others-1 192.168.65.1 - [10/May/2024 14:49:09] "GET / HTTP/1.1" 302 -
database-1 172.28.0.5 - [10/May/2024 14:49:09] "POST /find_item_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:49:10] "POST /list_items HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:49:10] "GET /dashboard HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:49:10] "POST /find_user_by_id HTTP/1.1" 200 -
database-1 172.28.0.5 - [10/May/2024 14:49:11] "POST /list_items HTTP/1.1" 200 -
others-1 192.168.65.1 - [10/May/2024 14:49:11] "GET /dashboard HTTP/1.1" 200 -
```

Backend logs-2

6. System Architecture Diagram



Ali Tunahan Güner
CENG495-HM2