

CO515-2024 : Advances in Computer Networks: Selected Topics

Objective: The objective of this lab exercise is to familiarize undergraduate students with Docker Compose, a tool used for defining and running multi-container Docker applications.

Prerequisites:

- Basic understanding of Docker and containers.
- Docker installed on the system.

Lab Exercise: In this exercise, students will create a basic multi-container application using Docker Compose. The application will consist of two services: a web server and a database.

Instructions:

1. Setup:

- Make sure Docker is installed on your system.
- Create a new directory for your project.
- Inside the project directory, create two files: **Dockerfile** and **docker-compose.yml**.

2. Create Dockerfiles:

- Write Dockerfiles for both services (web server and database).
- For example, for a simple Node.js web server:

```
Dockerfile                                         Copy code

FROM node:latest
WORKDIR /app
COPY package.json .
RUN npm install
COPY . .
EXPOSE 3000
CMD ["npm", "start"]
```

3. Write docker-compose.yml:

- Create a **docker-compose.yml** file to define the services.
- Here's an example for a Node.js web server and a MongoDB database:

```
yaml
version: '3'
services:
  web:
    build: .
    ports:
      - "3000:3000"
    depends_on:
      - db
  db:
    image: mongo
    ports:
      - "27017:27017"
```

4. Build and Run the Application:

- Run the following command in the project directory to build and run the application:

```
docker-compose up
```

- This command will start both services defined in the `docker-compose.yml` file.

5. Access the Application:

- Access the web server from a web browser at `http://localhost:3000`.
- You can interact with the application to see how it communicates with the database.

6. Cleanup:

- After you're done, stop the running containers by pressing `Ctrl + C`.
- Optionally, you can run `docker-compose down` to remove the containers.

Discussion Questions:

- What is Docker Compose, and how does it differ from Docker?
- What are the benefits of using Docker Compose for multi-container applications?
- Explain the purpose of each section in the `docker-compose.yml` file.
- What are some real-world scenarios where Docker Compose can be useful?
- **Submit the report in one week time.**