

**Bharatiya Vidya Bhavans’**

**Sardar Patel Institute of Technology Munshinagar, Andheri(W), Mumbai-400058 (Autonomous College Affiliated to University of Mumbai)**

**Academic Year: 2025 26 Semester: III Class: MCA**

**Course Code: MC520 Course Name: Cloud Computing**

Experiment No.2

Date: 23.09.25

**Aim**: Ubuntu: Development of an application using Docker and Docker Compose

**CO Mapping – OECS1.4**

**Objective**: To understand and implement containerization techniques in Ubuntu using Docker and Docker Compose for developing, deploying, and managing applications efficiently with isolated, reproducible environments.

**Concept**:  
 Docker is an open-source platform that automates the deployment, scaling, and management of applications inside lightweight, portable containers.

* A container is an isolated unit that packages an application with all its dependencies, libraries, and configuration files, ensuring it runs the same in any environment.
* Docker uses the Docker Engine to run containers and images (read-only templates) to create them.
* It eliminates the “works on my machine” problem by ensuring environment consistency.

Lab Exercise:  
  
Step 1: Update Ubuntu 22.04 system  
sudo apt update  
  
Step 2: Install prerequisites  
sudo apt install apt-transport-https ca-certificates curl software-properties-common  
  
Step 3: Add Docker GPG key  
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg  
  
Step 4: Add Docker repository  
echo "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/docker-archive-keyring.gpg] https://download.docker.com/linux/ubuntu $(lsb\_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null  
  
Step 5: Update package list  
sudo apt update  
  
Step 6: Install Docker  
sudo apt install docker-ce  
  
Step 7: Check Docker status  
sudo systemctl status docker  
  
Step 8: Verify installation  
sudo docker run hello-world  
  
Step 9: Install Docker Compose  
sudo apt install docker-compose  
  
Step 10: Verify Docker Compose  
docker-compose version  
  
Reference: Official Docker Documentation - https://docs.docker.com/engine/install/ubuntu/

Now Create a directory and then make a small project and then create 2 files in same directory Dockerfile and docker-compose.yml

**Dockerfile**

# Build stage

FROM node:18-alpine

WORKDIR /app

# Install dependencies

COPY package\*.json ./

RUN npm install –production

# Copy application files

COPY . .

# Expose the application port

EXPOSE 3001

# Start the application

CMD ["node", "index.js"]

**docker-compose.yml**

version: '1.0'

services:

  web:

    image: todo-app:1.0.0

    build: .

    container\_name: web

    ports:

      - "3001:3001"

    environment:

      - NODE\_ENV=production

      - MONGODB\_URI=mongodb+srv://angreatharva08\_db\_user:yYEtVTbasx0uD8Si@cluster0.rhgpdag.mongodb.net/todoapp?retryWrites=true&w=majority

    restart: unless-stopped

    networks:

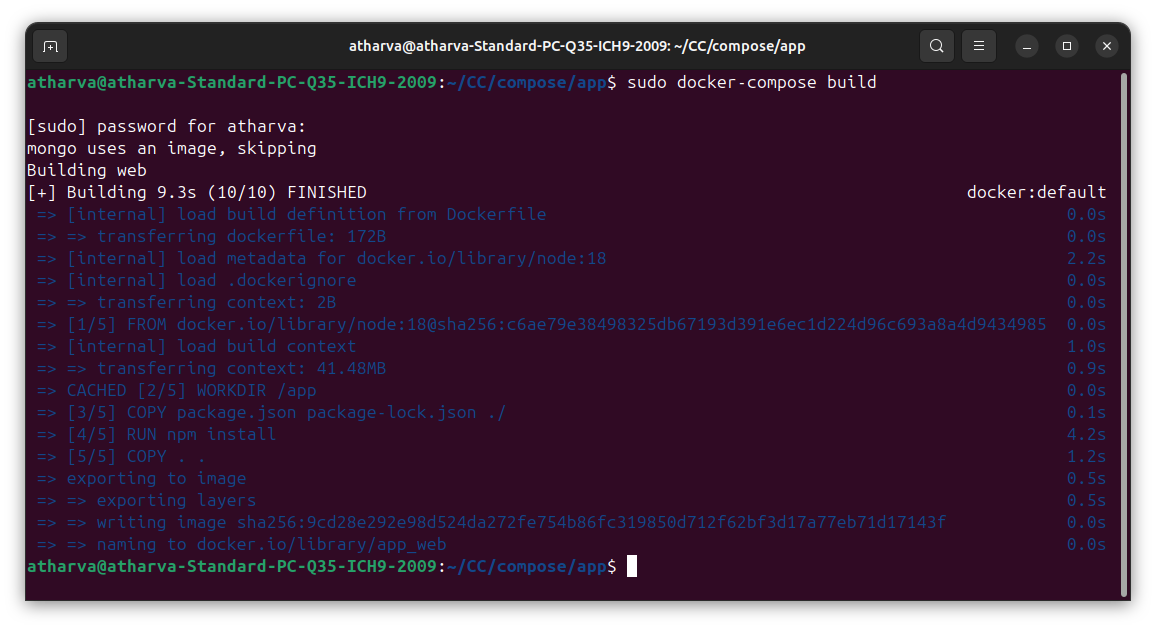
      - app-network

networks:

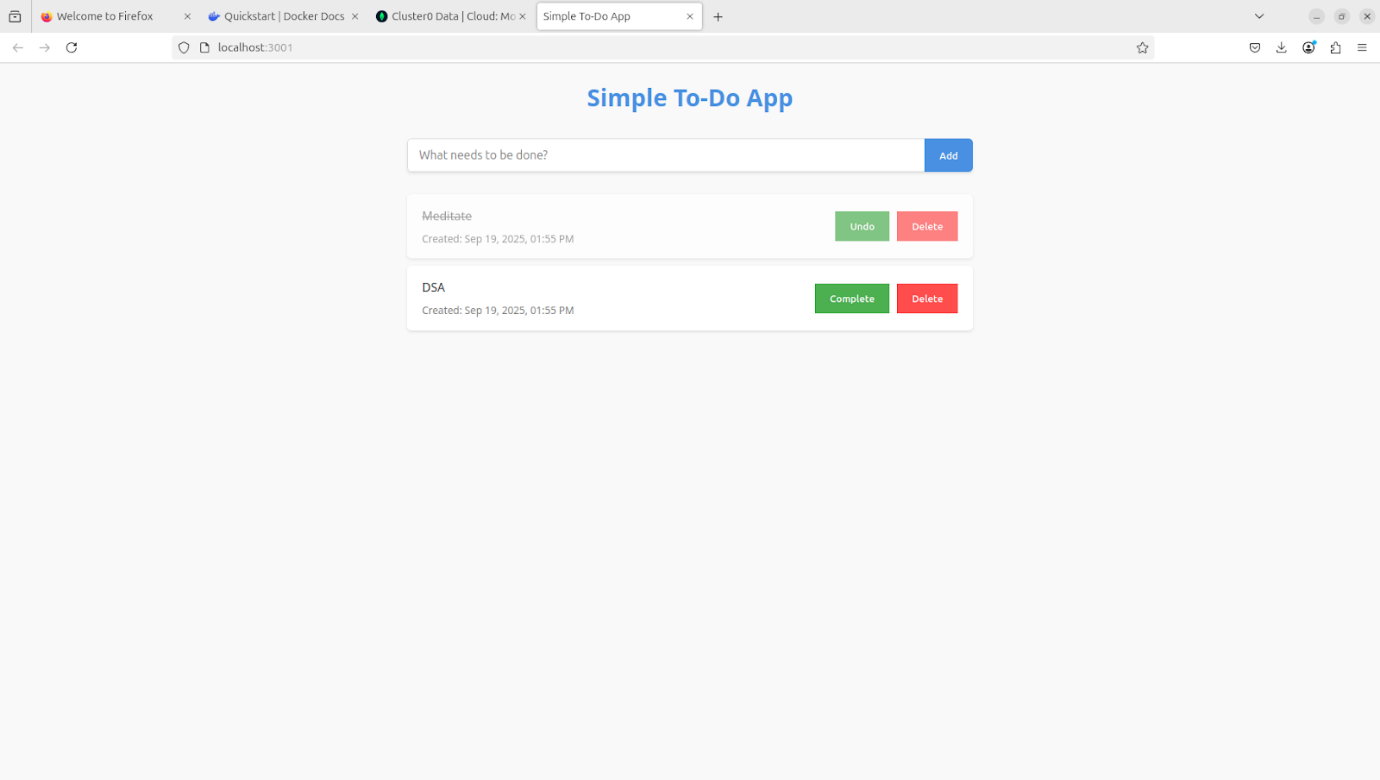
  app-network:

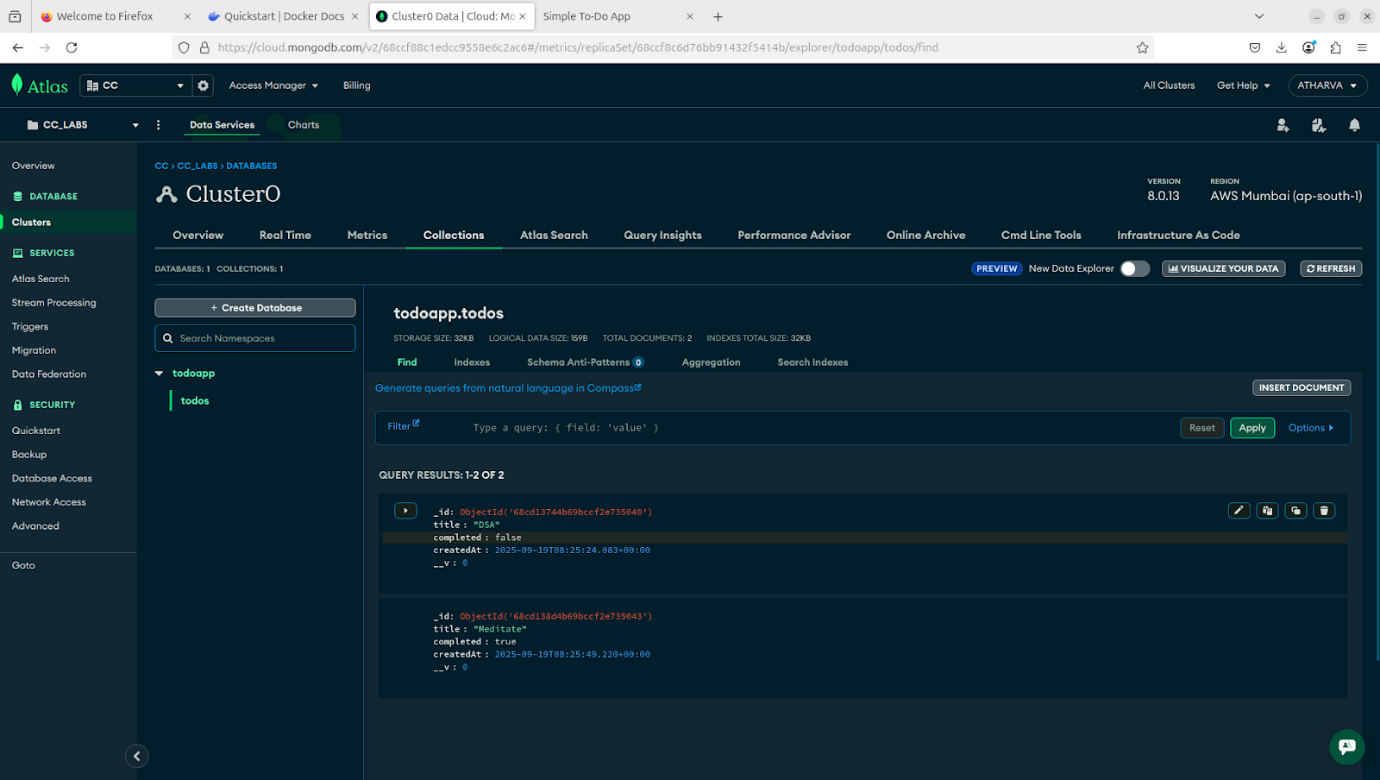
    driver: bridge

Then run command sudo docker-compose build



Then run command sudo docker-compose up





Observation:

* Docker and Docker compose was successfully installed.
* Running sudo docker-compose build successfully built the Docker image.
* Running sudo docker-compose up started the containers and the application ran without errors.
* The application was accessible at the specified port (e.g., http://localhost:3001 as defined in docker-compose.yml).