Full Completed Docker Note

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🔗**Full Tutorial :**https://www.youtube.com/watch?v=qtKK7qOGMuE

Welcome to the Docker Tutorials and Projects repository! This repository contains code and resources related to a comprehensive Docker tutorial video. The video covers all the essential areas you need to know before using Docker, including hands-on projects to solidify your understanding.

Dockerize a Simple application

Dockerfile

Commands

1.Create an docker image using the Dockerfile
docker build -t image_name .

2.To see all the images
docker images

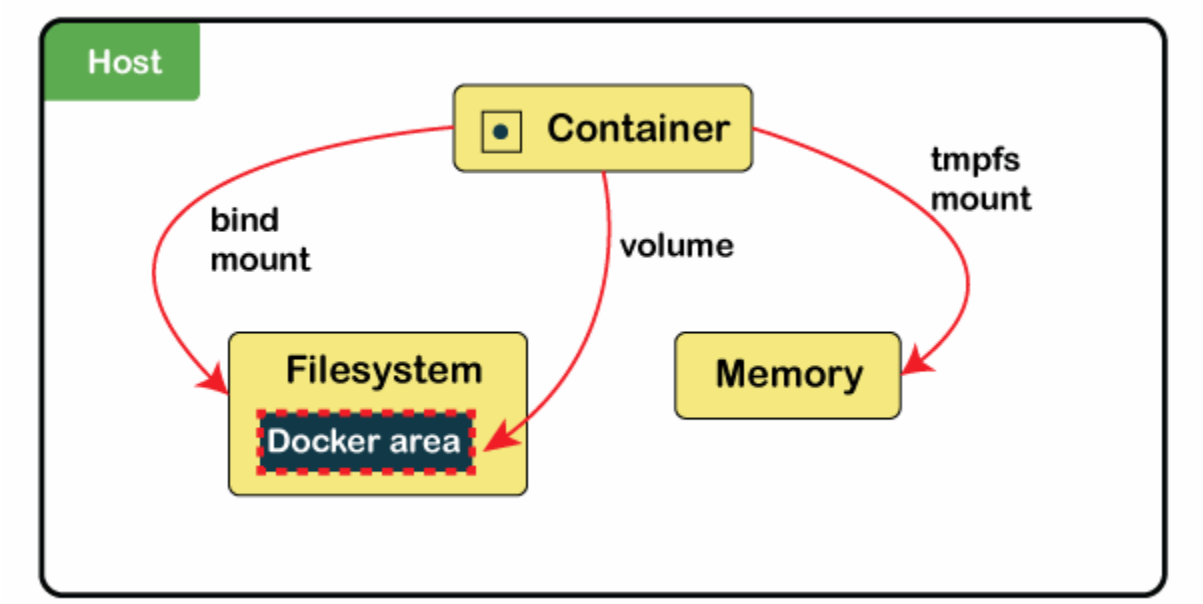
3.To create a container from that image
docker run –name container_name image_name
docker run –name container_name -d image_name (to run in detached mode)

4.To see all the running services(containers)
docker ps

5.To see all the containers (running ones or not)
docker ps -a

Docker Volumes

Docker volumes are a mechanism for persisting data generated and used by Docker containers. Unlike bind mounts, which link a directory on the host machine to a directory in the container, volumes are managed by Docker itself and can be stored in a location on the host filesystem that Docker chooses.



Types of Docker Volumes

1. Anonymous Volumes: Created and managed by Docker but not given a specific name. These volumes are typically used for temporary data that doesn't need to be persisted beyond the container's lifecycle.

   ```
   docker run -d --name my_container -v /app/data my_image
   ```

2. Named Volumes: Created with a specific name and can be referenced by multiple containers. Named volumes are useful for persisting data that needs to be shared between containers or across container restarts.

```
docker run -d --name my_container -v my_volume:/app/data my_image
```

3. Host Volumes (Bind Mounts): Directly map a directory or file on the host to a directory or file in the container. Unlike managed volumes, the host determines where the data is stored. Bind mounts provide more control but less isolation from the host system.

```
docker run -d --name my_container -v /path/on/host:/path/in/container my_image
```

Commands

1.Create a docker volume

```
docker volume create my_volume
```

2.Run a docker container with a volume

```
docker run -d --name my_container -v my_volume:/app/data my_image
```

```
docker run --name container_name --rm -v /app/node_modules -v ${PWD}:/app  image_name
```

3.List all docker volumes

```
docker volume ls
```

4.Inspect docker volumes
docker volume inspect my_volume

5.Remove
docker volume rm my_volume

Dockerize a React application

Dockerfile

Untitled-1 Docker

```
# Use the base image from Docker Hub
FROM node:20-alpine

# Set the working directory
WORKDIR /app

# Copy the package.json and package-lock.json files
COPY package*.json ./

# Install the dependencies
RUN npm install

# Copy the rest of the application files
COPY . .

# Expose the port your app will run on
EXPOSE 5173

# Start the application
CMD ["npm", "run", "dev"]
```

Dockerignore

In Docker, the `.dockerignore` file is used to specify which files and directories should be excluded from the Docker build context. When you build a Docker image, Docker uses a "build context" which includes all files and directories in the current directory (where your Dockerfile resides) and its subdirectories. The `.dockerignore` file helps optimize the build process by preventing unnecessary or sensitive files from being sent to the Docker daemon as part of the build context.

Commands

1.Create an docker image using the Dockerfile
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2.To see all the images
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3.To create a container from that image
docker run –name container_name -p 3000:5173 image_name
docker run –name container_name -p 3000:5173 -d image_name (to run in detached mode)

4.To see all the running services(containers)
docker ps

5.To see all the containers (running ones or not)
docker ps -a

6.To stop a running container

docker stop container_name
or
docker stop container_id

7.To restart a docker container
Docker start container_name
(here we don't need to re configure the port mappings as we did that earlier)

‘

8.Remove a docker container
docker ps -a
docker container rm CONTAINER_ID_OR_NAME

Remove multiple containers
docker container rm CONTAINER_ID_OR_NAME
CONTAINER_ID_OR_NAME

9.Remove a docker image
docker images
docker image rm IMAGE_ID_OR_TAG

10.Remove all containers all images and all volumes
docker system prune -a

11.Docker Volumes

This Docker `run` command sets up a container (`vite_container`) based on the `vite-app` image, with port mappings, volume mounts, environment variable settings, and automatic removal (`--rm`) when the container stops. It's configured to facilitate local development with live code updates (`${PWD}:/app`), efficient `node_modules` management (`/app/node_modules`), and reliable file change detection (`CHOKIDAR_USEPOLLING=true`). Adjustments can be made based on specific project requirements or environment configurations.

docker run --name container_name -p 3000:5173 --rm -v /app/node_modules -v ${PWD}:/app -e CHOKIDAR_USEPOLLING=true image_name

The `--rm` flag in the `docker run` command stands for "remove". When you use `--rm`, Docker automatically removes the container and its filesystem when the container exits (stops running).

Versioning Images

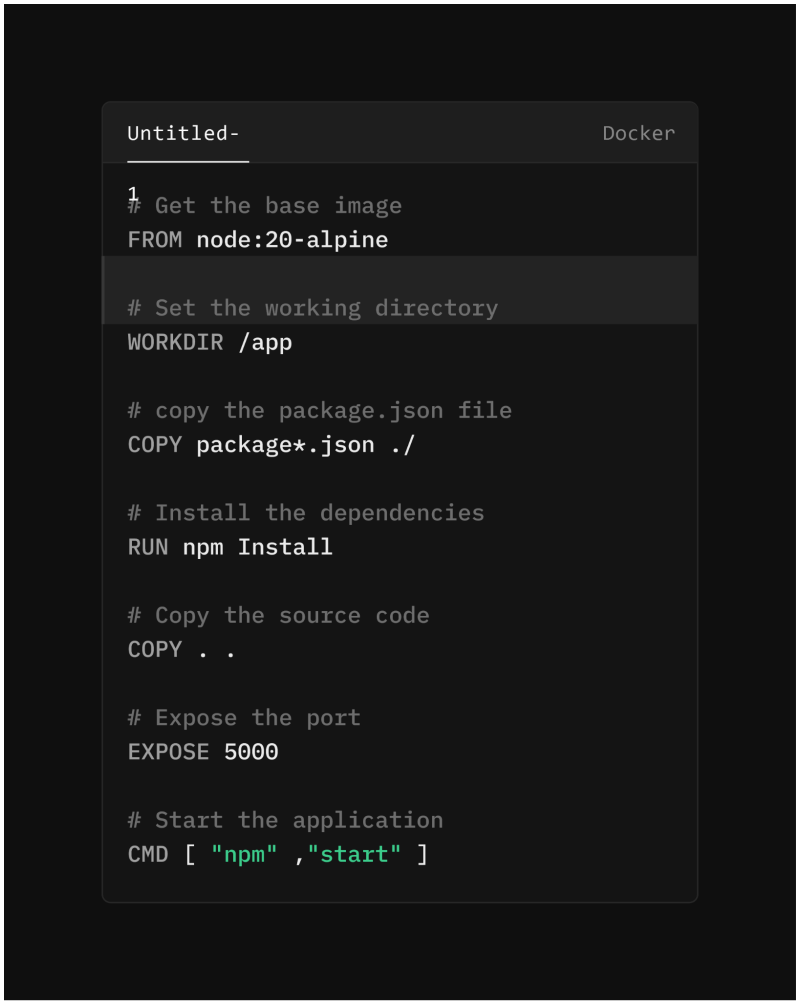
Here in docker we can manage the version by adding a tag to our images.

Add a tag to the docker image
docker build -t image_name:tag .

Create a container with the tag(specified version)
Docker run –name container_name -p 3000:4000 image_name:tag

Dockerize a Node application

Dockerfile



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docker run --name container_name -p 5000:5000 --rm -v /app/node_modules -v ${PWD}:/app image_name

The `--rm` flag in the `docker run` command stands for "remove". When you use `--rm`, Docker automatically removes the container and its filesystem when the container exits (stops running).

Versioning Images

Here in docker we can manage the version by adding a tag to our images.

Add a tag to the docker image
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Create a container with the tag(specified version)
Docker run –name container_name -p 5000:5000 image_name:tag

Push Images to Docker Hub

Docker Hub is a cloud-based registry service provided by Docker, Inc. It allows you to store, manage, and distribute Docker images. Docker Hub serves as a central repository where you can find official Docker images, share your own images, and collaborate with others.

docker login
docker tag image_name dockerhub_username/image_name -app:tag
docker push dockerhub_username/image_name -app:tag

Dockerize a Full Stack Application(MERN)

Server Dockerfile

Untitled-1 Docker

```
# Dockerfile for the API service
FROM node:20.14.0

RUN npm install -g nodemon

WORKDIR /app

COPY . .

RUN npm install

EXPOSE 5000

CMD ["npm","run" ,"start"]
```

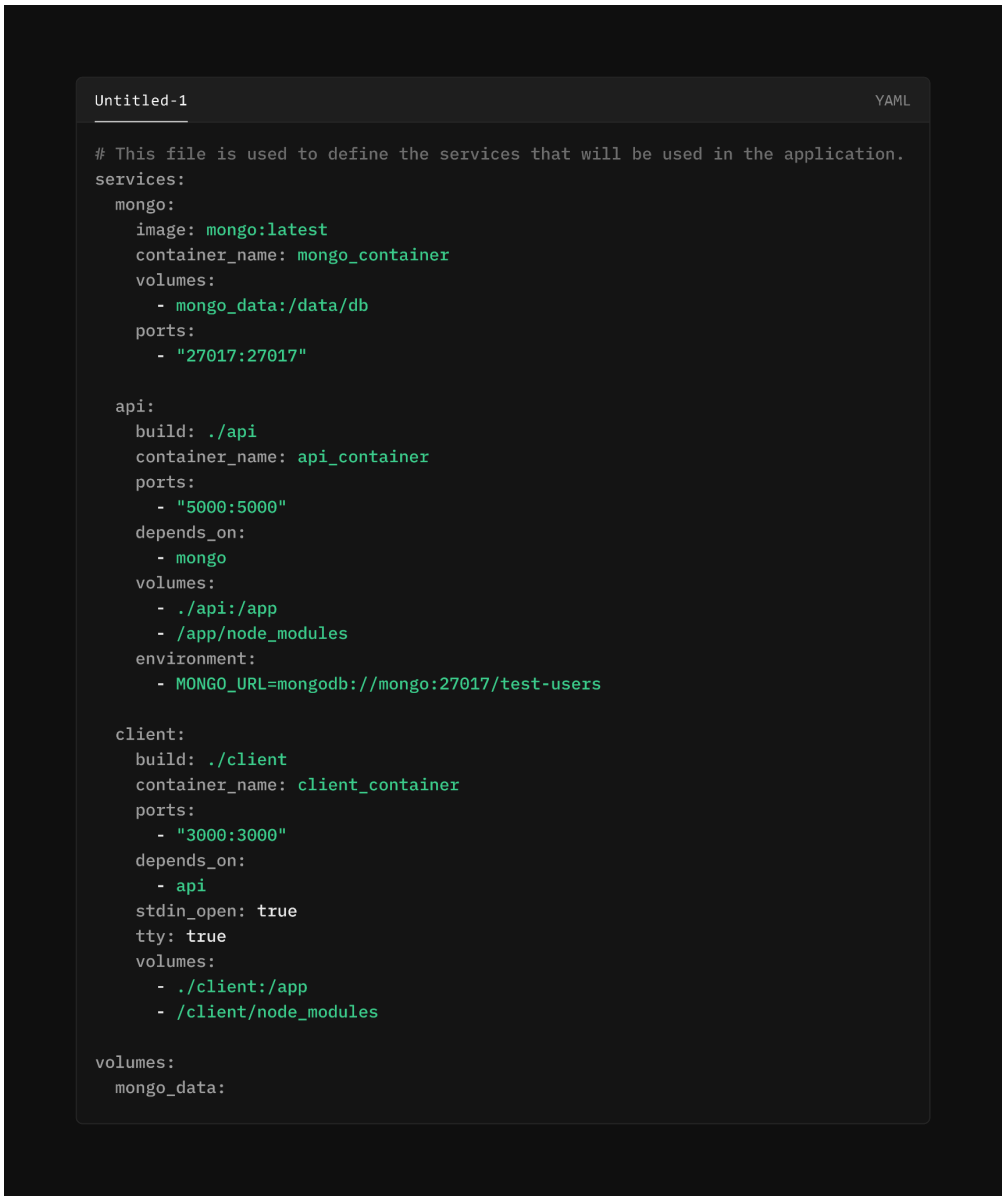
Client Dockerfile

Untitled-1 Docker

```
# Dockerfile for the client
FROM node:20.14.0

WORKDIR /app

COPY package.json .

COPY . .

RUN npm install

EXPOSE 3000

CMD ["npm","run" ,"start"]
```

Docker Compose file

•Docker Compose simplifies the process of defining and running multi-container Docker applications.
•By using a docker-compose.yml file, you can easily manage complex applications with multiple interconnected services, volumes, and networks.



Untitled-1 YAML

```yaml
# This file is used to define the services that will be used in the application.
services:
  mongo:
    image: mongo:latest
    container_name: mongo_container
    volumes:
      - mongo_data:/data/db
    ports:
      - "27017:27017"

  api:
    build: ./api
    container_name: api_container
    ports:
      - "5000:5000"
    depends_on:
      - mongo
    volumes:
      - ./api:/app
      - /app/node_modules
    environment:
      - MONGO_URL=mongodb://mongo:27017/test-users

  client:
    build: ./client
    container_name: client_container
    ports:
      - "3000:3000"
    depends_on:
      - api
    stdin_open: true
    tty: true
    volumes:
      - ./client:/app
      - /client/node_modules

volumes:
  mongo_data:
```

The `stdin_open: true` and `tty: true` options in Docker Compose are used to keep the container's standard input (stdin) open and to allocate a pseudo-TTY (a terminal) to the container. These options are particularly useful for containers where you need to interact with the shell or command line.

- `stdin_open: true`: This keeps the standard input (stdin) open, even if not attached. It's useful for containers where you might want to keep an interactive session open.
- `tty: true`: This allocates a pseudo-TTY, which is a terminal interface. It enables features such as colored output and allows interactive commands to work as if they are run in a regular terminal.

-END-