

## Docker – 1 Page Notes

### Introduction

- Docker is a platform for **building, running, and shipping** applications inside **containers**.
  - A **container** is a lightweight, portable, and isolated environment that includes everything needed to run an application (code, runtime, libraries, dependencies).
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### Key Concepts

Term	Description
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<b>Image</b>	A blueprint for creating containers (read-only). Built using a <b>Dockerfile</b> .
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<b>Container</b>	A running instance of an image.
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<b>Dockerfile</b>	A script containing instructions to build an image.
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<b>Docker Engine</b>	The core service that runs and manages containers.
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<b>Docker Hub</b>	A cloud-based registry for sharing and storing Docker images.
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### Basic Commands

Command	Description
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docker --version	Check Docker version
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docker pull <image>	Download image from Docker Hub
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docker images	List available images
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docker run <image>	Run a container from an image
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docker ps	List running containers
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docker ps -a	List all containers (including stopped)
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docker stop <container_id>	Stop a running container
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docker rm <container_id>	Remove a container
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docker rmi <image_id>	Remove an image
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Command	Description
docker build -t <name> .	Build an image from Dockerfile
docker exec -it <container_id> bash	Access container terminal

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### Dockerfile Example

```
# Base image
FROM node:18

# Set working directory
WORKDIR /app

# Copy files
COPY ..

# Install dependencies
RUN npm install

# Expose port
EXPOSE 3000

# Run command
CMD ["npm", "start"]
```

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### Docker Compose

- Used to define and run **multi-container** Docker applications.
- File: **docker-compose.yml**

```
version: "3"

services:
  web:
    build: .
    ports:
      - "3000:3000"
```

```
db:  
  image: mongo
```

👉 Run with: docker-compose up

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### 🔒 Benefits

- Consistent environment across systems
  - Lightweight and fast
  - Easy deployment and scalability
  - Works well with CI/CD pipelines
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### ⚡ Key Difference

#### Virtual Machine

Heavyweight (includes OS)

Slow startup

Uses GBs of space

#### Docker Container

Lightweight (shares host OS kernel)

Fast startup

Uses MBs of space