

1. What is Docker?

Docker is an **open-source platform** that allows developers to **build, package, and run applications in isolated environments** called **containers**.

- It helps ensure that an application runs the same way in **development, testing, and production**, regardless of the underlying system.
- Docker eliminates the “**it works on my machine**” problem by bundling the application and all its dependencies together.

Example:

If your Python app needs a specific version of Python and libraries, Docker can package all that into one environment (container) so anyone can run it easily.

2. What is Containerization?

Containerization is the **process of packaging an application and its dependencies** (libraries, runtime, system tools, etc.) into a **container**.

A **container** is a lightweight, standalone, executable unit that includes everything the software needs to run — except the operating system kernel.

- Containers share the host OS kernel but are **isolated** from one another.
- They are **faster and more efficient** than traditional virtual machines (VMs).

Analogy:

Think of containerization like shipping containers on a cargo ship — each container holds goods independently but uses the same ship (OS/kernel) to travel.

3. What is an Image?

A **Docker image** is a **blueprint or template** used to create containers.

- It contains the **application code, libraries, configuration files**, and everything required to run the application.

- Images are **read-only** — when a container runs from an image, it adds a **read-write layer** on top of it.

Example:

An image might be based on `python:3.10` — it contains Python 3.10 installed. You can then add your app files and dependencies to it to make a new image like `myapp:latest`.

4. What is Docker Hub?

Docker Hub is a **cloud-based repository (registry)** where you can **store, share, and download Docker images**.

- It's like **GitHub for Docker images**.
- Developers can pull pre-built images (like databases, OSes, frameworks) or push their own images for others to use.