

Docker Architecture

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Overview

- Docker is an open-source platform that enables you to automate the deployment, scaling, and management of applications using containerization. Docker architecture consists of several components :
 - Docker Engine
 - Docker images
 - Docker Containers
 - Docker registry
 - Docker network

Docker Engine

- The Docker Engine is the core component of Docker and is responsible for building, running, and managing containers. It comprises three main parts:
 - a. Docker daemon: It runs on the host machine and manages Docker objects such as images, containers, networks, and volumes. The daemon handles requests from the Docker client, manages container lifecycle, and communicates with the underlying operating system.
 - b. Docker REST API: It provides an HTTP API that allows users to interact with Docker. The Docker client communicates with the Docker daemon using this API to issue commands and manage containers.
 - c. Docker CLI: It is a command-line interface tool that enables users to interact with the Docker daemon. The CLI sends commands to the Docker daemon through the REST API.

Docker images

- Docker images are read-only templates used to create Docker containers. They include everything needed to run an application, such as the code, runtime, system tools, libraries, and dependencies. Images are built using a declarative specification called a Dockerfile, which defines the steps to create the image.
- Docker images are organized in a layered format using a union file system. Each layer represents an incremental change to the base image, allowing for efficient storage and sharing of common components across multiple images.

Docker Containers

- Docker containers are lightweight, isolated, and executable units that run applications. Containers are created from Docker images and encapsulate the application and its dependencies, providing a consistent and reproducible runtime environment. Each container operates in isolation from other containers and the host system, enabling portability and scalability.
- Containers leverage features of the underlying operating system, such as namespaces and control groups (cgroups), to provide resource isolation, process-level isolation, and filesystem isolation.

Docker Registry

- A Docker registry is a central repository that stores Docker images. It enables users to distribute and share images across different environments. The default public registry is Docker Hub, but you can also set up private registries to store your organization's images.
- Docker images can be pulled from a registry to a local system using the Docker client. Similarly, you can push images from your local system to a registry to make them accessible to others

Docker Network

- Docker provides a networking subsystem that allows containers to communicate with each other and with the outside world. It provides various network drivers to create different types of networks, such as bridge networks, overlay networks, and host networks. Containers can be connected to one or more networks, enabling inter-container communication and connectivity to external networks.