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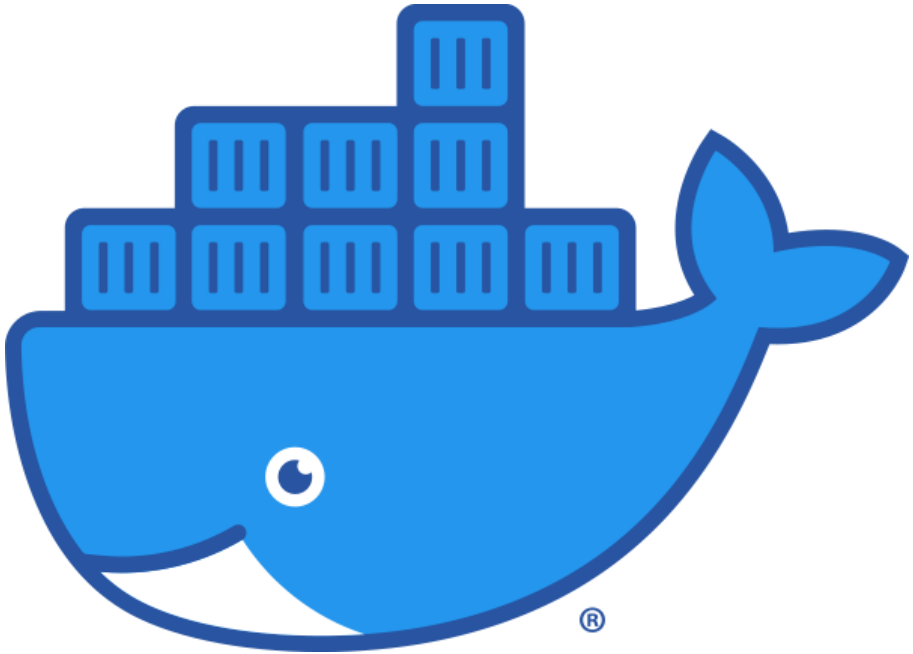
Power Ahead



Intro to Docker

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Agenda

- Issues we faced Before Containerization
- What is a container?
- Container vs VM
- Why do we Need Containers ?
- What is Docker?

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Agenda

Docker Installation and setup

Docker Environment

Docker Architecture

Q/A

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Issues we faced before Containerization

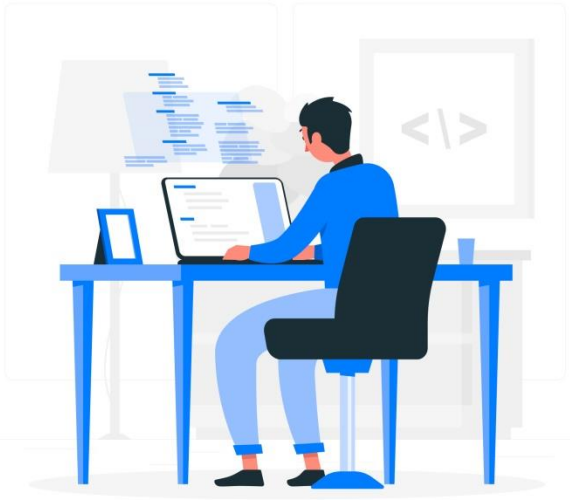
Issues we faced before Containerization

Developer

Tester

Standard Delivery Pipeline

Issues we faced before Containerization



Backend Developer

Operating System

Pytest 5.4.3

Pycharm IDE

Backend Code

Dependencies

Developer’s Environment

Issues we faced before Containerization

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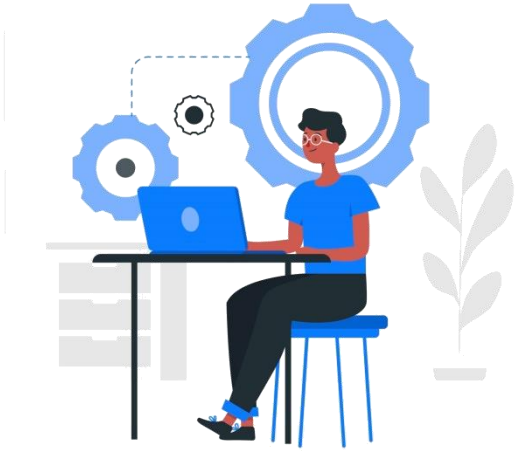
Power Ahead



Tester

Operating System

Pytest 5.3.0

Spyder IDE

Backend Code

Dependencies

Tester's Environment

Issues we faced before Containerization

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Developer

- This Code runs fine on my computer

Tester

- This Code does not run on my system

Issues we faced before Containerization

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Power Ahead

Developer


Operating System


Pytest 5.4.3


Pycharm IDE


Backend Code


Dependencies

Tester


Operating System


Pytest 5.3.0


Spyder IDE


Backend Code


Dependencies

Issues we faced before Containerization

- Now Let’s see what happens when we introduce Containers.

Issues we faced before Containerization

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- This Code runs fine on my computer

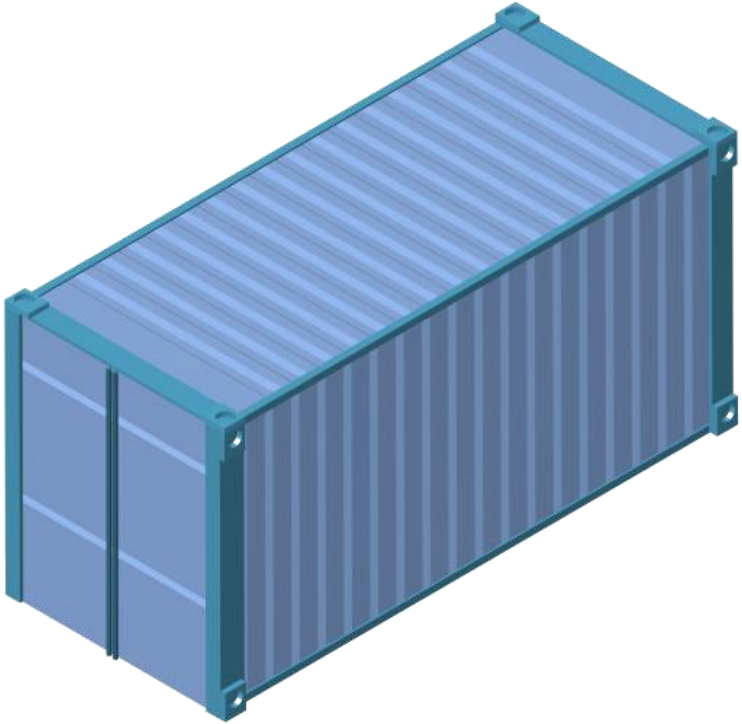
- This Code runs fine on my computer

Developer

Tester

Prod

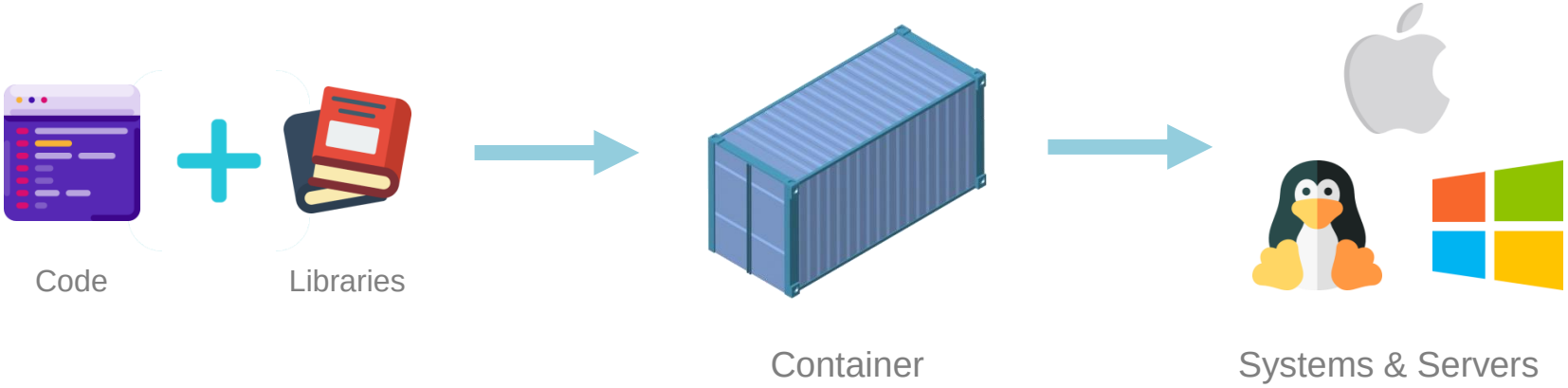
Similar Delivery Pipeline but with containers



What is a Container?

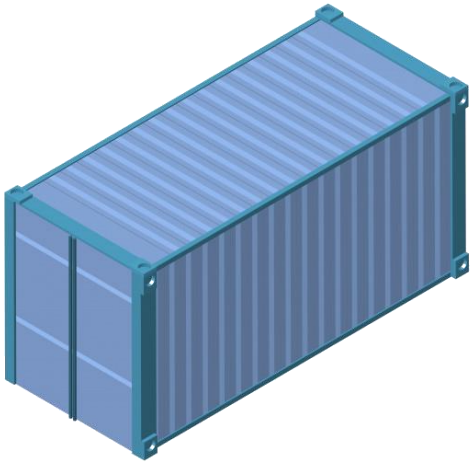
What is a Container?

Containers are software that wrap up all the parts of a code and all its dependencies into a single deployable unit that can be used on different systems and servers.

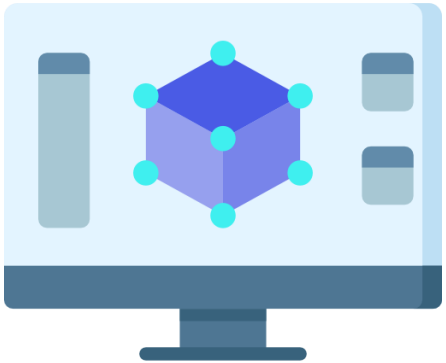


What is a Container?

You can compare Containers to VM to get a better Idea.



Container



VM

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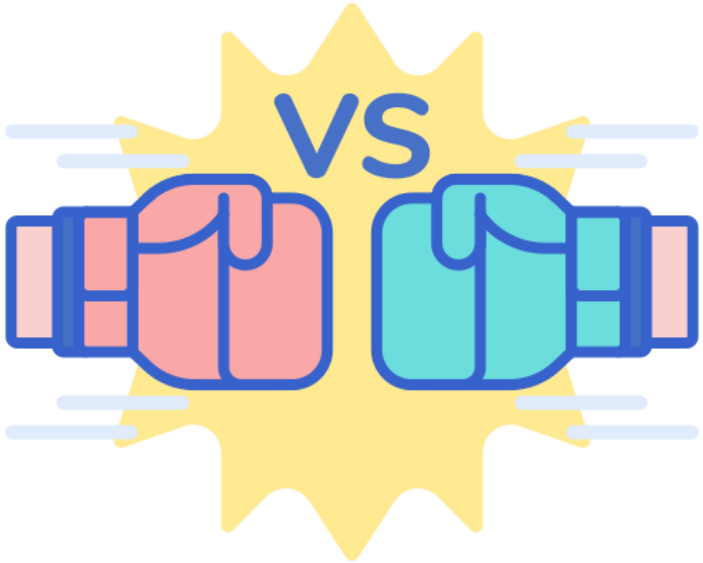


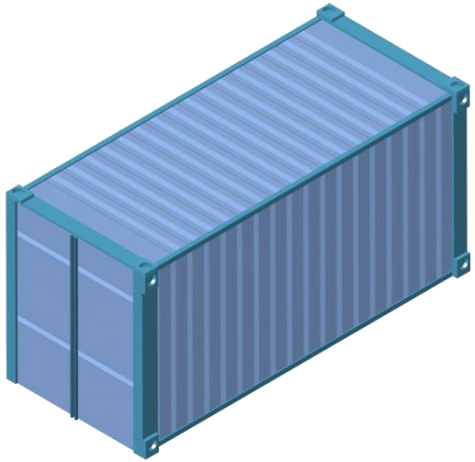
Container

VS

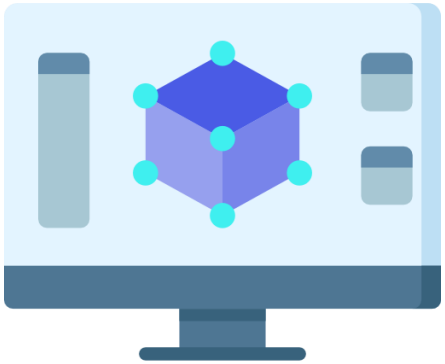
VM

Container vs VM

Let’s set some criteria to compare them



- Operating Systems
- Architecture
- Isolation
- Efficiency
- Portability
- Scalability
- Deployment



Container vs VM

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Operating System

Container

Contains only the bare minimum parts of the Operating system required to run the software.
Updates are easy and simple to do

VM

Contains the complete Operating system that is normally used on systems for general purpose.
Updates are time consuming and tough.

Container vs VM

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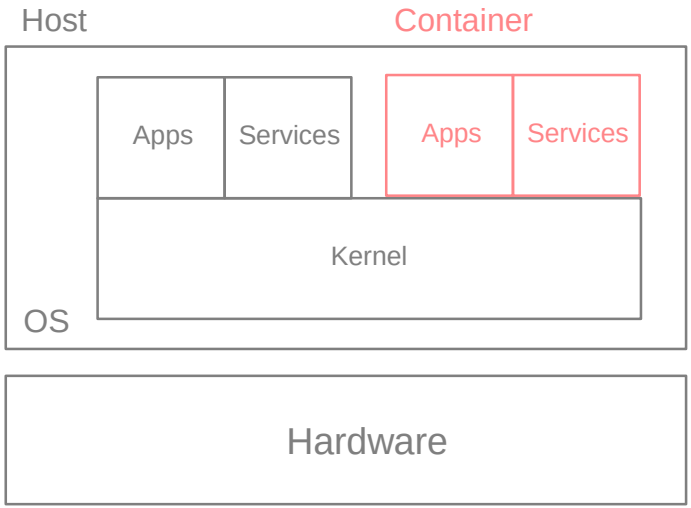
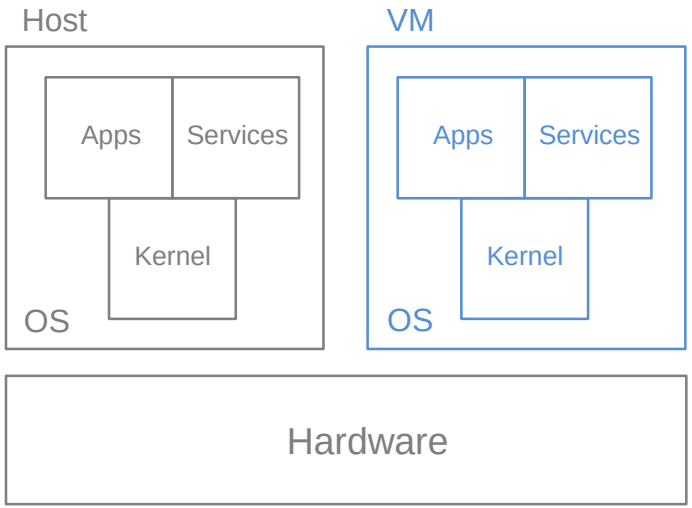
Architecture

Container



VM



Container vs VM

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Isolation

Container

The isolation provided by a container isn't as complete as of a VM but is adequate.

VM

VM provides complete isolation from the concerning host system and is also more secure.

Container vs VM

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Efficiency

Container

Container are way more efficient as they only utilise the most necessary parts of the Operating system. They act like any other software on the host system

VM

VM are less efficient as they have to manage full blown guest operating system. VM's have to access host resource through a hypervisor.

Container vs VM

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Portability

Container

Containers are self-contained environments that can easily be used on different Operating systems,

VM

VMs aren’t that easily ported with the same settings from one operating system to another.

Container vs VM

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Scalability

Container

Containers are very easy to scale, they can be easily added and removed based on requirements due to their light weight.

VM

VMs aren’t very easily scalable as they are heavy in nature.

Container vs VM

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Deployment

Container

Containers can be deployed easily using the Docker CLI or making use of Cloud services provided by aws or azure.

VM

VMs can be deployed by using the powershellor by using the VMM or using cloud services such as aws or azure.

Why do we need Containers?

Why do we need Containers?

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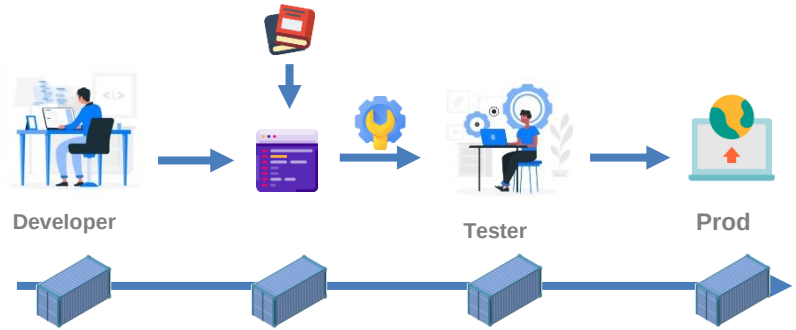
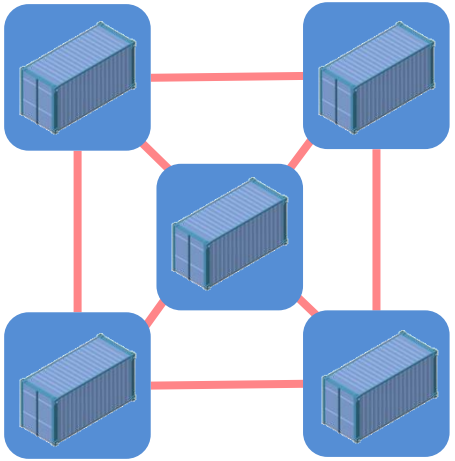
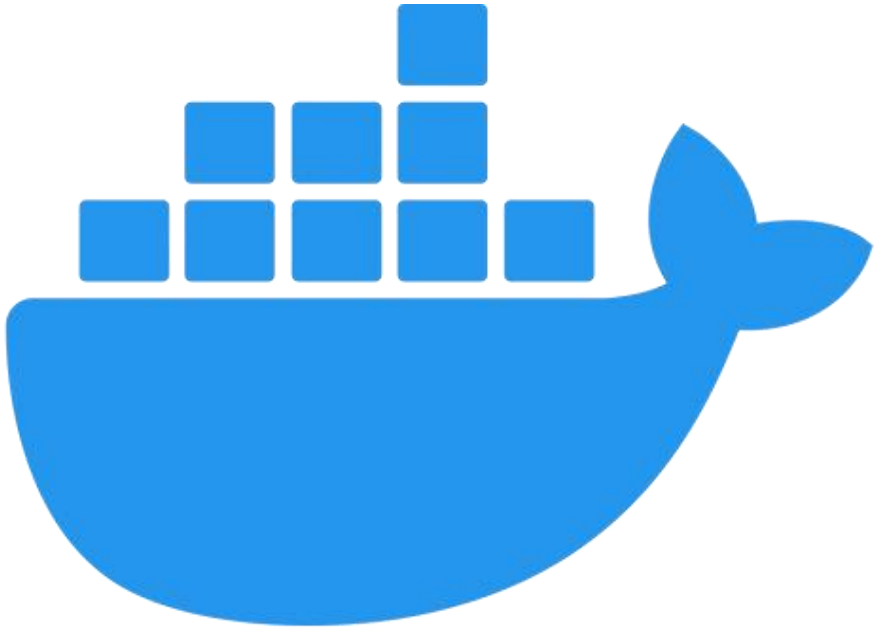
Consistent Development Environments



Mircoservices





What is Docker?

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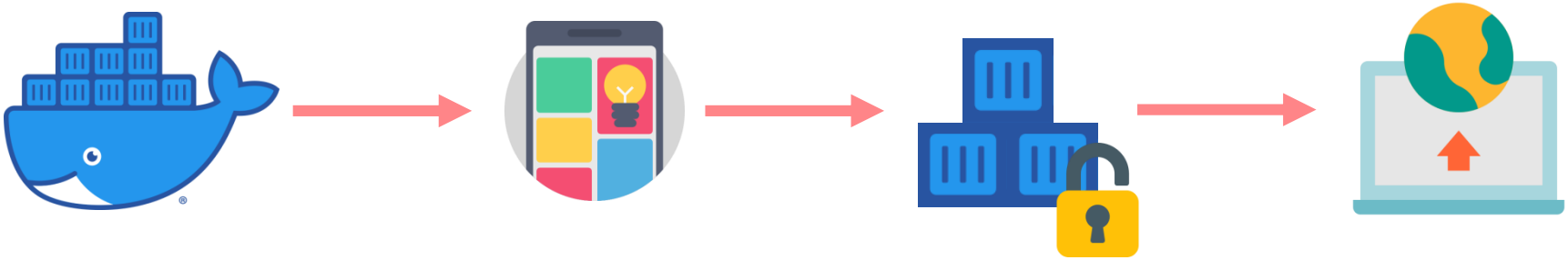
What is Docker?

Docker is a tool that helps in developing, building, deploying and executing software in isolation. It does so by creating containers that completely wrap a software.



The Isolation provided by container gives a layer of security to the containers.

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Why Docker?

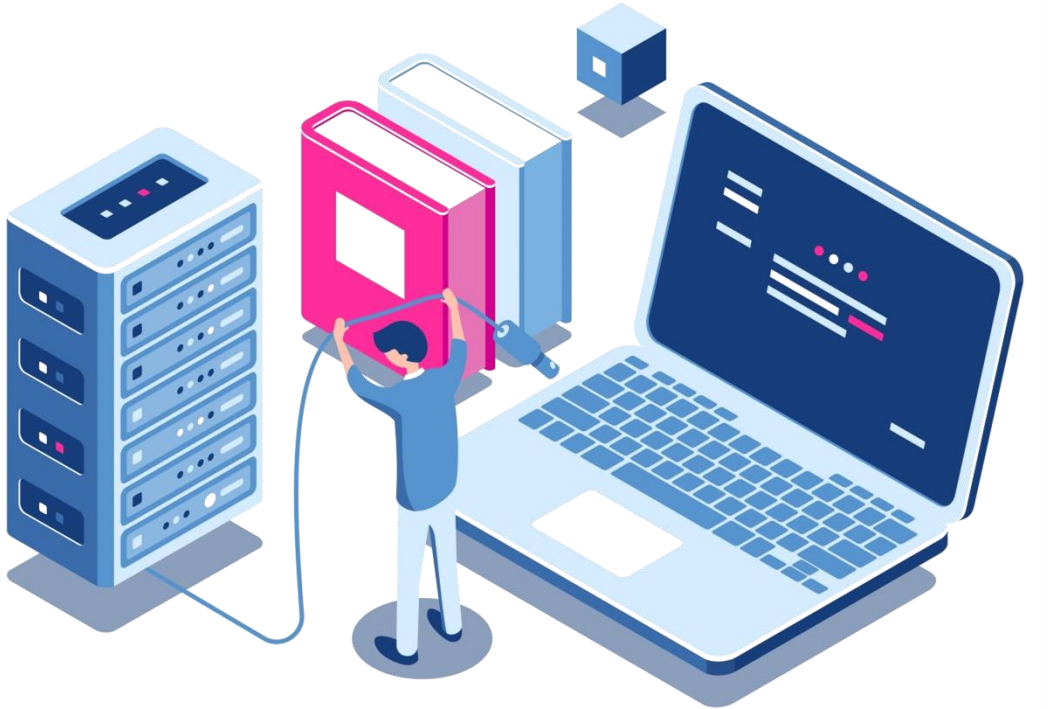
Simple

Fast

Easy Collaboration

Built for Developers, by Developers

Docker Community



Docker Installation & Setup

Docker Installation & Setup

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Linux

Windows

MAC

Docker Environment

Docker Environment

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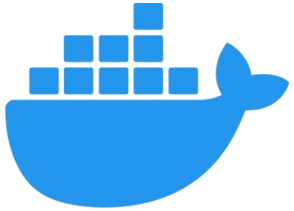
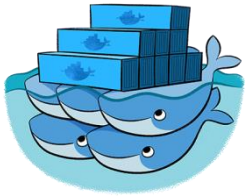
Docker Engine

Docker Objects



Docker Registry

Docker Compose



Docker Swarm

Docker Engine

Docker Engine

Docker engine is as the name suggests, its technology that allows for the creation and management of all the Docker Processes. It has three major parts to it.

Docker CLI | **Docker API** | **Docker Daemon**

Docker Objects

Docker Objects

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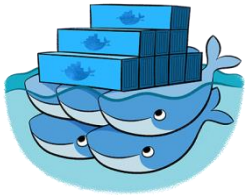
Docker Images

Docker Containers

Docker Volumes

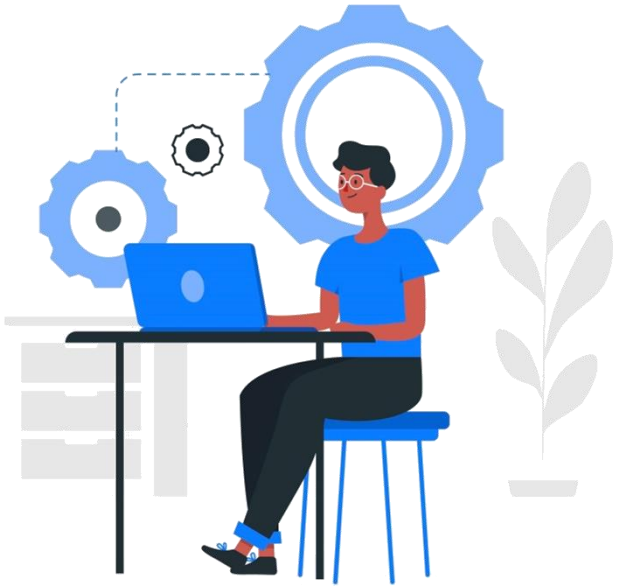
Docker Networks



Docker Swarm
Nodes & Services

Docker Objects - Images

Docker images are sets of instructions that are used to create containers and execute code inside it.



Docker Common Commands

Docker Objects - Volumes

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Docker Volumes are basically persistent storage locations for the containers. They can be easily & safely attached and removed from different container. And they are also portable from system to another.

Docker Objects – Volumes drivers

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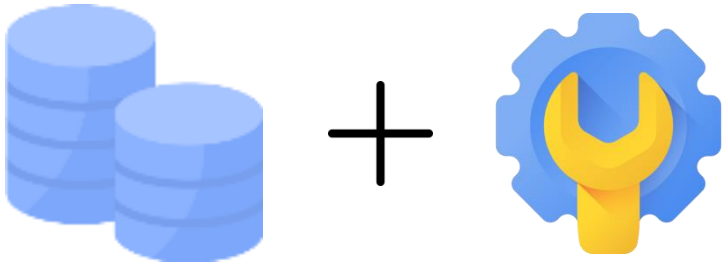
Docker Volumes drivers allow you to perform unique abilities such as creating persistent storage on other hosts, cloud, encrypt Volumes. They basically enhance the abilities of a Volume.



Docker Objects - Network

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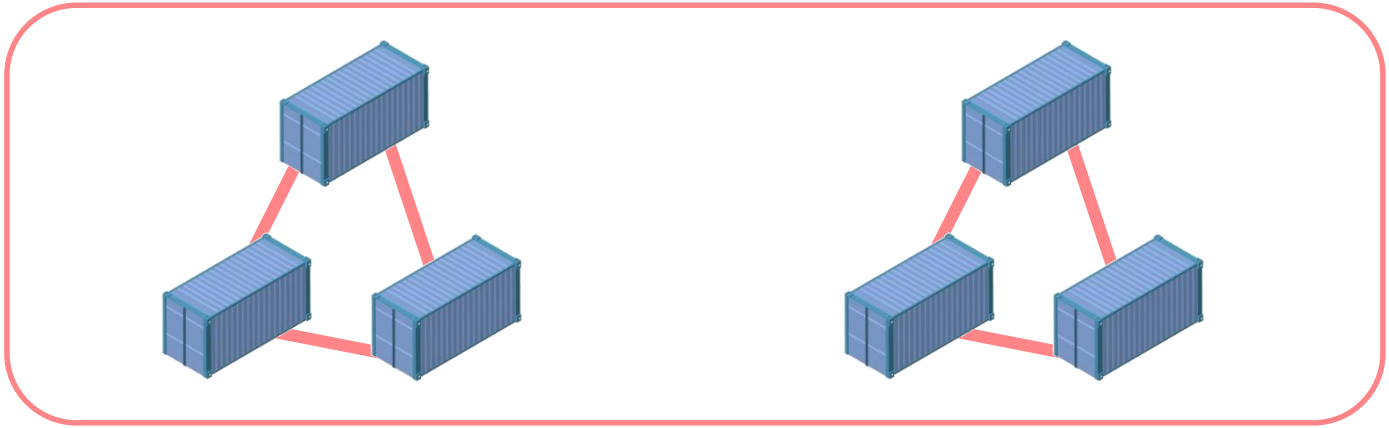
A Docker network is basically a connection between one or more containers.One of the more powerful things about the Docker containers is that they can be easily connected to one other and even other software, this makes it very easy to isolate and manage the containers



Docker Registry

Docker Registry

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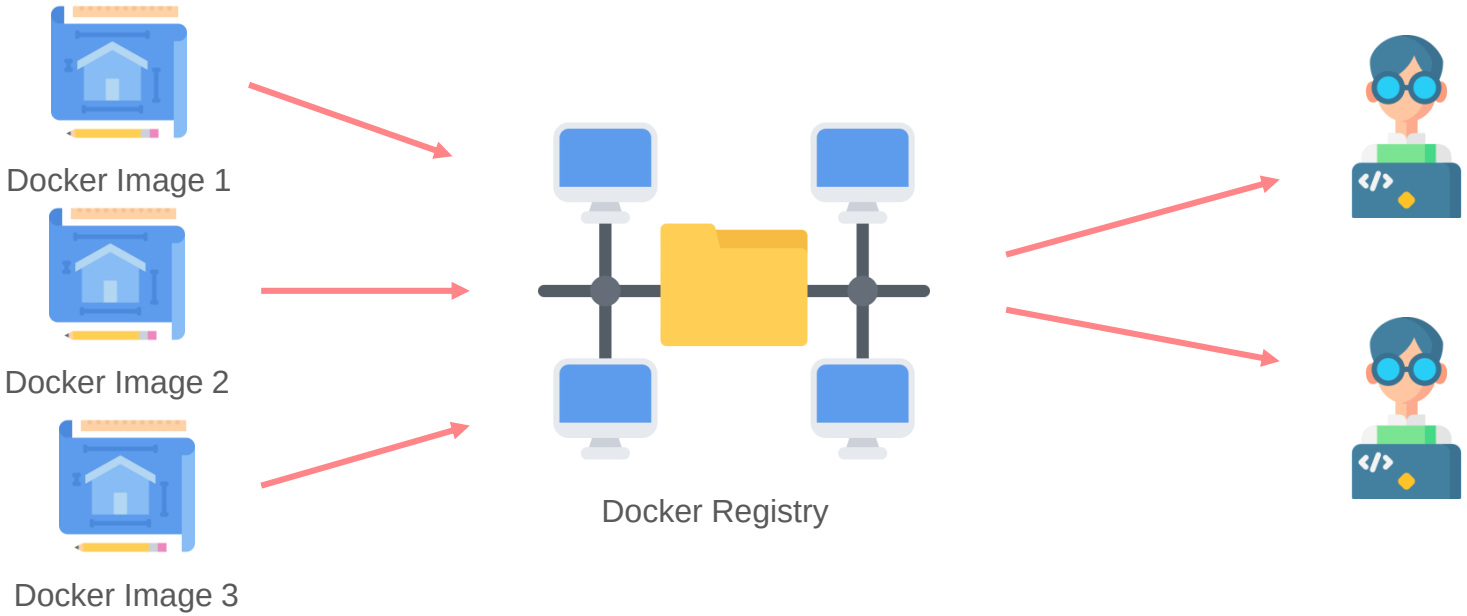
You can think of registries as storage locations for Docker Images. These images can be versioned in the registry as well.



Docker Registry – DockerHub

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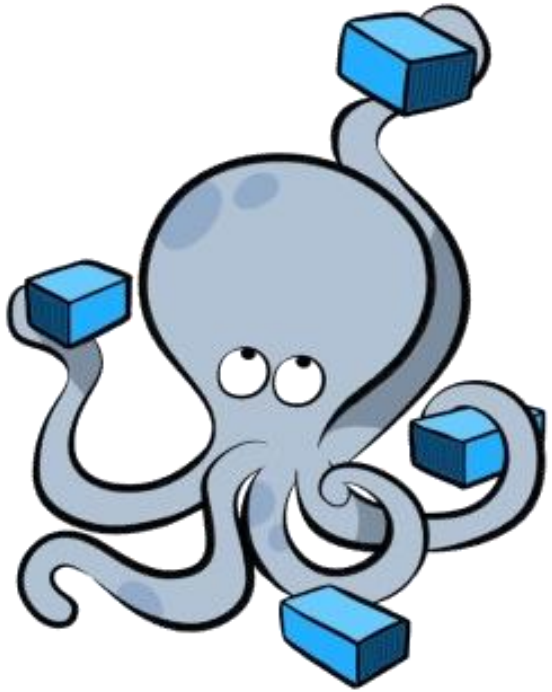
You have many options for a Docker Registry, you can go with DockerHub as your main Docker registry as there is already a Docker command to pull and push images to it. If you don't want to use DockerHub there are many alternatives to it.

Docker Objects – Registry

Right! Let’s create our own DockerHub account and then let’s try and pull and push images.



Docker Compose

Docker Compose

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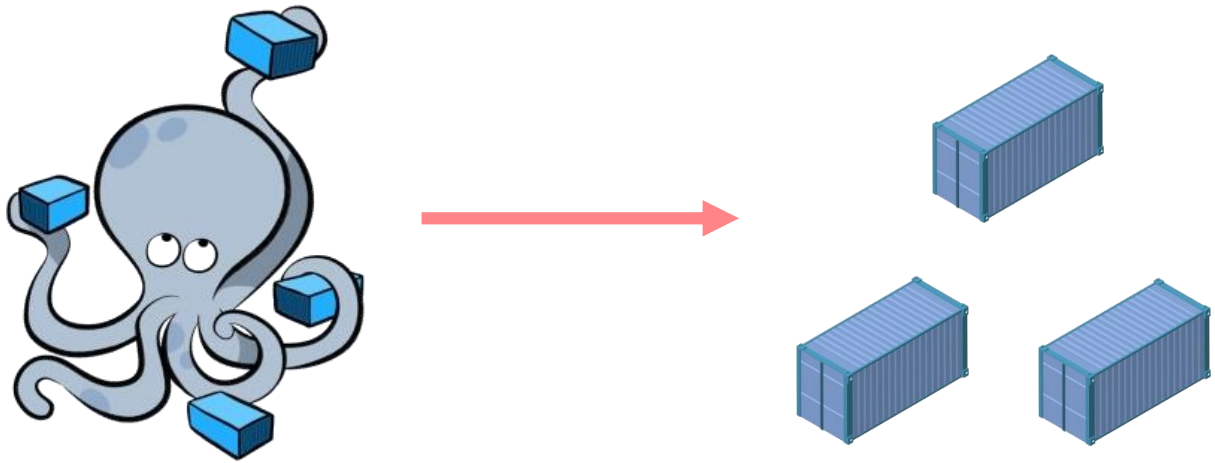
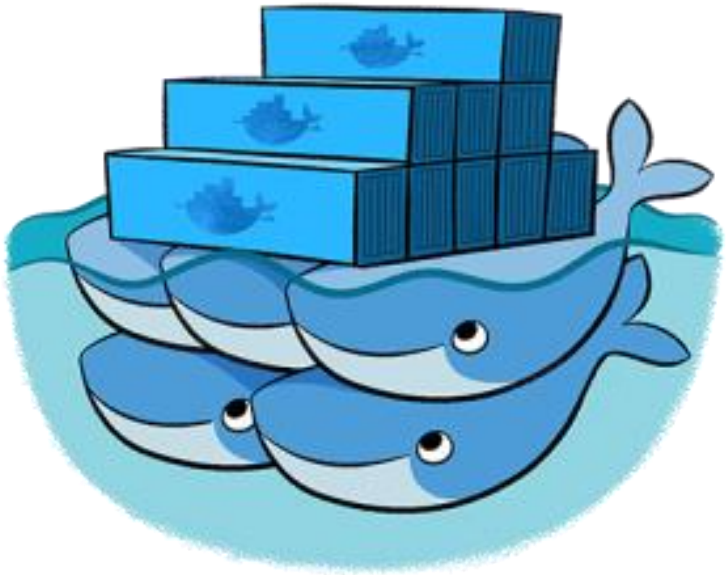
For Now let's just understand that Docker Compose is just a Service within Docker that let's us launch multiple containers at the same time.





Docker Swarm

Docker Swarm

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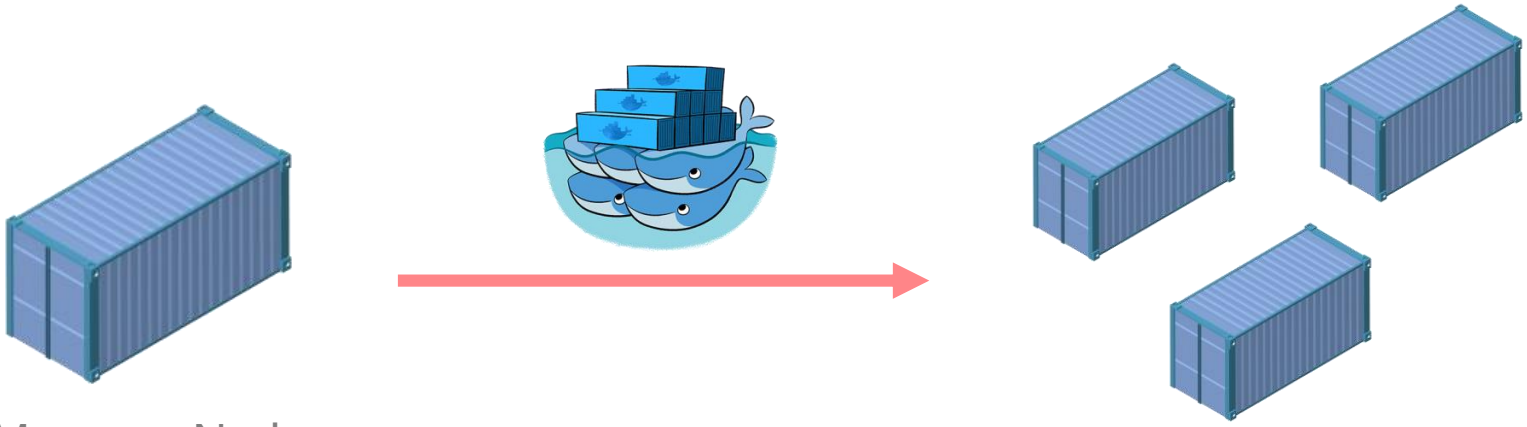
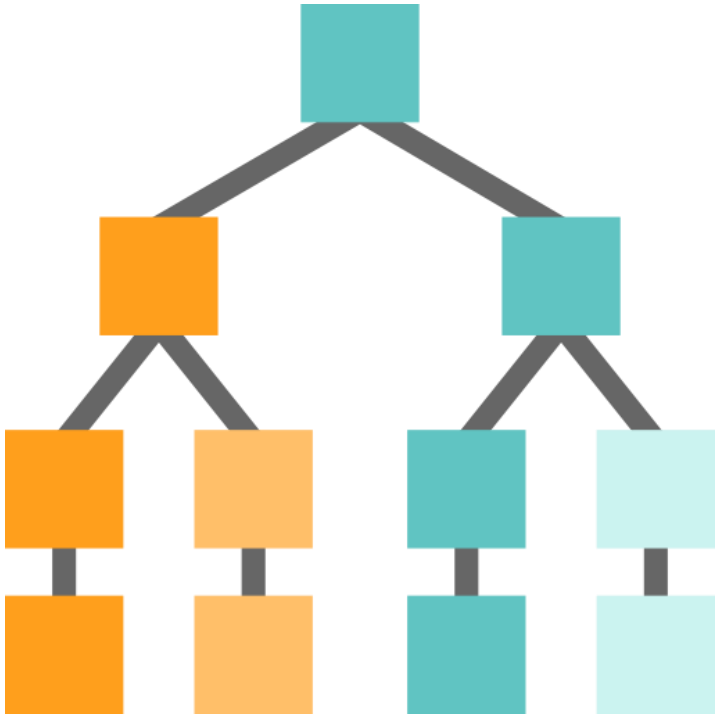
For Now just understand that Docker Swarm is a service within Docker that allows us to manage multiple containers.



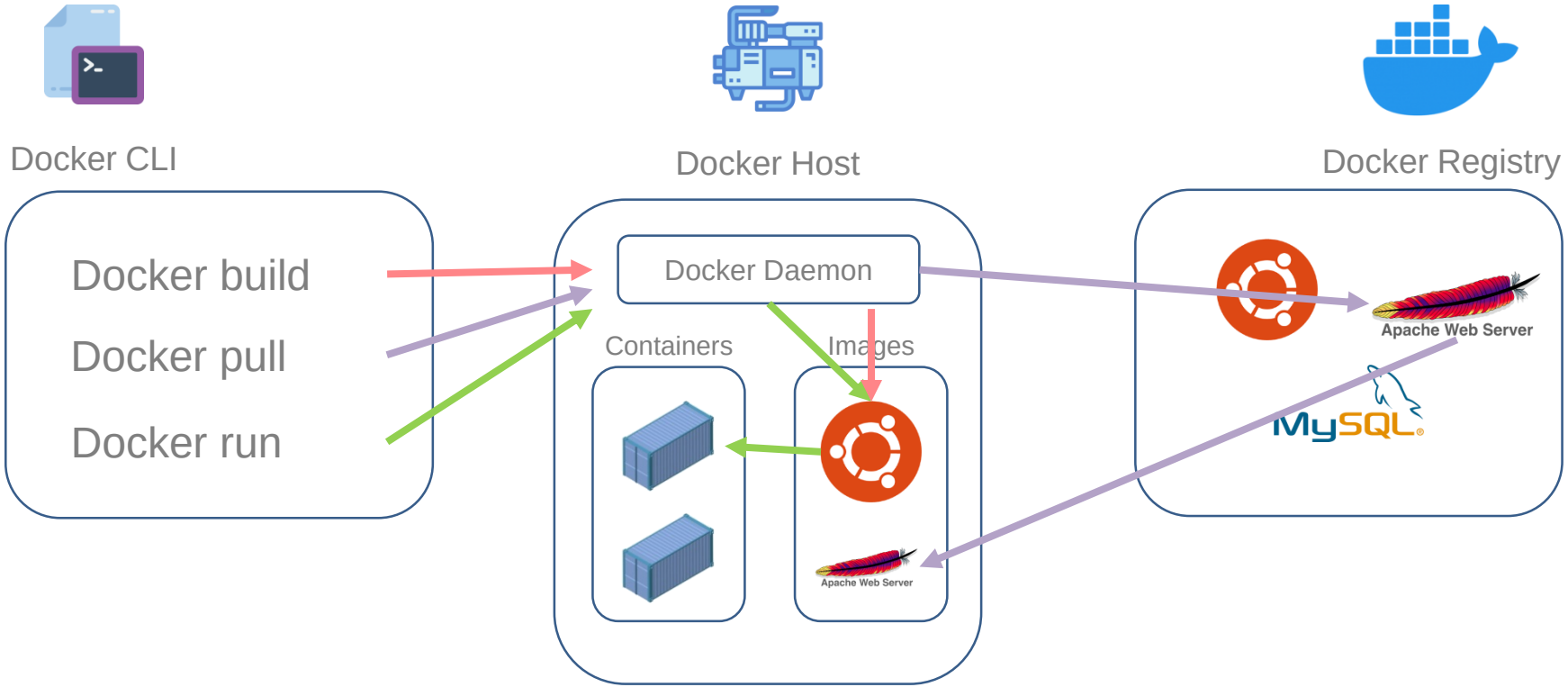
Manager Node

Worker Node



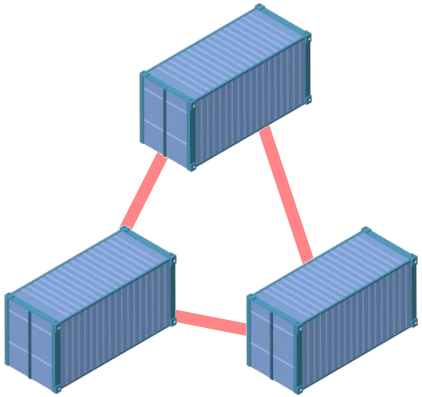
Docker Architecture

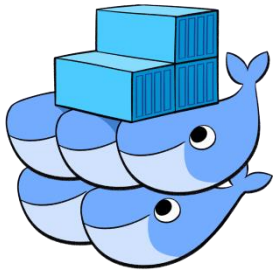
Docker Architecture



What is a Container?

Multiple isolated containers can be launched together to form Microservices which can be easily managed using any orchestration tool e.g. Docker Swarm, Kubernetes, etc.





O
R

Q&A

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