CSE 3421

Containerization

SPRING 2022

MD. RAFI-UR-RASHID

LECTURER, DEPT. OF CSE, UIU

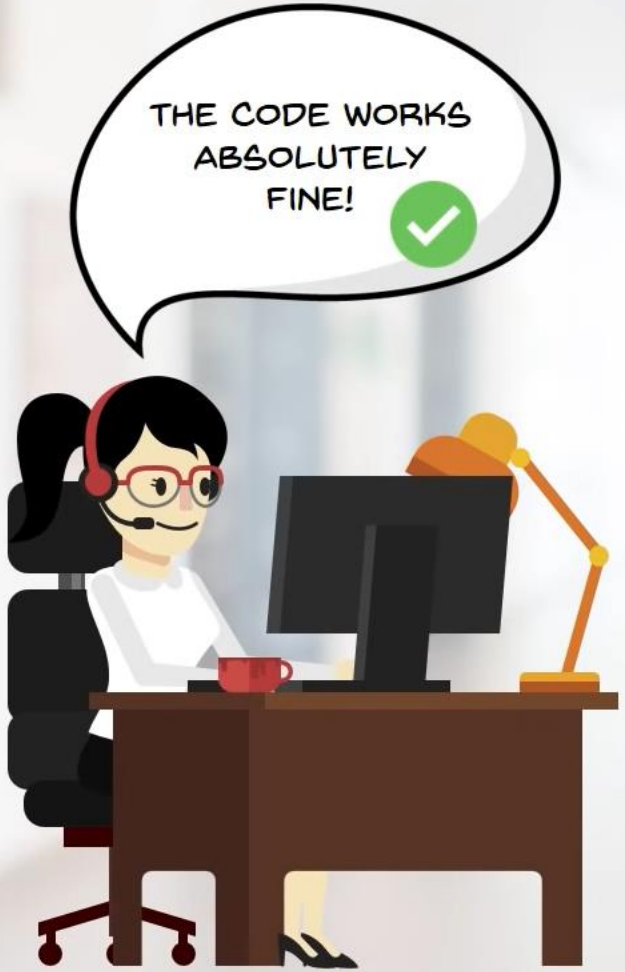
Why This Lesson?

It enables us to separate our applications from our infrastructure, so that we can deliver software quickly

Why Docker?

Before Docker

Developer



Tester

Consider an example where a company develops an Oracle WebLogic Software

A developer will setup an Oracle WebLogic software on his system

After the application is developed, it is examined by the testing team

Here, the tester repeats the installation process of Oracle WebLogic

Once the application is tested, it will be deployed by the production team

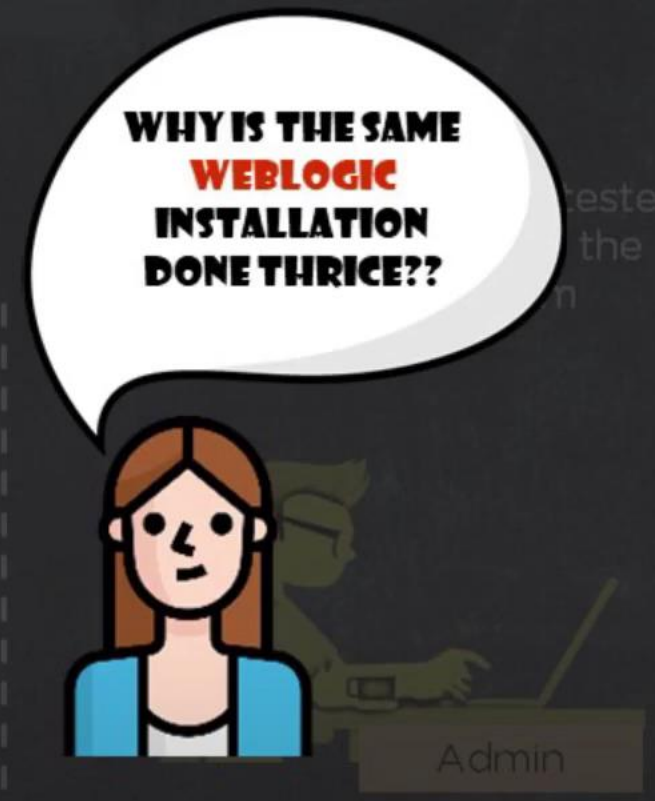
To host the Java application, the system admin also must install Oracle WebLogic on his system

Consider an example where a company develops an Oracle WebLogic Software

A developer will setup an Oracle WebLogic software on his system

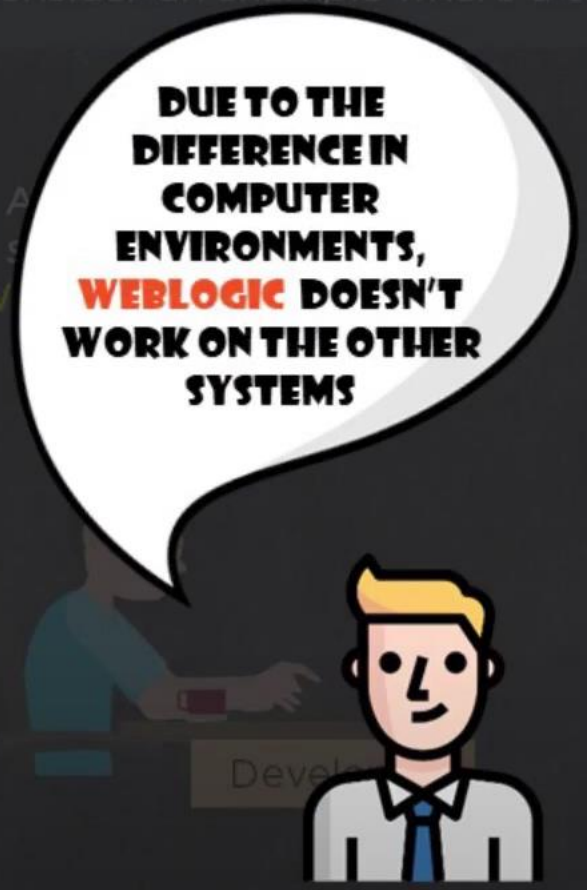
After the application is developed, it is examined by the testing team

Here, the tester repeats the installation process of Oracle WebLogic



To host the Java application, the system admin also must install Oracle WebLogic on his system

Consider an example where a company develops an Oracle WebLogic Software



Develo

After the application is developed, it is examined by the testing team

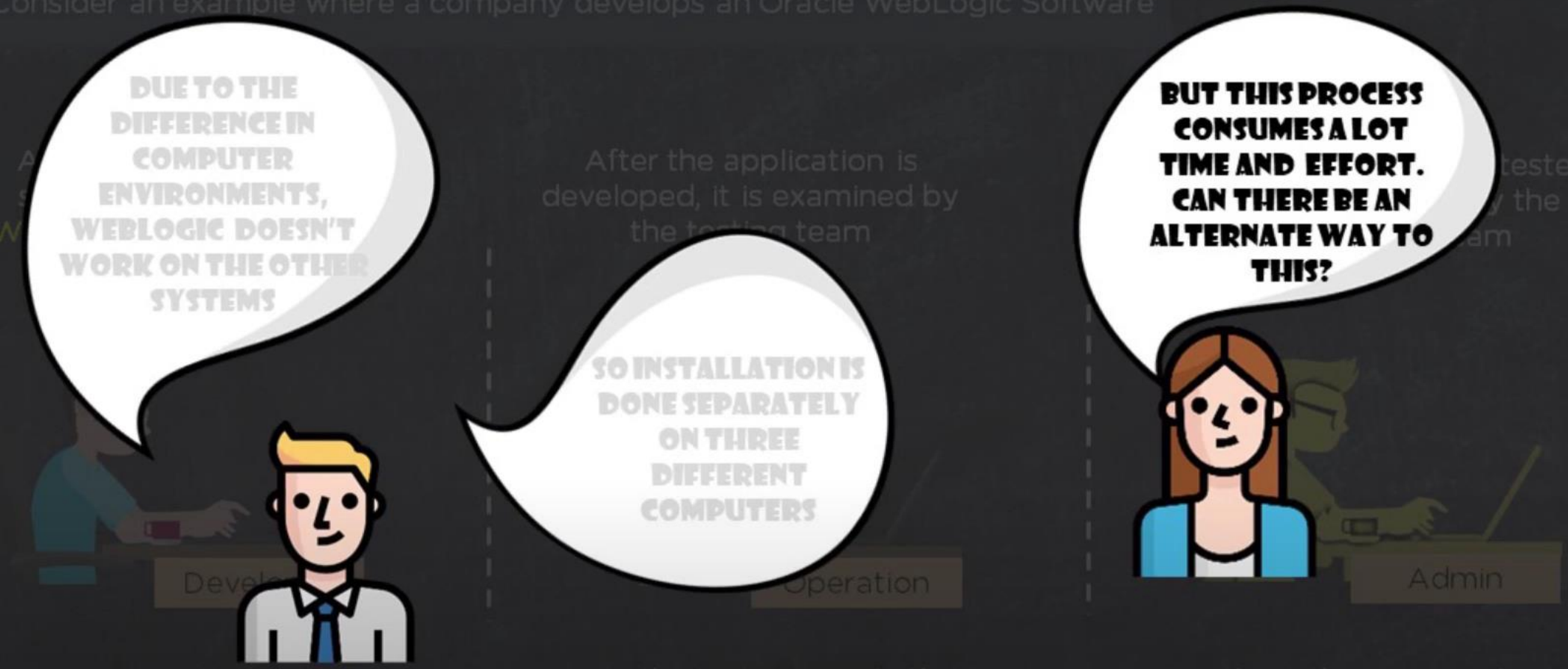
Operation

Here, the tester repeats the installation process of Oracle WebLogic

Admin

To host the Java application, the system admin also must install Oracle WebLogic on his system

Consider an example where a company develops an Oracle WebLogic Software



After the application is developed, it is examined by the testing team

Here, the tester repeats the installation process of Oracle WebLogic

To host the Java application, the system admin also must install Oracle WebLogic on his system

Consider an example where a company develops an Oracle WebLogic Software

After the application is developed, it is examined by the testing team

Here, t ats the installation process of Oracle WebLogic

To host the Java application, the system admin also must install Oracle WebLogic on his system

Why Docker?

The code doesn't work on the other system due to the difference in computer environments
So, what could be the solution to this?

What is Docker?

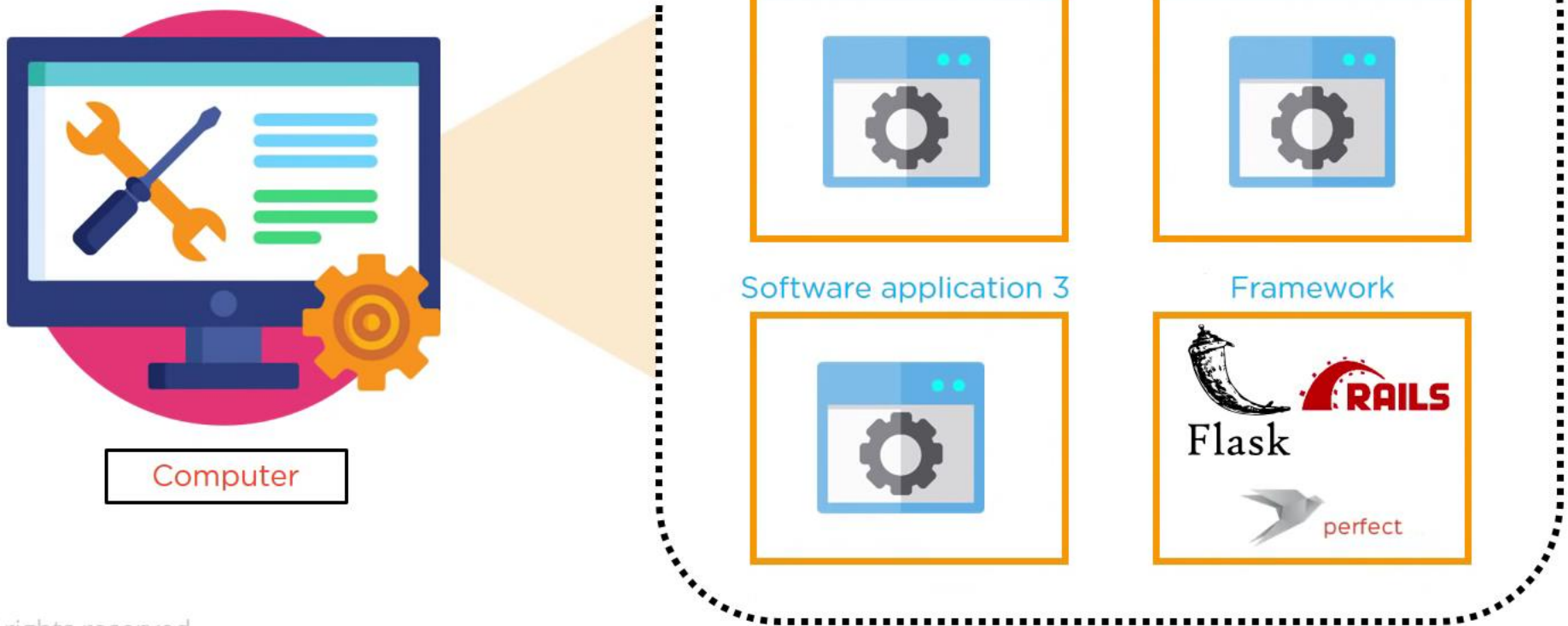
What is Docker?

Let's take an example where you plan to rent a house in Airbnb

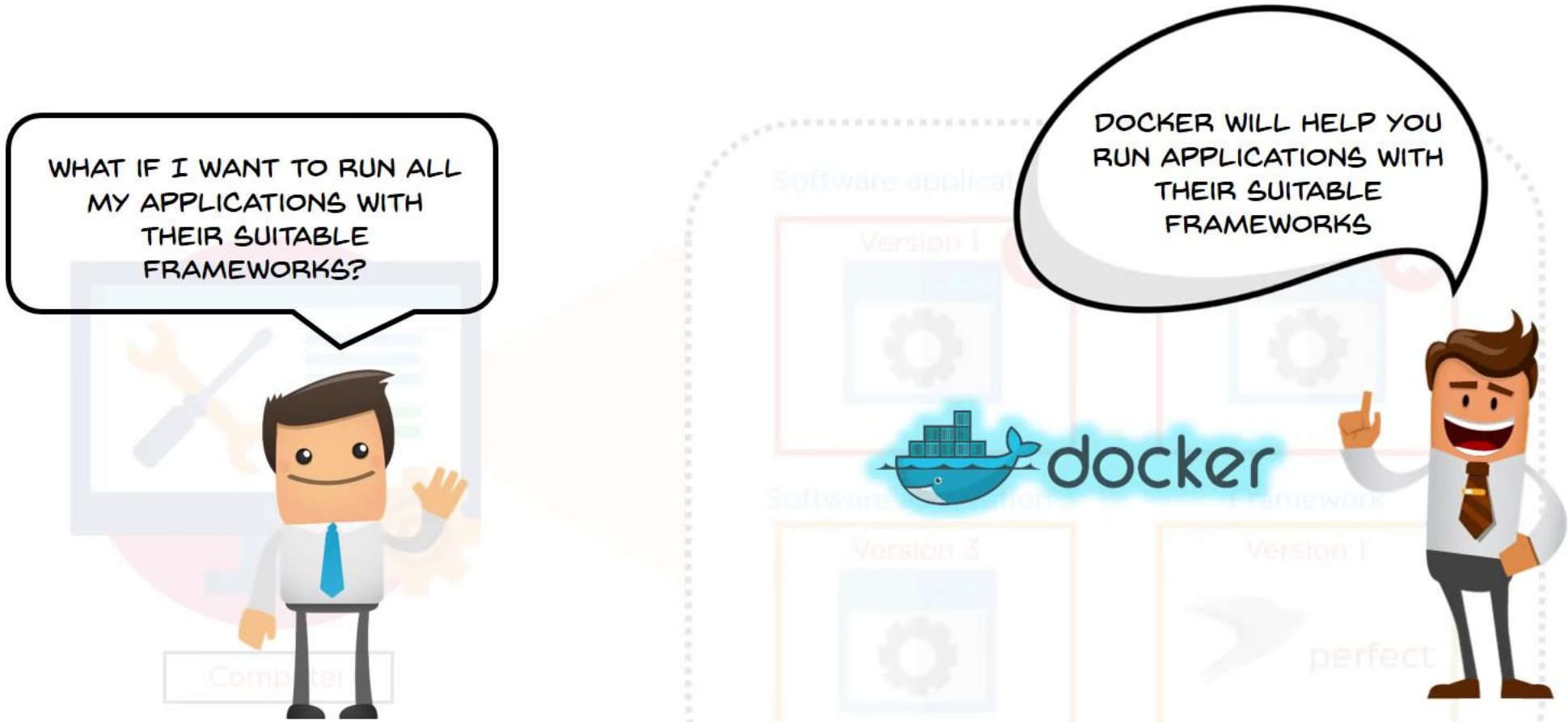
And none of the guests are ready to share the cupboard and the kitchen

What is Docker?

Let's use this example with computers, where all the three applications use different frameworks



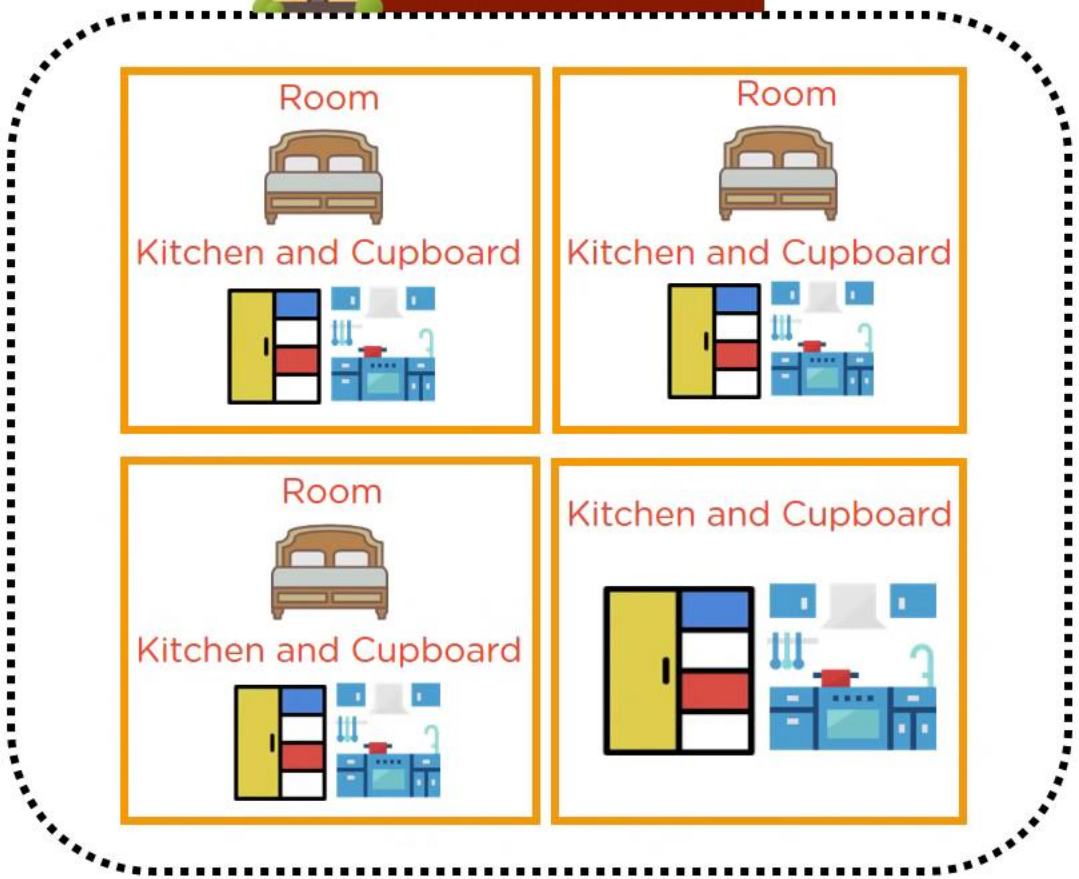
What is Docker?



What is Docker?

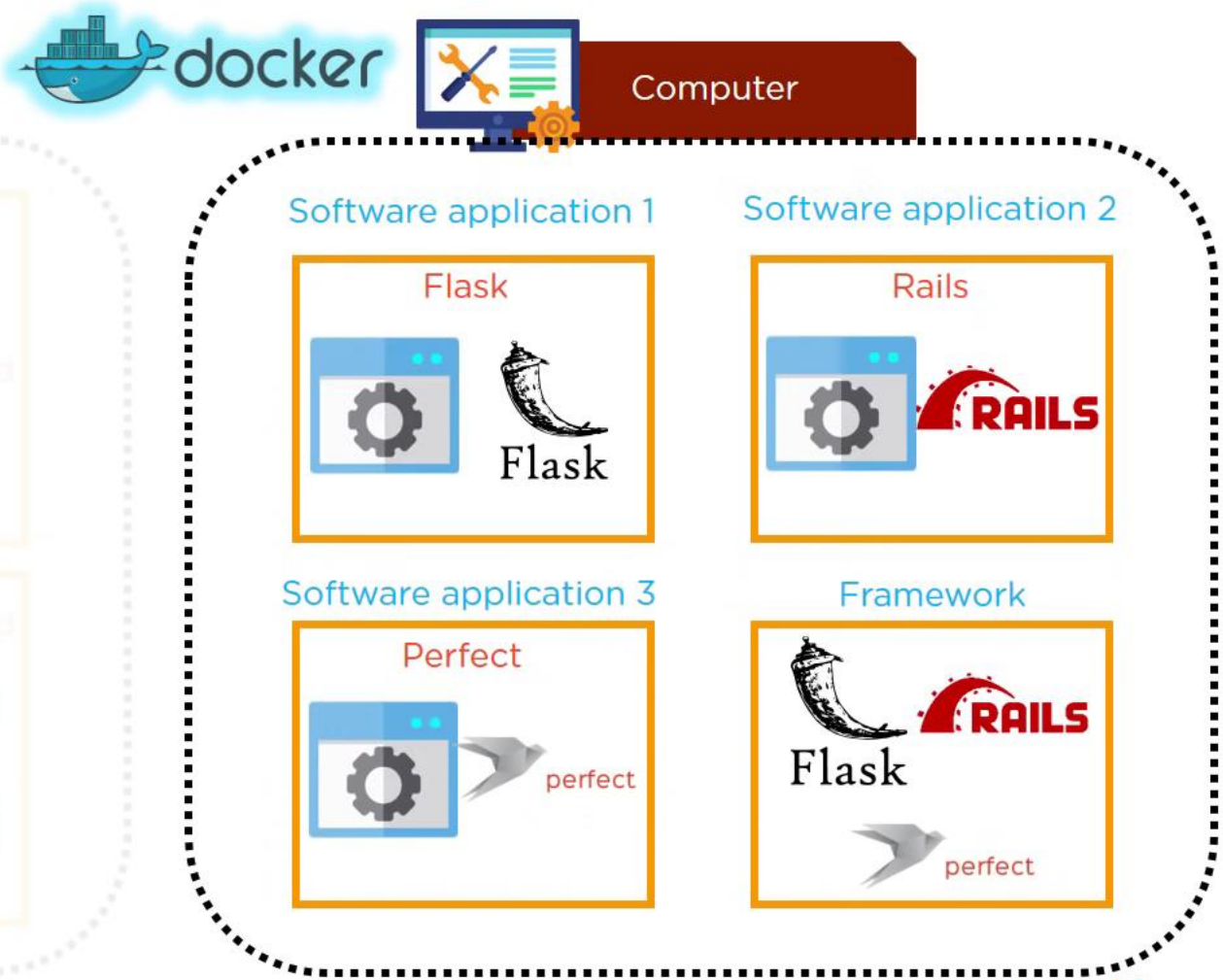
Solution:

Airbnb



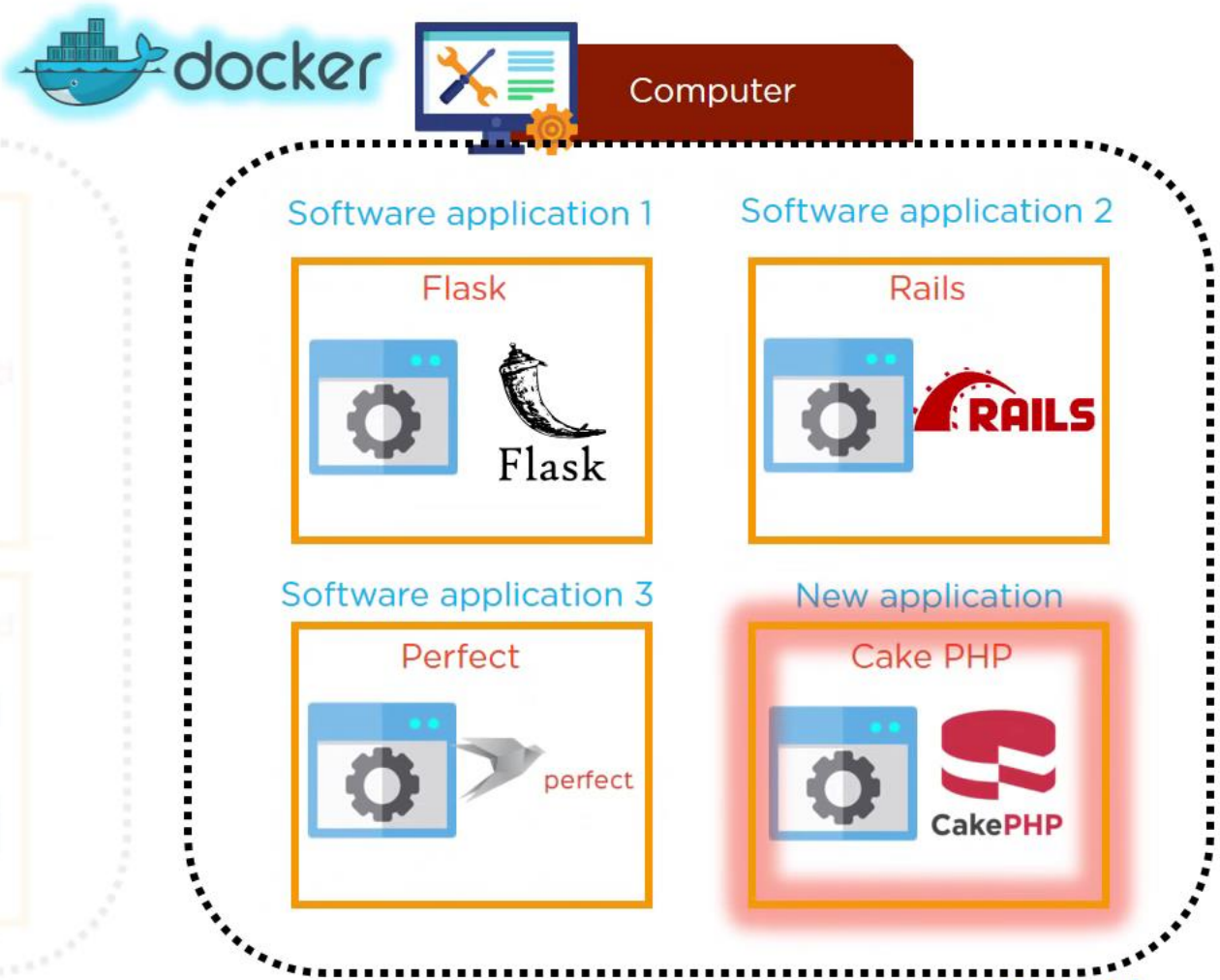
What is Docker?

Solution:



What is Docker?

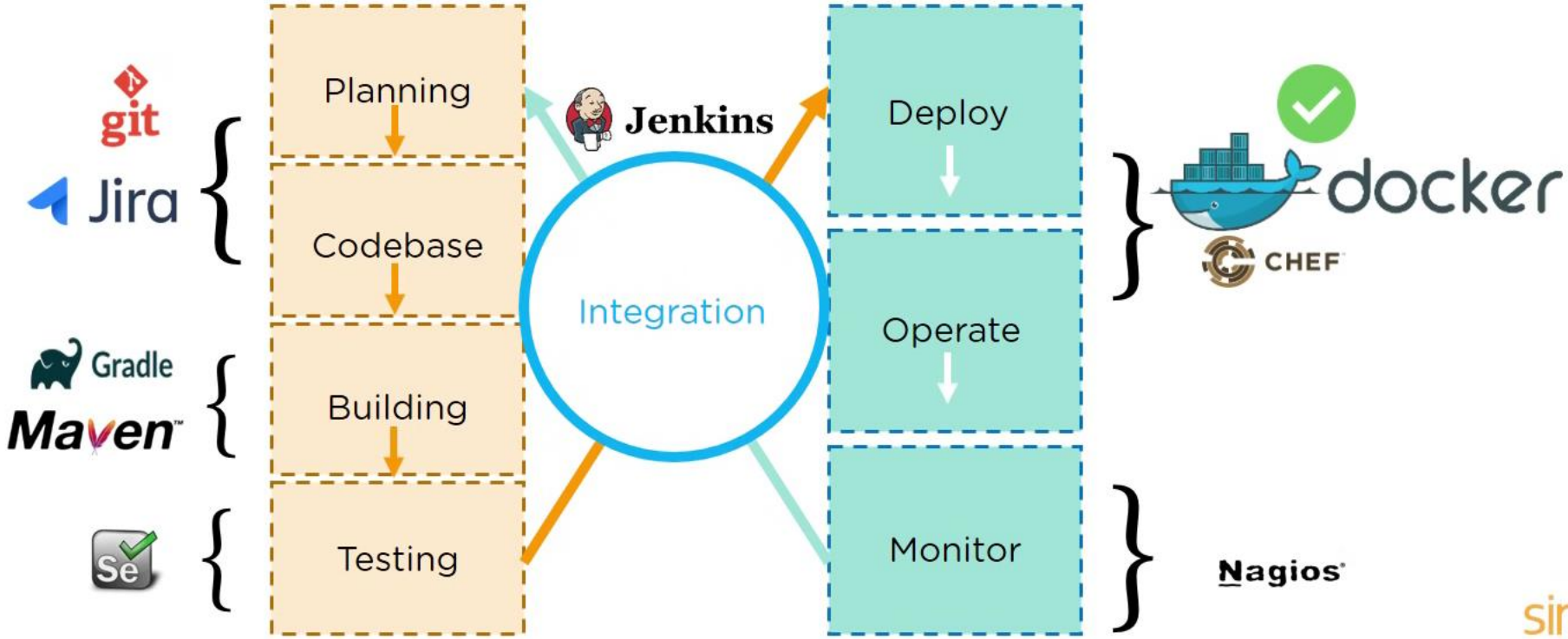
Solution:



simplilearn

DevOps and its tools

DevOps is a collaboration between development and operation teams which enables continuous delivery of applications and services to our end users



What is Docker?

Docker is a tool which is used to automate the deployment of applications in lightweight containers so that applications can work efficiently in different environments

Multiple containers run on the same hardware

Maintains isolated applications

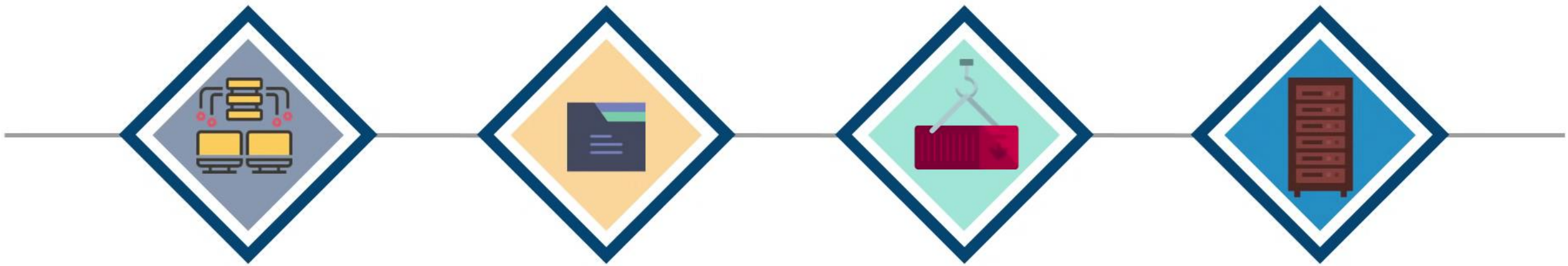
High productivity

Quick and easy configuration

Note: Container is a software package that consists of all the dependencies required to run an application

Docker Architecture

Components of Docker



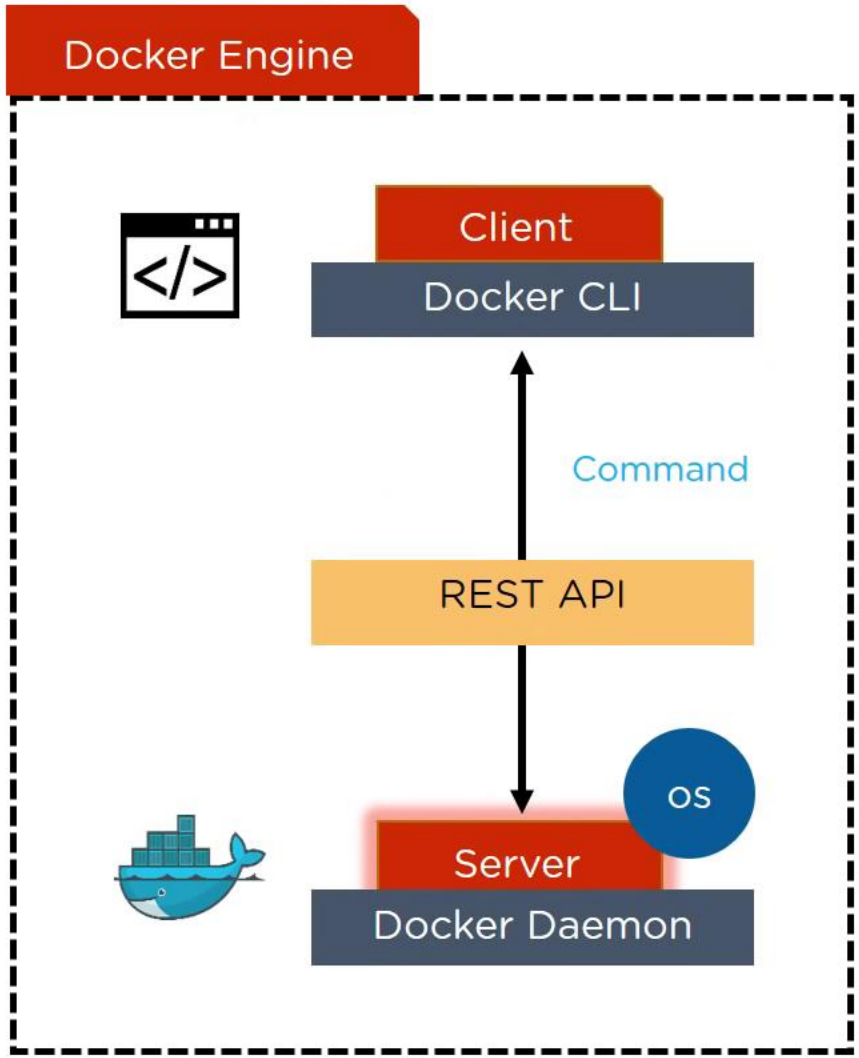
Docker Client and Server

Docker Images

Docker Containers

Docker Registry

How does Docker work?

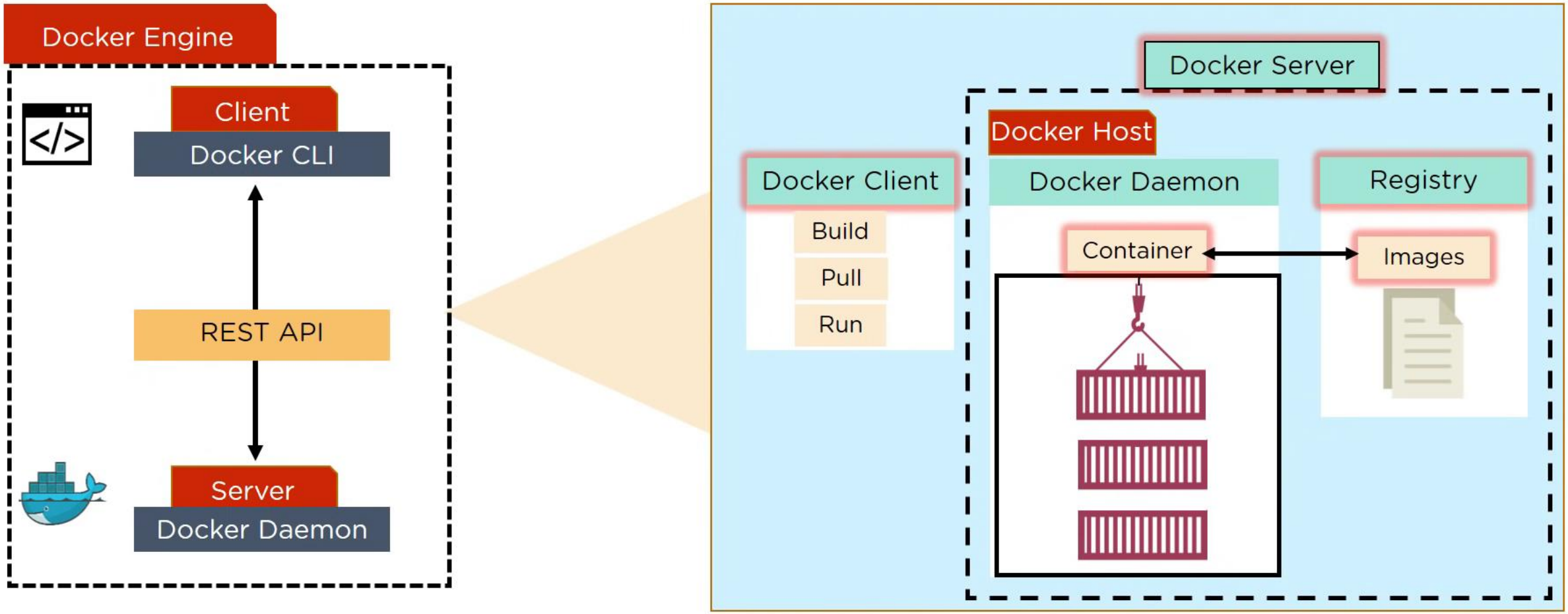


- Docker Engine or Docker is the base engine installed on your host machine to build and run containers using Docker components and services
- It uses a client-server architecture
- Docker Client and Server communicate using Rest API

What happens here?

- Docker Client is a service which runs a command. The command is translated using REST API and is sent to the Docker Daemon (server)
- Then, Docker Daemon checks the client request and interacts with the operating system in order to create or manage containers

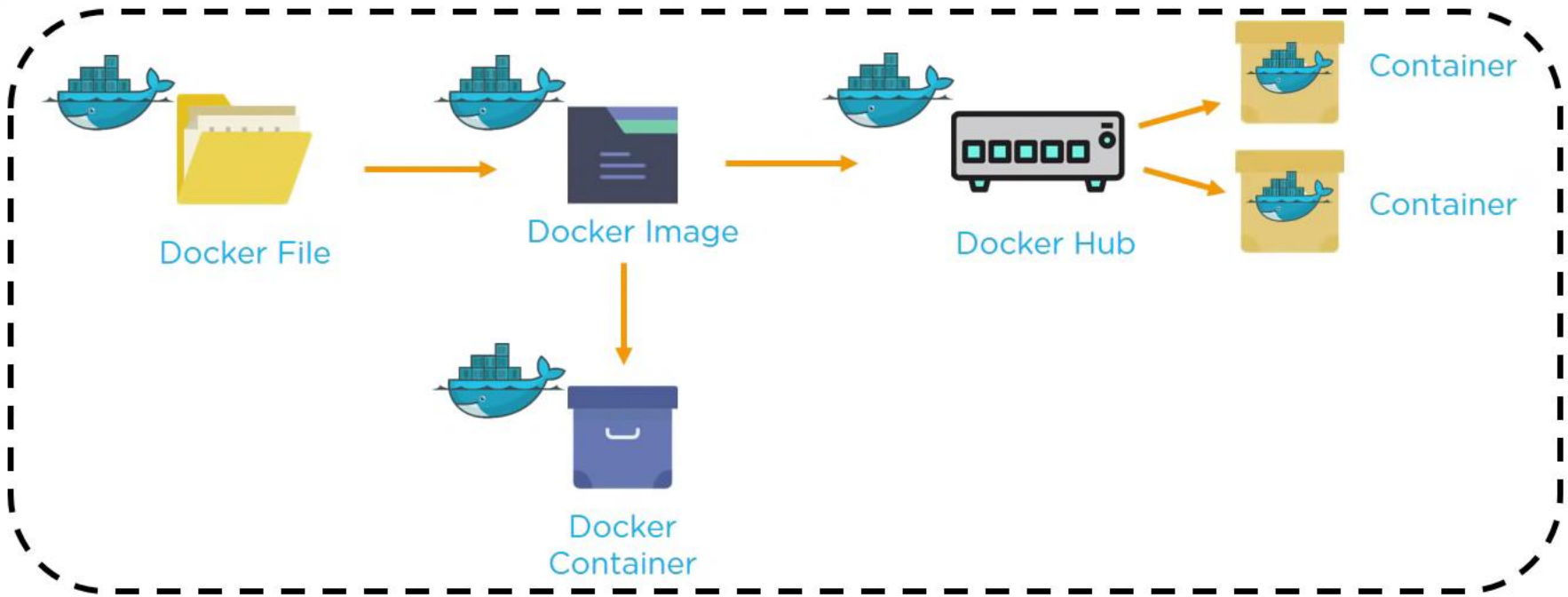
Components of Docker



Components of Docker

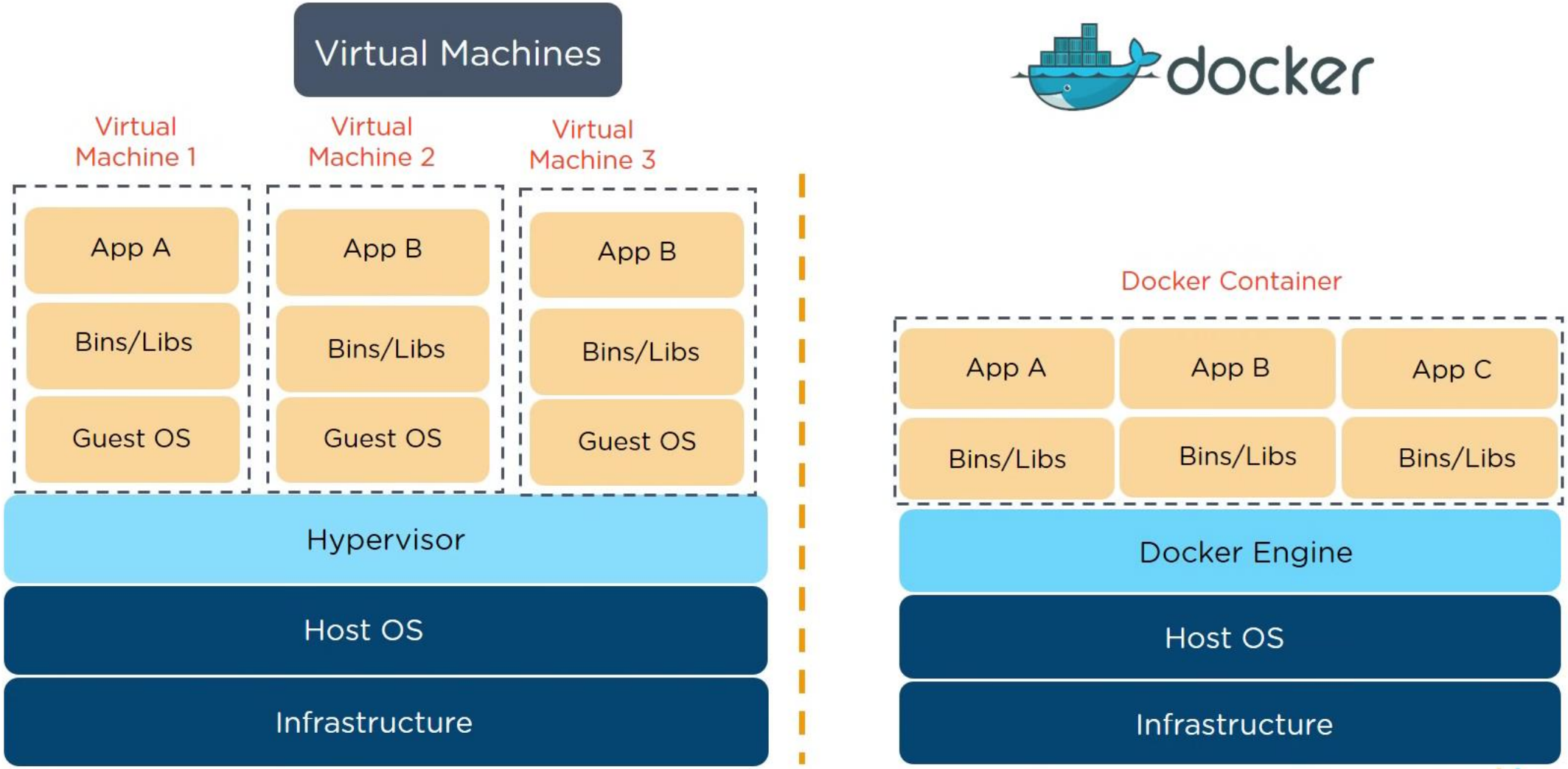
Recap

- Docker File creates a Docker Image using the build command
- A Docker Image contains all the project's code
- Using Docker Image, any user can run the code in order to create Docker Containers
- Once a Docker Image is built, it's uploaded in a registry or a Docker Hub
- From the Docker Hub, users can get the Docker Image and build new containers



Docker vs VM

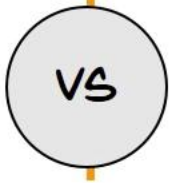
Why Docker?



simplilearn

Why Docker?

Criteria	Virtual Machine	Docker
OS support	Occupies a lot of memory space	Docker Containers occupy less space
Boot-up time	Long boot-up time	Short boot-up time
Performance	Running multiple virtual machines leads to unstable performance	Containers have a better performance as they are hosted in a single Docker engine
Scaling	Difficult to scale up	Easy to scale up
Efficiency	Low efficiency	High efficiency
Portability	Compatibility issues while porting across different platforms	Easily portable across different platforms
Space allocation	Data volumes cannot be shared	Data volumes can be shared and reused among multiple containers



Thank You