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Deploy a Python App using Red Hat® OpenShift®

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Note: It's case sensitive!





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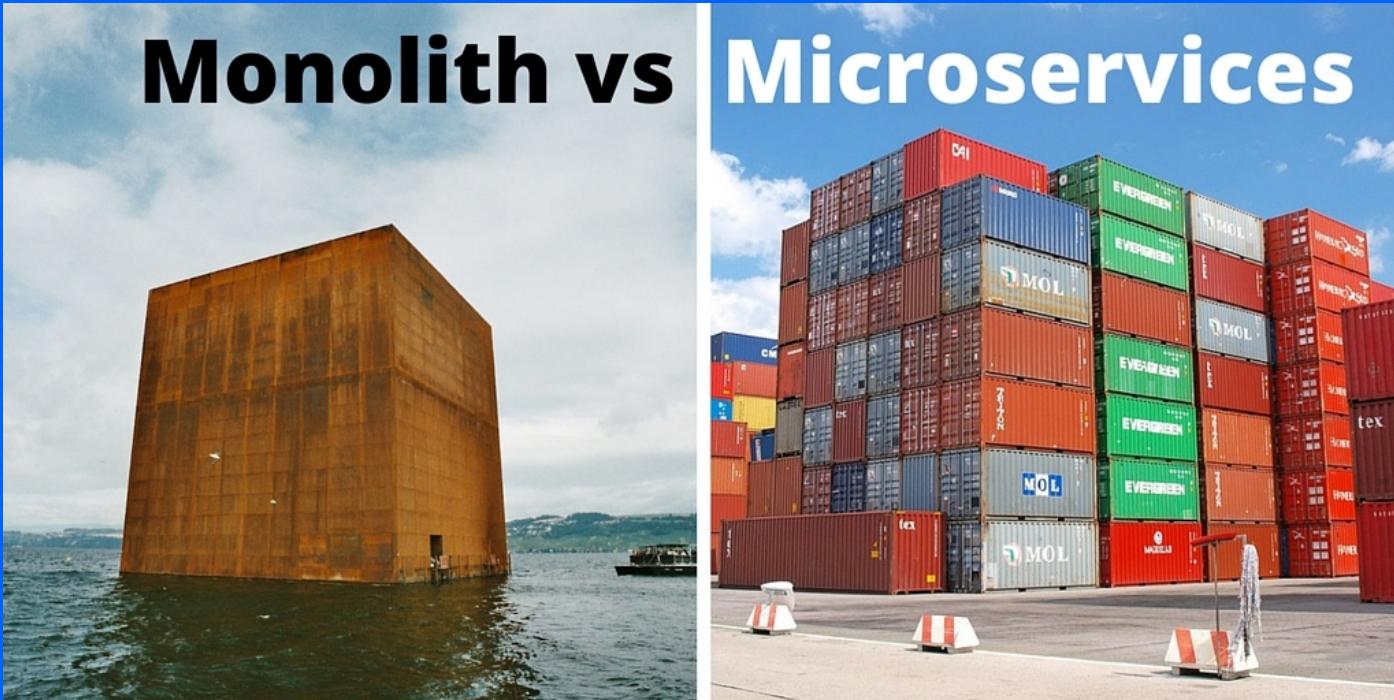
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Today's Agenda



- 1-Monolithic Architecture.
- 2-Microservices.
- 3-Docker and Kubernetes.
- 4-Redhat OpenShift Container Platform.
- 5-Hands-on Workshop.

Monolith Vs. Microservices Architectures



Monolithic Architecture - Tight Coupling ?

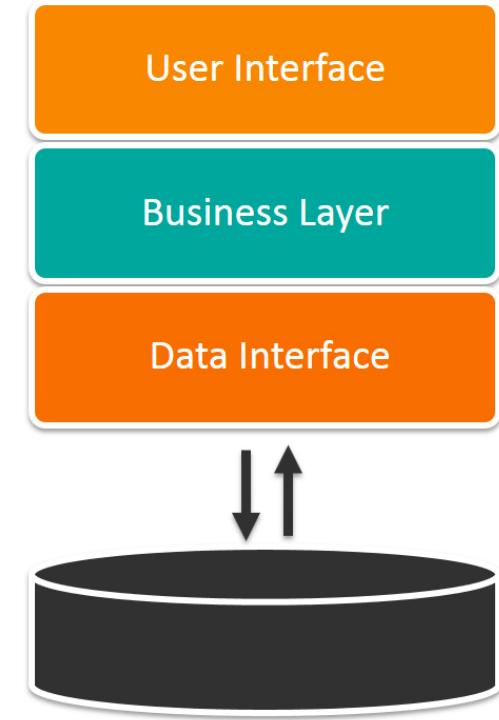
“It's similar to a big container
wherein all the software components
of an application are assembled
together and tightly packaged.”

Monolithic Architecture

Monolith application built as a single, indivisible unit.

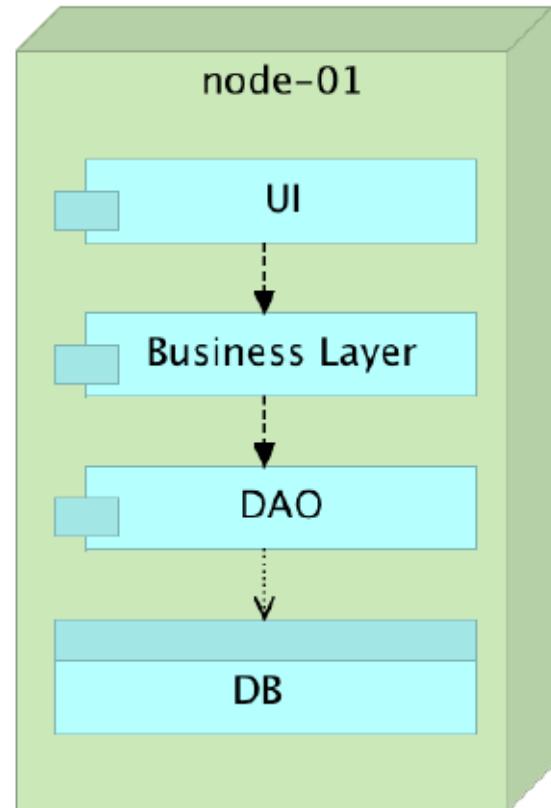
This style has been an integral part of many businesses.

Monolithic Architecture



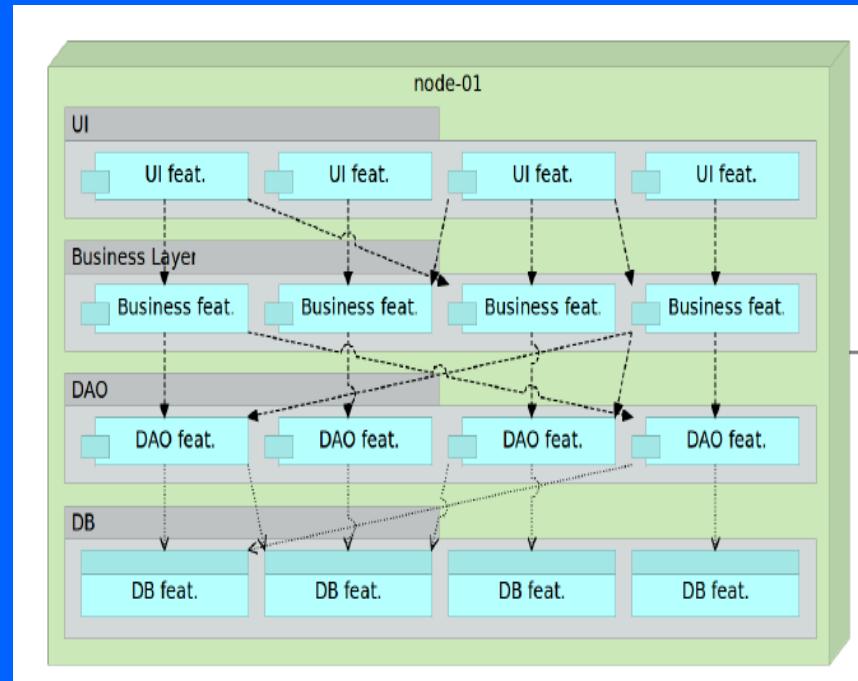
Monolithic Architecure

Monolithic Application deals
perfect with **Small Applications**



When it comes to complex Applications!

It's still a challenge to deliver a good software quality when the application becomes bigger.



So, What are the
Challenges ?

Monolithic Applications Challenges:

- 1- Inflexible.
- 2- Unreliable.
- 3- Unscalable.
- 4- Slow development.
- 5- Not fit for complex applications.
- 6- Blocks continuous development.



MONOLITHS

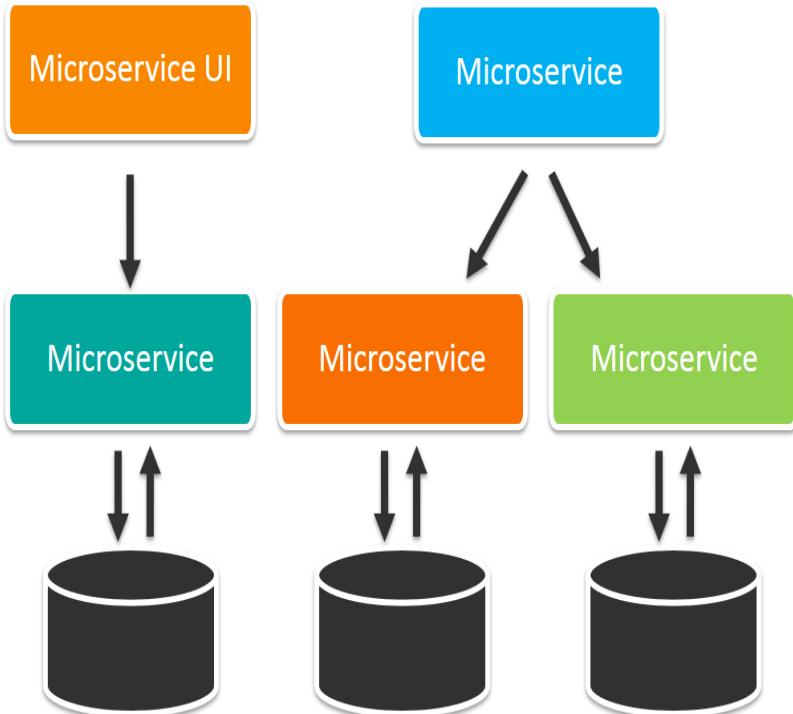
Hard to deliver, even harder to test and impossible to maintain

From here began the evolution of
Microservices.

Microservices

Software Application
is divided into
fine-grained
small independent **services**
called **microservices** -
Loosing coupling

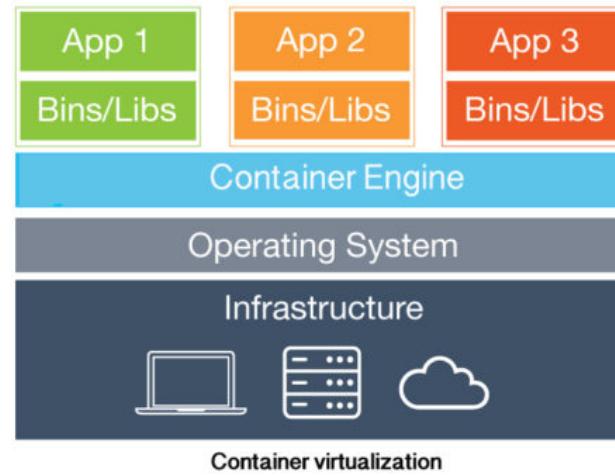
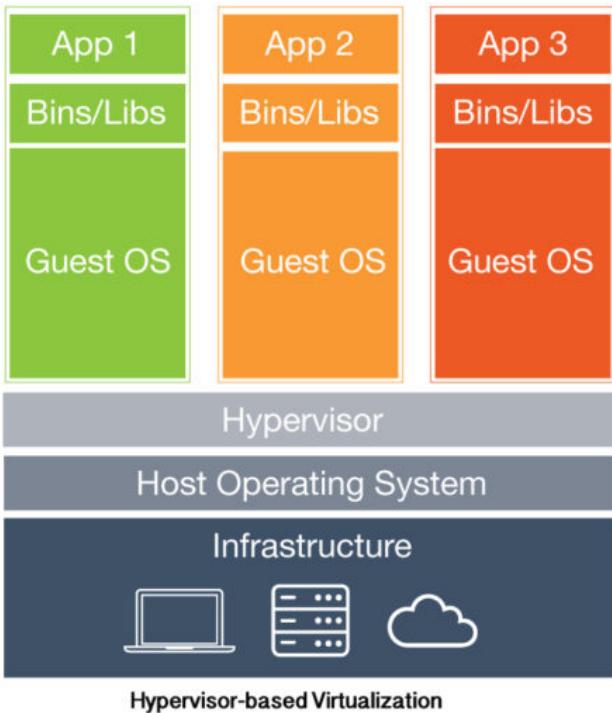
Microservices Architecture



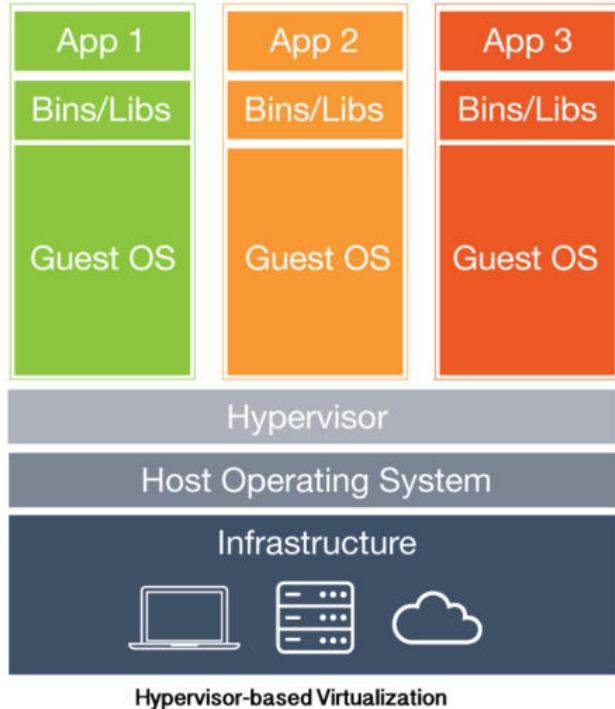
Microservices Architecture Benefits:

- 1- Easier to build and maintain Apps.
- 2- Organized around business capabilities.
- 3- Improved productivity and speed.
- 4- Autonomous cross-functional teams.

Virtualization Vs. Containerization



Virtualization

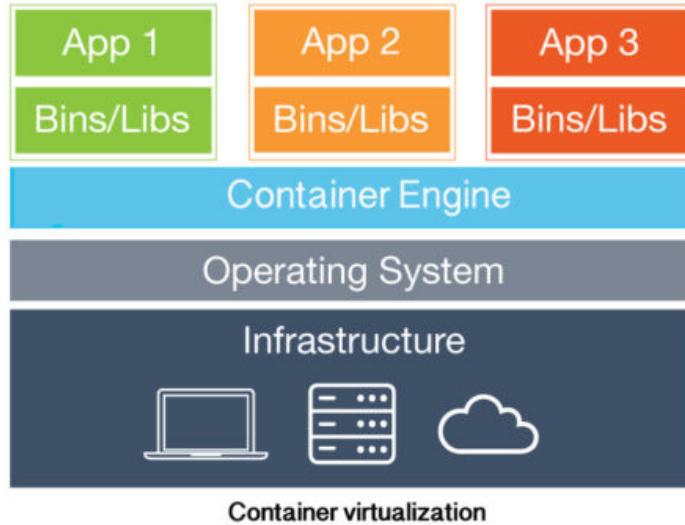


Each VM includes:

- Full OS on each Instance.
- Bigger in size.
- Slow to Start.
- High resource consumption and overhead.



Containerization



Lowered operational costs.

Higher Efficiency.

Flexible Storage.

Isolation provided by Linux kernel.

Faster Execution.

Lighter in Weight.



Containers



What are Containers ?

Containers are software packages that allow a software/program to run reliably in a different computing environments.



Container Contents

App Code

Run Time

System Tools

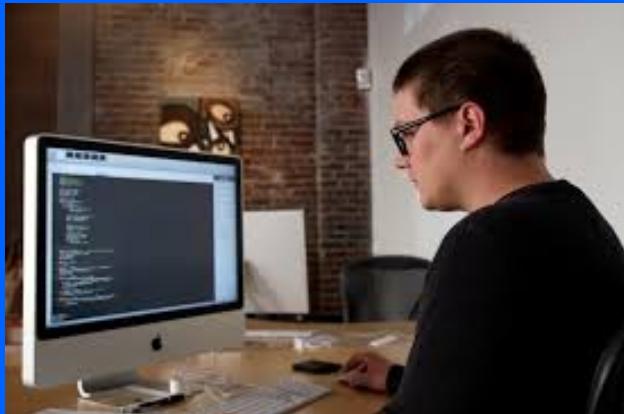
Libraries

Software Version

Settings



Use Case Scenario

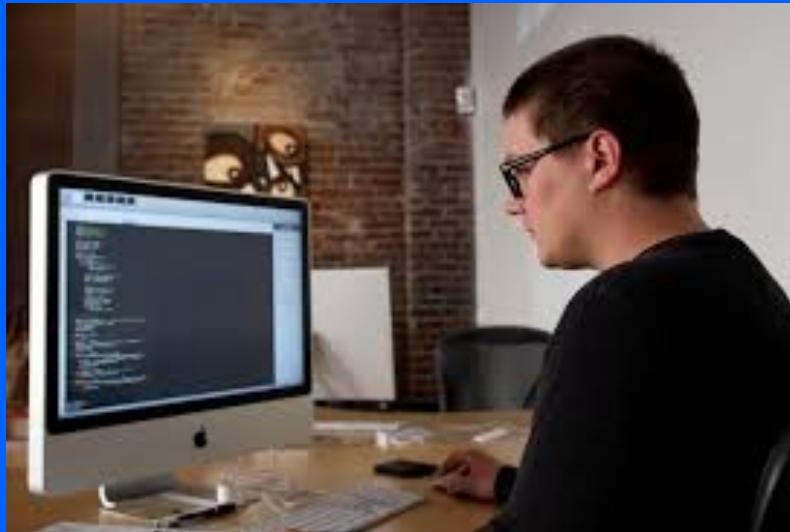


Software Developer



Software Tester (QA)

Use Case Scenario – cont'd



Software Developer
will go Crazy!



But how do we create
containers?



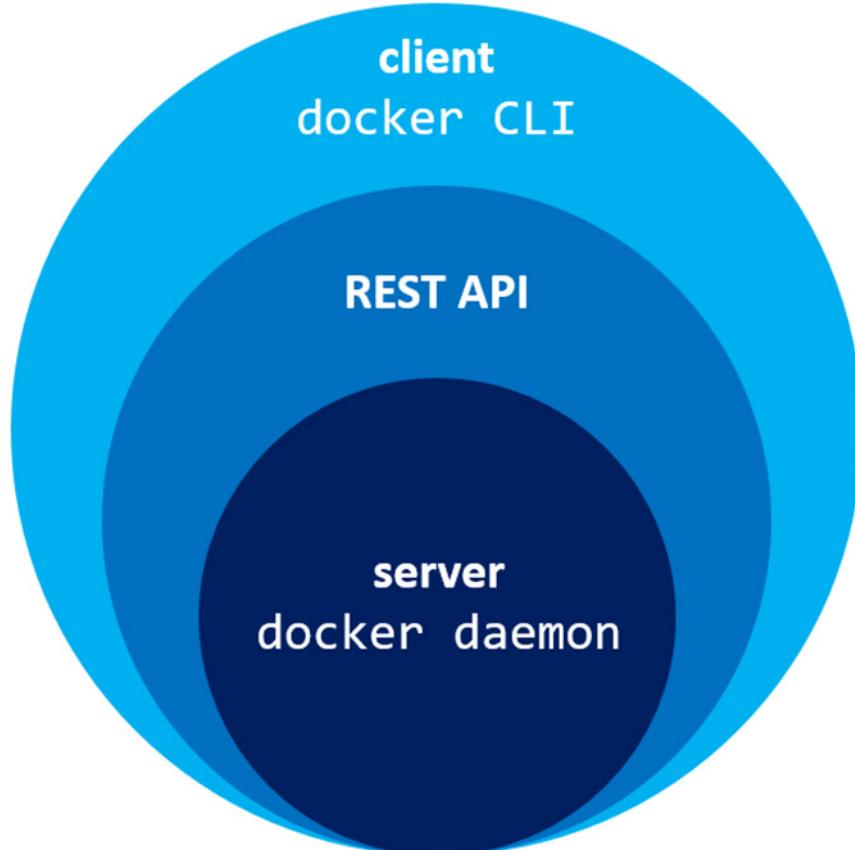


Its an **open source software platform** used to **manage** containers.

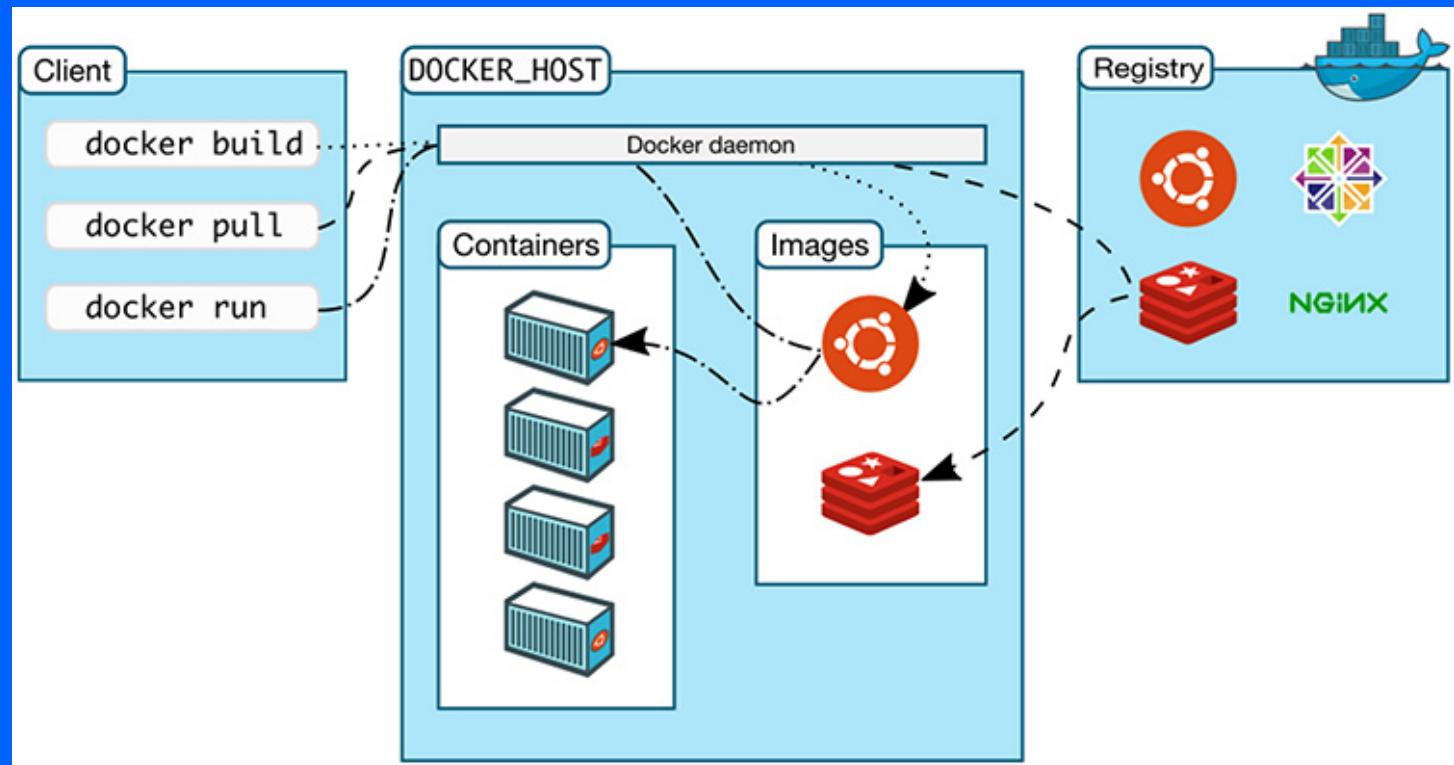
Allows you to **package**, **ship** and **run** applications on anywhere, No vendor lock-in.



Docker *Architecture*



Docker Architecture





Docker Container Lifecycle:



Docker
File



Build

Docker
Image



Produces

Docker
Container

How can we manage Containers ?



Kubernetes



Kubernetes - aka K8s

It is an open-source container orchestration system for managing containerized workloads and services across multiple hosts in a cluster.



Cluster

It is a group of computers that are connected with each other and operate closely to act as a ***single computer***.



Kubernetes

Architecture



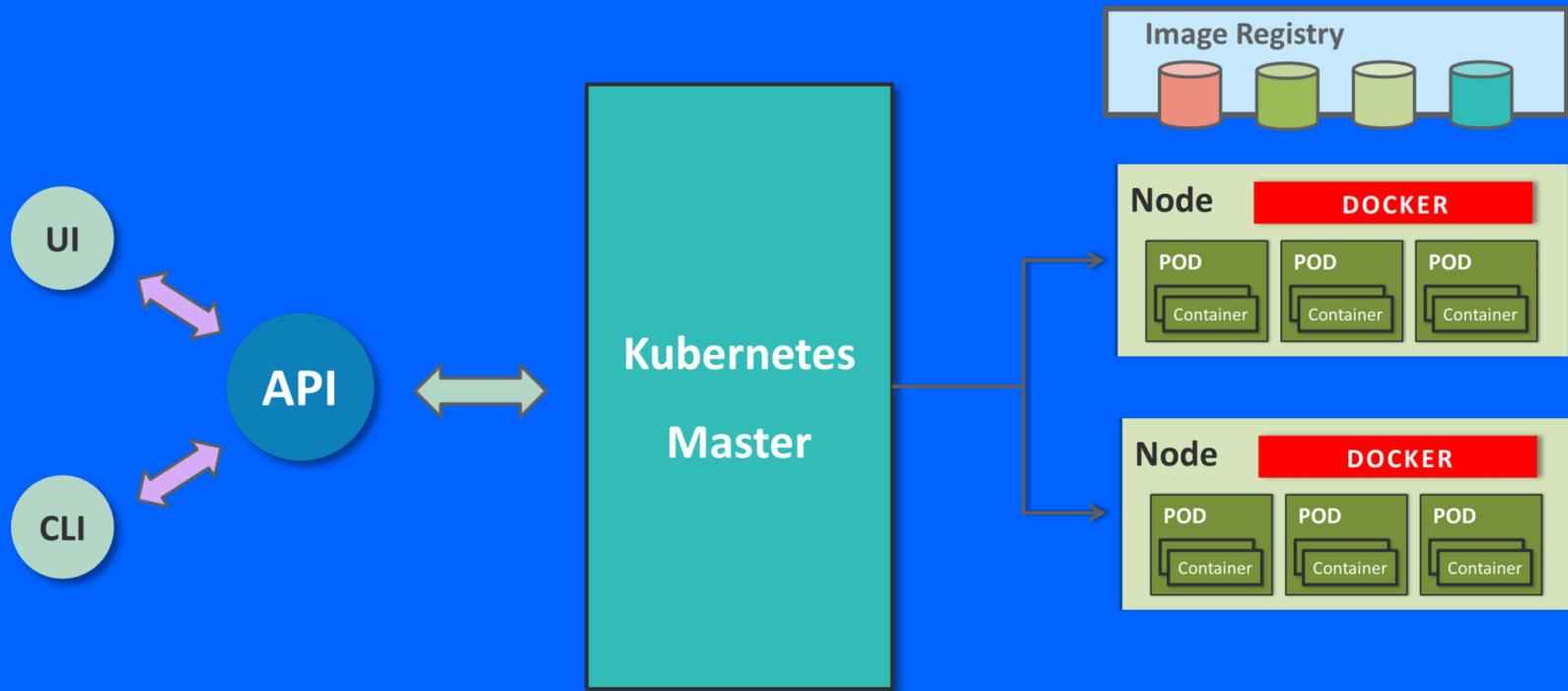
Kubernetes - aka K8s

There are two types of machines that forms a cluster:

- Kubernetes Head/Master Node [**Brain of Kubernetes**].
- Kubernetes Worker/Slave Node.



Kubernetes - aka K8s





Kubernetes - aka K8s

Master Node : So called the **control plane** of Kubernetes, this is where decisions are made about clusters, such as **scheduling, detecting/responding** to cluster events.

Main Components:

Kube-apiserver

Kube-etcd

kube-Controller Manager

Kube-Scheduler

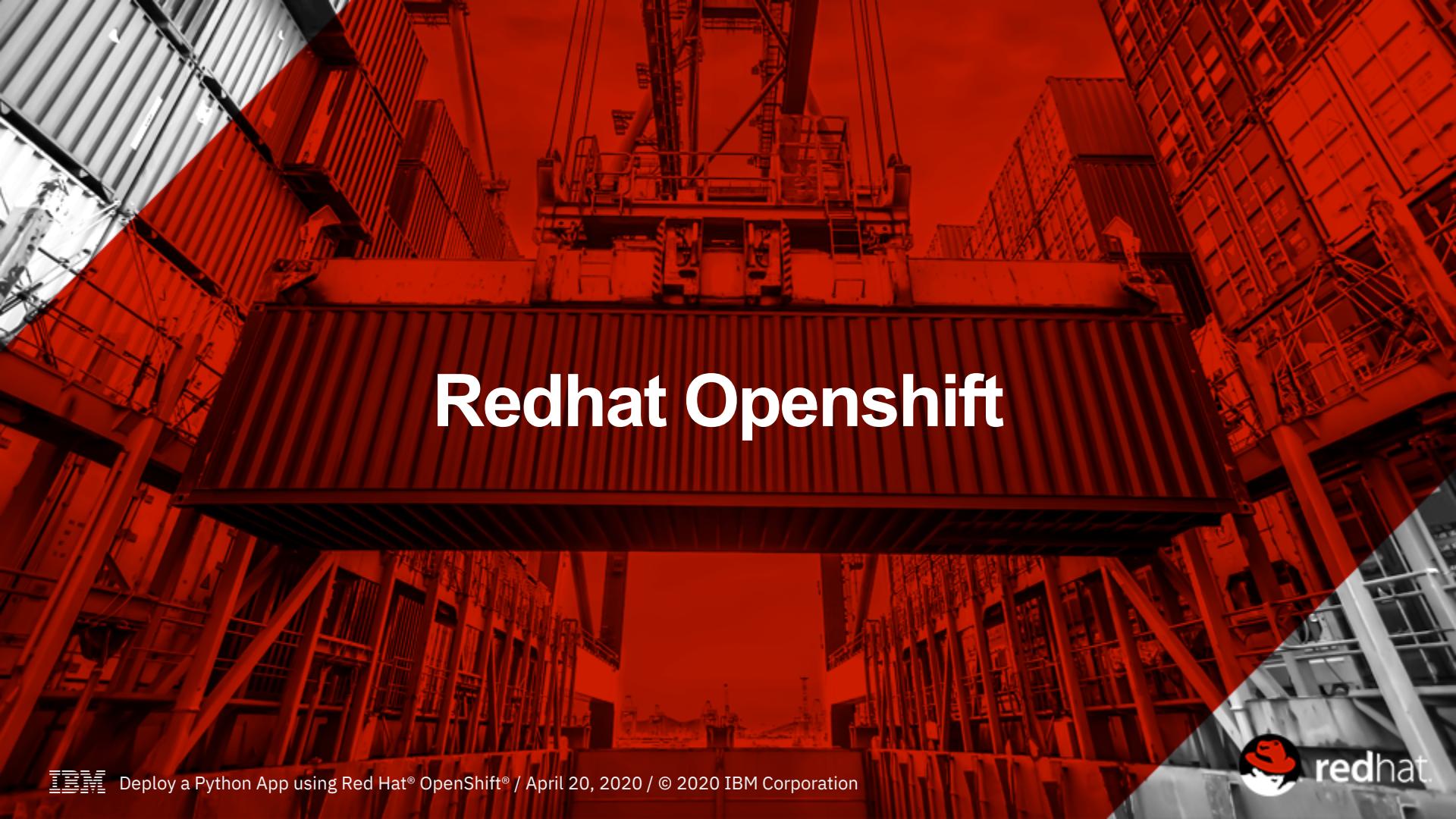


Kubernetes - aka K8s

Run the **containers** and provide kubernetes with runtime environment.

Main Components:

- *Kubelet.*
- *Pod.*
- *Kube-proxy.*
- *Docker Runtime.*

A black and white photograph of a large stack of shipping containers in a port terminal. The containers are stacked high, filling the frame. The perspective is from a low angle, looking up at the top of the stack. The sky is clear and blue.

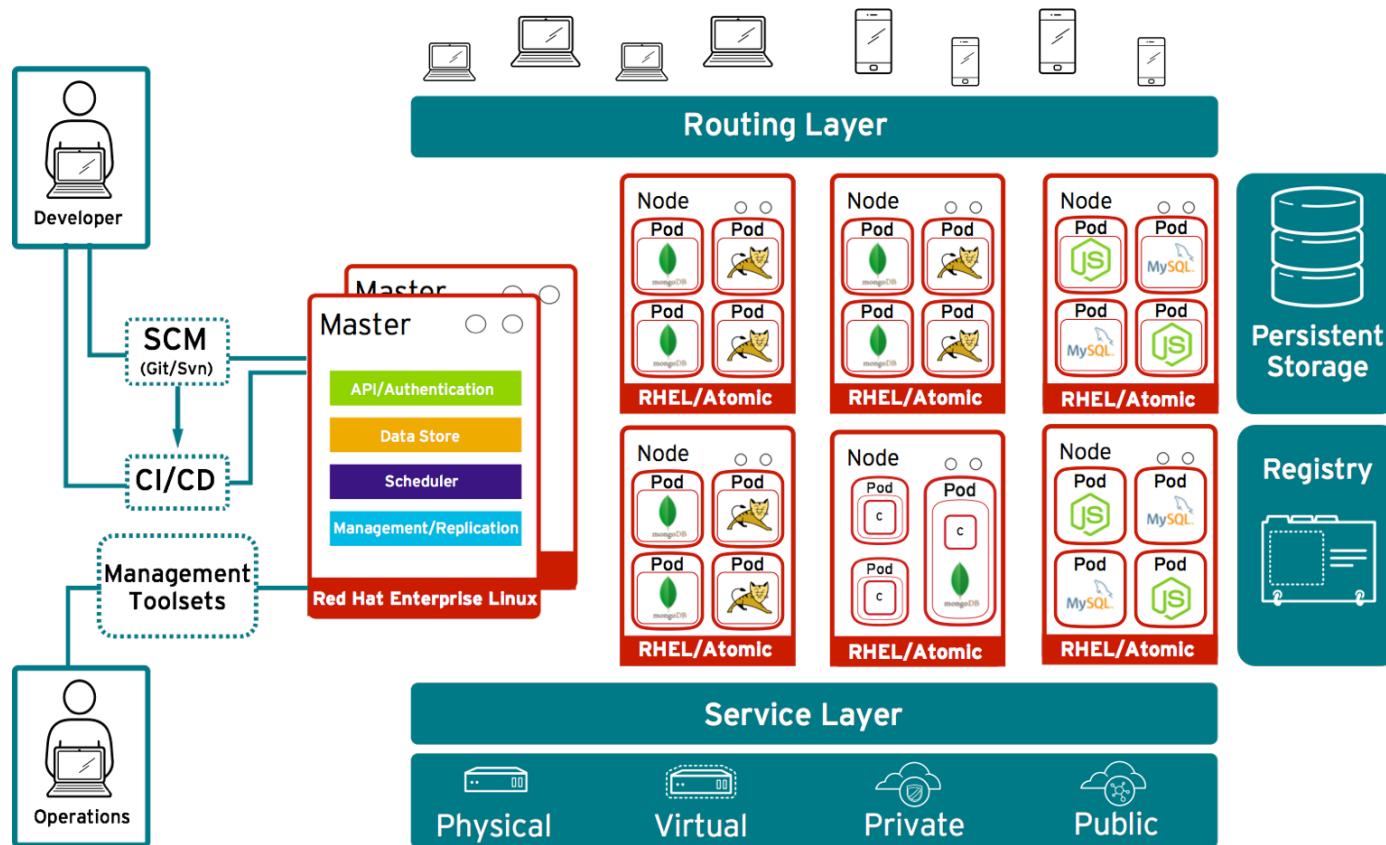
Redhat OpenShift



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Openshift Architectural View



Openshift Key Features:

- Rapid app development with DevOps methodology
- Enables scaling of containerized applications automatically or manually
- A good-looking interface to use in addition to the terminal
- Inbuilt security checks across the container and application stack
- Source to Image (S2I) that automatically builds your image without having a “Dockerfile”

Hands-on Lab: Deploy a Python app in 3 ways

<https://ibm.biz/Bdqj7v>

1. Using an existing Docker Image
2. Using a docker file from a Github repo
3. Using source code from a Github repo

20 CALL FOR CODE®

Global Challenge

Build solutions that fight back.

- Build & deploy solutions to **help seize & reduce** the impact of **COVID-19**
- Build & deploy solutions to help **halt & reverse** the impact of **Climate Change**



In 2020, Call for Code is aligned to the UN 75th anniversary global conversation theme of **climate change**, with a focus on:

- **water sustainability**
- **energy sustainability**
- **disaster resiliency**

The 2020 Call for Code Global Challenge is being expanded to address the **COVID-19 pandemic**, with a focus on:

- **crisis communication**
- **remote education**
- **community cooperation**

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Thanks

