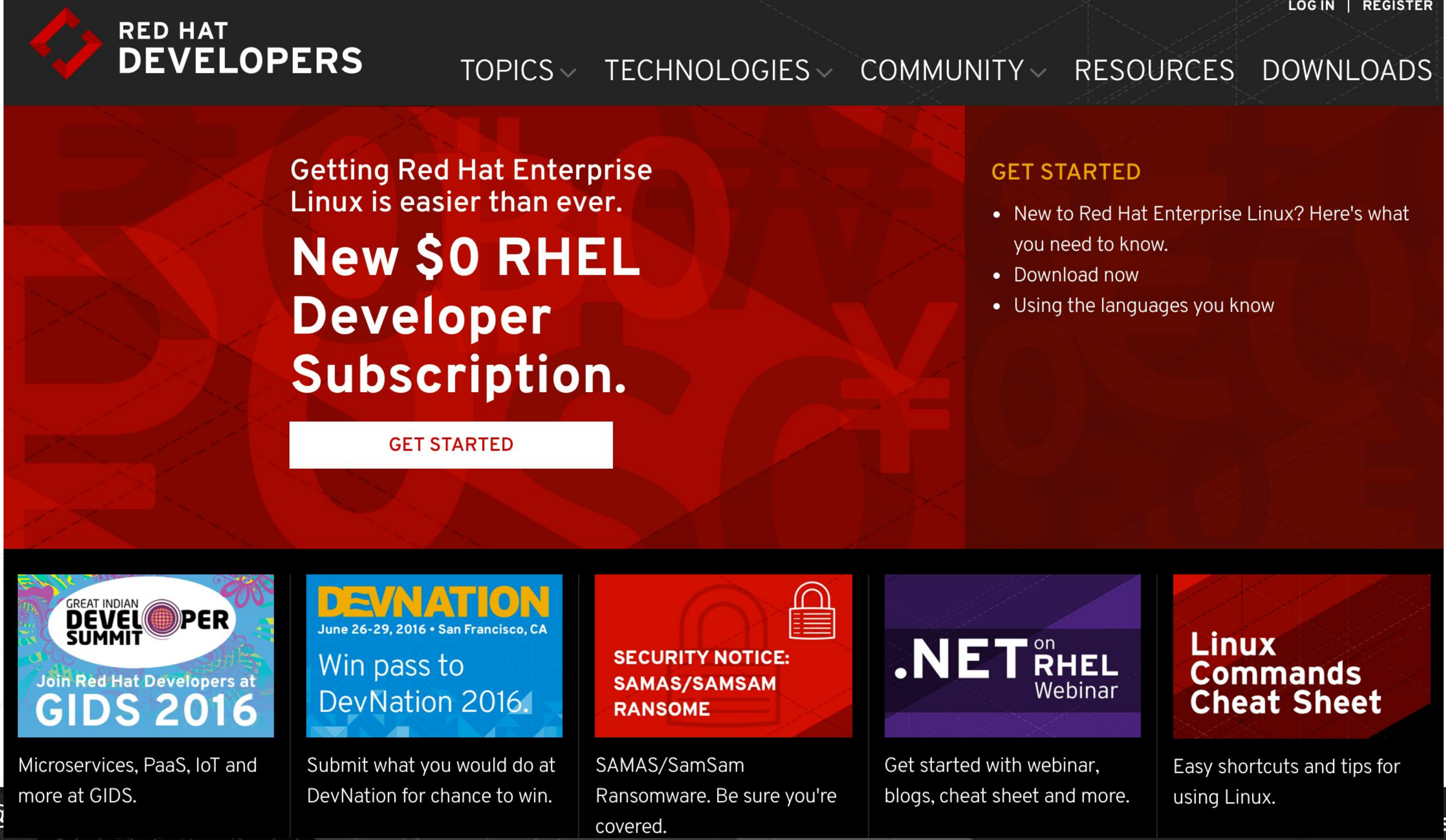
RED HAT DEVELOPERS

Kubernetes for Docker Developers

@burrsutter
burr@redhat.com
http://developers.redhat.com
http://bit.ly/kube4docker

Change History

1.0 - Great Indian Developer Summit
1.1 - Added demo recording link


RED HAT DEVELOPERS
LOG IN | REGISTER
TOPICS
TECHNOLOGIES
COMMUNITY
RESOURCES
DOWNLOADS
GET STARTED
GREAT INDIAN DEVELOPER SUMMIT
Join Red Hat Developers at GIDS 2016
DEVNATION
June 26-29, 2016 • San Francisco, CA
Win pass to DevNation 2016.
SECURITY NOTICE: SAMAS/SAMSAM RANSOME
.NET on RHEL Webinar
Linux Commands Cheat Sheet

Getting Red Hat Enterprise Linux is easier than ever.

New $0 RHEL Developer Subscription.

GET STARTED

- New to Red Hat Enterprise Linux? Here's what you need to know.
- Download now
- Using the languages you know

Microservices, PaaS, IoT and more at GIDS.

Submit what you would do at DevNation for chance to win.

SAMAS/SamSam Ransomware. Be sure you're covered.

Get started with webinar, blogs, cheat sheet and more.

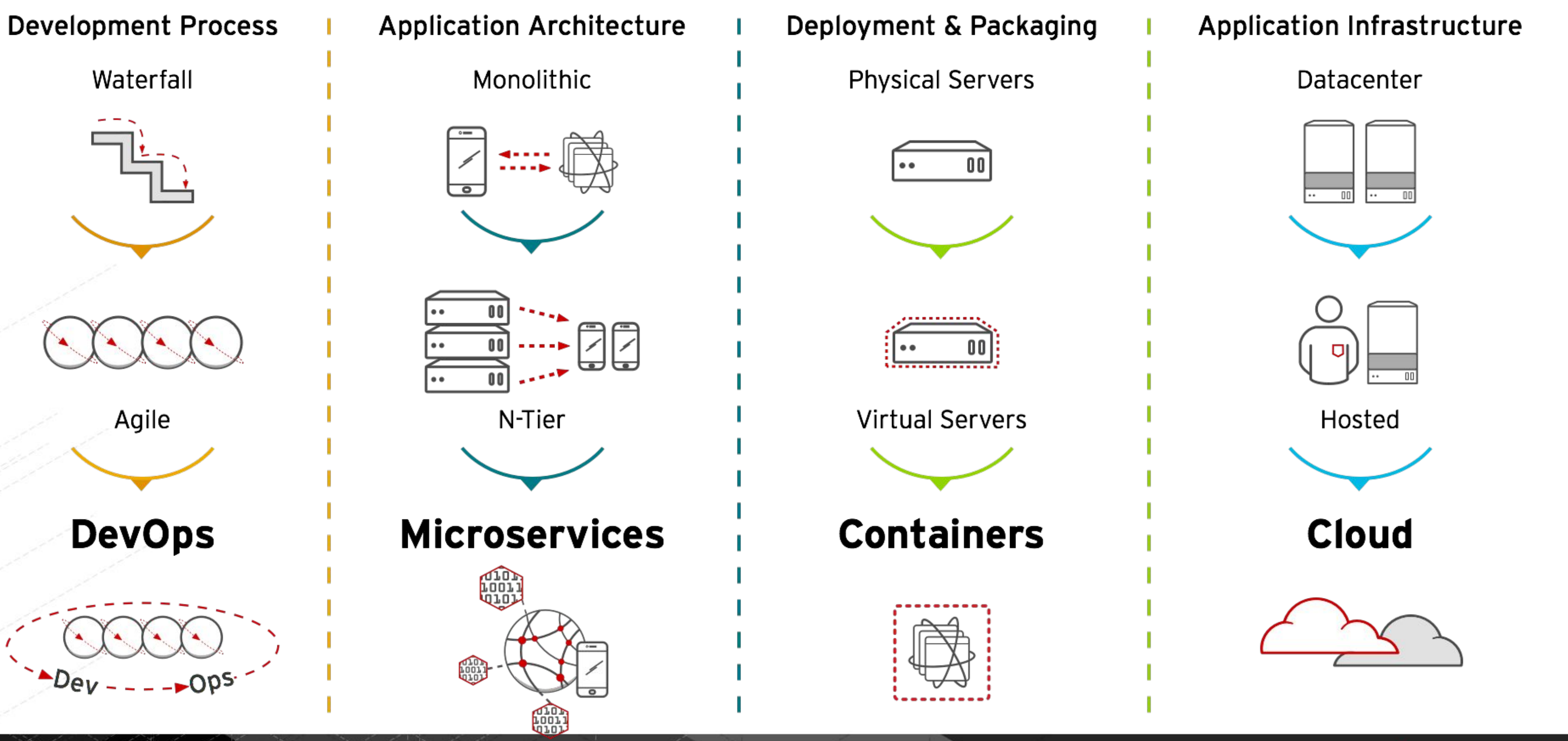
Easy shortcuts and tips for using Linux.

Kubernetes

for Docker Developers

RED HAT DEVELOPERS

Our IT World Morphs



Development Process

Waterfall

Agile

DevOps

Application Architecture

Monolithic

N-Tier

Microservices

Deployment & Packaging

Physical Servers

Virtual Servers

Containers

Application Infrastructure

Datacenter

Hosted

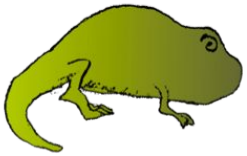
Cloud

Your Journey to Awesomeness :-)

Re-Org to DevOps

Self-Service, On-Demand, Elastic Infrastructure

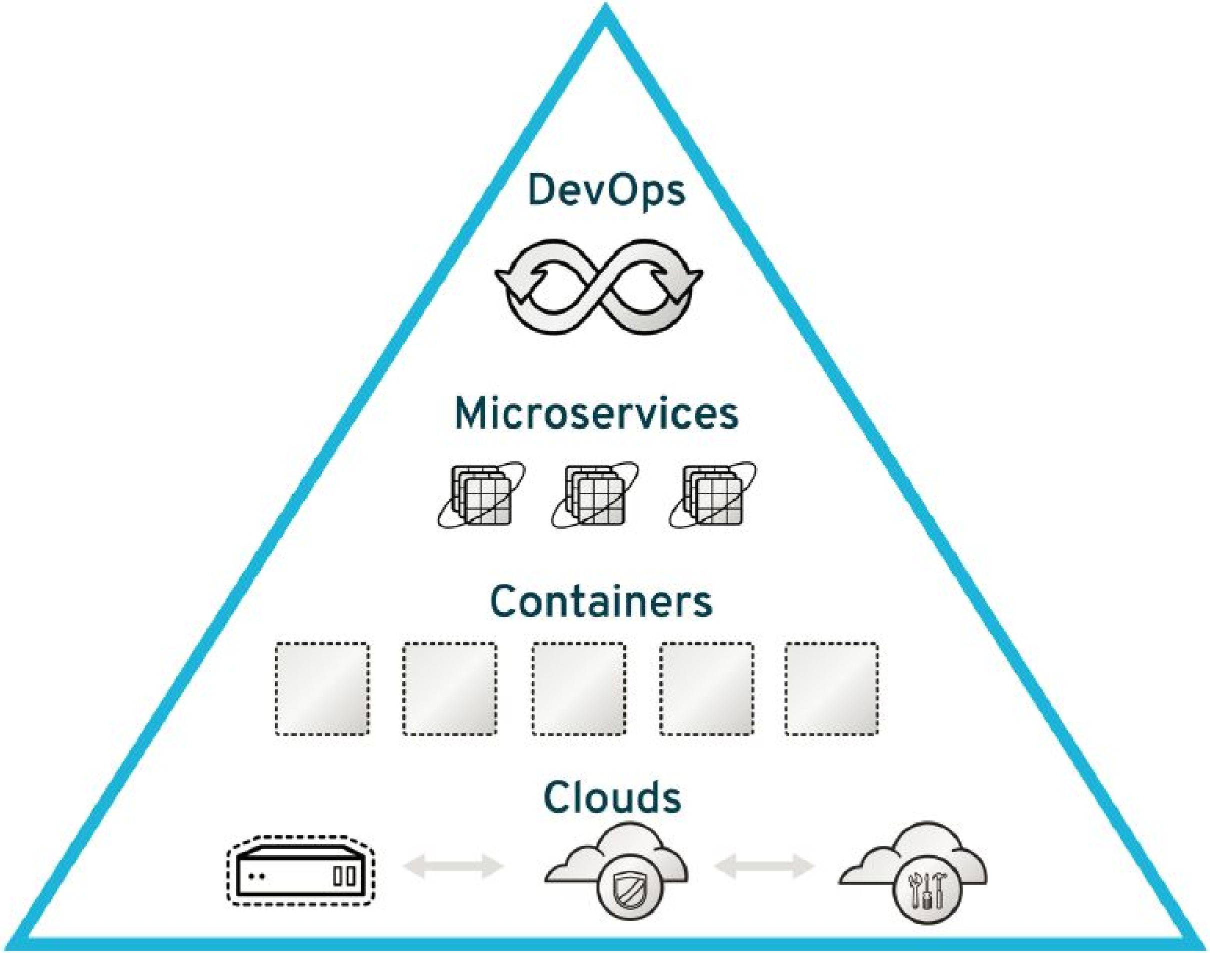
Automation Puppet, Chef, Ansible, Kubernetes



CI & CD Deployment Pipeline

Advanced Deployment Techniques

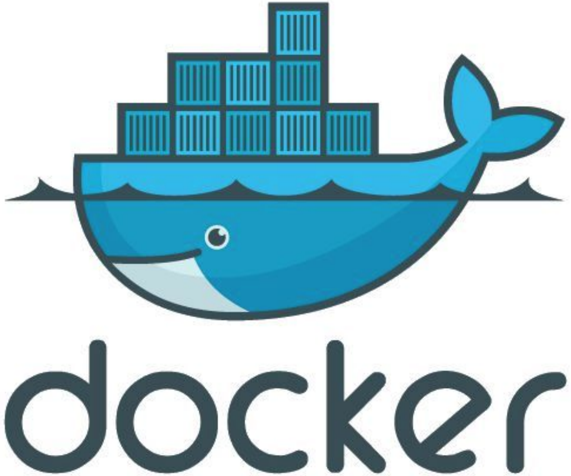
Microservices


DevOps
Microservices
Containers
Clouds

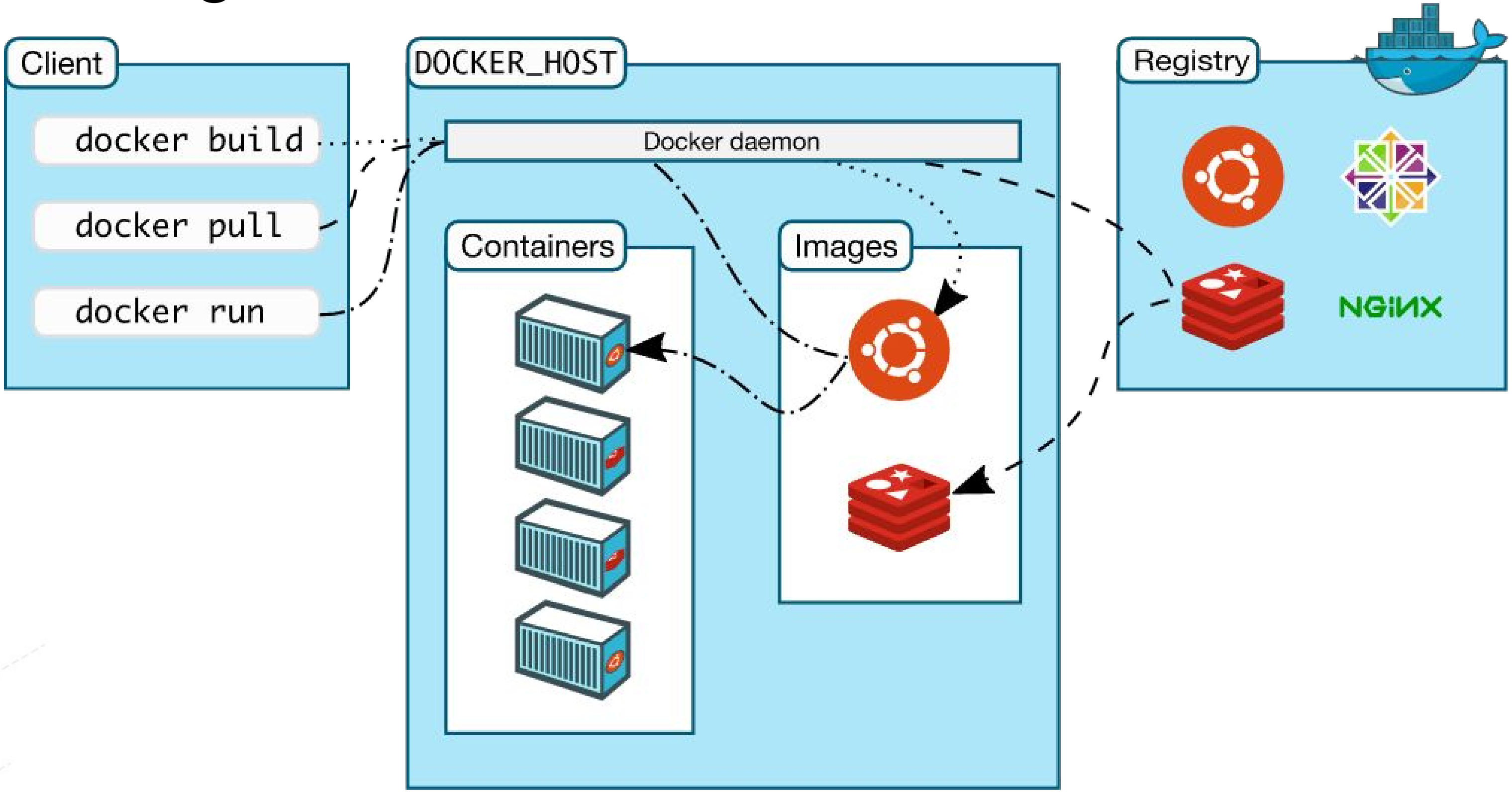
Containers bring Big Wins for developers

- Highly Portable Packaging solution - for microservices, web apps
- Lightweight, Encapsulated OS abstraction - carry your OS with you
- Getting Started (docker run -it centos/wildfly) Instantly
- Dev Environments that more closely match Prod Environments
- Dev Environments that match OTHER Dev Environments

  (no more...but it works on my machine)
- No more waiting 3+ weeks for a VM to be provisioned by Ops just so you can run a series of tests

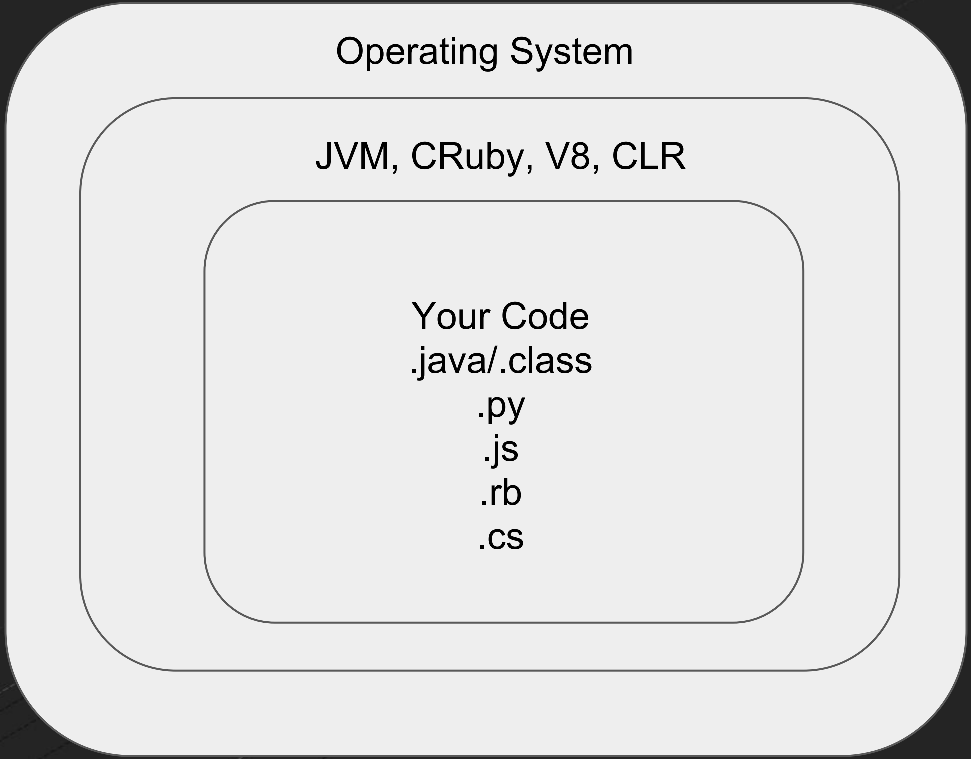

docker

Docker High-Level architecture



https://docs.docker.com/v1.9/engine/introduction/understanding-docker/

Computer - Processor, RAM, Disk

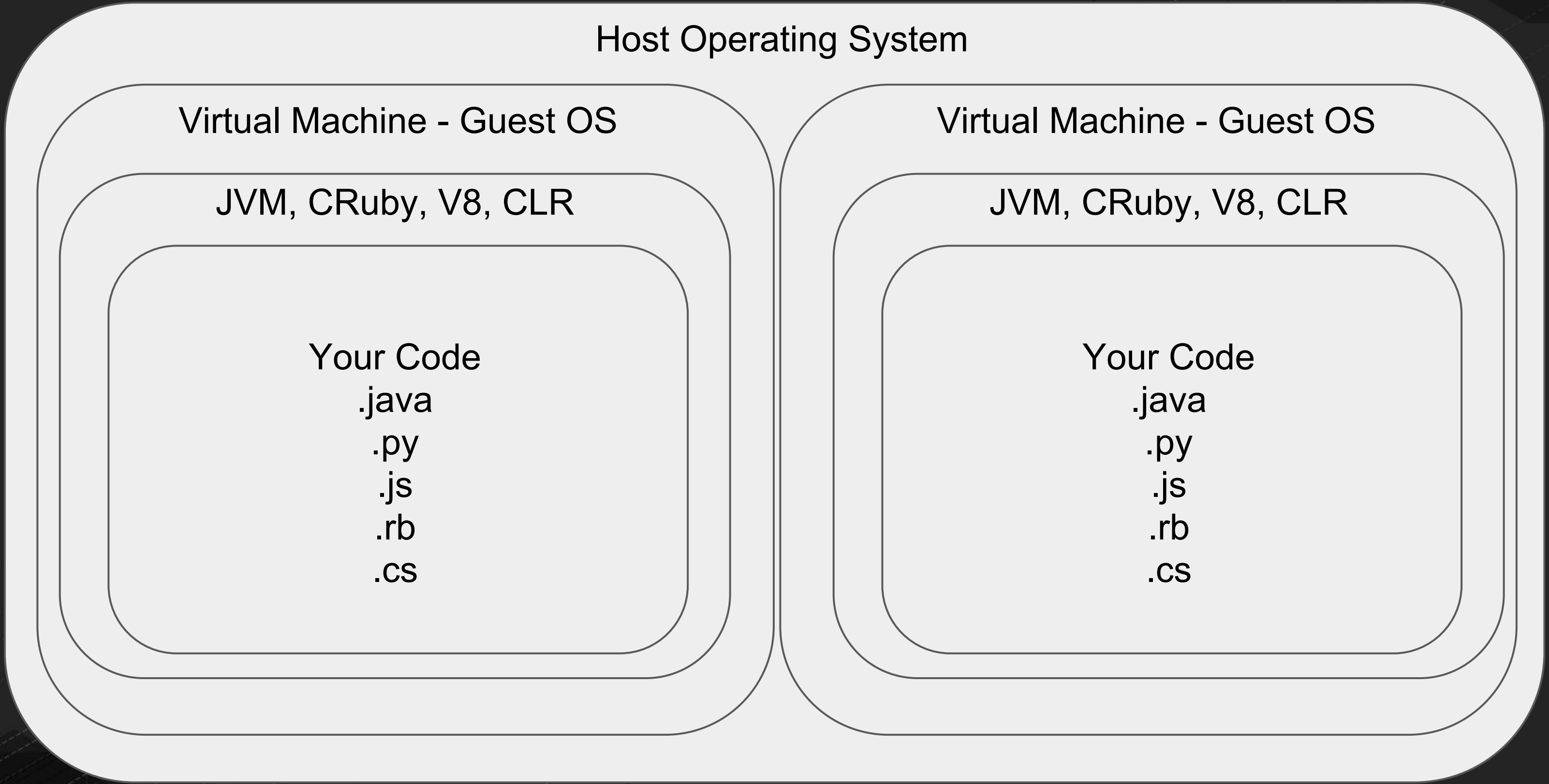


Operating System

JVM, CRuby, V8, CLR

Your Code
.java/.class
.py
.js
.rb
.cs

Computer - Processor, RAM, Disk



Host Operating System

Virtual Machine - Guest OS

JVM, CRuby, V8, CLR

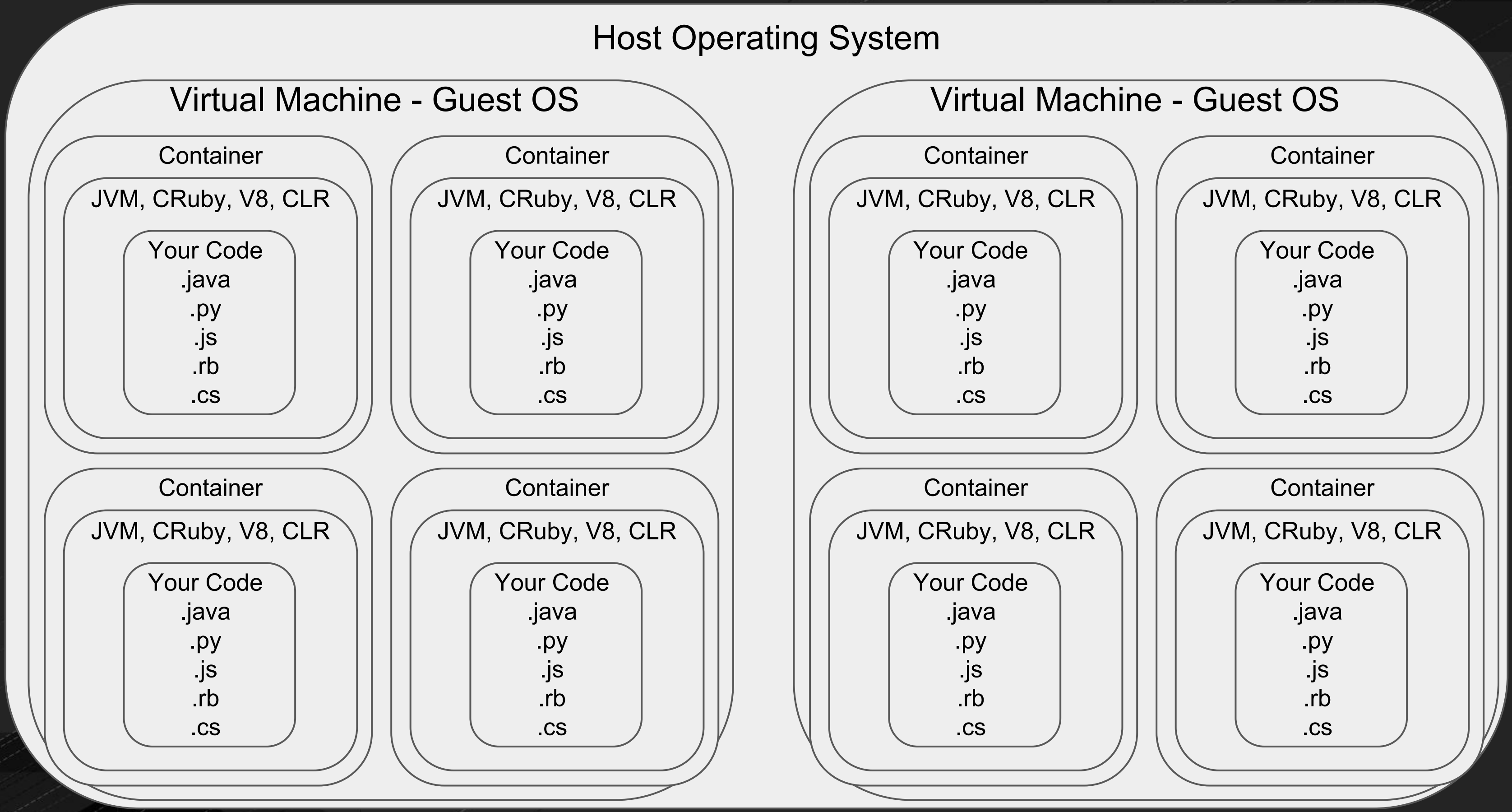
Your Code
.java
.py
.js
.rb
.cs

Virtual Machine - Guest OS

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

Computer - Processor, RAM, Disk



Host Operating System

Virtual Machine - Guest OS

Container

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

Container

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

Container

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

Container

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

Virtual Machine - Guest OS

Container

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

Container

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

Container

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

Container

JVM, CRuby, V8, CLR

Your Code
.java
.py
.js
.rb
.cs

For a Java Developer

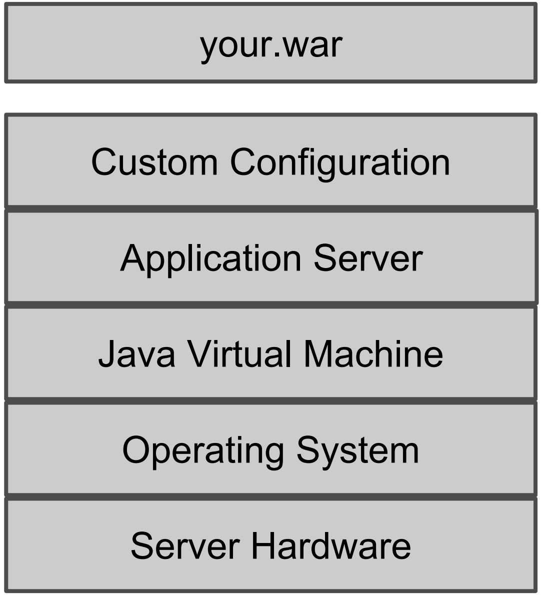
Have you ever had **“/”** vs **“\”** break your app? (Unix to Windows)

Or perhaps your app needed a unique version of a **JDBC driver**?

Or had a **datasource** with a slightly misspelled **JNDI name**?

Or received a **patch** for the **JVM** or **app server** that broke your code?

Your Stack Matters



your.war

Custom Configuration — JDBC driver, datasource, JMS queue, users

Application Server — Weblogic 10.x.y, Tomcat 6.x.y, JBoss EAP 6.x.y

Java Virtual Machine — Java 1.6.6_45 or Java 1.7.0_67

Operating System — Linux Kernel Version & Distribution

Server Hardware

Email Requirements

MyApp.war has been tested with the following

On my Windows 7 desktop

JDK 1.8.43

Tomcat 7.10

Configuration:

Datasource: MySQLDS

Tested with: mysql-connector-java-5.1.31-bin.jar

Email Requirements

MyApp.war has been tested with the following

On my Windows 7 desktop

JDK 1.8.43

Tomcat 7.10

Configuration:

Datasource: MySQLDS

Tested with: mysql-connector-java-5.1.31-bin.jar

Production Environment

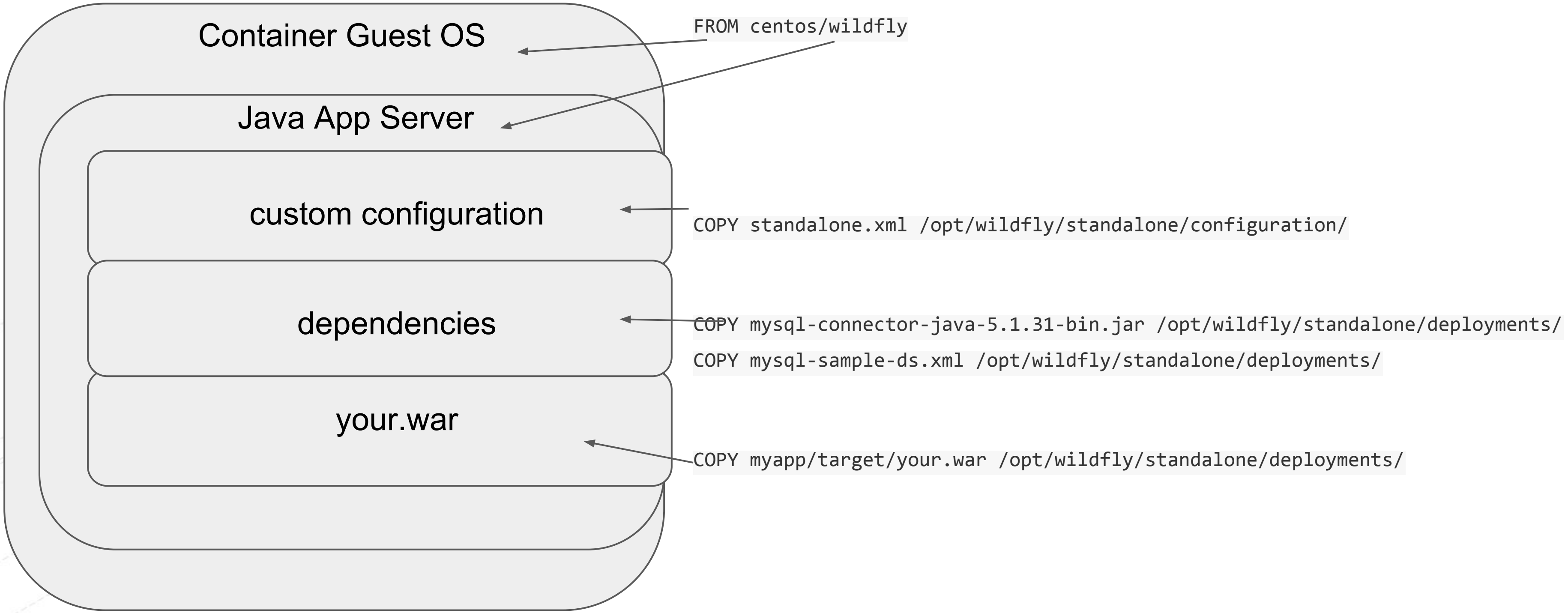
Red Hat Enterprise Linux 6.2

JRE 1.7.3

WebSphere 8.5.5

Oracle 9

Docker Magic



Container Guest OS

Java App Server

custom configuration

dependencies

your.war

```
FROM centos/wildfly

COPY standalone.xml /opt/wildfly/standalone/configuration/

COPY mysql-connector-java-5.1.31-bin.jar /opt/wildfly/standalone/deployments/
COPY mysql-sample-ds.xml /opt/wildfly/standalone/deployments/

COPY myapp/target/your.war /opt/wildfly/standalone/deployments/
```

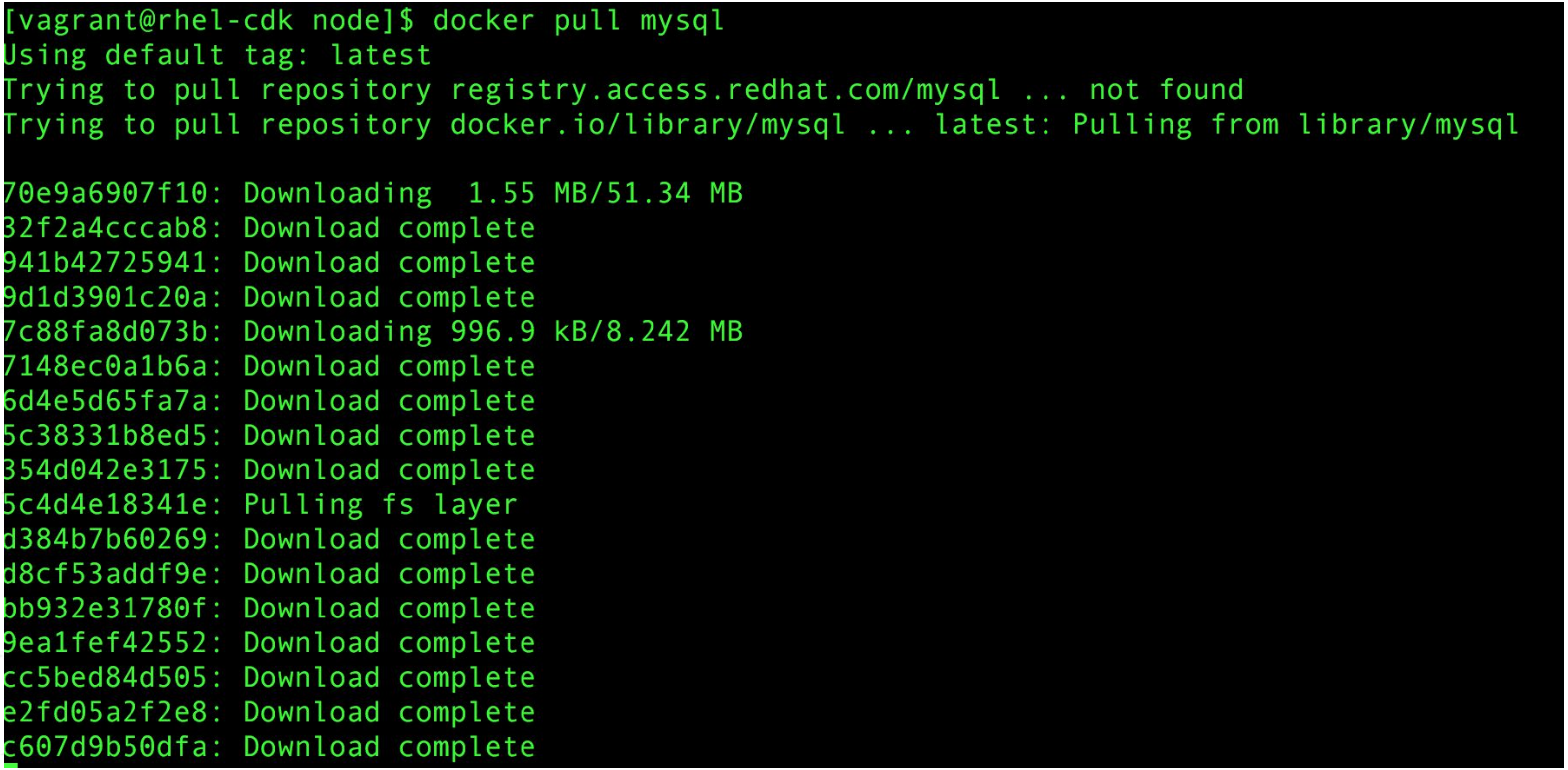
docker run is like magic

```
docker run -it centos /bin/bash
```

Or Via the CDK (http://developers.redhat.com/products/cdk/overview/)

```
docker run -it rhel7 /bin/bash
```

docker pull mysql



```
[vagrant@rhel-cdk node]$ docker pull mysql
Using default tag: latest
Trying to pull repository registry.access.redhat.com/mysql ... not found
Trying to pull repository docker.io/library/mysql ... latest: Pulling from library/mysql

70e9a6907f10: Downloading  1.55 MB/51.34 MB
32f2a4cccab8: Download complete
941b42725941: Download complete
9d1d3901c20a: Download complete
7c88fa8d073b: Downloading 996.9 kB/8.242 MB
7148ec0a1b6a: Download complete
6d4e5d65fa7a: Download complete
5c38331b8ed5: Download complete
354d042e3175: Download complete
5c4d4e18341e: Pulling fs layer
d384b7b60269: Download complete
d8cf53addf9e: Download complete
bb932e31780f: Download complete
9ea1fef42552: Download complete
cc5bed84d505: Download complete
e2fd05a2f2e8: Download complete
c607d9b50dfa: Download complete
```

bit.ly/docker-devnexus2017

Making Docker Ready

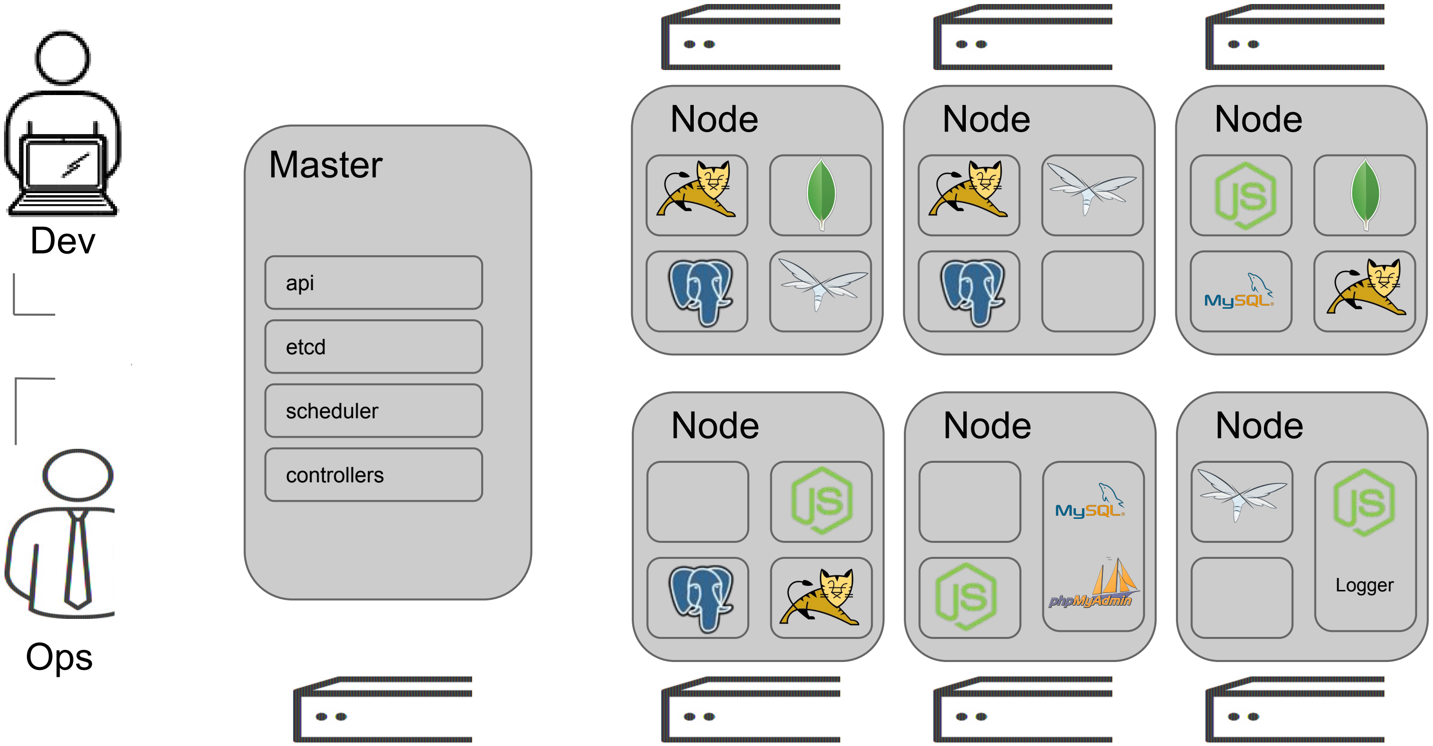
- High Availability
- Load-balancing
- Scaling
- Staying Up
- Persistent Storage

Google

kubernetes

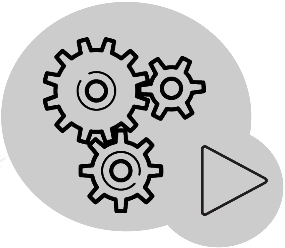
OPENSHIFT®
by Red Hat®

Kubernetes Cluster



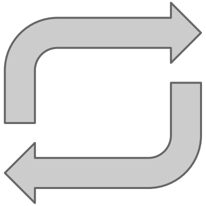
Kubernetes Concepts

Pod



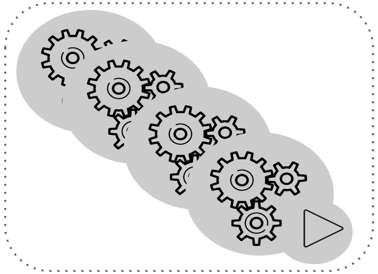
One or More Containers
Shared IP
Shared Storage Volume
Shared Resources
Shared Lifecycle

Replication Controller



Ensures that a specified number of pod replicas are running at any one time

Service



Grouping of pods, act as one, has stable virtual IP and DNS name

Label

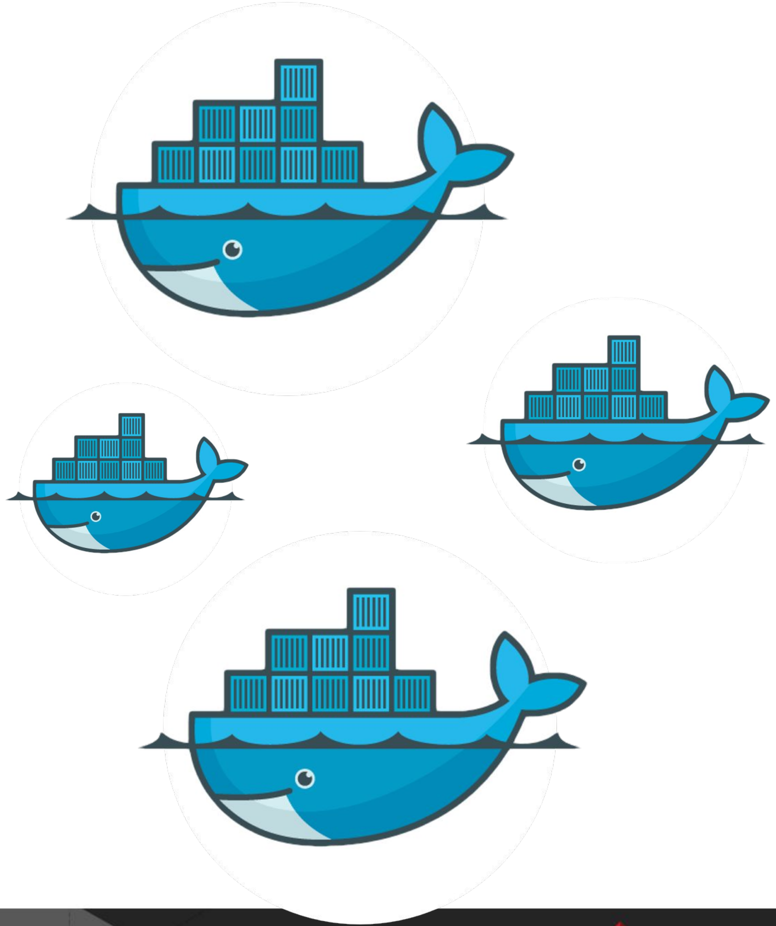
Key/Value pairs associated with Kubernetes objects (e.g. env=production)

Pods

A group of whales is commonly referred to as a **pod** and a pod usually consists a group of whales that have bonded together either because of biological reasons (i.e. a mother baring offspring and raising her child) or through friendships developed between two or more whales.

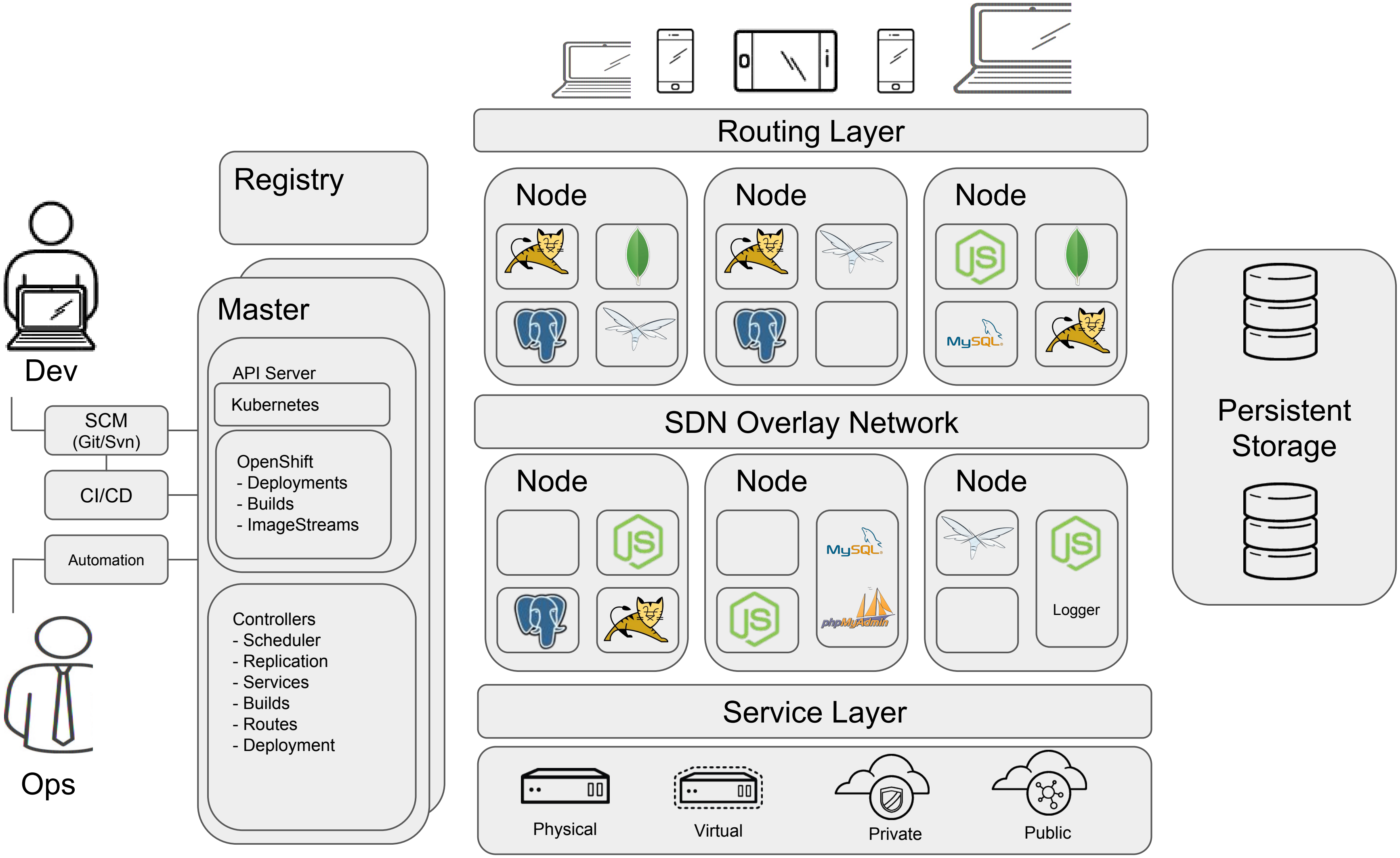
In many cases a typical whale pod consists of anywhere from 2 to 30 whales or more.

http://www.whalefacts.org/what-is-a-group-of-whales-called/



Key Kubernetes Capabilities

- Self-healing
- Horizontal Manual & Auto Scaling
- Automatic Restarting
- Scheduled across hosts
- Built-in load-balancer
- Rolling upgrades



Registry

Dev

SCM
(Git/Svn)

CI/CD

Automation

Ops

Master

API Server

Kubernetes

OpenShift
- Deployments
- Builds
- ImageStreams

Controllers
- Scheduler
- Replication
- Services
- Builds
- Routes
- Deployment

Routing Layer

Node

Node

Node

SDN Overlay Network

Node

Node

Node

Logger

Service Layer

Physical

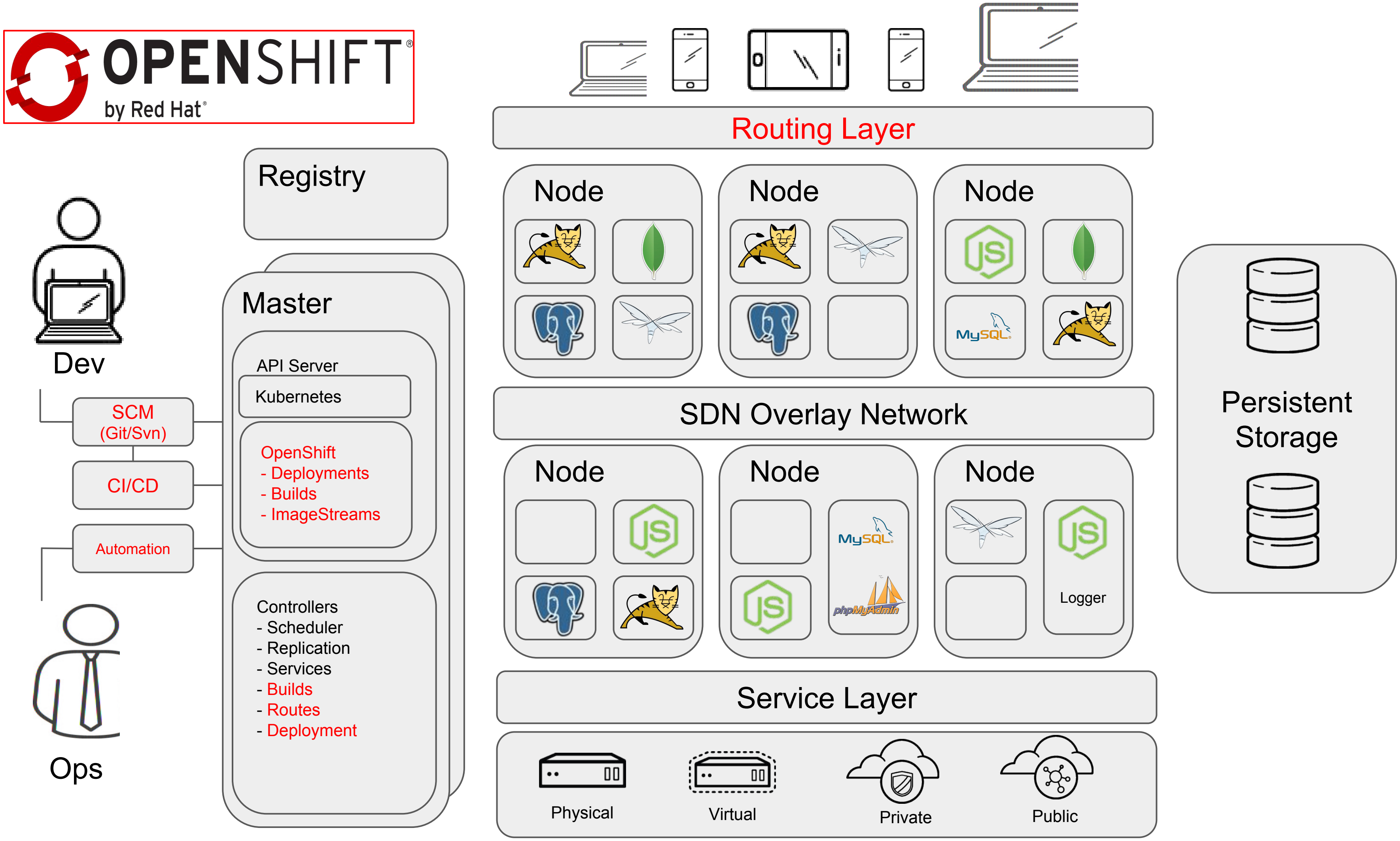
Virtual

Private

Public

Persistent Storage

OPENSHIFT® by Red Hat®



Routing Layer

Registry

Master

API Server

Kubernetes

OpenShift
- Deployments
- Builds
- ImageStreams

Controllers
- Scheduler
- Replication
- Services
- Builds
- Routes
- Deployment

Dev

SCM
(Git/Svn)

CI/CD

Automation

Ops

Node

Node

Node

SDN Overlay Network

Node

Node

Node

Logger

Service Layer

Physical

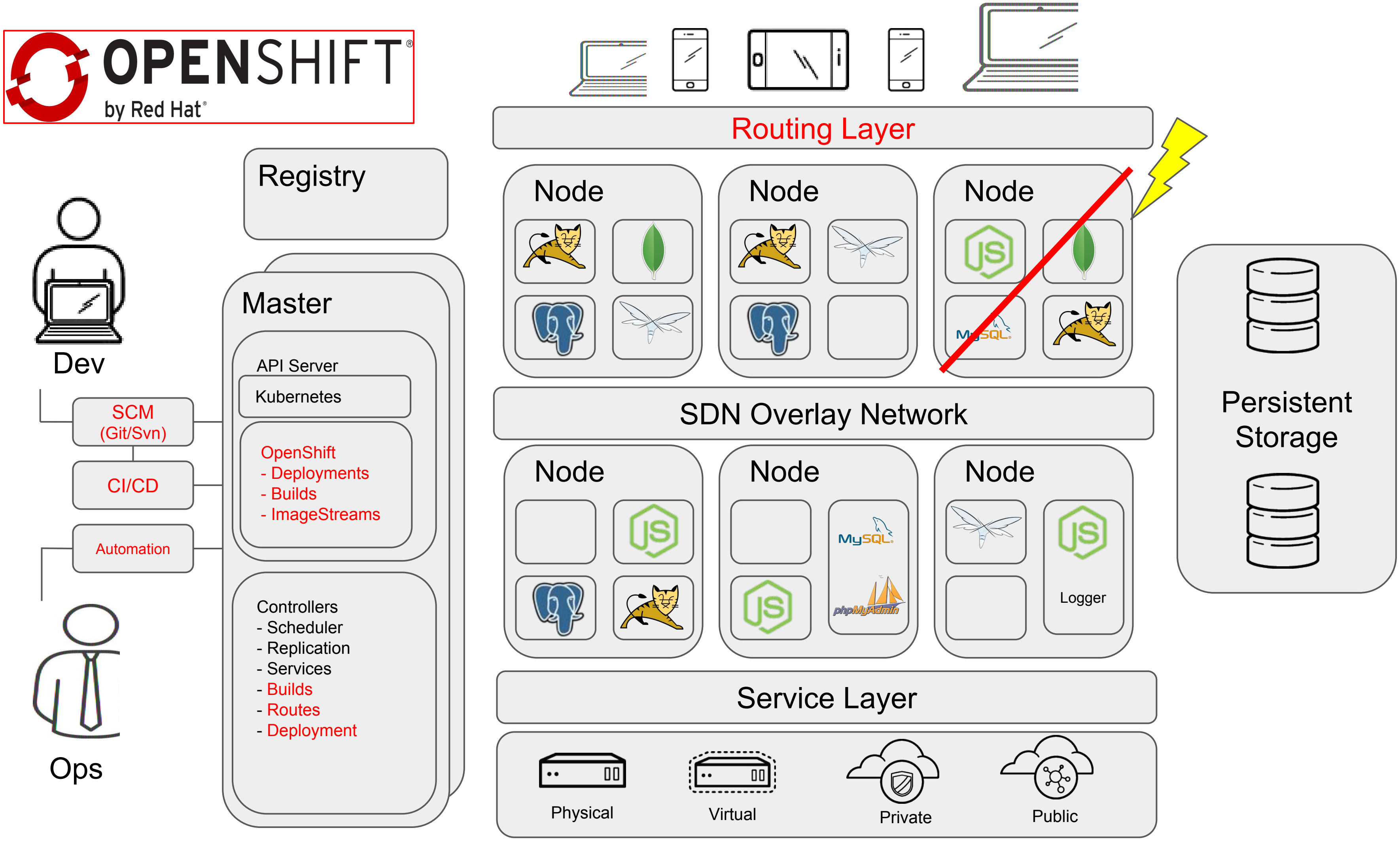
Virtual

Private

Public

Persistent Storage

OPENSHIFT by Red Hat



Routing Layer

Registry

Dev

Master

API Server

Kubernetes

OpenShift
- Deployments
- Builds
- ImageStreams

Controllers
- Scheduler
- Replication
- Services
- Builds
- Routes
- Deployment

SCM (Git/Svn)

CI/CD

Automation

Ops

Node

Node

Node

SDN Overlay Network

Node

Node

Node

Logger

Service Layer

Physical

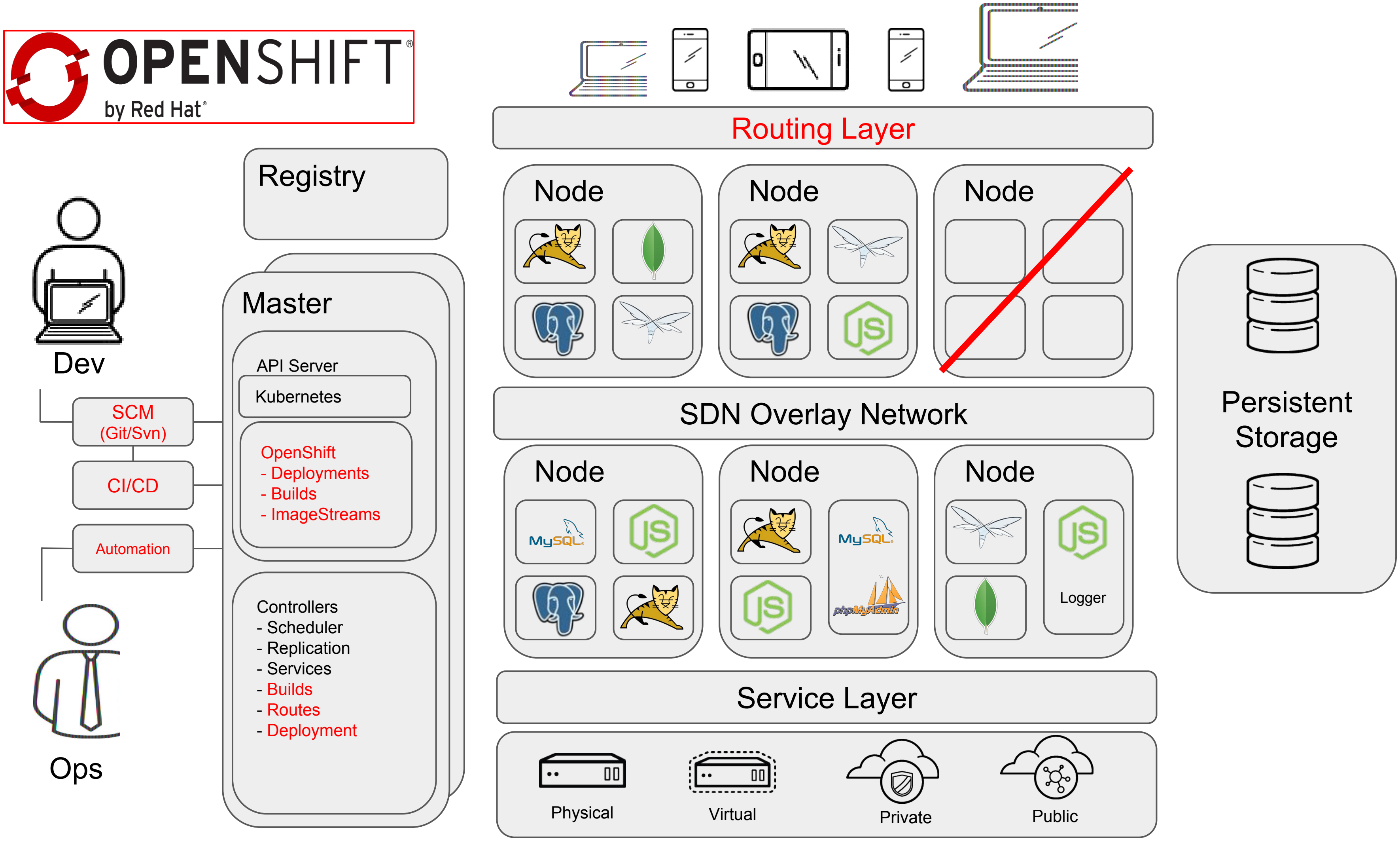
Virtual

Private

Public

Persistent Storage

OPENSHIFT
by Red Hat



Registry

Dev

SCM
(Git/Svn)

CI/CD

Automation

Ops

Master

API Server

Kubernetes

OpenShift
- Deployments
- Builds
- ImageStreams

Controllers
- Scheduler
- Replication
- Services
- Builds
- Routes
- Deployment

Routing Layer

Node

Node

Node

SDN Overlay Network

Node

Node

Node

Logger

Service Layer

Physical

Virtual

Private

Public

Persistent Storage

Kubernetes Commands

```
kubectl get nodes
kubectl get pods
kubectl run mynode --image=burr/mynode:v1 --port=8000
kubectl logs mynode-kk605
kubectl expose rc mynode --type="LoadBalancer"
kubectl scale rc mynode --replicas=3
kubectl rolling-update mynode --image=mynode --update-period=2s
```

K8S or Kube Demo

https://github.com/redhat-developer-demos/kube4docker
https://docs.google.com/document/d/1AMRL2OWmxC2j8vja3xe2VTUvcRtK6UQ01QGOE3t34O8/edit?usp=sharing

Recorded Demo
https://youtu.be/AoDhQt8PtUQ

More Information

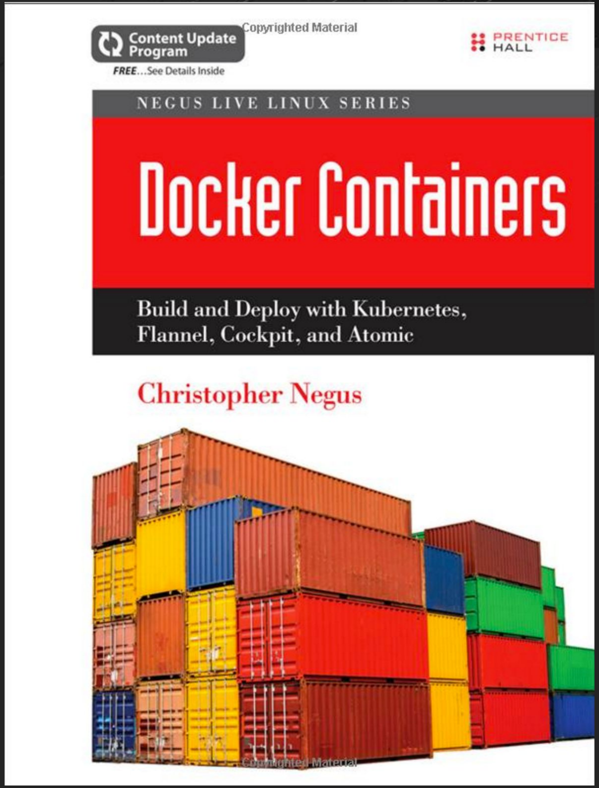
http://bit.ly/kube4docker

https://github.com/burrsutter/kube4docker

http://kubernetes.io/docs/user-guide/

http://developers.redhat.com/products/cdk/overview/

http://kubernetes.io/docs/user-guide/docker-cli-to-kubectl/


Content Update Program
FREE...See Details Inside
Copyrighted Material
PRENTICE HALL
NEGUS LIVE LINUX SERIES
Docker Containers
Build and Deploy with Kubernetes, Flannel, Cockpit, and Atomic
Christopher Negus
Copyrighted Material