

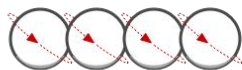
Microservices deployment with Docker, Ansible and Kubernetes

Burr Sutter & Jason DeTiberus
<http://developers.redhat.com>

Our IT World Morphs

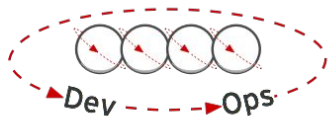
Development Process

Waterfall



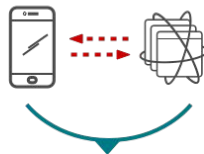
Agile

DevOps



Application Architecture

Monolithic



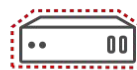
N-Tier

Microservices



Deployment & Packaging

Physical Servers



Virtual Servers

Containers



Application Infrastructure

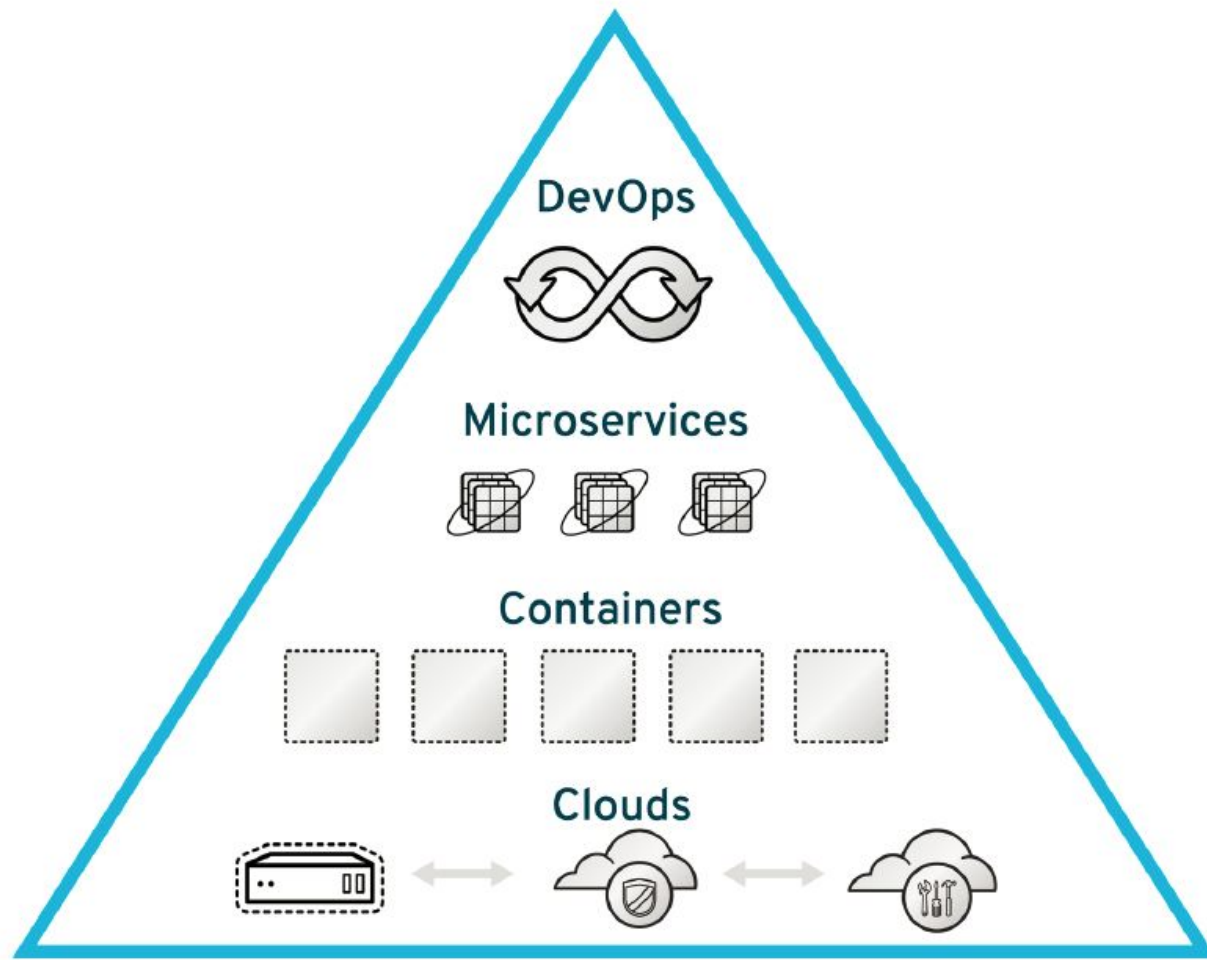
Datacenter



Hosted

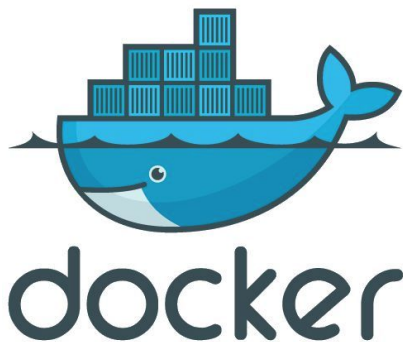
Cloud





Introduction

Docker: Linux container image
your “OS wrapper” for your app
Red Hat is the largest contributor outside of Docker Inc.



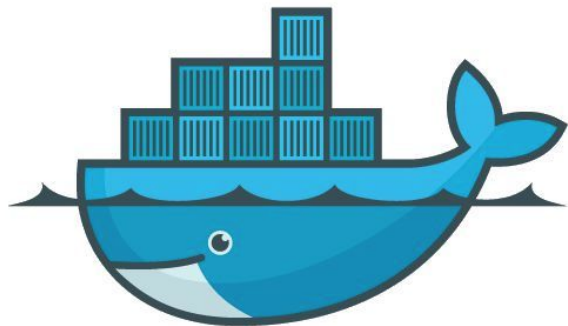
Kubernetes: open-sourced by Google
running/managing your Docker containers at scale
Red Hat is the largest contributor outside of Google



Ansible: Configuration management, App Deployment,
Agentless automation engine
acquired by Red Hat

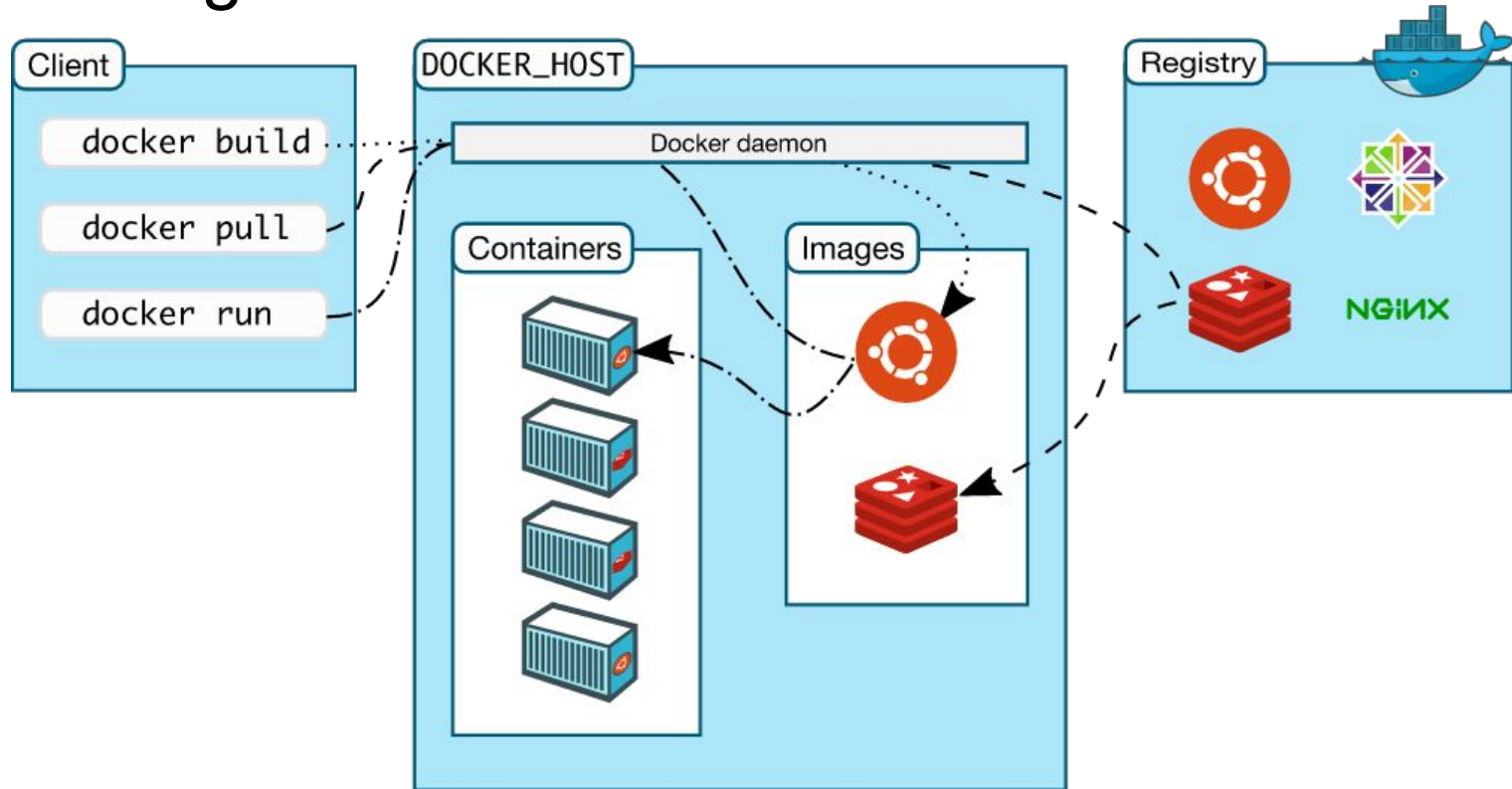


ANSIBLE



docker

Docker High-Level architecture



Demo

(docker, blue-green)



kubernetes

Kubernetes Concepts

- **Container:** a docker container
- **Pods:** contains one or more containers
 - Shared IP
 - Shared Storage Volume
 - Shared Resource Allocation (CPU, Memory)
- **Labels:** key/value pairs associated with Objects
- **Service:** a logical grouping of pods
- **Secrets:** Arbitrary sensitive data injected into a pod

Key Kubernetes Capabilities

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



Dev

SCM
(Git/Svn)

CI/CD

Automation



Ops

Registry

Master

API Server

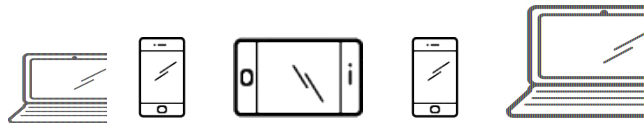
Kubernetes

OpenShift

- Deployments
- Builds
- ImageStreams

Controllers

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



Routing Layer

Node



Node



Node



SDN Overlay Network

Node



Node



Node



Logger



Persistent
Storage



Service Layer



Physical



Virtual



Private



Public



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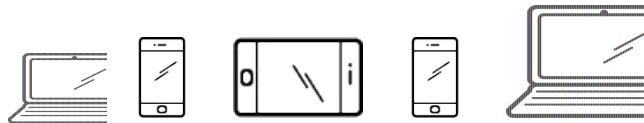
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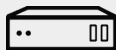


Node



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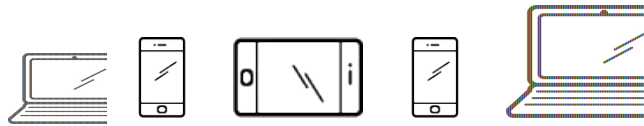
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SDN Overlay Network

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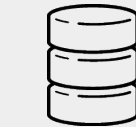
Node



Node



Logger



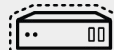
Persistent
Storage



Service Layer



Physical



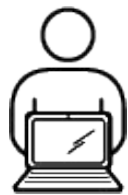
Virtual



Private



Public



Dev

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(Git/Svn)

CI/CD

Automation



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Registry

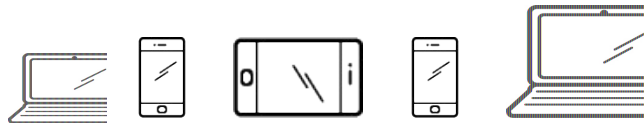
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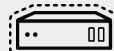
Node



Service Layer



Physical



Virtual



Private



Public



Persistent
Storage



Demo

(sketch pod)

Submit a Sketch:

<http://bit.ly/devnexus16>

Demo

(core kubernetes)



ANSIBLE

Ansible

- Orchestration
- Configuration Management
- Agent-less, push-based
- Makes the easy things easy
- Makes the hard things possible
 - highly pluggable architecture

Ansible Orchestration

- Provision cloud infrastructure
- Automate complex tasks
- Serial or Parallel processing

Ansible Configuration Management

- Declarative
- Idempotent
- In order processing (except for handlers)

Ansible Core Concepts

- **Module:** base unit of execution
- **Inventory:** host data, can be static or dynamic.
- **Play:** yaml description of group of hosts to operate on, and a collection of operations to perform on the hosts
- **Playbook:** yaml file containing one or more plays
- **Role:** a re-usable collection of tasks

Demo

(ansible)