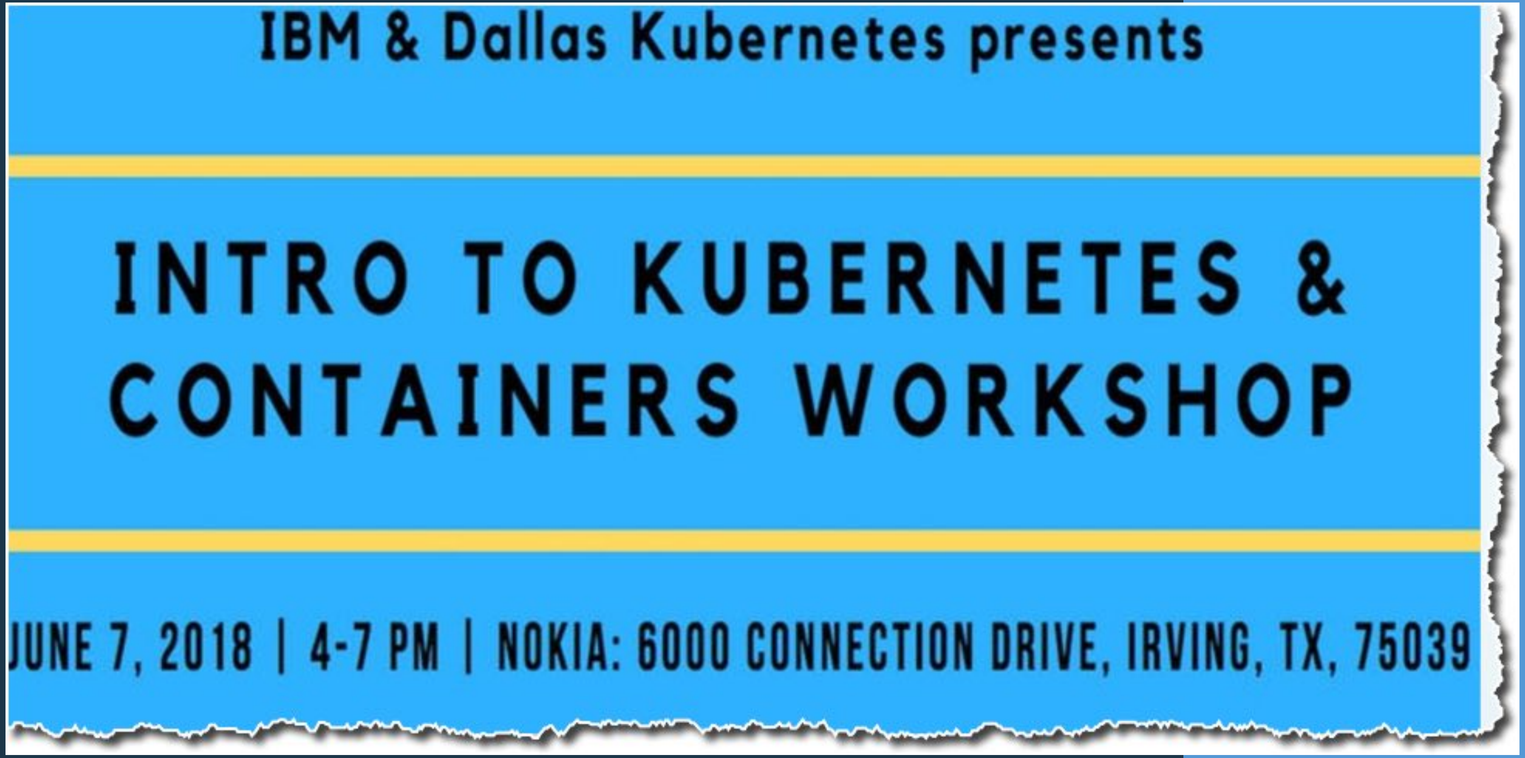
Intro to Kubernetes Workshop



IBM & Dallas Kubernetes presents

INTRO TO KUBERNETES & CONTAINERS WORKSHOP

JUNE 7, 2018 | 4-7 PM | NOKIA: 6000 CONNECTION DRIVE, IRVING, TX, 75039

Richard Irving

Agenda

- What is Docker?
- What is Kubernetes?
- Deploy some containers
- Ask some questions

The Objective

Get enough information and insight to begin experimenting with your own containerized workloads...

Getting Started...

1. *Cluster URL*

2. *Username & password*

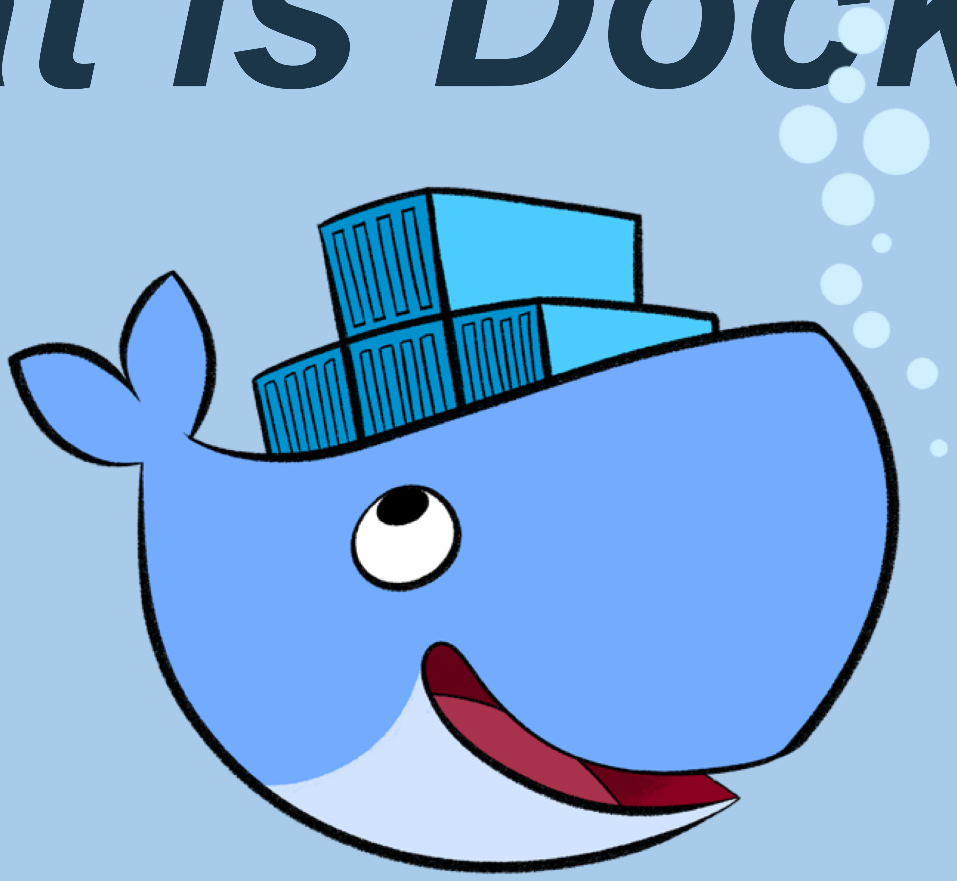
3. *Download and configure the kubectl client*

4. *Create an account at https://hub.docker.com*

Where are the labs?

https://github.com/irvnet/dallas-icp-workshop-june2018

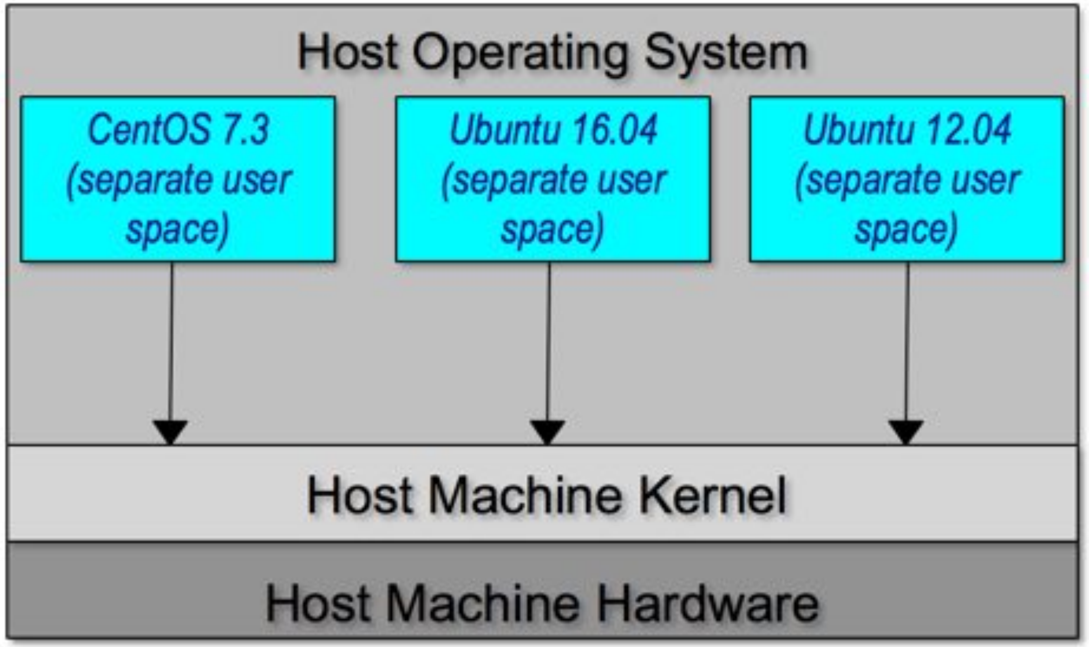
What is Docker?



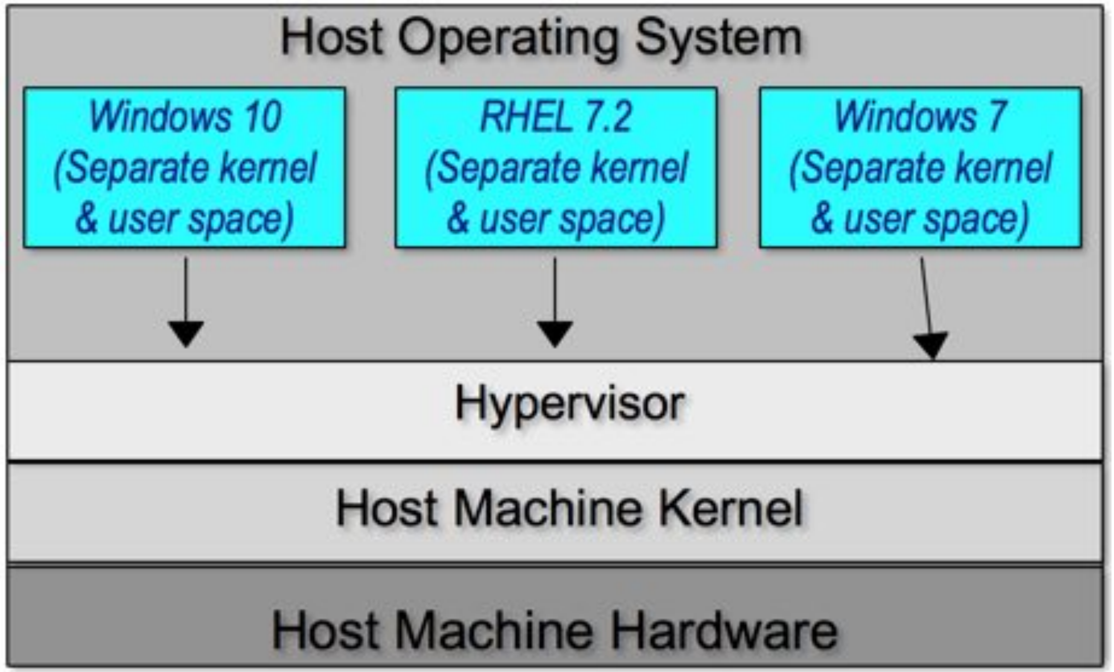
Containers VS Virtual machines

VS

Containers VS Virtual machines

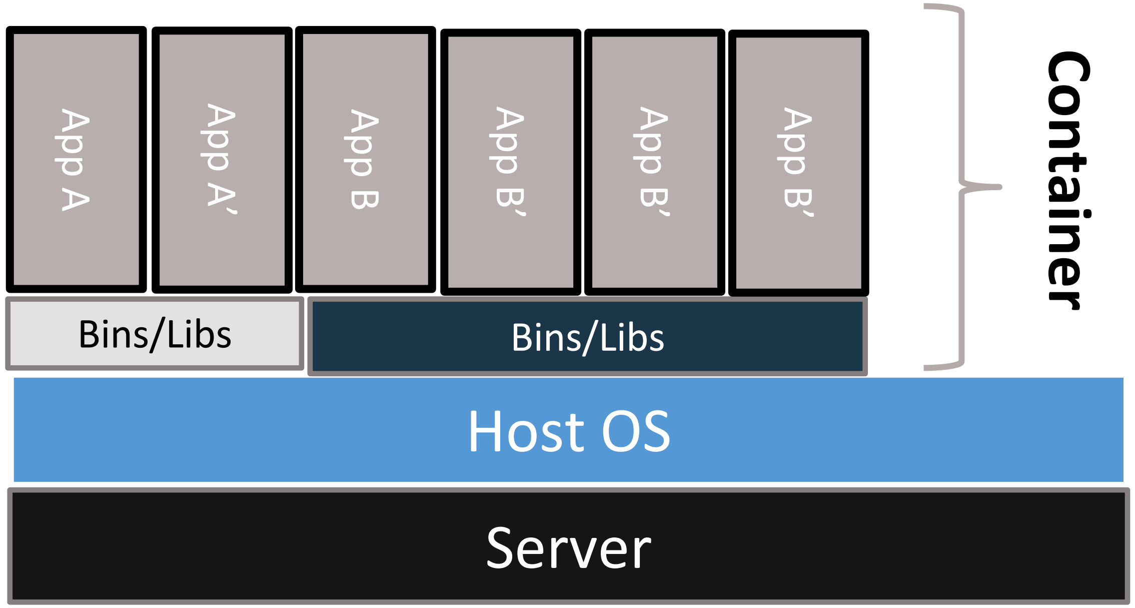

Host Operating System
CentOS 7.3 (separate user space)
Ubuntu 16.04 (separate user space)
Ubuntu 12.04 (separate user space)
Host Machine Kernel
Host Machine Hardware

VS


Host Operating System
Windows 10 (Separate kernel & user space)
RHEL 7.2 (Separate kernel & user space)
Windows 7 (Separate kernel & user space)
Hypervisor
Host Machine Kernel
Host Machine Hardware

What's a container anyway?

- Isolated userspace within a running linux OS
- Shared linux kernel across containers
- All packages and data in an isolated runtime saved as a filesystem
- Works on all the major linux platforms
- Looks like a vm from inside, like a normal process from outside
- Standardized packaging for applications and their dependencies that runs on any docker-enabled machine



Separation of Concerns

Debbie: The Developer

Handles what’s “**inside**” the container

- Her code
- Her Libraries
- Her Package Manager
- Her Apps
- Her Data

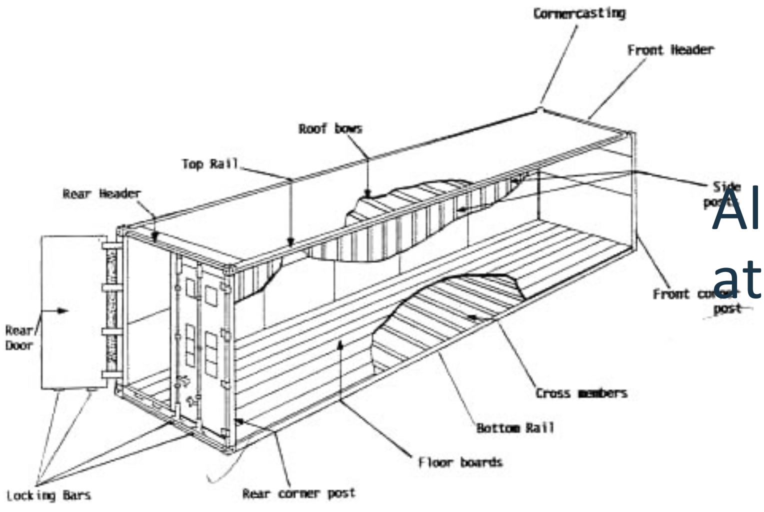
Linux servers all look the same

Oswaldo: The Ops Guy

Handles what’s “**outside**” the container

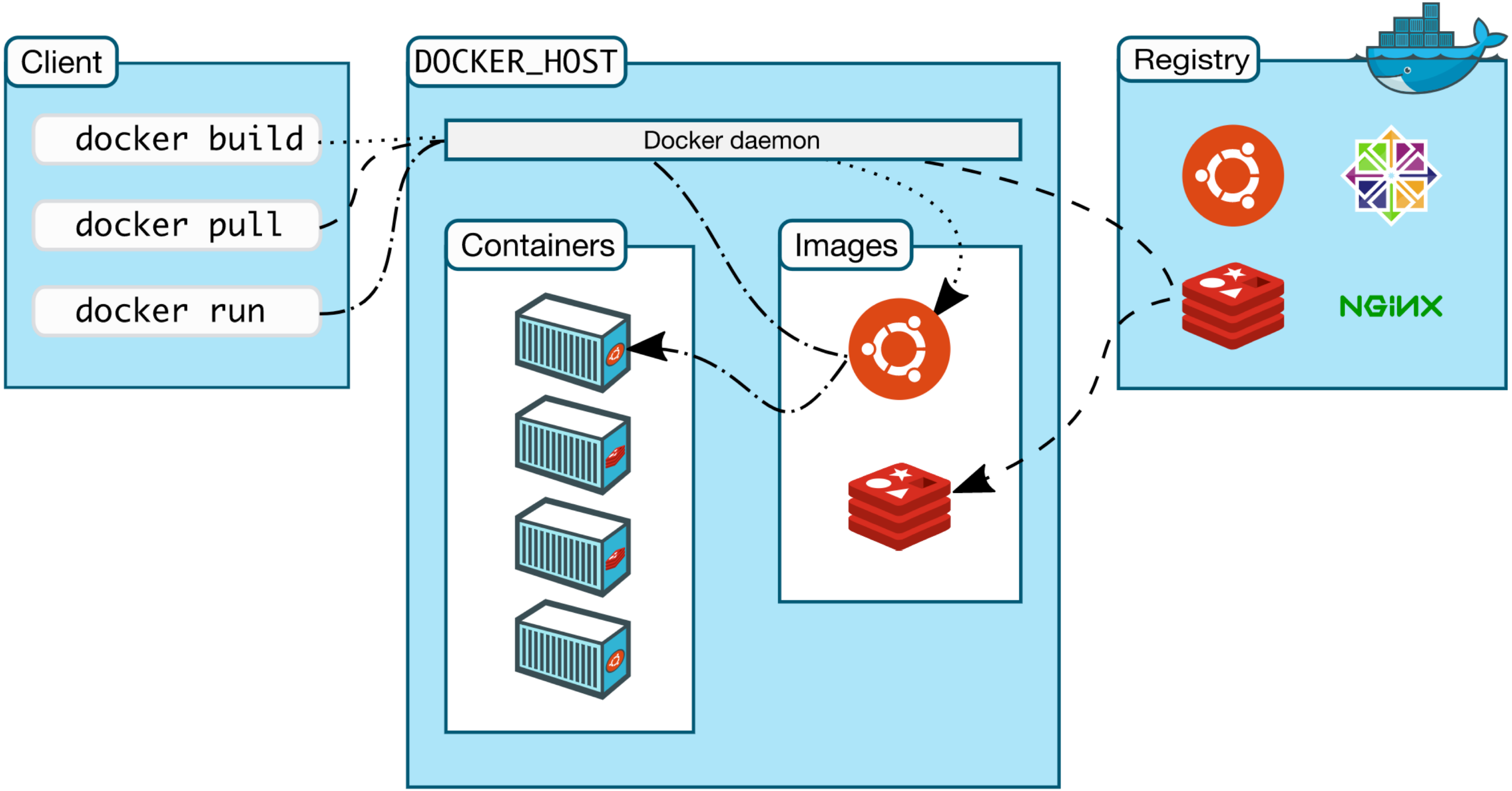
- Logging
- Remote access
- Monitoring
- Network configuration

All containers start, stop, copy, attach, migrate, etc. the same way

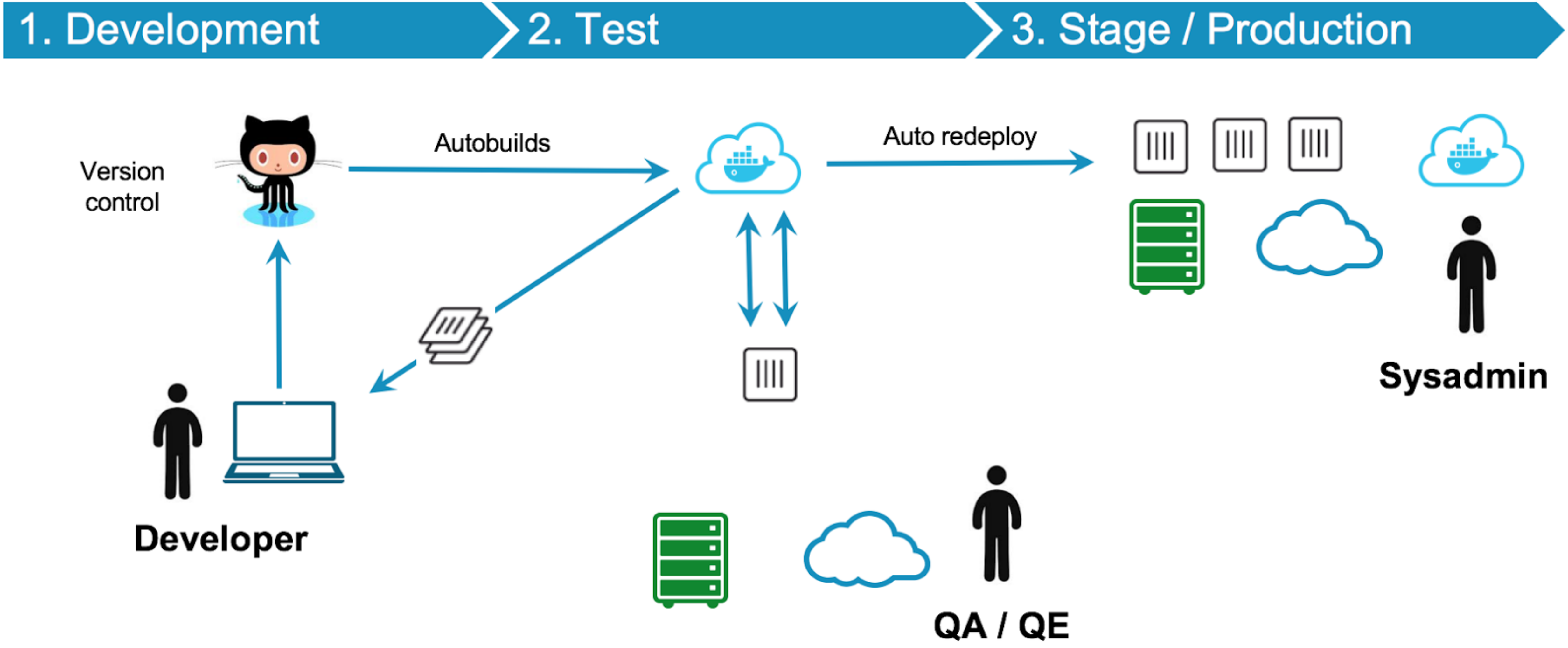


Major components of the container:

Docker Architecture



Docker Workflow



What is Kubernetes?

What is Kubernetes?

- Project started by Google
- platform for hosting containers in a clustered environment with multiple Docker hosts
- Provides container grouping, load balancing, auto-healing, scaling features
- Contributors == Google, CodeOS, Redhat, Mesosphere, Microsoft, HP, IBM, VMWare, Pivotal, SaltStack, etc

What is Container Orchestration?

Container orchestration

- Manages the deployment, placement, and lifecycle of workload containers

Cluster management

- Federates multiple hosts into one target

Scheduling

- Distributes containers across node

Service discovery

- Knows where the containers are located
- Distributes client requests across the containers

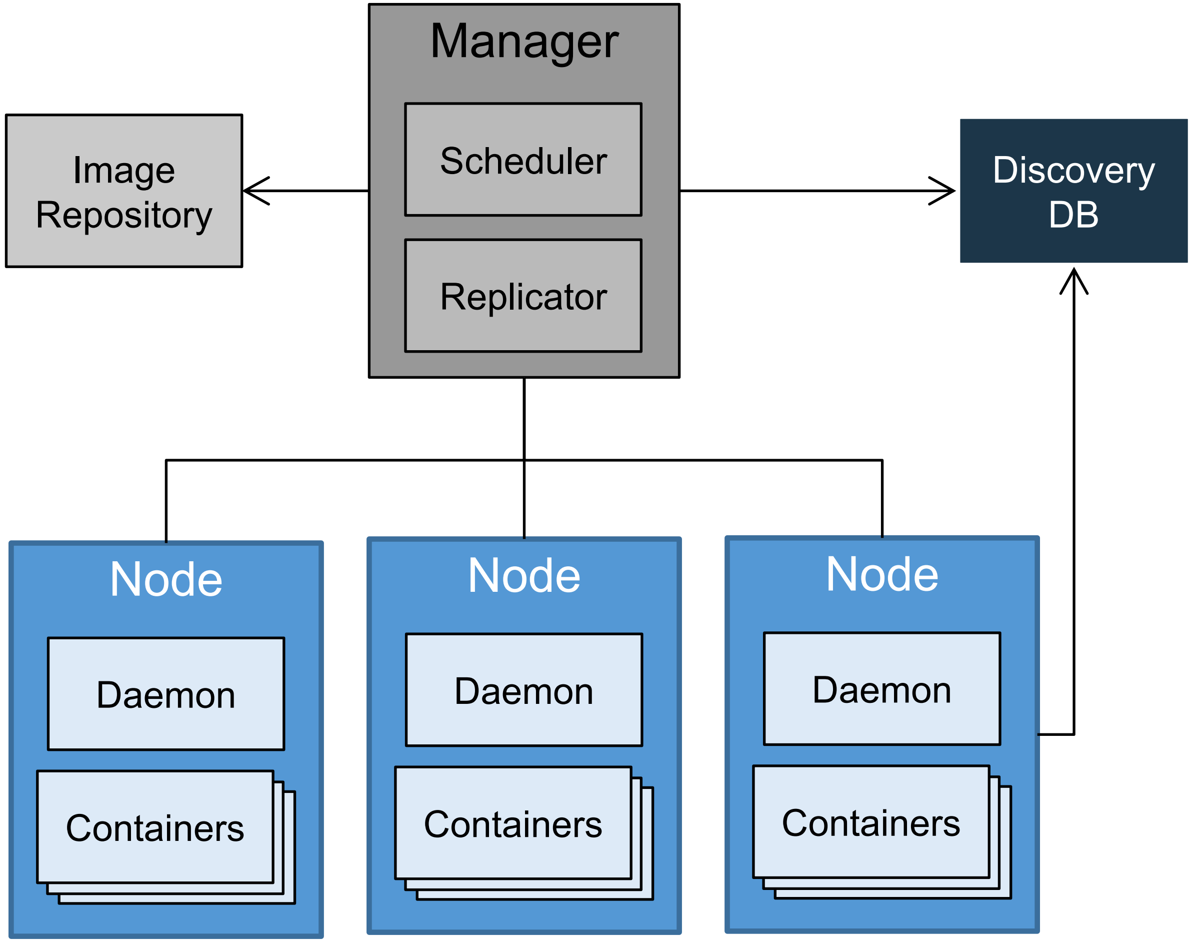
Replication

- Ensures the right number of nodes and containers

Health management

- Replaces unhealthy containers and nodes

Container Orchestrator



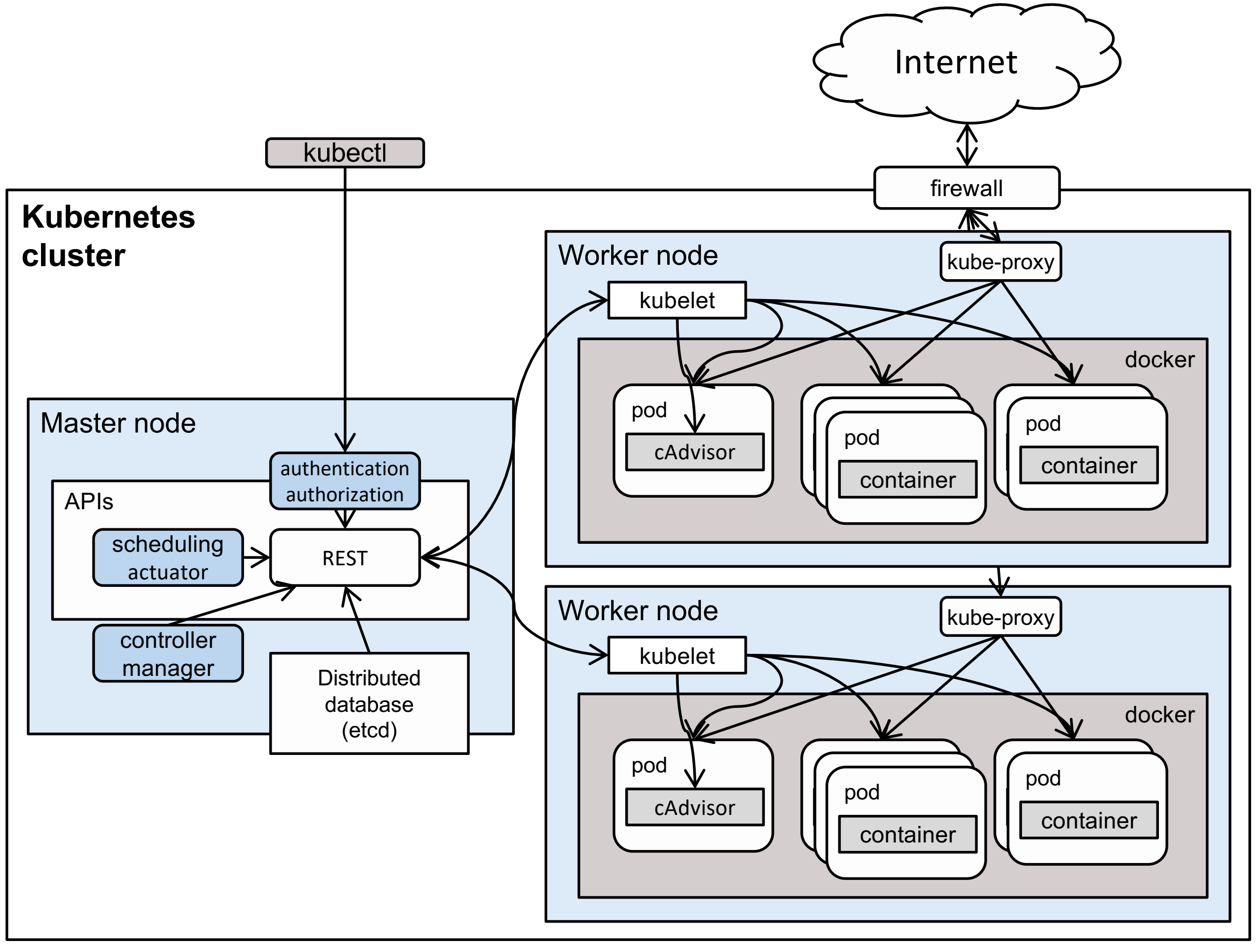
Kubernetes Cluster Architecture

Master node

- Node that manages the cluster
- Scheduling, replication & control
- Multiple nodes for HA

Worker nodes

- Node where pods are run
- Docker engine
- kubelet agent accepts & executes commands from the master to manage pods
- cAdvisor – Container Advisor provides resource usage and performance statistics
- kube-proxy – routes inbound or ingress traffic

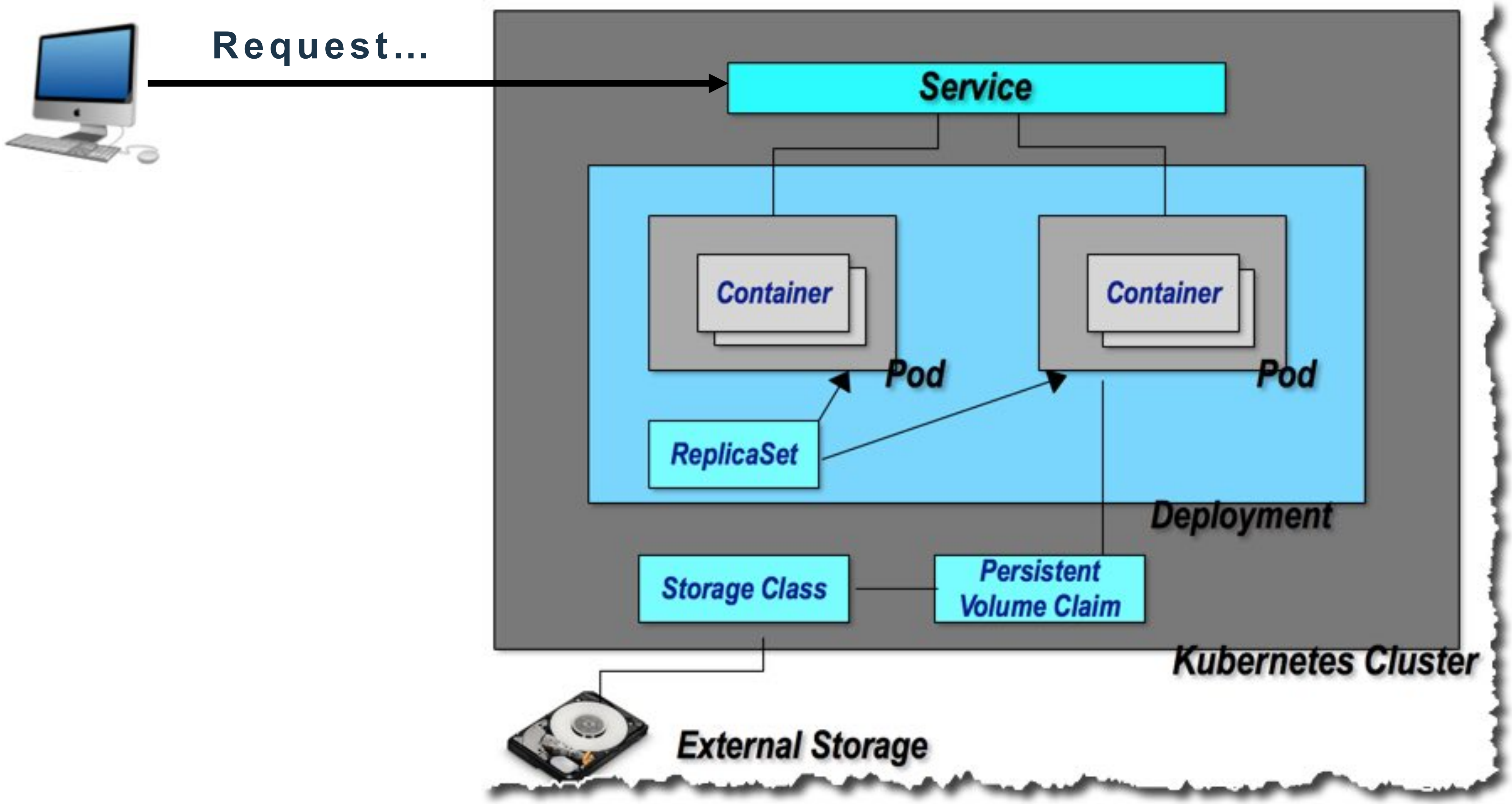


Kubernetes Objects…

- ***Pod*** *- represents a unit of deployment: a single instance of an application in Kubernetes*
- ***Service*** *- abstraction which defines a logical set of Pods and a policy by which to access*
- ***Volume*** *- makes data persistent though pods are not…*
- ***Namespace*** *- A scope for names, and a mechanism to attach authorization and policy to a subsection of the cluster.*

- ***Deployment*** *- describe a desired state in a Deployment object, and the Deployment controller changes the actual state at a controlled rate*
- ***ReplicaSet*** *- ensures that a specified number of pod replicas are running at any given time.*
- ***StatefulSet*** *- maintains a sticky identity for each of their Pods. Pods are from the same spec, but each has a persistent identifier that maintains across any rescheduling.*
- ***Job*** *- A job is a supervisor for pods carrying out batch processes*

Kubernetes Objects…



Hey… psst!

Wanna see some docker stuff?

Time to go do labs…

https://github.com/irvnet/dallas-icp-workshop-june2018

Time to go do labs!...

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Thank you