

Docker Introduction

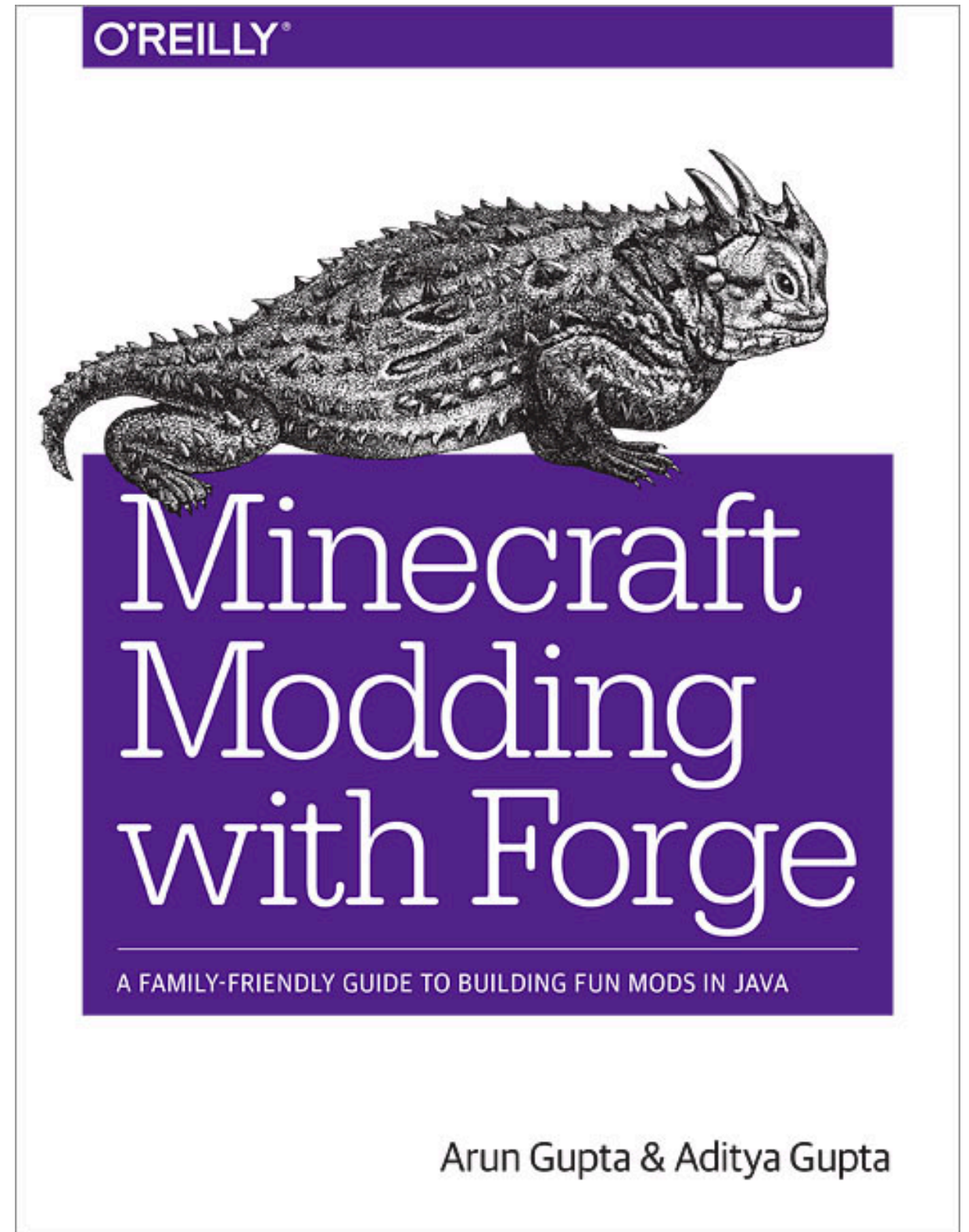


Arun Gupta

Vice President, Developer Advocacy

@arungupta, blog.arungupta.me

arun@couchbase.com



What is Docker?

- Open source project and company



- Used to create containers for software applications
- Package Once Deploy Anywhere (PODA)

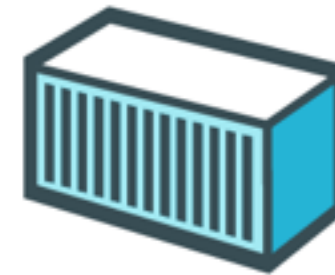
Advantages of Containers

- Immutability
- Reproducibility
- Isolation
- Faster deployments
- Portability - “it works on my machine”
- Snapshotting
- Security sandbox
- Limit resource usage
- Simplified dependency
- Sharing



Build

Develop an app using Docker containers with any language and any toolchain.



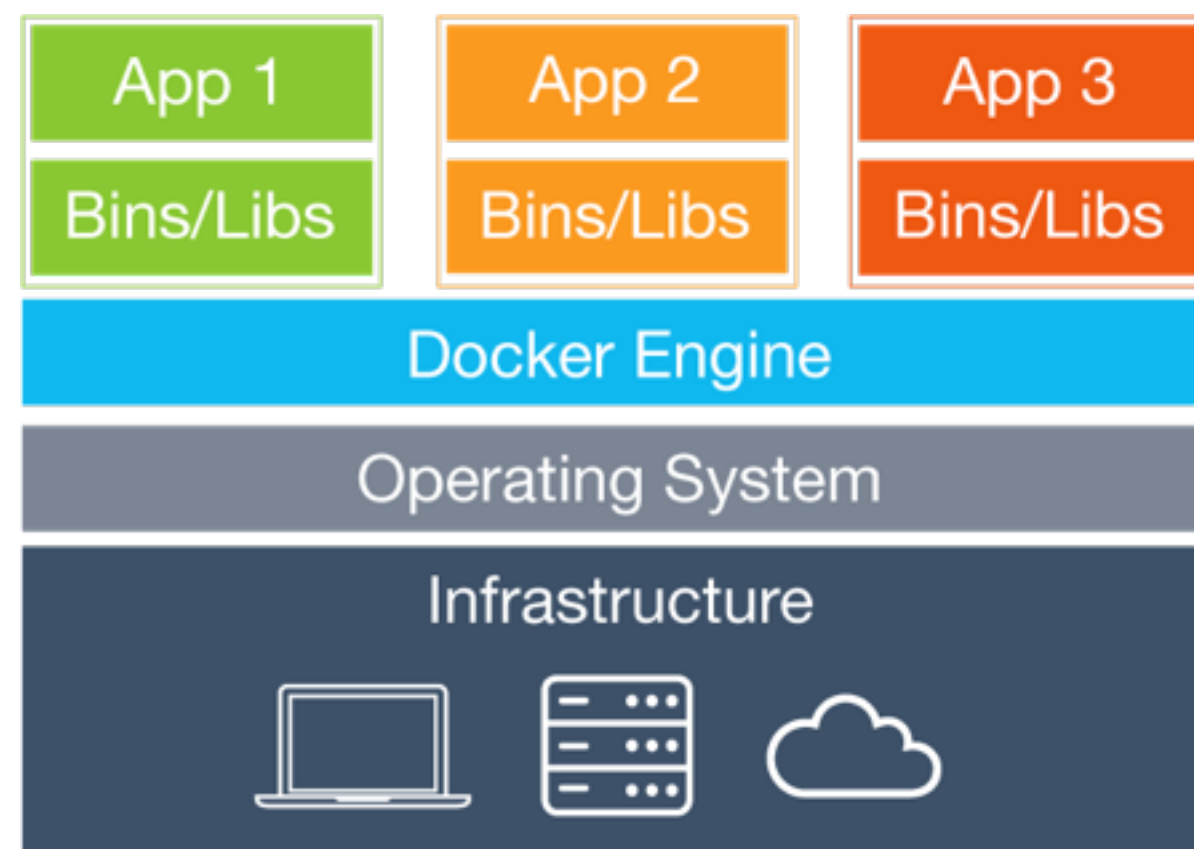
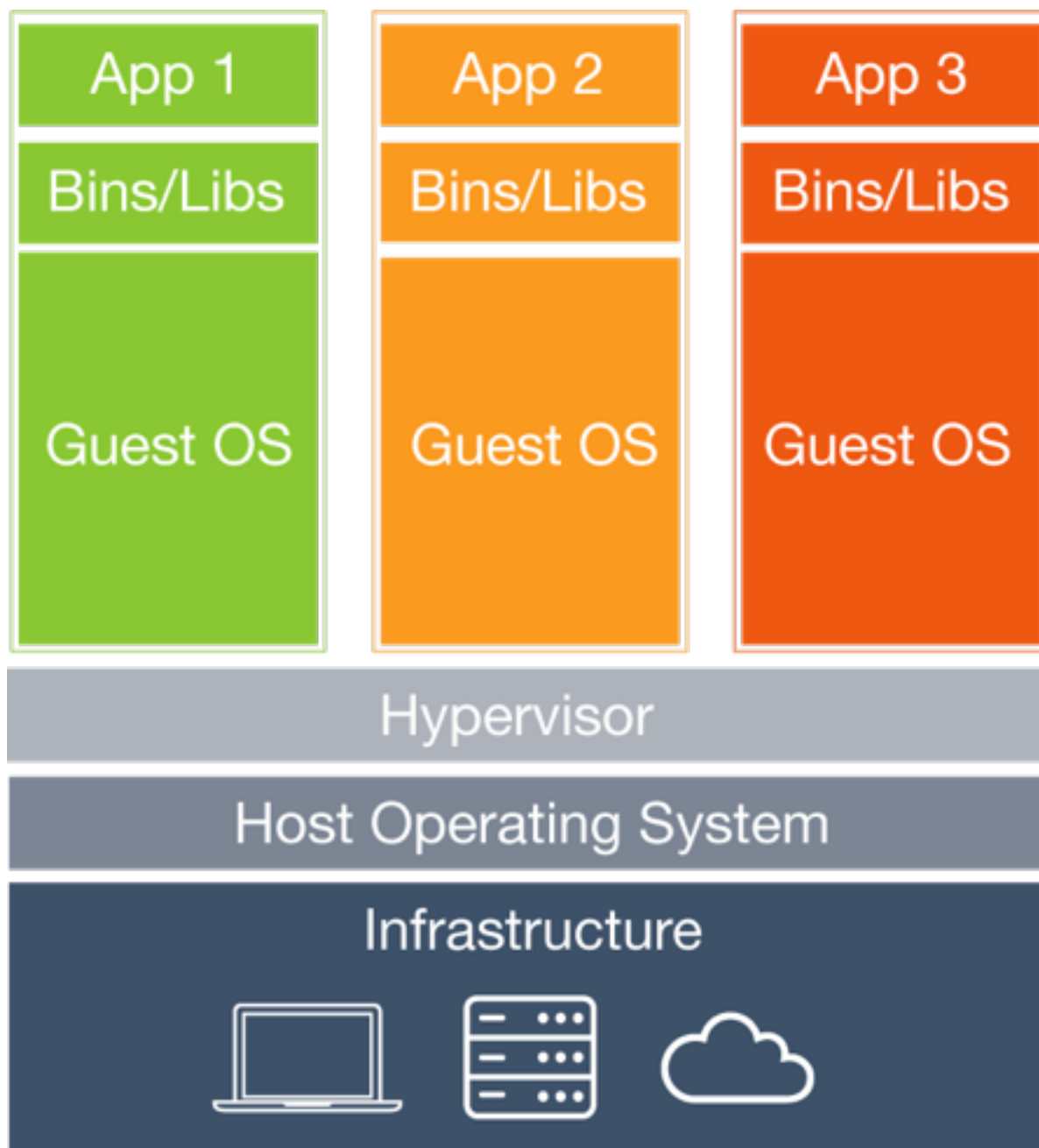
Ship

Ship the “Dockerized” app and dependencies anywhere - to QA, teammates, or the cloud - without breaking anything.



Run

Scale to 1000s of nodes, move between data centers and clouds, update with zero downtime and more.





Build

Develop an app using Docker containers with
any language and any toolchain.

- Image defined in text-based **Dockerfile**
- List of commands to build the image

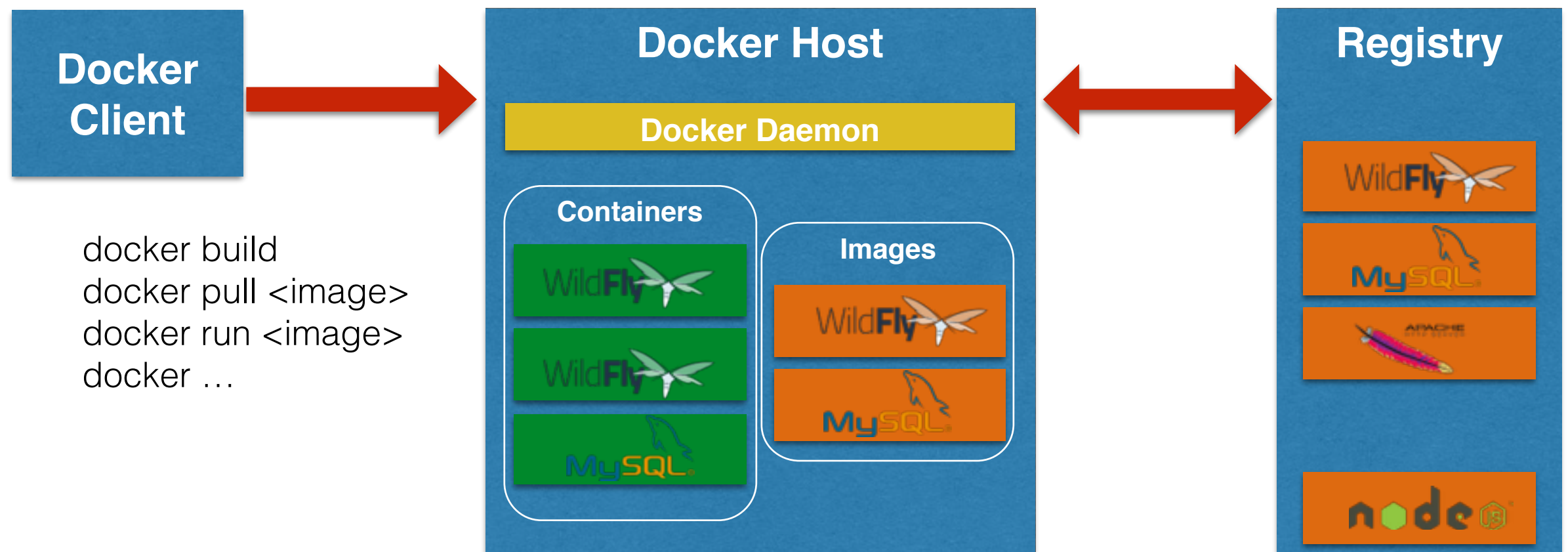
```
FROM fedora:latest
```

```
CMD echo "Hello world"
```

```
FROM jboss/wildfly
```

```
RUN curl -L https://github.com/javaee-samples/javaee7-hol/raw/master/solution/  
movieplex7-1.0-SNAPSHOT.war -o /opt/jboss/wildfly/standalone/deployments/  
movieplex7-1.0-SNAPSHOT.war
```

Docker Workflow



Image

Image

Image

Base Image

Bootfs/Kernel

jboss/wildfly

jboss/base-jdk:8

jboss/base

centos:7

Docker Machine



- Create Docker Host on computer or cloud provider

```
docker-machine create --driver=virtualbox  
myhost
```

- Configure Docker client to talk to host
- Create and pull images
- Start, stop, restart containers
- Upgrade Docker
- Not recommended for production yet

Docker Machine Providers

Microsoft Azure



SOFTLAYER®



Docker Compose

- Defining and running multi-container applications
- Configuration defined in a single file
- Great for dev, staging, and CI
- Not recommended for production yet

docker-compose.yml

mysqldb:

image: mysql

environment:

MYSQL_DATABASE: sample

MYSQL_USER: mysql

MYSQL_PASSWORD: mysql

MYSQL_ROOT_PASSWORD: supersecret

mywildfly:

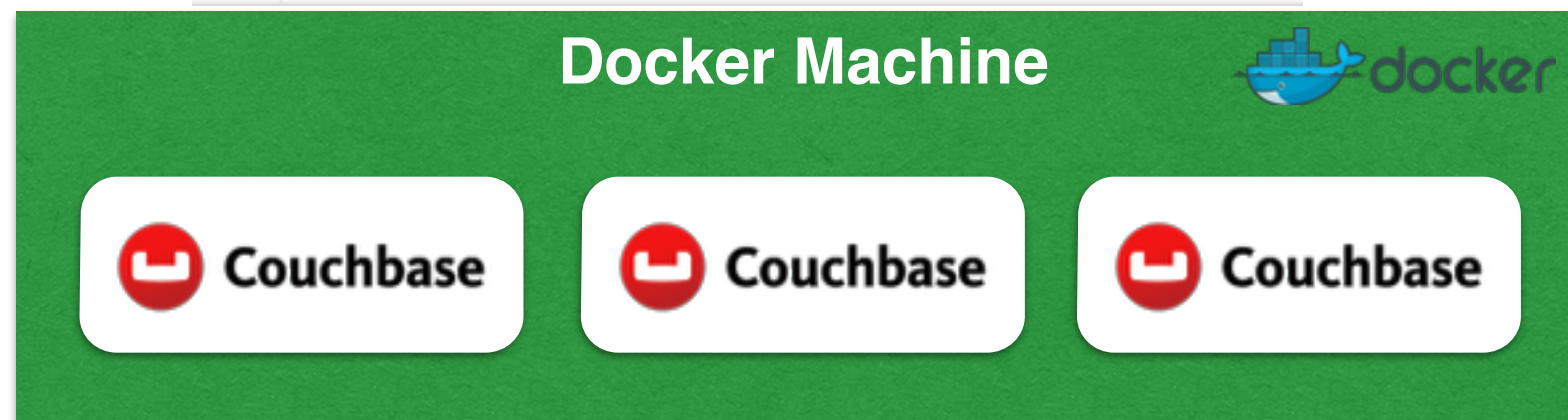
image: arungupta/wildfly-mysql-javaee7

links:

- mysql

Couchbase Cluster using Docker Compose

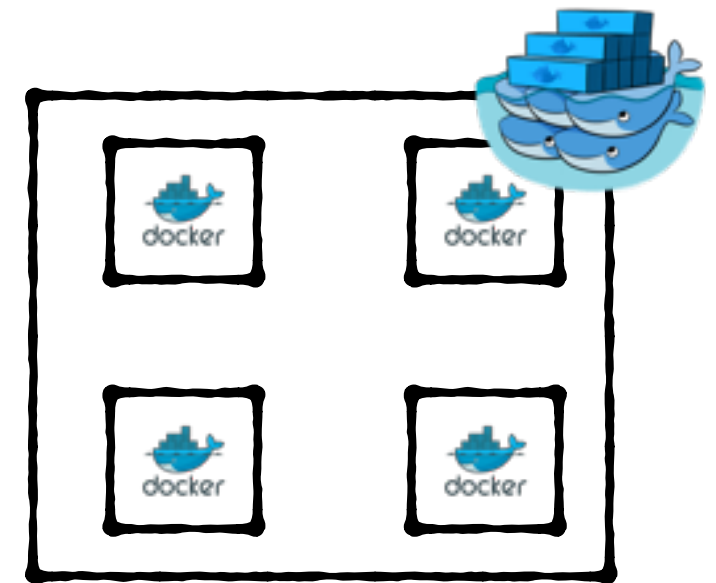
```
1 couchbase1:
2   image: couchbase/server
3   volumes:
4     - ~/couchbase/node1:/opt/couchbase/var
5 couchbase2:
6   image: couchbase/server
7   volumes:
8     - ~/couchbase/node2:/opt/couchbase/var
9 couchbase3:
10  image: couchbase/server
11  volumes:
12    - ~/couchbase/node3:/opt/couchbase/var
13  ports:
14    - 8091:8091
15    - 8092:8092
16    - 8093:8093
17    - 11210:11210
```



Docker Swarm



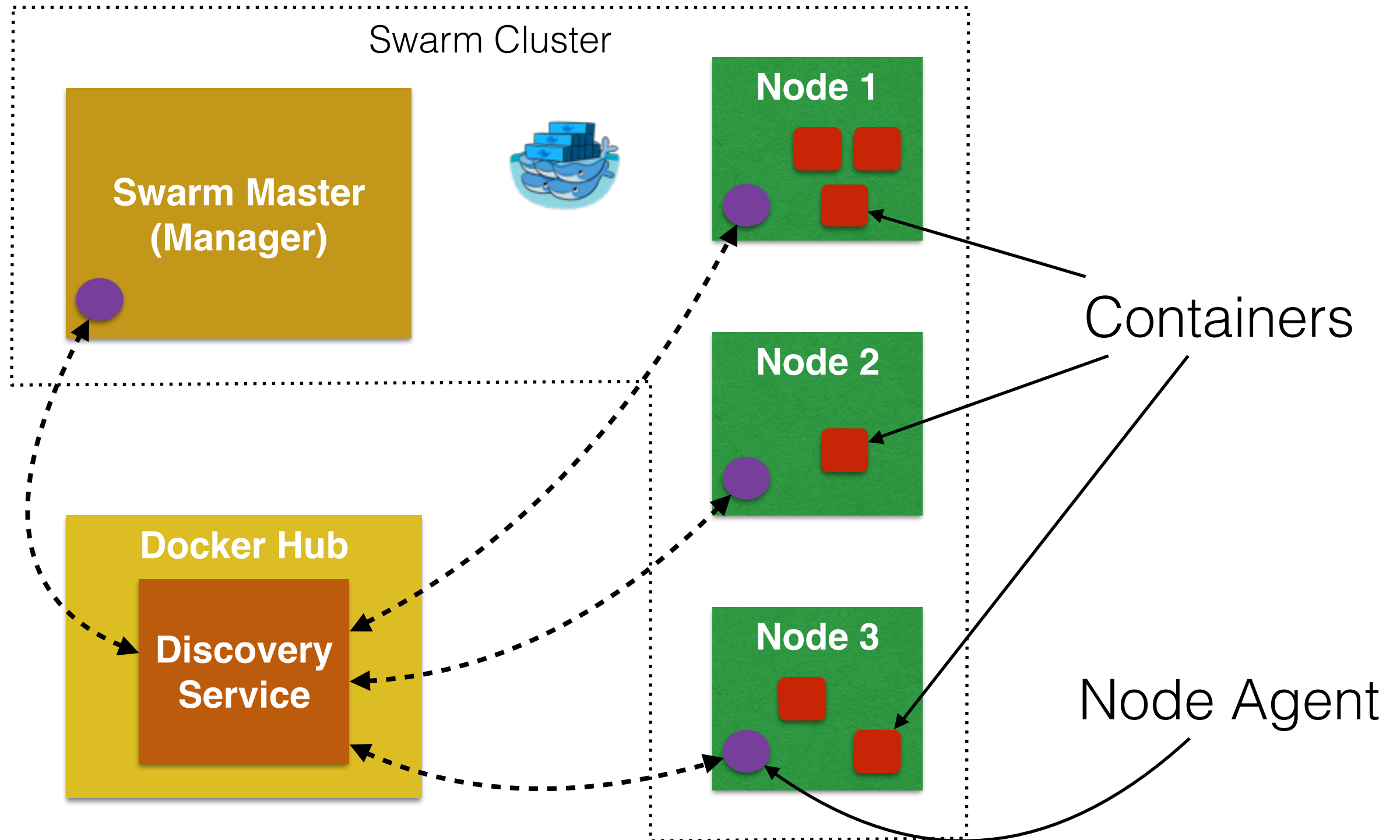
- Native clustering for Docker
- Provides a unified interface to a pool of Docker hosts
- Fully integrated with Machine
- Serves the standard Docker API
- Partially integrated with Compose
- 1.0.0 - Ready for production



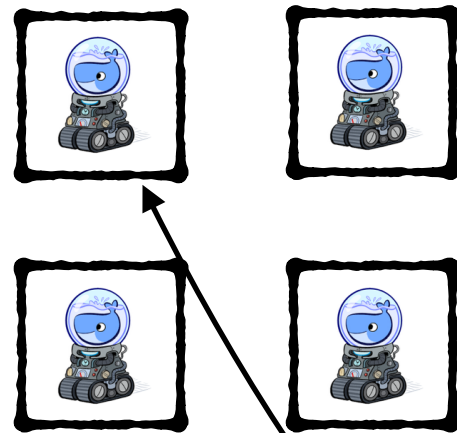
Docker Swarm

- Simple scheduling backends included, API for pluggable backends (e.g. Mesos) coming
 - Based on CPU (`-c`), RAM (`-m`), number of containers
 - `spread` (default): node with least number of running containers
 - `binpack`: node with most number of running containers
 - `random`: mostly for debugging
 - Specified using `--strategy`

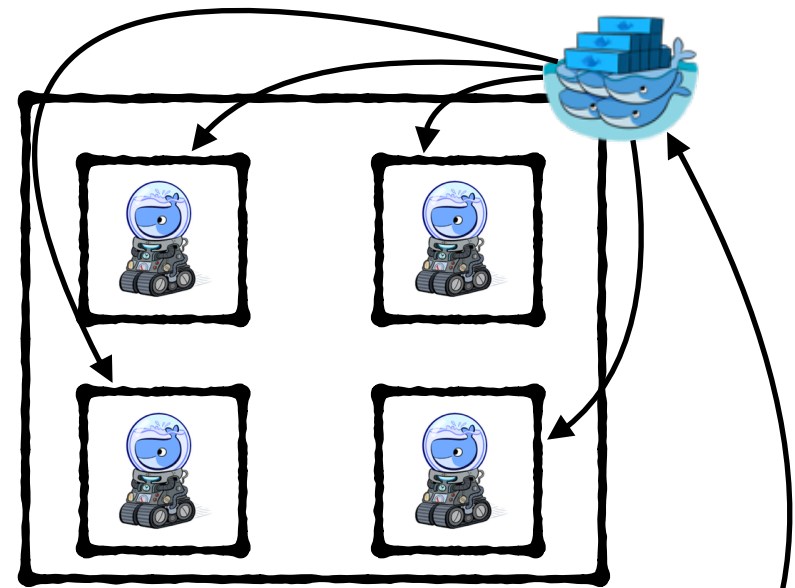
Docker Swarm



Machine

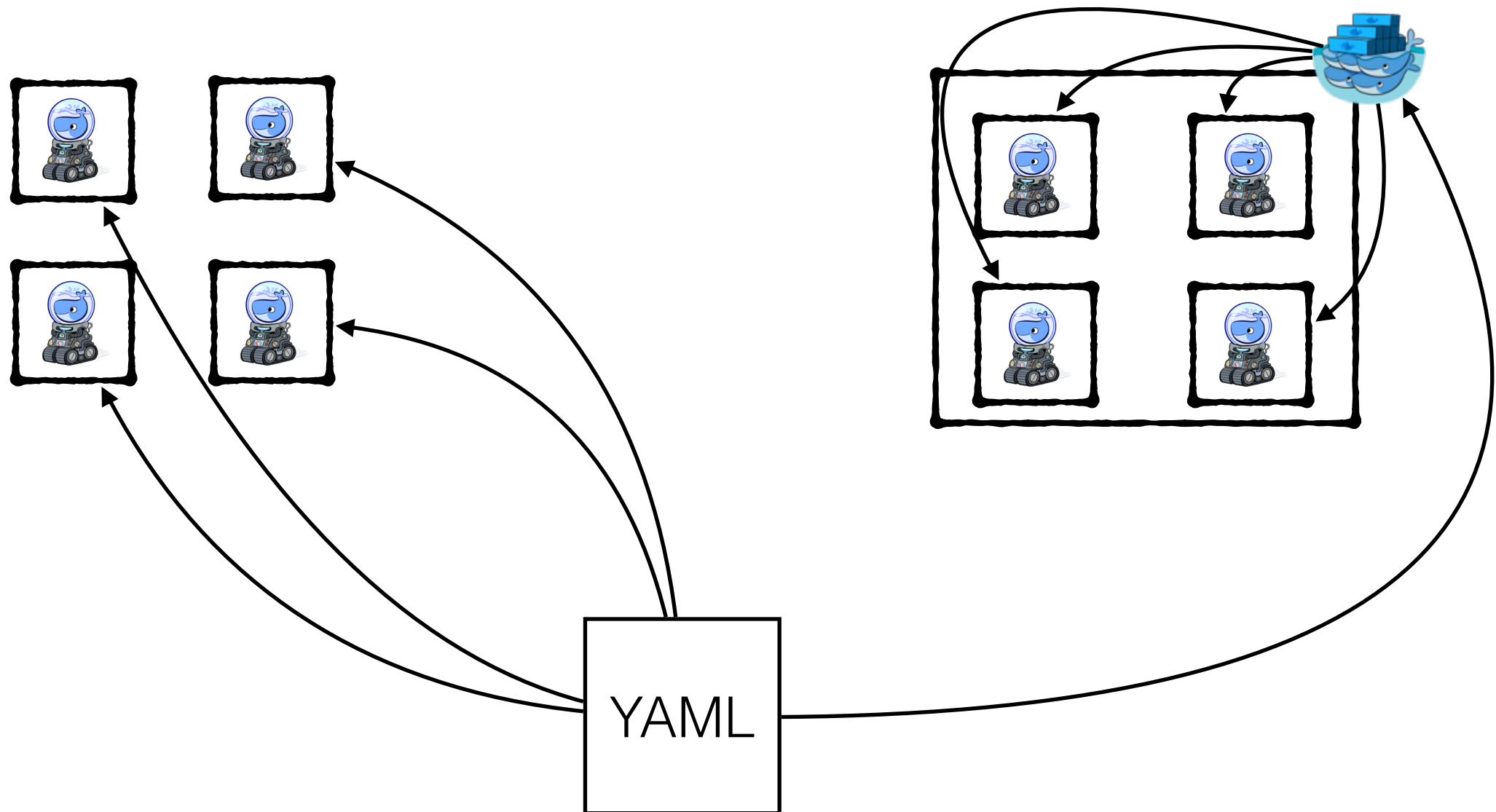


Swarm



YAML

Compose



Docker Toolbox

- Docker Client 1.9.0
- Docker Machine 0.5.0
- Docker Compose 1.5.0 (~~Mac only~~)
- Docker Kitematic 0.9.3
- Boot2Docker ISO 1.9.0
- Virtualbox 5.0.8



Persistent Storage

- New volume management system
- Multiple plugins
 - Flocker, Ceph, . . .

Virtual Networks

- Backed by multiple plugins
 - Calico, Cisco, Weave, . . .

Continuous Delivery using Docker and Jenkins Workflow

