Docker Workshop

by Borislav Borislavov

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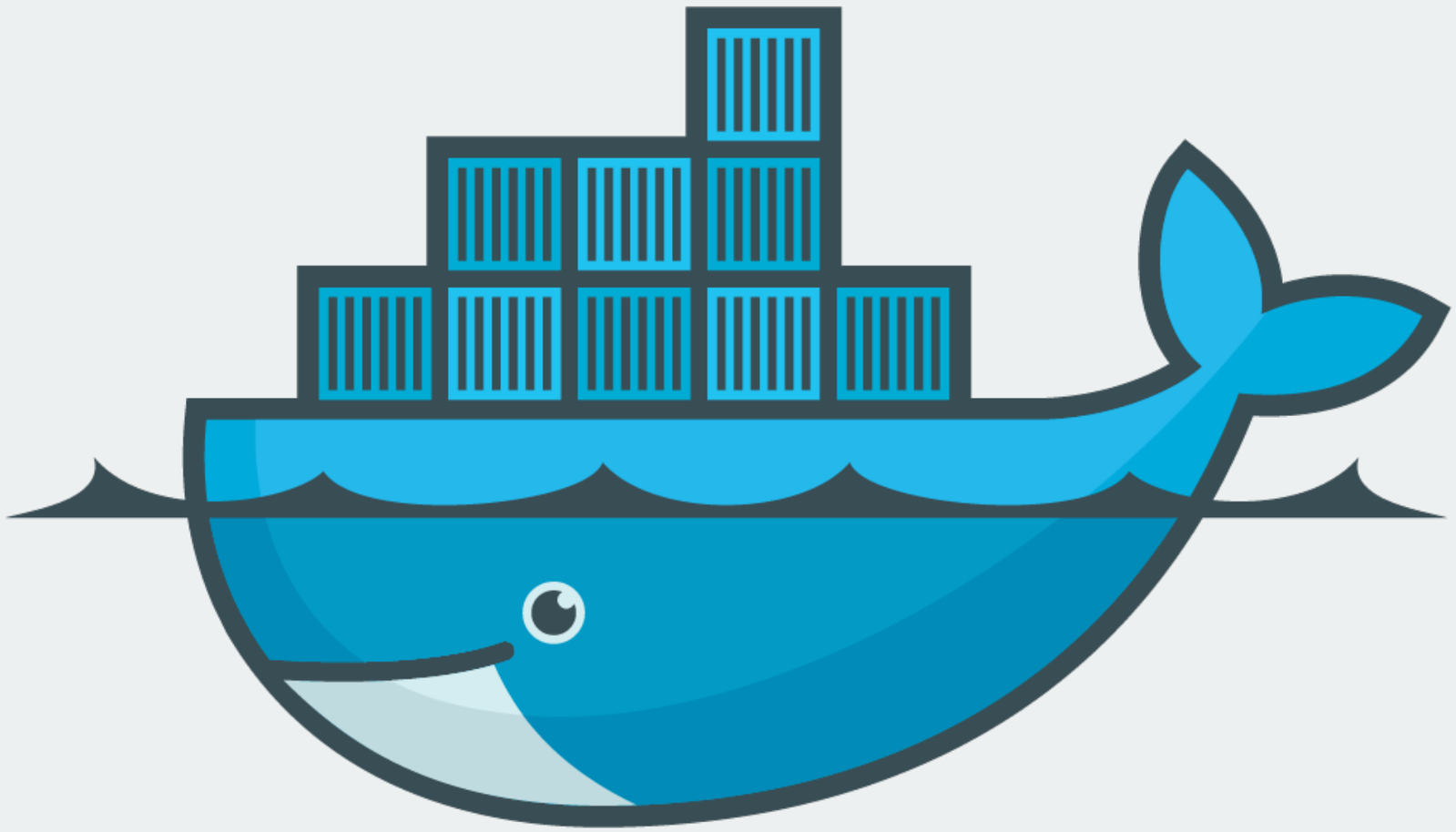
Resources: https://github.com/icnbg/docker-workshop



docker

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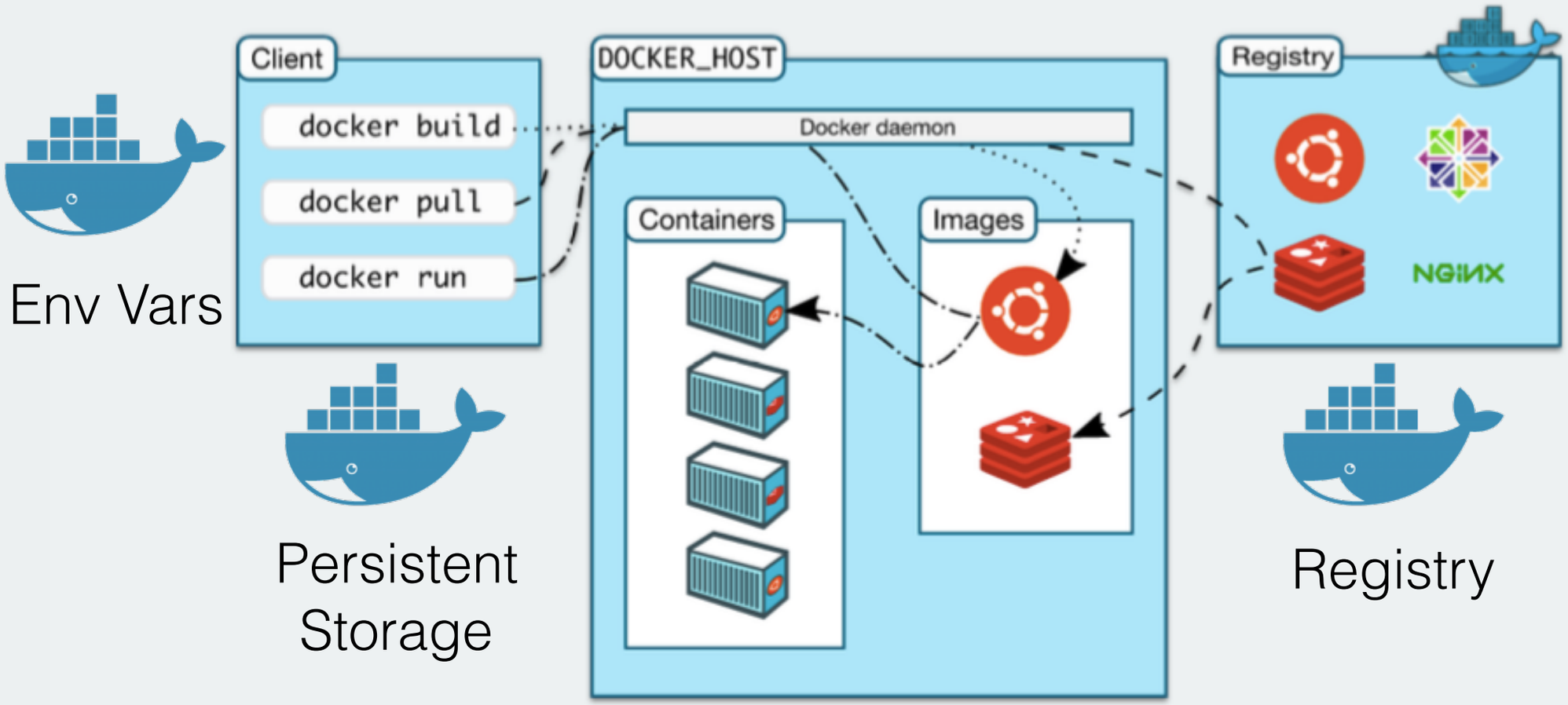
What is Docker?



Docker Engine allows you to package an application with all of its dependencies into a standardized unit for software development.

Docker Image: In Dockerland, there are **images** and there are **containers**. The two are closely related, but distinct. To use a programming metaphor, if an image is a class, then a container is an instance of a class—a runtime object.

Glossary

Immutable Infra: A pattern or strategy for managing services in which infrastructure is divided into “data” and “everything else”. “Everything else” components are replaced for every deployment, rather than being updated in-place. Same as USA Economy vs European economy

Stateless App: an **application** program that does not record data generated in one session – such as information about user settings and events that occurred -- for use in the next session with that user.

Micro-Services: software architecture style in which complex applications are composed of small, independent processes communicating with each other using language-agnostic APIs.

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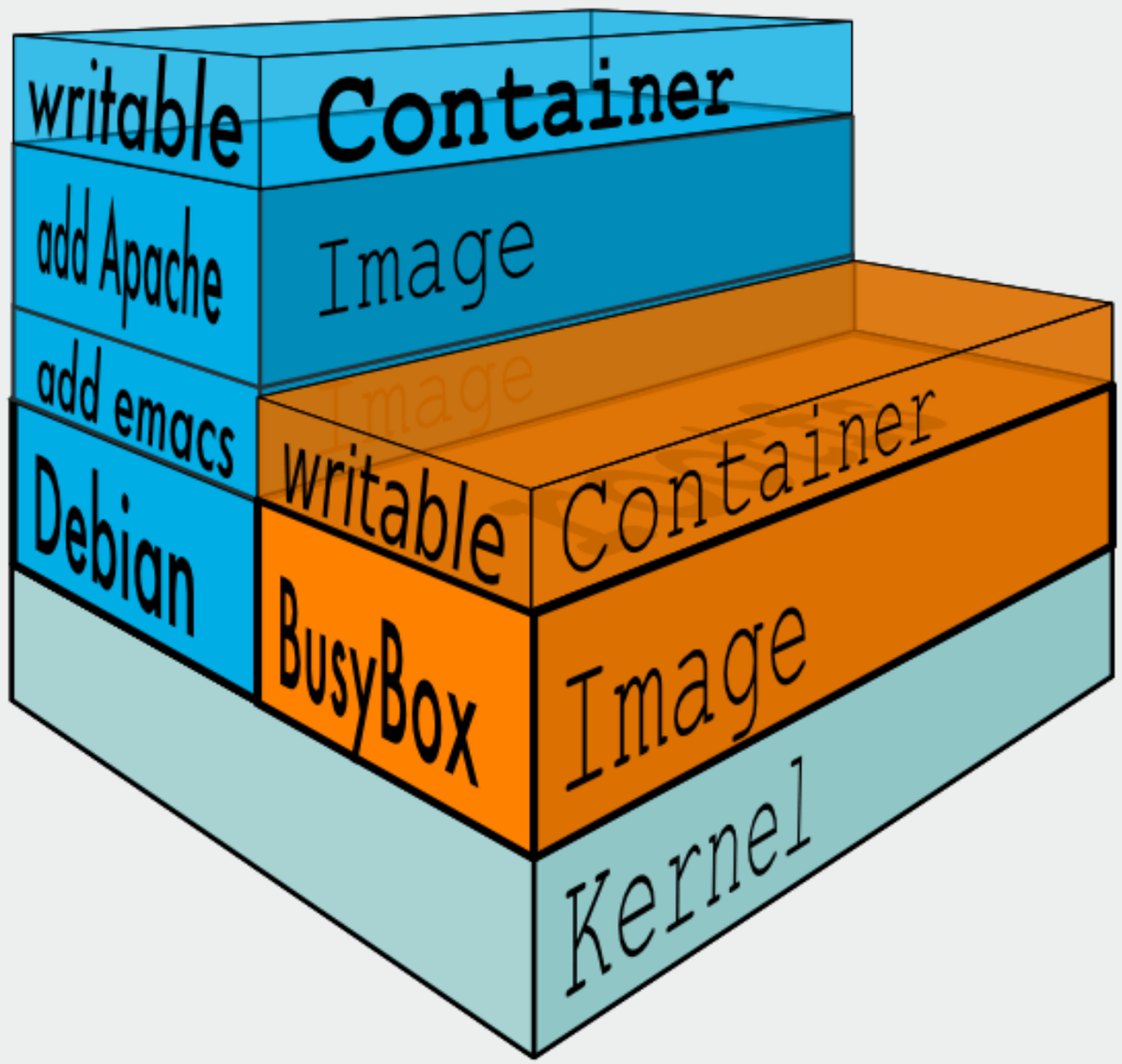
Docker File System



Containers vs Images

Recipe == Dockerfile

31 lines (24 sloc) | 634 Bytes — Raw | Blame | History

```
#
# Nginx Dockerfile
#
# https://github.com/dockerfile/nginx
#

# Pull base image.
FROM dockerfile/ubuntu

# Install Nginx.
RUN \
  add-apt-repository -y ppa:nginx/stable && \
  apt-get update && \
  apt-get install -y nginx && \
  rm -rf /var/lib/apt/lists/* && \
  echo "\ndaemon off;" >> /etc/nginx/nginx.conf && \
  chown -R www-data:www-data /var/lib/nginx

# Define mountable directories.
VOLUME ["/etc/nginx/sites-enabled", "/etc/nginx/certs", "/etc/nginx/conf.d", "/var/log/nginx", "/var/www/html"]

# Define working directory.
WORKDIR /etc/nginx

# Define default command.
CMD ["nginx"]

# Expose ports.
EXPOSE 80
EXPOSE 443
```

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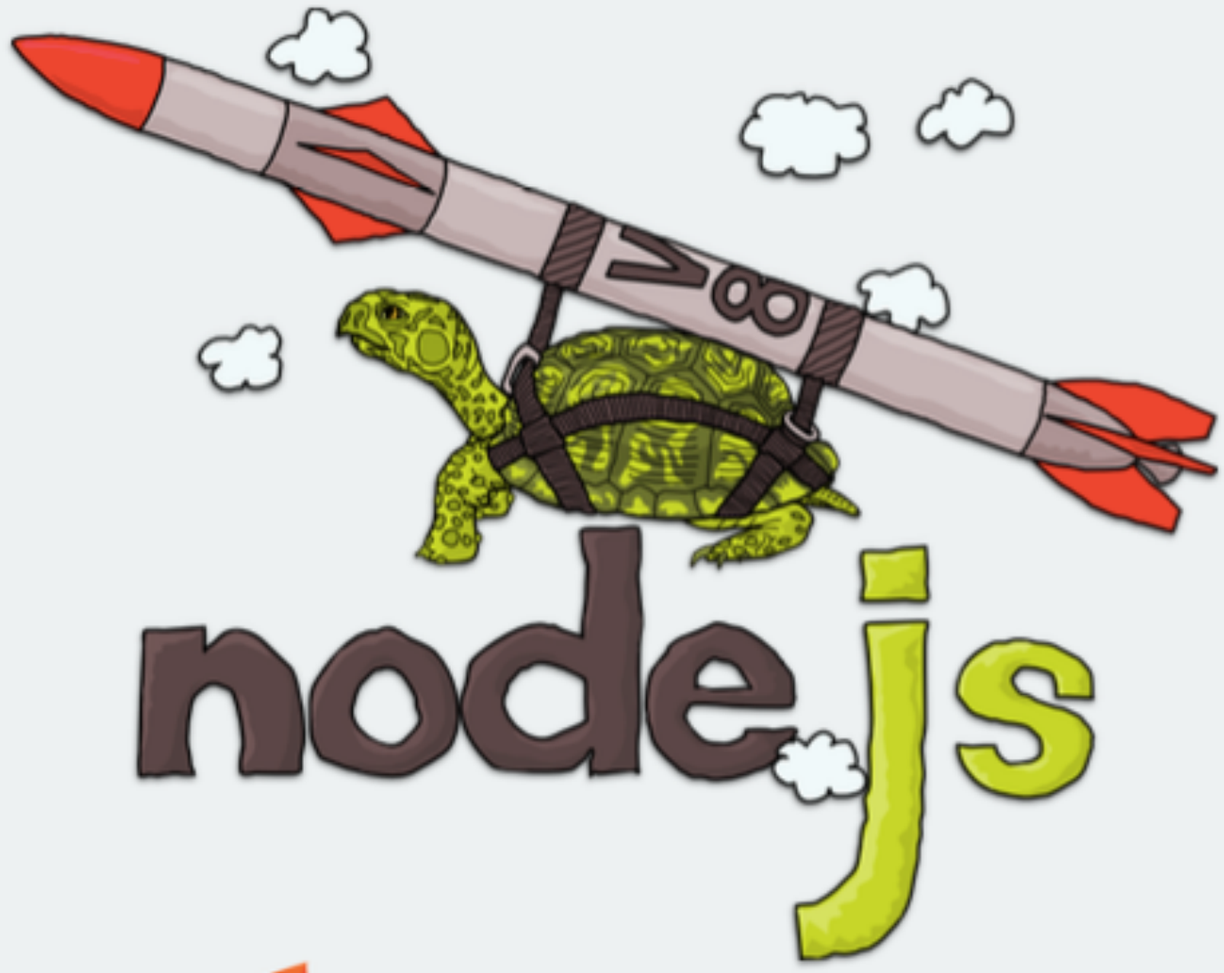
Hello World



Summary

```
bash-3.2$ docker build -t hello:v1 .
bash-3.2$ docker images
bash-3.2$ docker run -d --name hello -p 8080:8080 -e "EXPOSE_PORT=8080" hello:v1
bash-3.2$ docker ps
bash-3.2$ docker logs hello
bash-3.2$ docker ps -a
bash-3.2$ docker run -d --name hello-node2 -p 8081:8081 -e "EXPOSE_PORT=8081" -e
"DEMO_FILE=file" hello:v2
bash-3.2$ docker rm hello-node2
bash-3.2$ docker stop hello-node2
bash-3.2$ docker run -d --name hello-node2 -p 8081:8081 -e "EXPOSE_PORT=8081" -e "DEMO_FILE=/
storage/file" -v /home/:/storage hello:v2
bash-3.2$ docker restart hello-node2
bash-3.2$ docker inspect 7ec962fe097c
bash-3.2$ docker history hello:v2
bash-3.2$ docker exec -ti hello-node2 bash
bash-3.2$ docker login -u monday -e docker@icn.bg registry.icnapp.net
bash-3.2$ docker tag hello:v2 registry.icnapp.net/monday/hello:v2
bash-3.2$ docker push registry.icnapp.net/monday/hello:v2
bash-3.2$
```

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kubernetes

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What is Kubernetes?

Kubernetes: a system for managing containerized applications in a cluster. Intended to make deploying containerized/microservice-based applications easy but powerful.

Pods: smallest deployable units that can be created, scheduled, and managed.

Replication Controllers: manage the lifecycle of pods. They ensure that a specified number of pods are running at any given time, by creating or killing pods as required.

Services: Services provide a single, stable name and address for a set of pods. They act as basic load balancers.

Replica

Selector

Label

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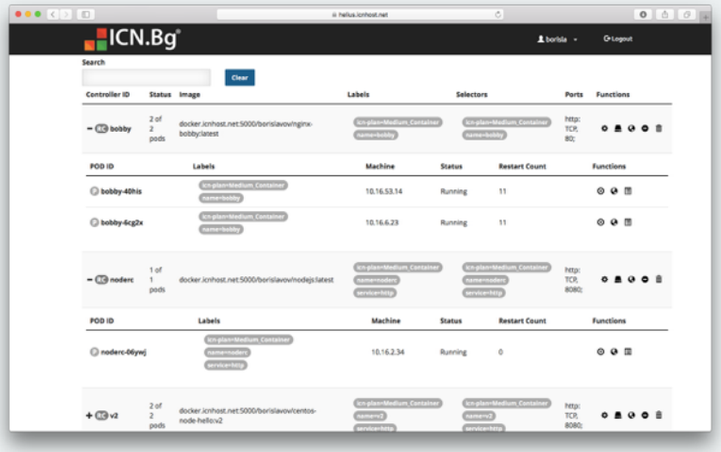
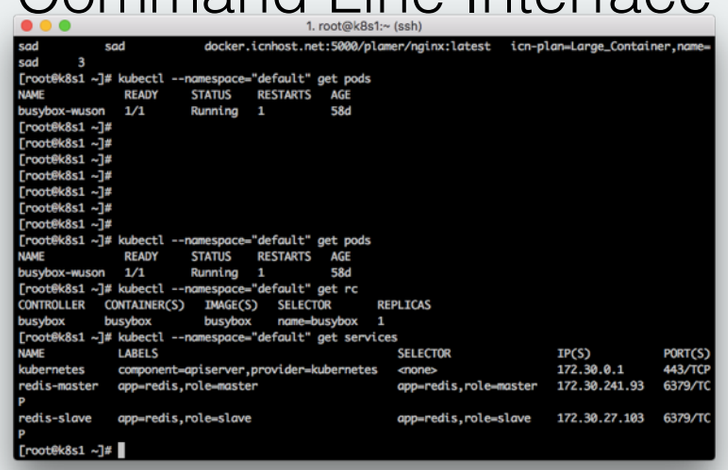
How it works?

Control Panel



Command Line Interface



MASTER

Minion

Docker

POD | POD | POD

Container | Container | Container

Minion

Docker

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Search

Clear

Controller ID	Status	Image	Labels	Selectors	Ports	Functions
− RC bobby	2 of 2 pods	docker.icnhost.net:5000/borislavov/nginx-bobby:latest	icn-plan=Medium_Container name=bobby	icn-plan=Medium_Container name=bobby	http: TCP, 80;	

POD ID	Labels	Machine	Status	Restart Count	Functions
P bobby-40his	icn-plan=Medium_Container name=bobby	10.16.53.14	Running	11	
P bobby-6cg2x	icn-plan=Medium_Container name=bobby	10.16.6.23	Running	11	

Controller ID	Status	Image	Labels	Selectors	Ports	Functions
− RC noderc	1 of 1 pods	docker.icnhost.net:5000/borislavov/nodejs:latest	icn-plan=Medium_Container name=noderc service=http	icn-plan=Medium_Container name=noderc service=http	http: TCP, 8080;	

POD ID	Labels	Machine	Status	Restart Count	Functions
P noderc-06ywj	icn-plan=Medium_Container name=noderc service=http	10.16.2.34	Running	0	

Controller ID	Status	Image	Labels	Selectors	Ports	Functions
+ RC v2	2 of 2 pods	docker.icnhost.net:5000/borislavov/centos-node-hello:v2	icn-plan=Medium_Container name=v2 service=http	icn-plan=Medium_Container name=v2 service=http	http: TCP, 8080;	

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Wake up and ask questions :)

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