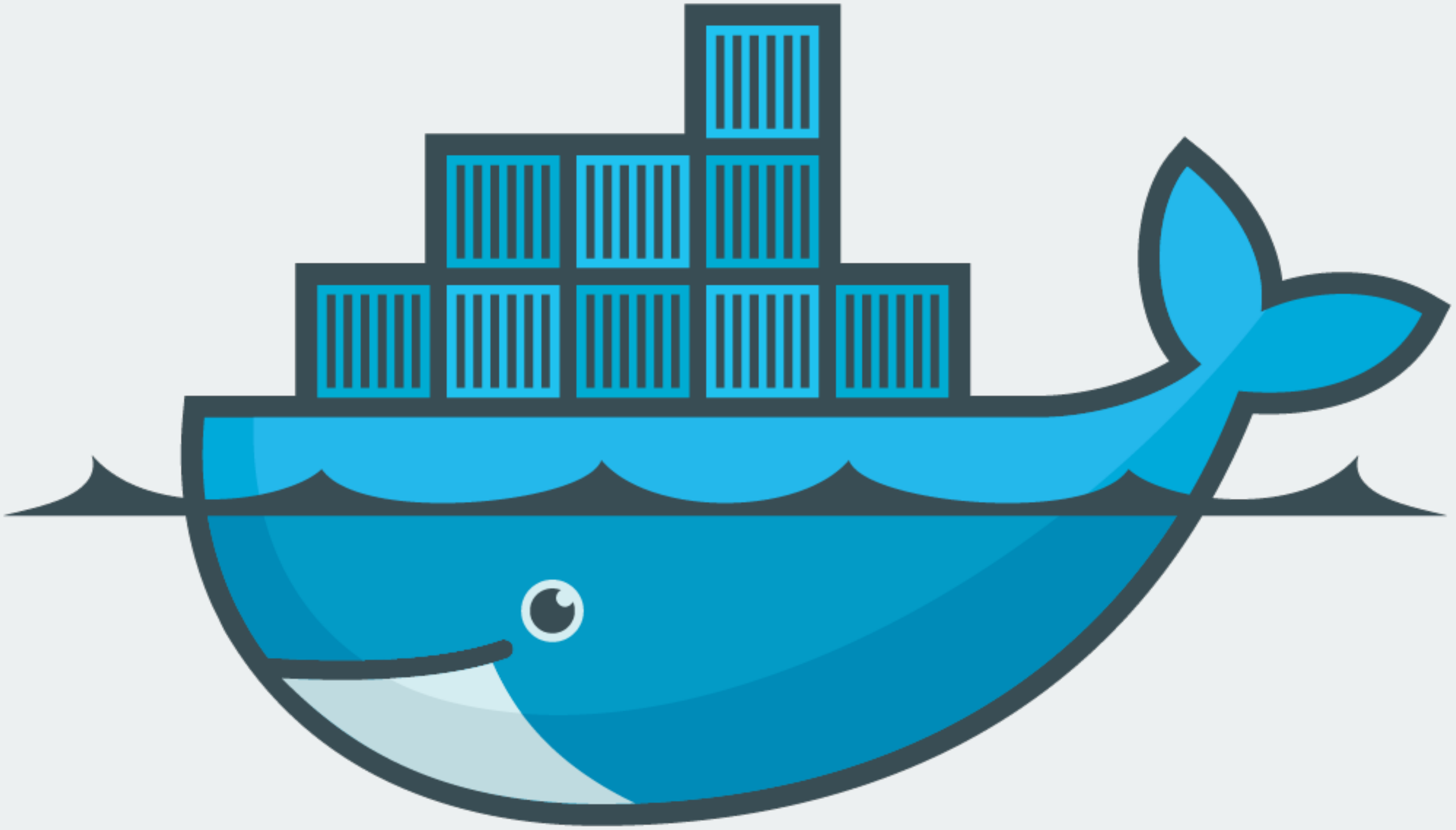
Docker Workshop

by Borislav Borislavov

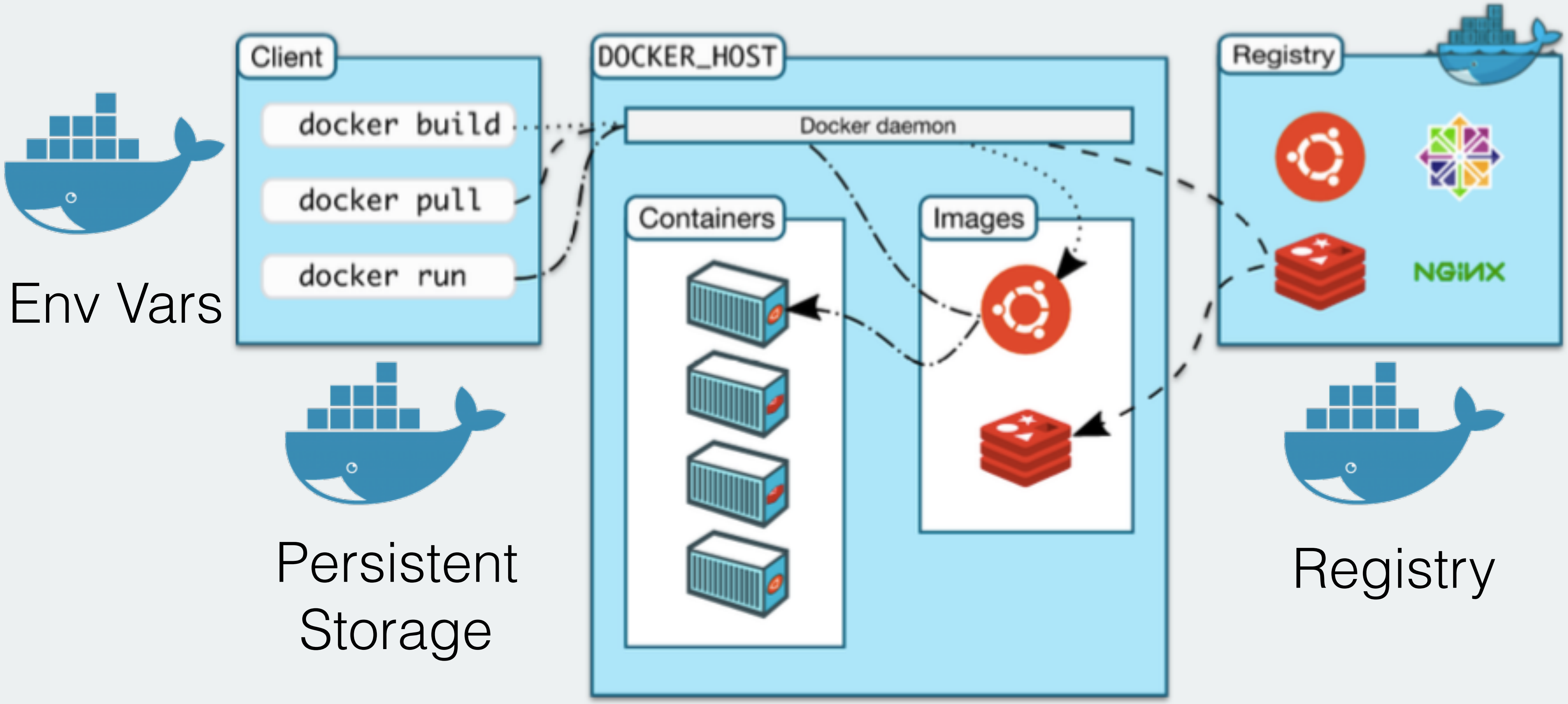
Resources: https://github.com/icnbg/docker-workshop



docker

ICN.Bg®

What is Docker?



Env Vars

Persistent Storage

Registry

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.

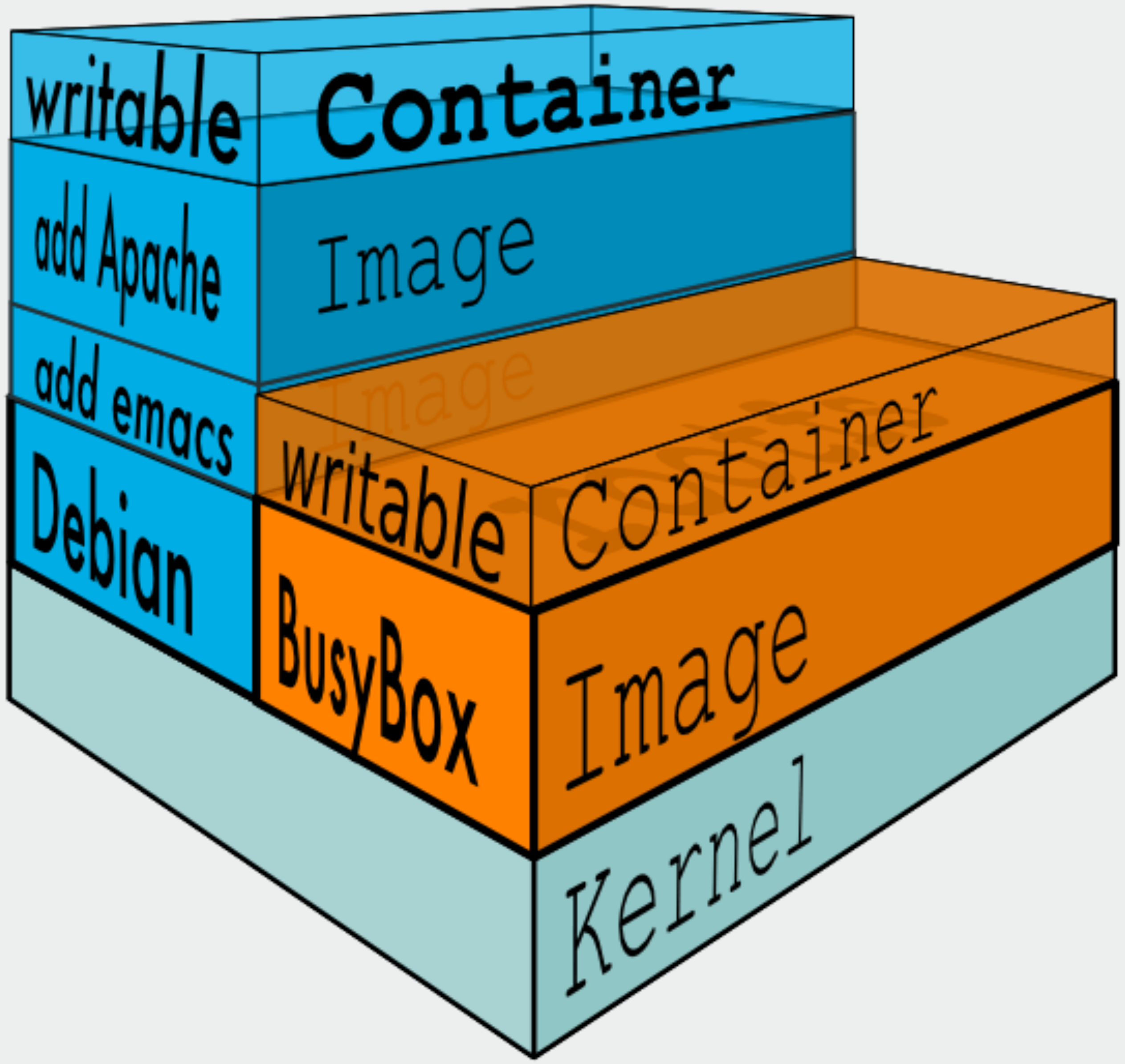
Glossary

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.

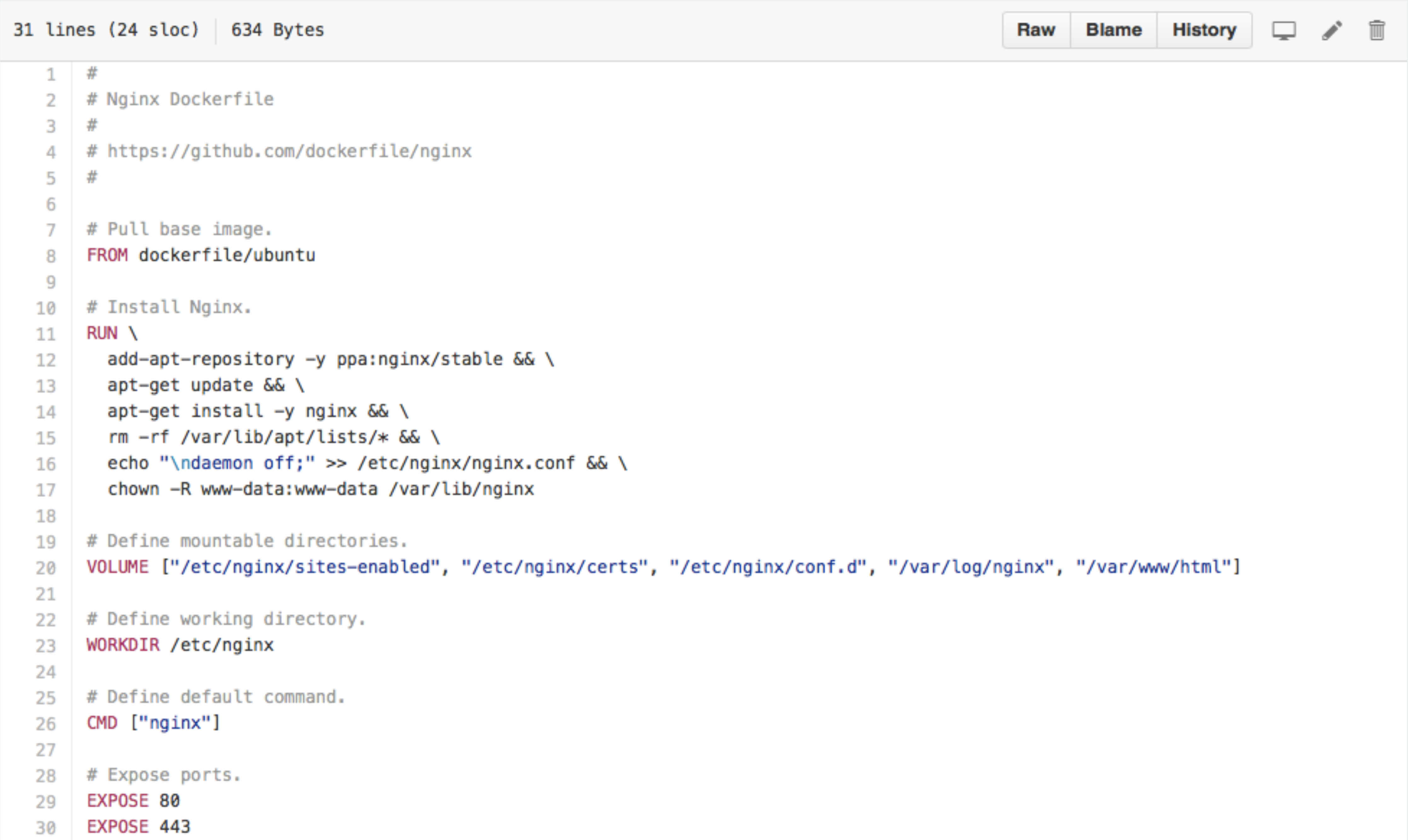
Docker File System



ICN.Bg®

Containers vs Images

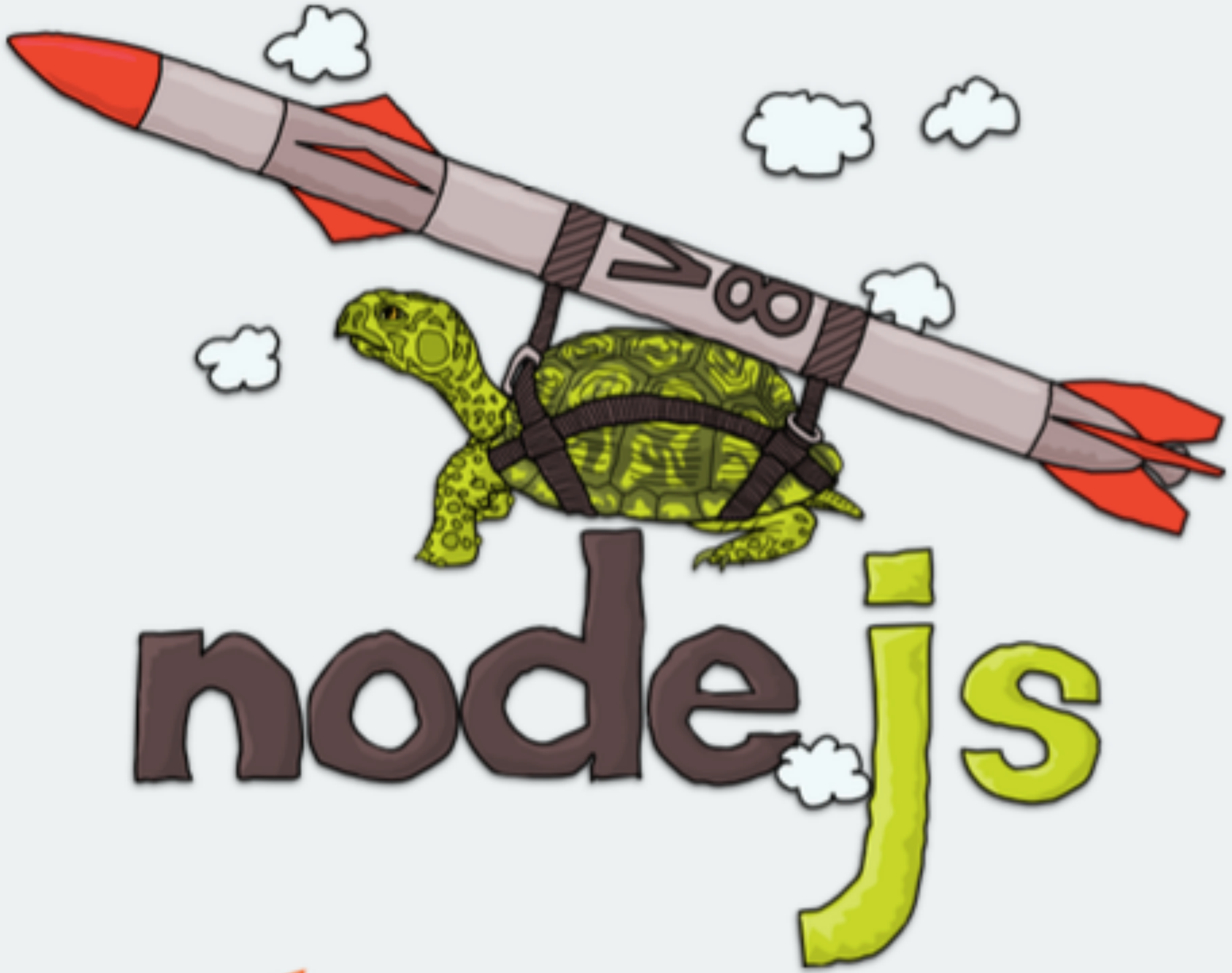
Recipe == Dockerfile



31 lines (24 sloc) | 634 Bytes

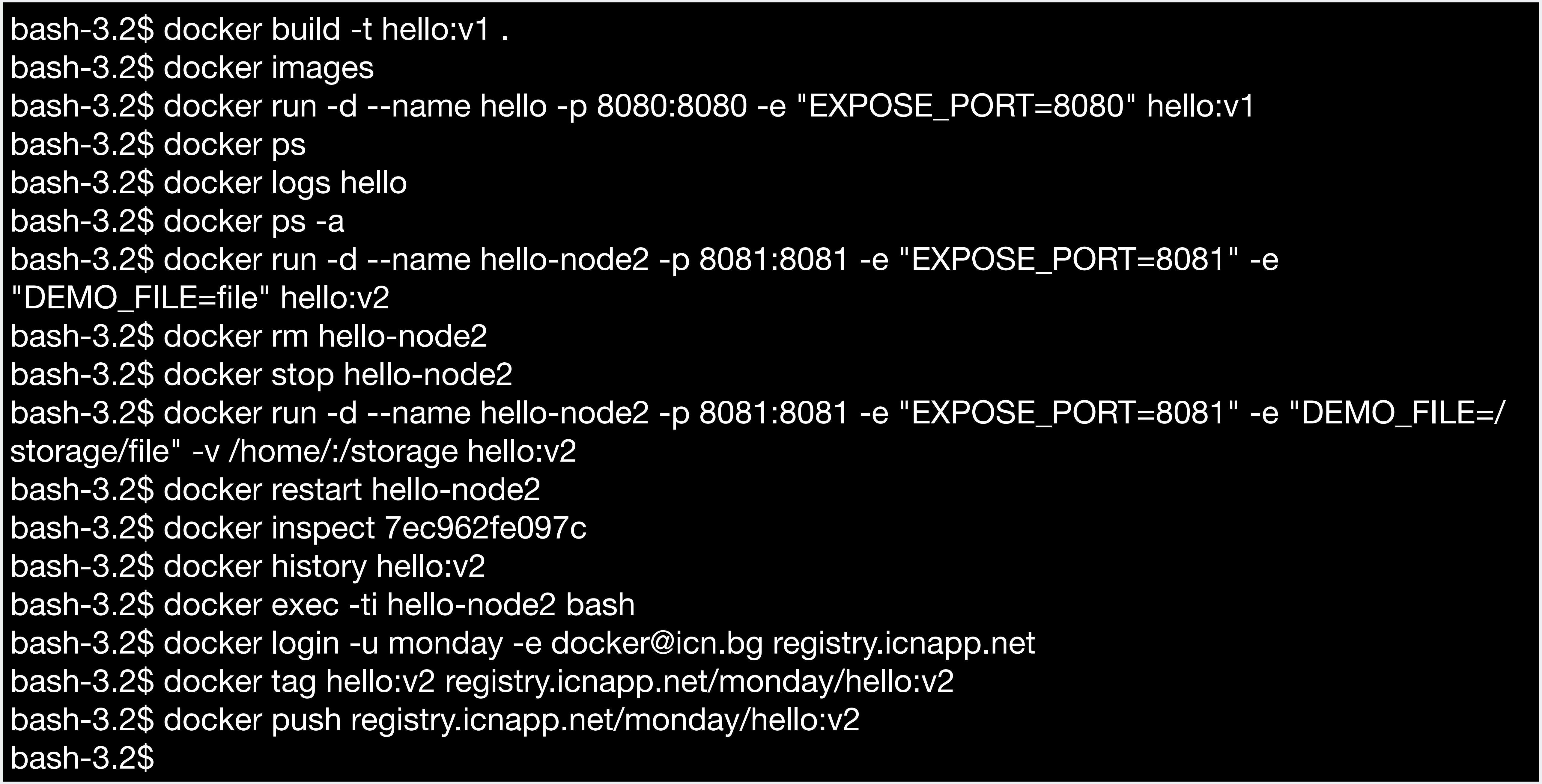
```
#
# Nginx Dockerfile
#
# https://github.com/dockerfile/nginx
#

# 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
```

Hello World



ICN.Bg®

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$
```

Kubernetes

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.

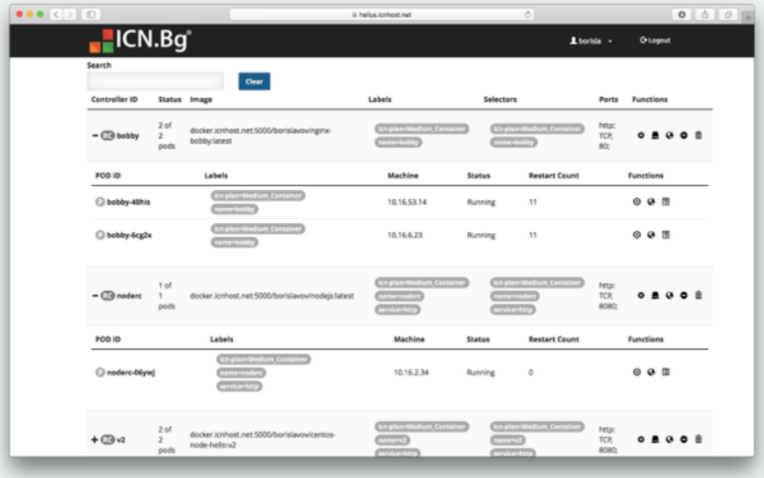
Replica

Selector

Label

How it works?

Control Panel



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;	

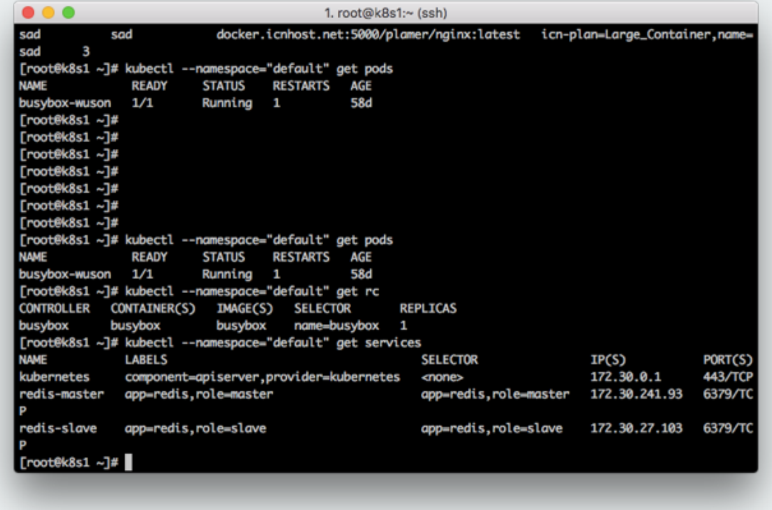
POD ID	Labels	Machine	Status	Restart Count	Functions
bobby-40his	icn-plan=Medium_Container name=bobby	10.16.53.14	Running	11	
bobby-6cg2x	icn-plan=Medium_Container name=bobby	10.16.6.23	Running	11	

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;	

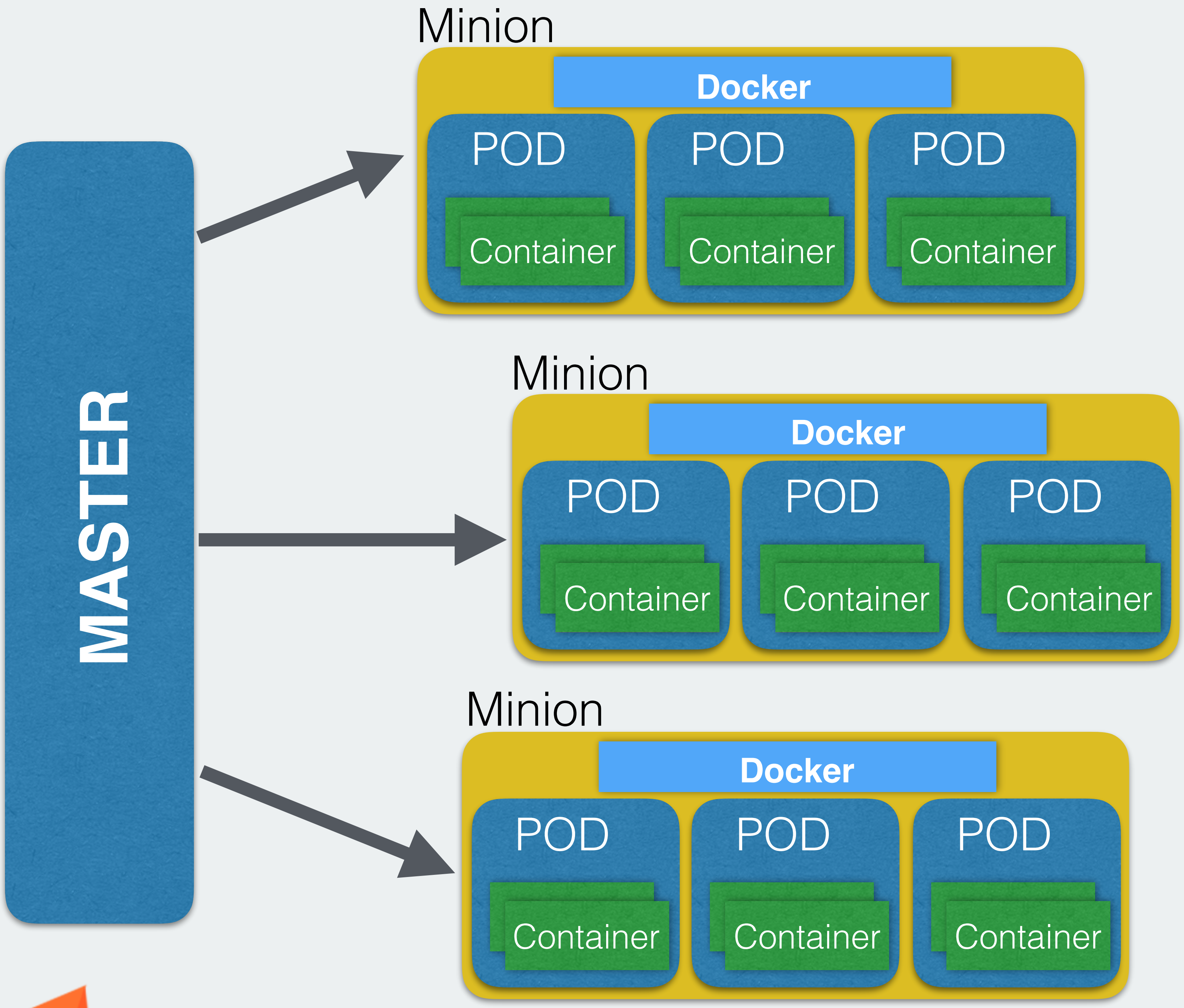
POD ID	Labels	Machine	Status	Restart Count	Functions
noderc-06ywj	icn-plan=Medium_Container name=noderc service=http	10.16.2.34	Running	0	

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;	

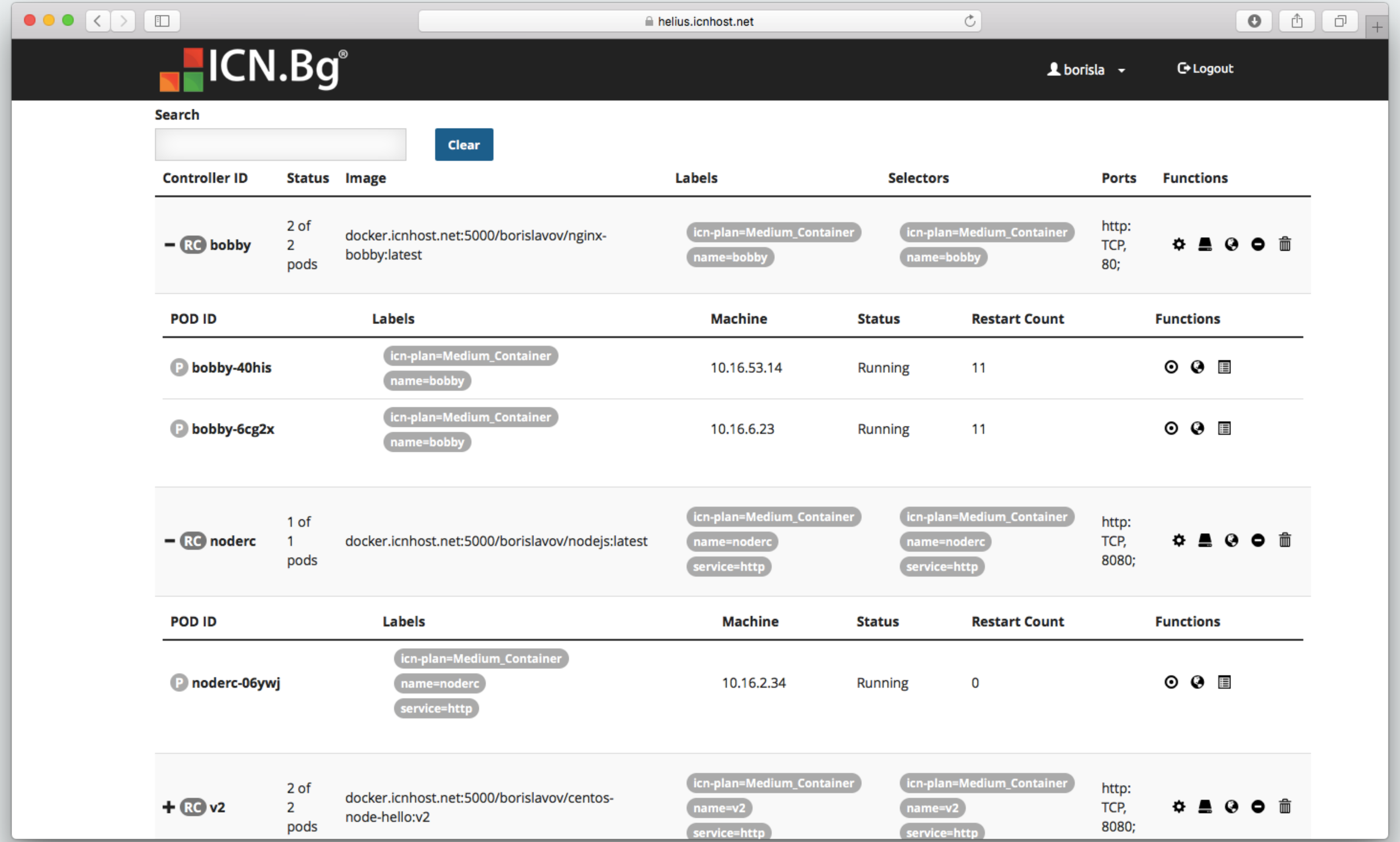
Command Line Interface



```
sad          sad           docker.icnhost.net:5000/plamer/nginx:latest   icn-plan=Large_Container,name=
sad      3
[root@k8s1 ~]# kubectl --namespace="default" get pods
NAME            READY     STATUS    RESTARTS   AGE
busybox-wuson   1/1       Running   1          58d
[root@k8s1 ~]#
[root@k8s1 ~]#
[root@k8s1 ~]#
[root@k8s1 ~]#
[root@k8s1 ~]#
[root@k8s1 ~]#
[root@k8s1 ~]#
[root@k8s1 ~]# kubectl --namespace="default" get pods
NAME            READY     STATUS    RESTARTS   AGE
busybox-wuson   1/1       Running   1          58d
[root@k8s1 ~]# kubectl --namespace="default" get rc
CONTROLLER   CONTAINER(S)   IMAGE(S)   SELECTOR       REPLICAS
busybox      busybox        busybox    name=busybox   1
[root@k8s1 ~]# kubectl --namespace="default" get services
NAME           LABELS                                    SELECTOR                IP(S)           PORT(S)
kubernetes     component=apiserver,provider=kubernetes   <none>                  172.30.0.1      443/TCP
redis-master   app=redis,role=master                     app=redis,role=master   172.30.241.93   6379/TC
P
redis-slave    app=redis,role=slave                      app=redis,role=slave    172.30.27.103   6379/TC
P
[root@k8s1 ~]# █
```



ICN.BG Apps platform



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;	⚙ ▲ 🌐 ⊖ 🗑

ICN.Bg®

Wake up and ask questions :)

Stars in Your Eyes	68441	60	1140	45	11
dataflow	15919	28	568	4	1
Summit	52937	147	360	250	23
Bridging The Gap	55098	154	357	250	16
Hide And Seek	14563	43	338	1	6
female1	94733	286	331	2	4
Solidarity	49530	157	315	15	14
Pile Of Documents	14430	46	313	1	1
Reconciliation	64306	221	290	150	19
Social Worker	22546	81	278	15	3
Female with Group of Males	43879	159	275	15	23
boardroom meeting	8804	32	275	1	2
Sea Of Hands	[illegible]	215	263	15	21
sweepstakes	[illegible]	21	258	0	1
[illegible]	34	23	254	1	12
[illegible]	137	32	254	0	4
[illegible]	9674	39	248	15	6
[illegible]	6210	25	248	6	2
[illegible]	7810	32	244	0	1
[illegible]	9965	41	243	0	1
Outsourcing	78247	325	240	35	47
Shipping And Receiving	5251	22	238	4	3
Moor	28010	118	237	0	1
Greengrocer's Shop	8525	36	236	15	12
Oath	26222	112	234	6	7
On Top Of The World	64765	282	229	15	34
Upperdeck View	69129	308	224	15	31
Internet Cafe	7599	34	223	7	3
Composite Image	40960	190	215	1	9
Audience	105790	491	215	150	82