



KUBERNETES WORKSHOP

*DIMITRIS KARAKASILIS - MARIOS KARAGIANNPOULOS
KOSTANTINOS TSAKALOZOS*

WESTERN GREECE SOFTWARE DEVELOPERS GROUP, POS, JANUARY 2018



LOGISTICS

- The workshop consists of 2 parts:
 - Kubernetes basics
 - Micro k8s for developers
- It will run from 10:00 am to 13:00 pm
- There will be a coffee break at 11:30 am
- Feel free to interrupt for questions at any time
- Live feedback, questions, help on Slack channel [#kubernetes](https://wgsdg.slack.com) (wgsdg.slack.com)
- All you need is a laptop and a little docker knowledge
- Please introduce yourself and explain a bit why you're interested in this workshop

AGENDA – PART 1

- Kubernetes Overview
- Create a Cluster
- Deploy an App
- Explore Your App
- Expose Your App Publicly
- Scale Your App
- Update Your App

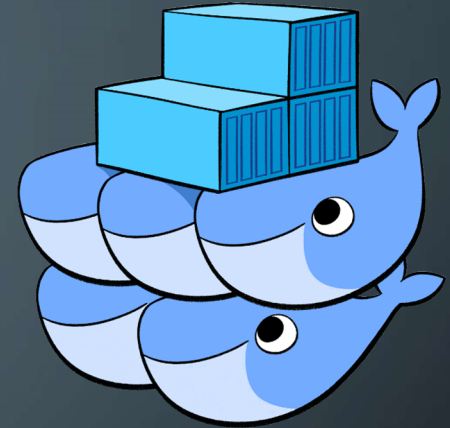
KUBERNETES OVERVIEW

- Remember some things from Docker workshop
- What is Kubernetes
- Kubernetes Features – Problems that it solves
- Pods, Controllers, Services
- Architecture

DOCKER WORKSHOP...

- Continuous delivery
- Improved Security
- Run anything, anywhere
- Reproducibility

<https://katacoda.com/courses/docker/create-nginx-static-web-server>



WHAT IS KUBERNETES (K8S)?



Kubernetes is an open-source container-management tool which automates container deployment, container (de)scaling & container load balancing.

FEATURES OF KUBERNETES

1. Automatic
binpacking

2. Service Discovery &
Load Balancing

3. Storage
Orchestration

4. Self Healing

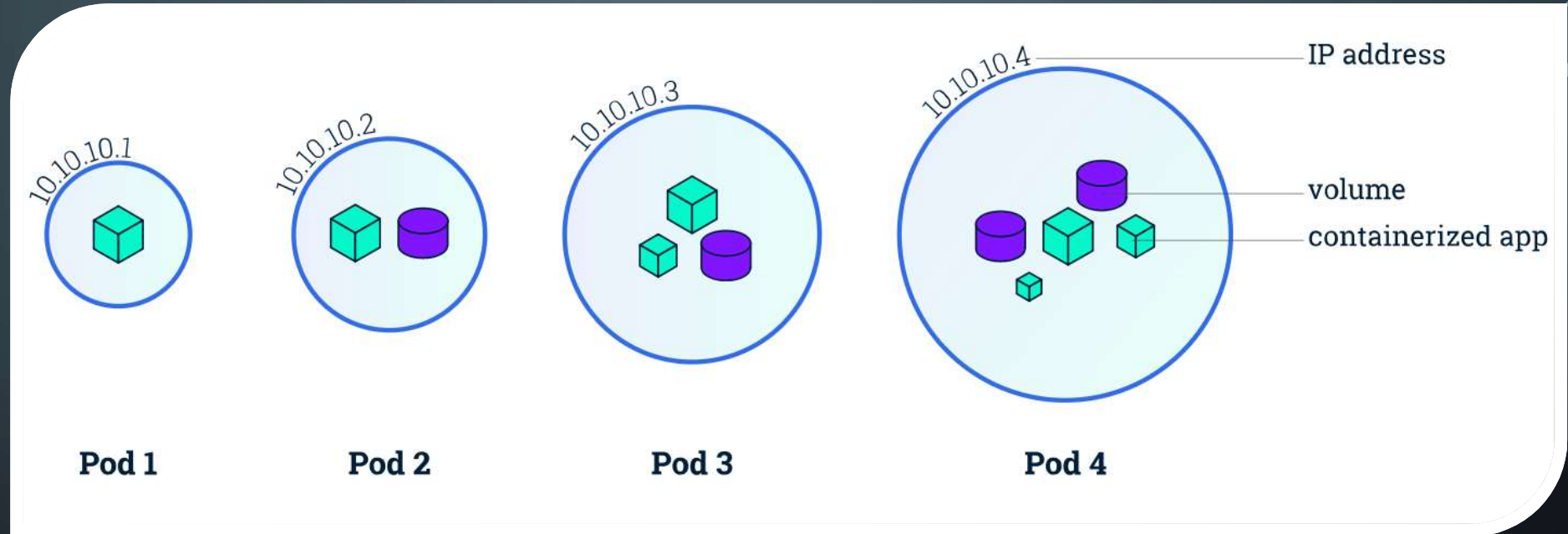
5. Secret &
Configuration
Management

6. Batch Execution

7. Horizontal Scaling

8. Automatic Rollbacks
& Rollouts

POD



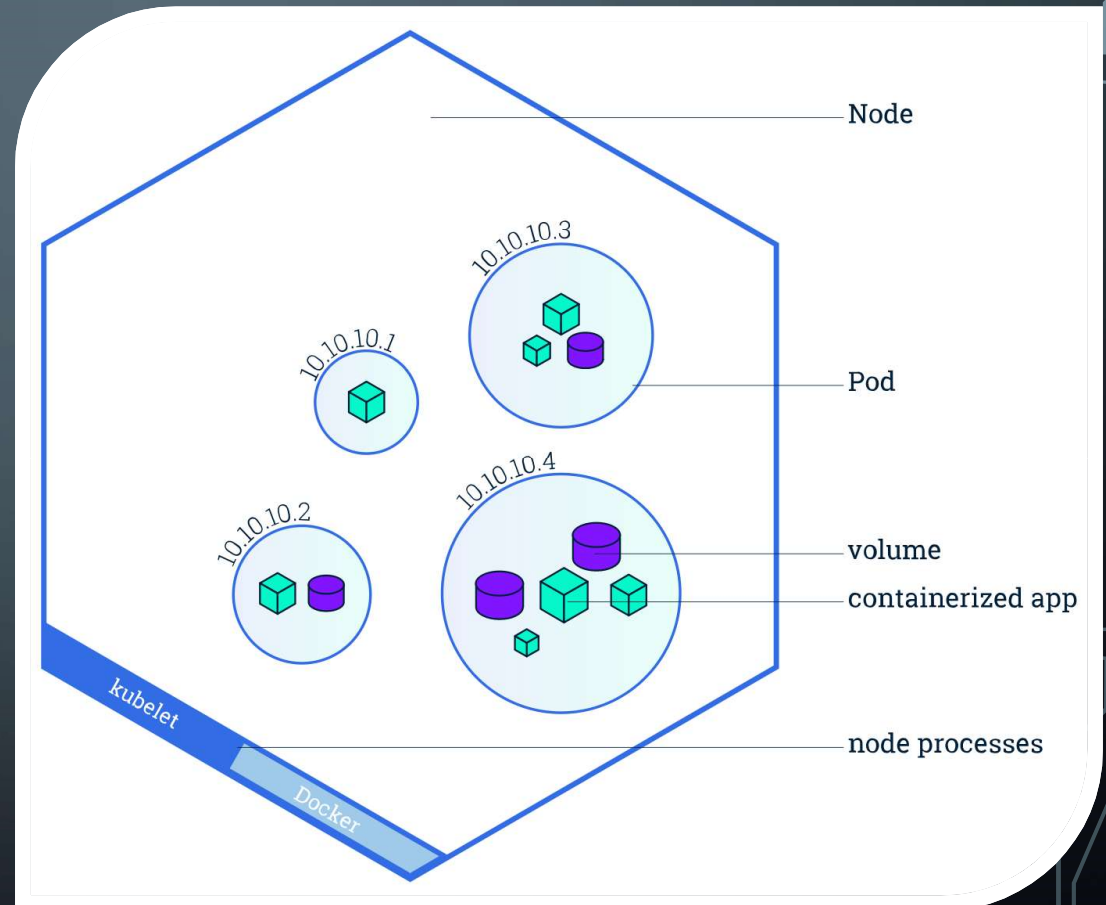
A Pod is a group of one or more application containers (such as Docker) and includes shared storage (volumes), IP address and information about how to run them.

NODE

A node is a worker machine in Kubernetes and may be a VM or physical machine, depending on the cluster. Multiple Pods can run on one Node.

Runs at least:

- *Kublet*
- *Container runtime*



CONTROLLERS

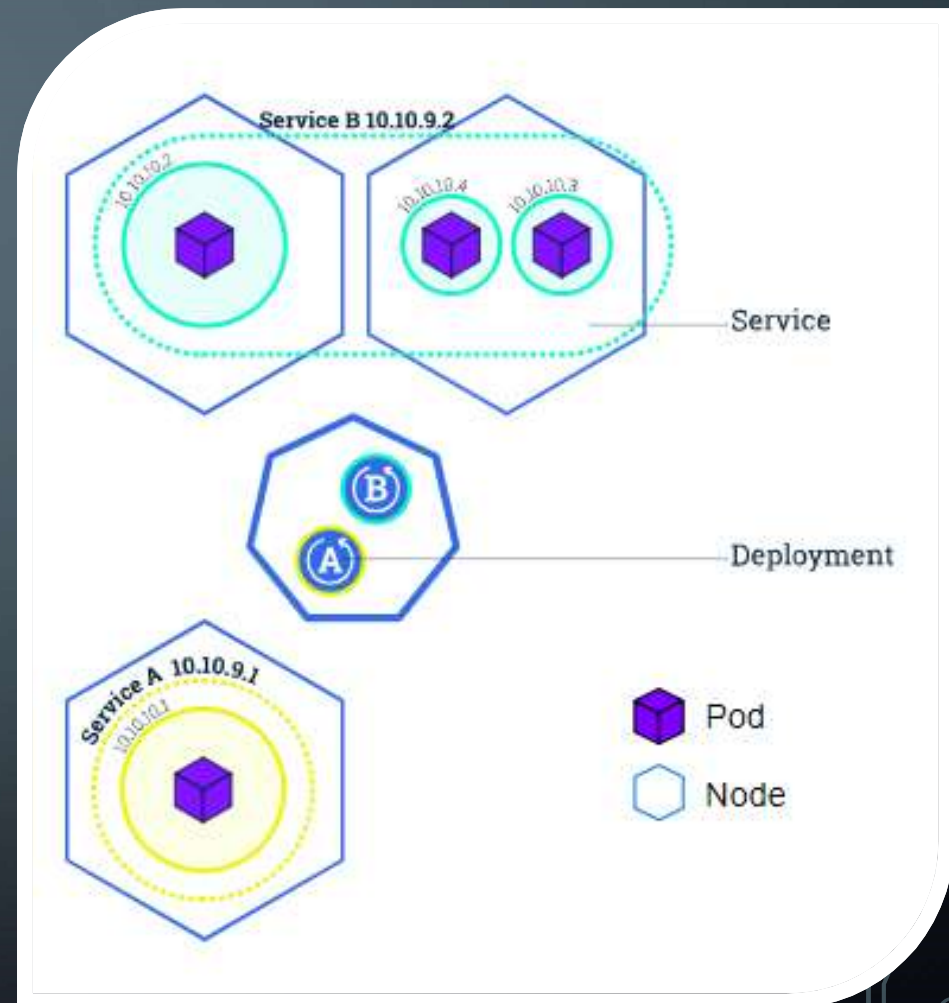
Manage the 2 use cases of PODs usage

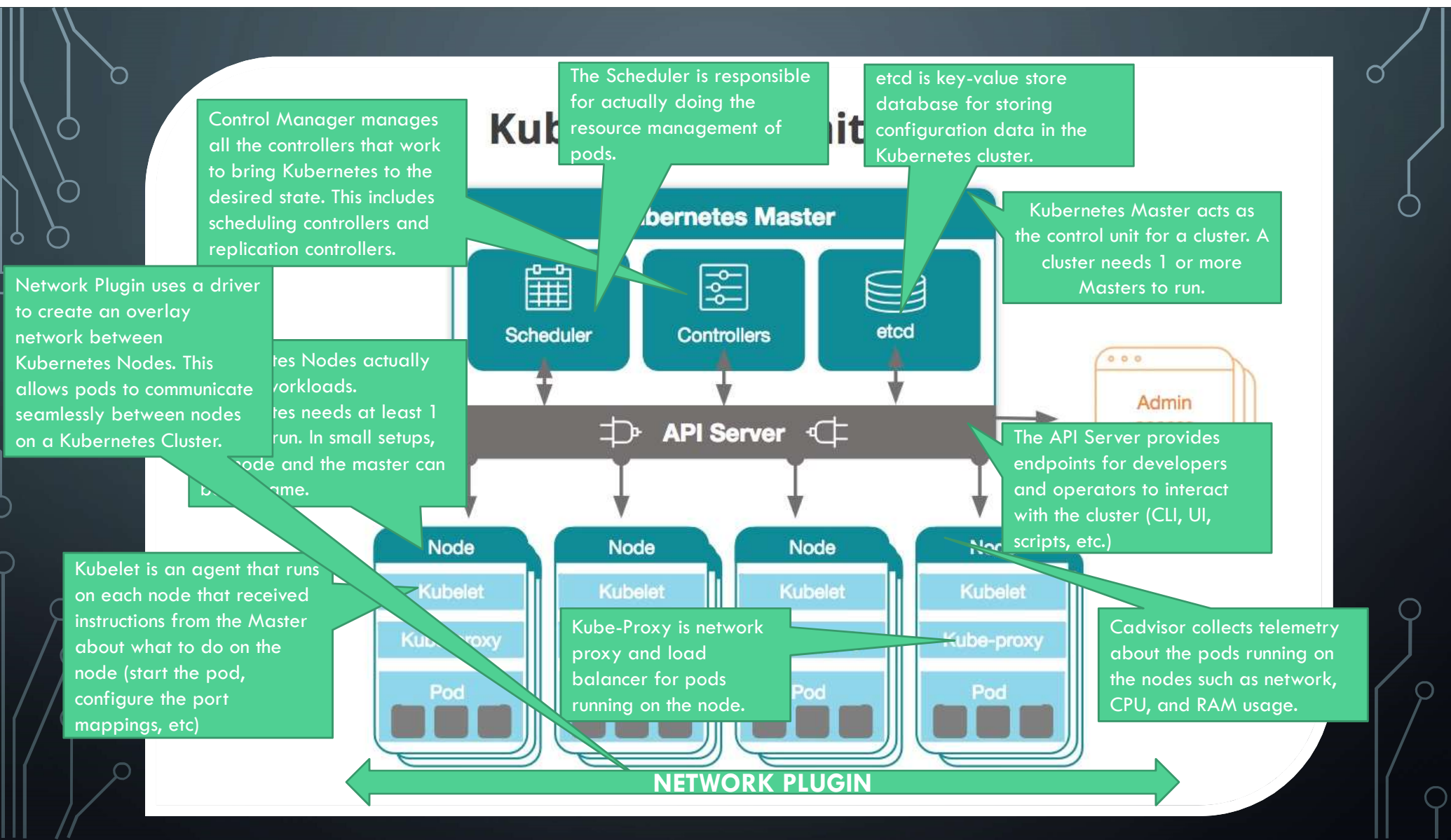
- Replica sets > scaling purposes
- Jobs > just like cron jobs

SERVICE

A Kubernetes Service is an abstraction layer which defines a logical set of Pods and enables external traffic exposure, load balancing and service discovery for those Pods.

***Kube-Proxy** handles all the port forwarding stuff to enable the above facilities.*





KUBERNETES TOOLS

- **Kubeadm**: An administration tool for setting up and managing Kubernetes clusters.
- **Kubectl**: The CLI for interacting with Kubernetes clusters.
- **Minikube/Microk8s**: A utility for setting up single node instances of Kubernetes for testing and development.



INTERACTIVE TUTORIALS (10MINS EACH)

<https://kubernetes.io/docs/tutorials/kubernetes-basics/create-cluster/cluster-interactive/>

<https://kubernetes.io/docs/tutorials/kubernetes-basics/deploy-app/deploy-interactive/>

<https://kubernetes.io/docs/tutorials/kubernetes-basics/explore/explore-interactive/>

<https://kubernetes.io/docs/tutorials/kubernetes-basics/expose/expose-interactive/>

<https://kubernetes.io/docs/tutorials/kubernetes-basics/scale/scale-interactive/>

<https://kubernetes.io/docs/tutorials/kubernetes-basics/update/update-interactive/>

\$ minikube dashboard > + View HTTP port 30000 on HOST 1

Dashboard > [+] Create > mariosk/node > Pods > Nodes > Services

```
$ export NODE_PORT=$(kubectl get services/mknode -o go-template='{{(index .spec.ports 0).nodePort}}')
```

```
$ curl $(minikube ip):$NODE_PORT
```

KUBERNETES PLAYGROUND

- <https://www.katacoda.com/courses/kubernetes/playground>
- <https://www.katacoda.com/courses/kubernetes/>
- <https://www.katacoda.com/javaion/courses/kubernetes-fundamentals/>
- <https://www.katacoda.com/courses/ubuntu/deploy-microk8s>

FUTURE WORKSHOPS/PRESENTATIONS

- Kubernetes Architecture
- Kubernetes Dashboard
- Kubernetes on AWS/GCP
- Kubernetes Networking
- Kubernetes vs Docker Swarm

REFERENCES

- <https://kubernetesbootcamp.github.io/kubernetes-bootcamp/index.html>
- <https://kubernetes.io/docs/tasks/tools/install-minikube/>
- <https://itnext.io/microk8s-on-macos-98f1de3aa63e>
- <https://en.wikipedia.org/wiki/Kubernetes>
- <https://kubernetes.io/docs/setup/pick-right-solution/>
- <https://kubernetes.io/docs/reference/#api-reference>
- <https://kubernetes.io/docs/setup/>
- https://www.youtube.com/watch?v=F-p_7XaEC84
- <https://www.youtube.com/watch?v=RNgy31gFul>
- <https://www.youtube.com/watch?v=qTYfDVvTGmk>

