KUBERNETES WORKSHOP

MARIOS KARAGIANNOPOULOS - DIMITRIS KARAKASILIS

WESTERN GREECE SOFTWARE DEVELOPERS GROUP, POS, JANUARY 2019

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 (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

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DOCKER WORKSHOP…

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

https://katacoda.com/courses/docker/create-nginx-static-web-server
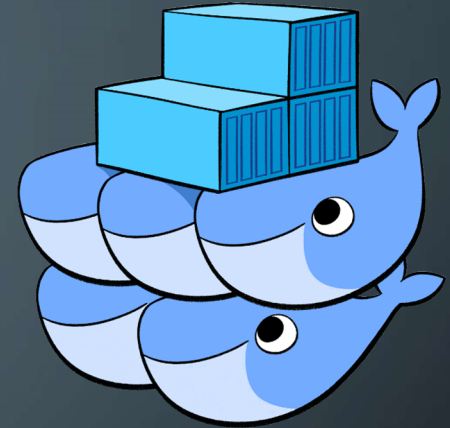
WHAT IS KUBERNETES (K8S)?

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
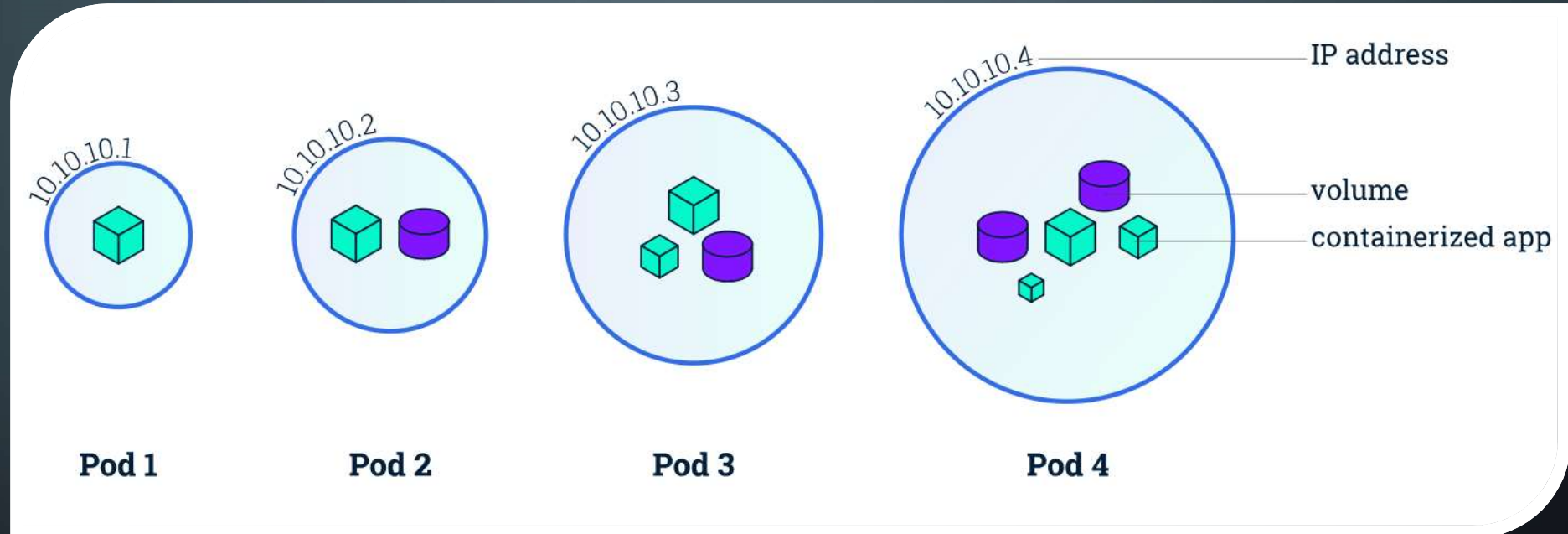
3. Storage Orchestration

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.
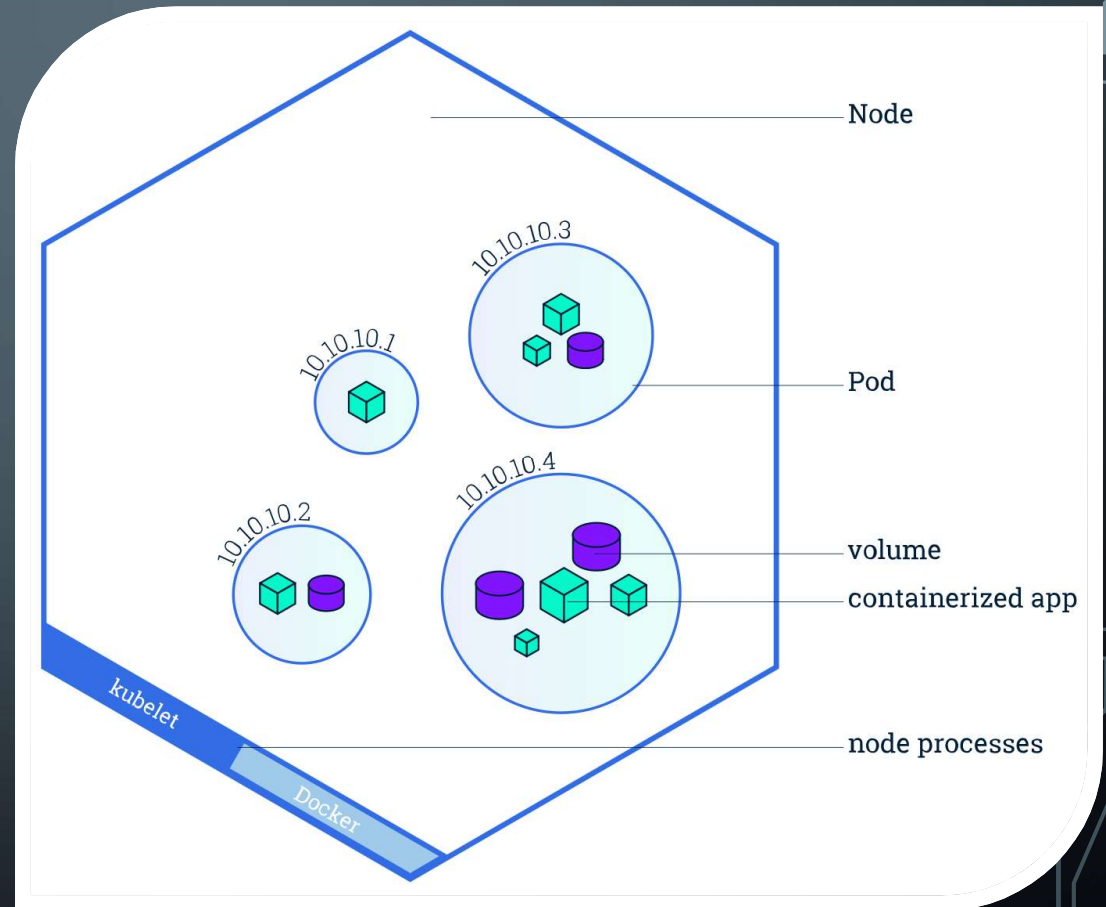
NODE

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

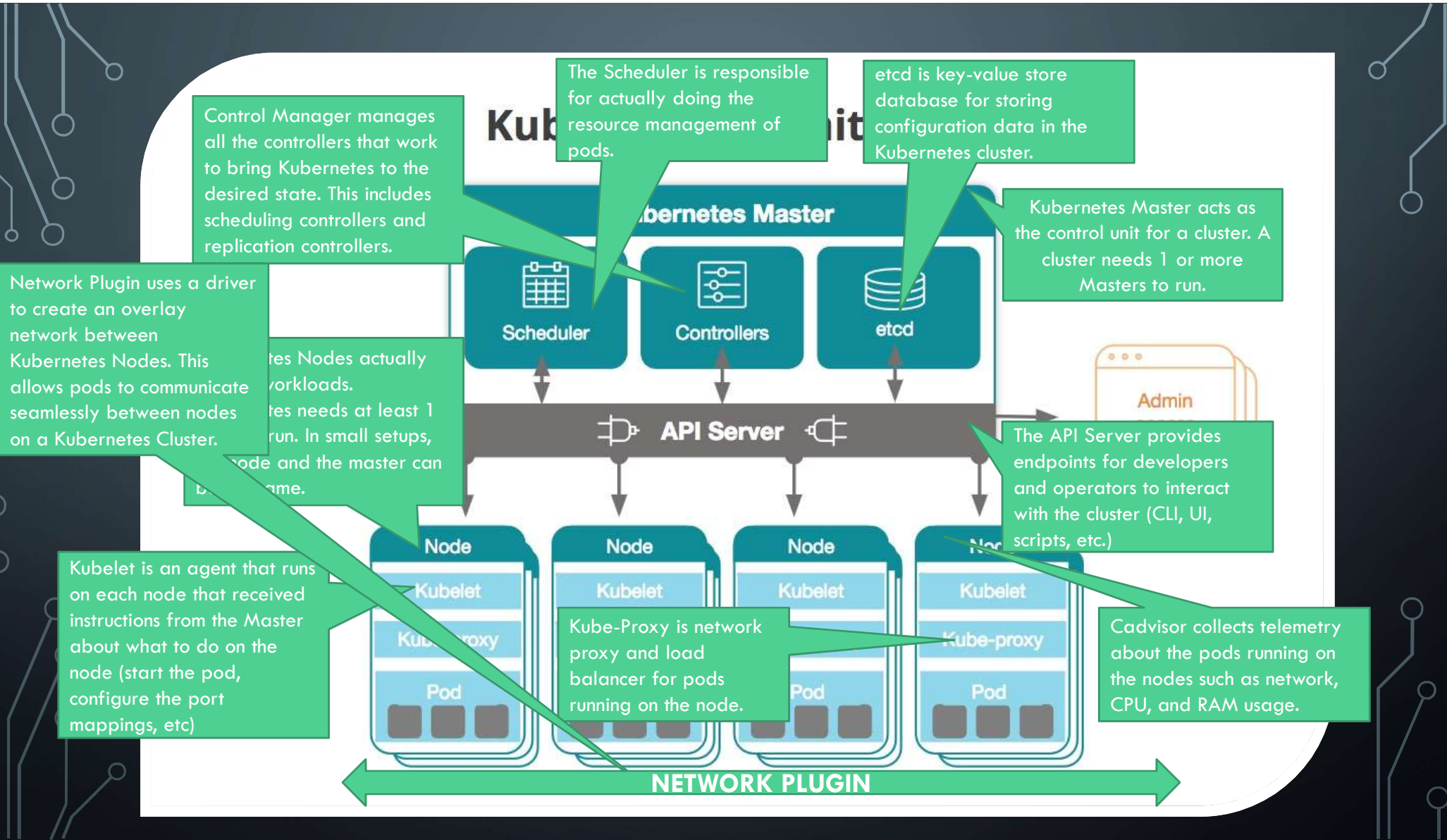**Manage the 2 use cases of PODs usage**

- 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.*
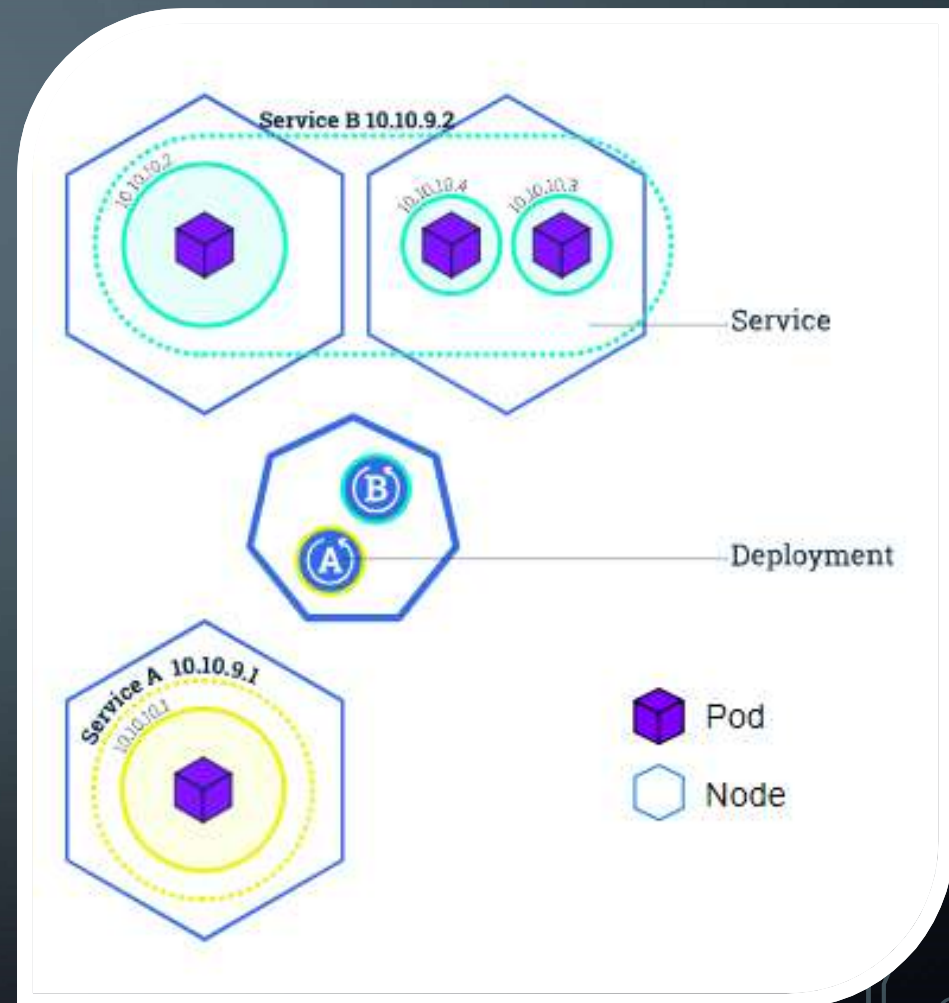
KUBERNETES TOOLS

- **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

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KUBERNETES PLAYGROUND

- https://www.katacoda.com/courses/kubernetes/playground

- https://www.katacoda.com/courses/kubernetes/

- https://www.katacoda.com/javajon/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=RNgjy31gFuI
- https://www.youtube.com/watch?v=qTYfDVvTGmk