What is Kubernetes?

edureka!

Topics For Today's DevOps Training

1. Need for Kubernetes
2. What exactly it is & what its not?
3. How does Kubernetes work?
4. Use-Case: Kubernetes @ Pokemon Go
5. Hands-on: Deployment with Kubernetes

Containers Are Good...

Both ***Linux Containers*** & ***Docker Containers*** isolate the application from the host.

FASTER, RELIABLE, EFFICIENT, LIGHT-WEIGHT & SCALABLE.

Damn! Container Problems...

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Damn! Container Problems...

Both ***Linux Containers*** & ***Docker Containers*** isolate the application from the host.

But.....Not easily Scalable...

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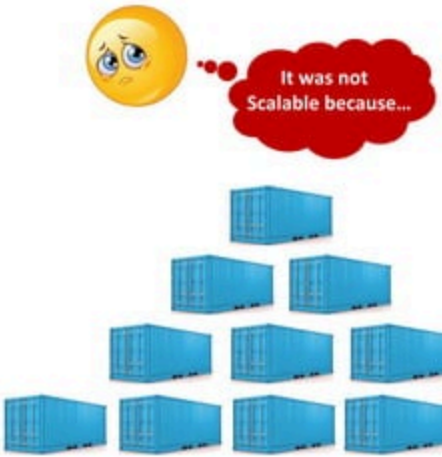
Problems With Scaling Up The Containers



1. Containers could not **communicate** with each other
2. Containers had to be **deployed appropriately**
3. Containers had to be **managed carefully**
4. **Auto scaling** was not possible
5. **Distributing traffic** was still challenging

So, What Is Needed?

A Container Management Tool !!!

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

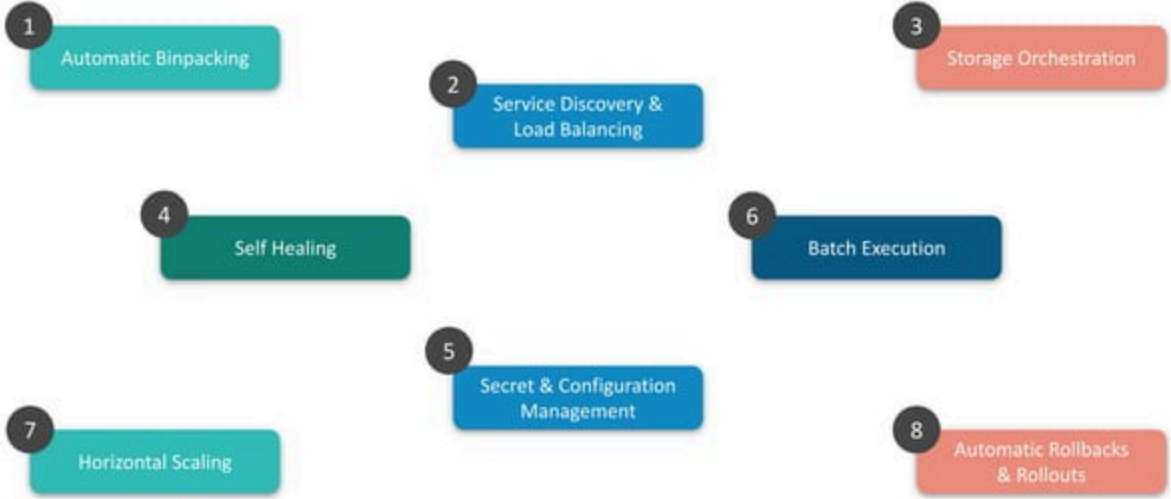
Benefit**: Works brilliantly with all cloud vendors: **Public, Hybrid & On-Premises.

More About Kubernetes

- Written on Golang, it has a huge community because it was first developed by Google & later donated to **CNCF**
- Can group 'n' no of containers into one logical unit for managing & deploying them easily

Reference: https://kubernetes.io/

Features Of Kubernetes

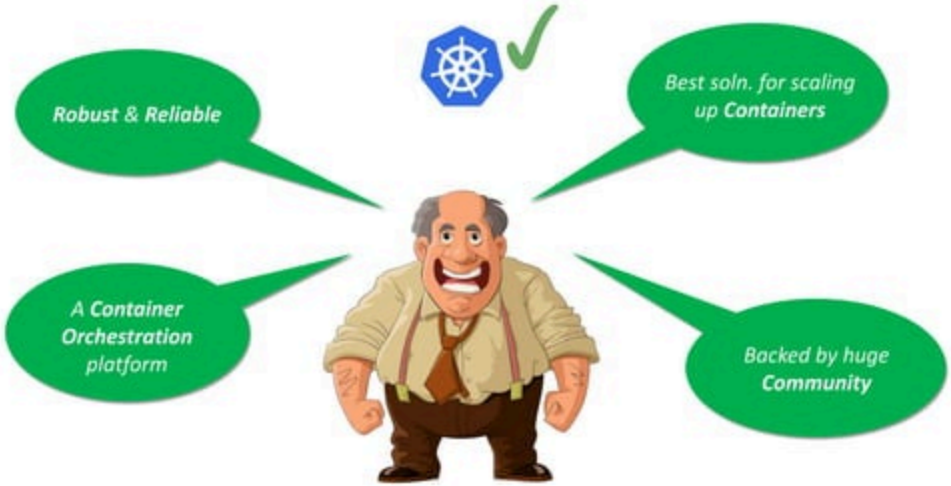


Uncovering Few Myths About

KUBERNETES

Kubernetes 'IS NOT'

Kubernetes 'ACTUALLY IS'

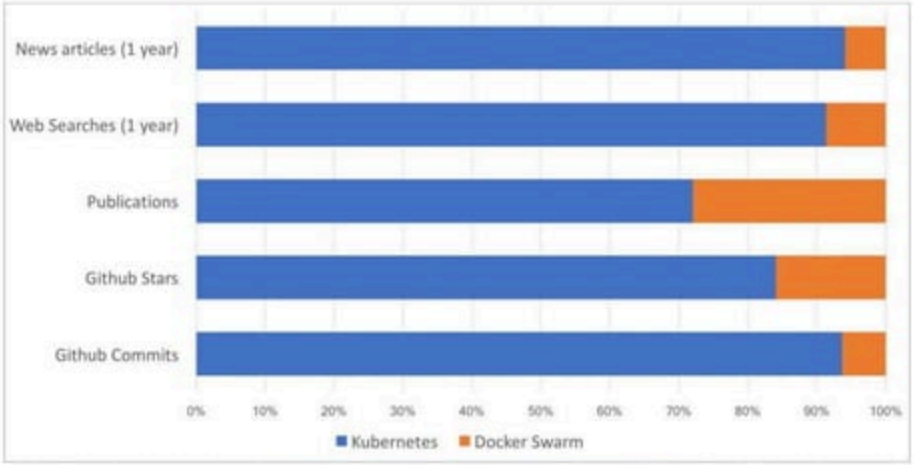



Kubernetes
vs.
Docker ??
Kubernetes
vs.
Docker Swarm ??

Kubernetes vs. Docker Swarm

FEATURES	Kubernetes 	Docker Swarm 
Installation & Cluster configuration	Complicated & time consuming	Easy & fast
GUI	GUI available	GUI not available
Scalability	Scaling up is slow compared to Swarm; but guarantees stronger cluster state	Scaling up is faster than K8S; but cluster strength not as robust
Load Balancing	Load balancing requires manual service configuration	Provides built in load balancing technique
Updates & Rollbacks	Process scheduling to maintain services while updating	Progressive updates and service health monitoring throughout the update
Data Volumes	Only shared with containers in same Pod	Can be shared with any other container
Logging & Monitoring	Inbuilt logging & monitoring tools	Only 3rd party logging & monitoring tools

Kubernetes vs. Docker Swarm Mindshare



Reference: https://platform9.com/blog/kubernetes-docker-swarm-compared/

Pokemon Go Using Kubernetes

Use-Case

Kubernetes @ Pokemon GO

Pokemon Go is an augmented reality game developed by **Niantic** for Android & iOS devices.

"We believe that people are healthier when they go outside and have a reason to be connected to others."

- **Edward Wu,** Director of Software Engineering, ***Niantic Labs***

★ **KEY STATS:-**

- **500+ million** downloads, **20+ million** daily active users
- Initially launched only in NA, Australia & New Zealand
- Inspired users to walk over 5.4 billion miles in a year
- Surpassed engineering expectations by 50 times

Backend Architecture Of Pokemon Go Container

MapReduce & Cloud DataFlow For Scaling-Up

Easy Scaling Of Containers Using Kubernetes

Easy Scaling Of Containers Using Kubernetes

CHALLENGE

- *Biggest challenge for most applications is **horizontal scaling***
- *But for Pokemon Go, **vertical scaling** was also a major challenge, because of **real-time activity in gaming environment** from millions of users world-wide*
- *Niantic were prepared for traffic disasters of upto x5 times*

Easy Scaling Of Containers Using Kubernetes

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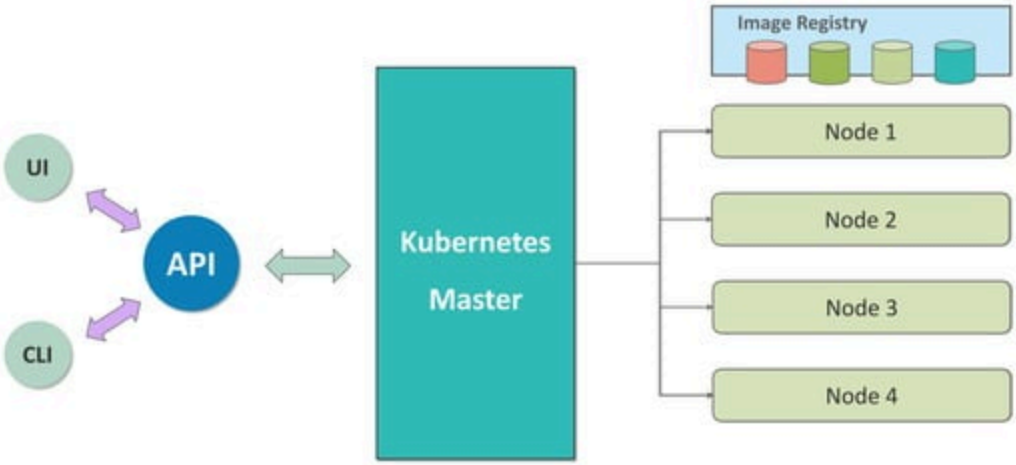
SOLUTION

- *Thanks to **Kubernetes**, Niantic were able to handle x50 times traffic*

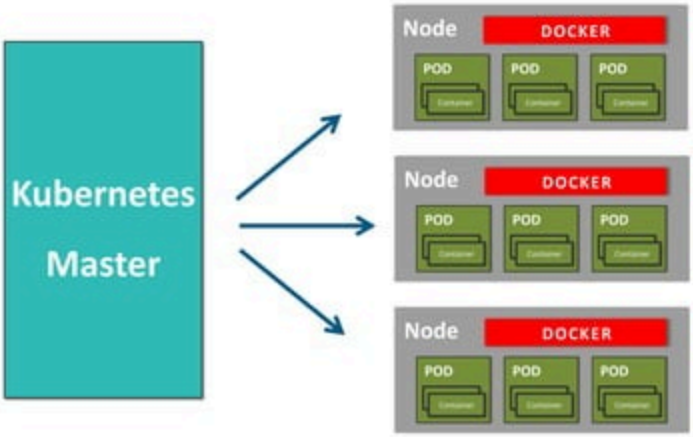
Architecture Of

KUBERNETES

Kubernetes Architecture



Working Of Kubernetes



- → ***Master*** *controls the cluster; and the nodes in it*
- → ***Nodes*** *host the containers inside them; Containers are inside separate PODS*
- → ***PODS*** *are logical collection of containers which need to interact with each other for an Application*

- → **Replication Controller** is Master's resource to ensure that requested no. of pods are running on nodes always
- → **Service** is an object on Master that provides load balancing across a replicated group of PODS

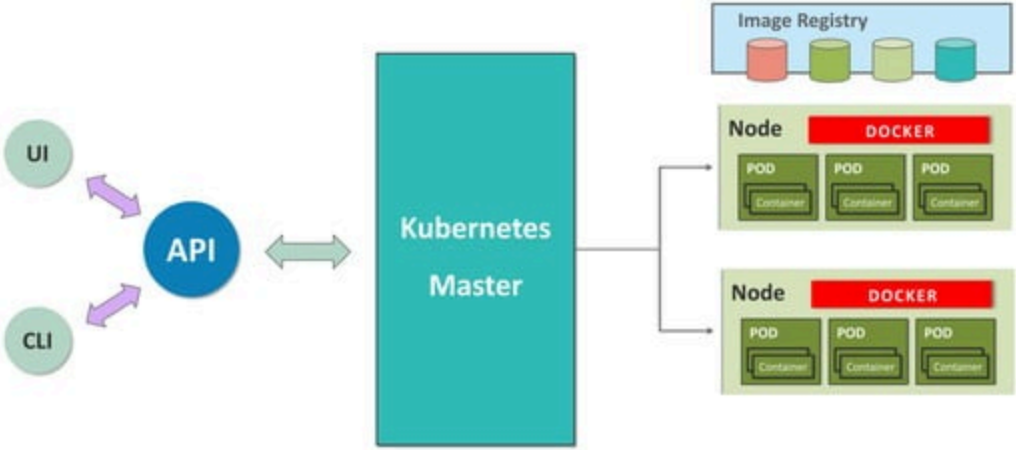


Image Registry
UI
API
CLI
Kubernetes
Master
Node
DOCKER
POD
Container
POD
Container
POD
Container
Node
DOCKER
POD
Container
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Container
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Container

Hands-On

KUBERNETES

Thank You

For more information please visit our website
www.edureka.co