

Kubernetes and Container Orchestration

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Quick Refresher on Containers

Kubernetes

It came from the BORG!!!

The Borg is program/framework that Google uses to run it's data centers and it's written in C

Some guys at Google were tired of C and decide to make a new distrubuted system in Go.

Quick Vocab lesson

Pods - A group of containers, (get it a group of whales is a pod haha)

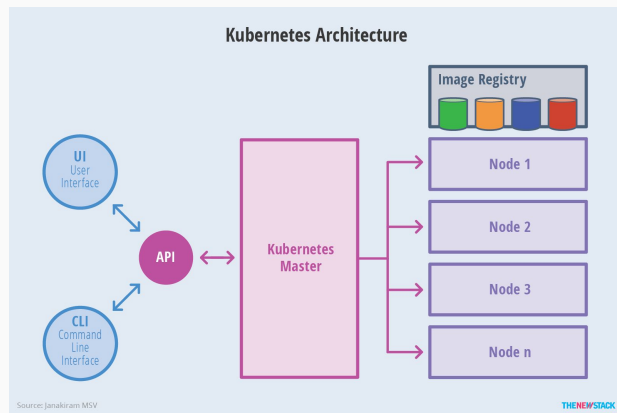
ReplicaSet - How many copies of a pod do you want running

Deployment = ReplicaSet++

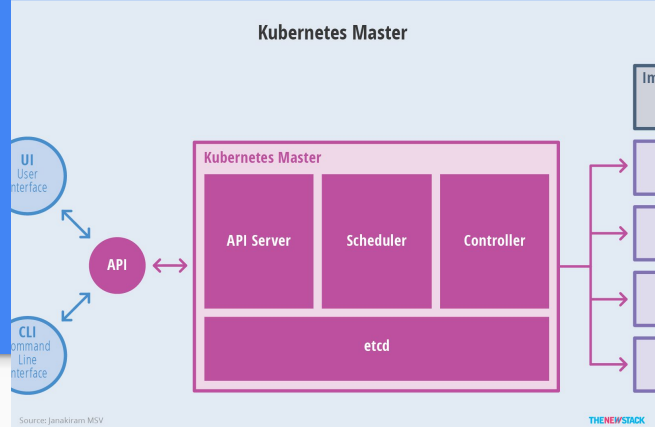
Kubernetes Architecture

Two main parts:

1. Master nodes that ingress traffic and make sure that everything is running correctly
2. Regular nodes run your containers



Details about the master node



There can be multiple masters, because redundancy matters.

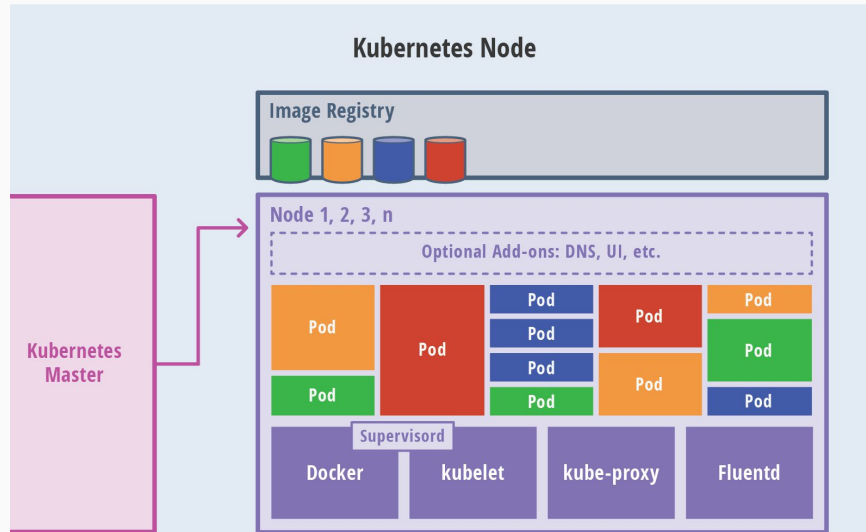
The master acts as an ingress and load balancer for all of your network traffic

The masters handle scheduling of pods, and damage control when a node falls over.

Supports /etcd, a really cool distributed file/messaging system. This is one of the main ways the cluster talks to itself.

The nodes

These run your pods and make you money!!!



The nodes

Each node has a couple of things running in the background

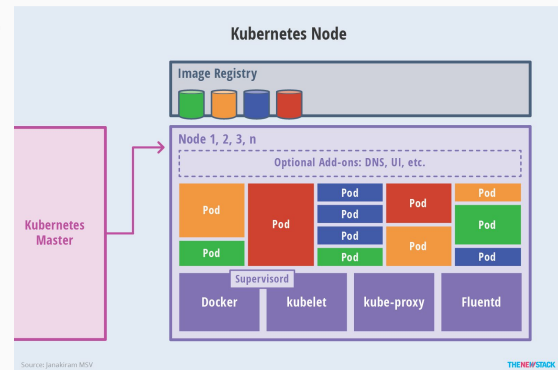
A Kubelet (borglet) daemon handles talking to the master

A Docker Daemon

A proxy service that does a lot of network black magic.

Fluentd, a service that does a lot of logging

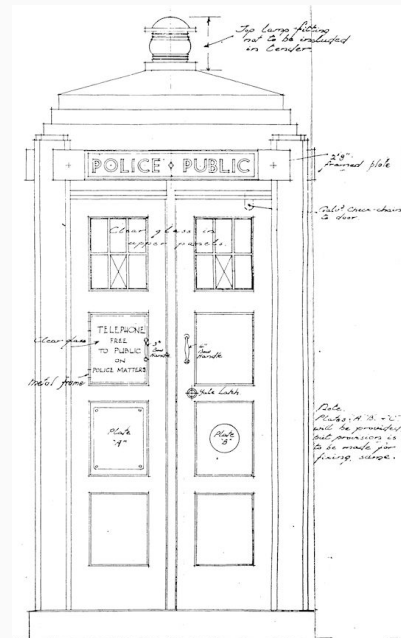
Optional add ons to make you life better



The Image Registry

This is a server that basically contains all of the blueprints for your boxes.

This is one place that can control what runs on your cluster.



Running Things on Your Shiny New Cluster

How does you Master Know what do

Yaml...

You define what you consider to be an optimal state of an object (pod, deployment, etc) in a yaml. Then the master node tries as hard as it can to reach and maintain that state.

What does this yaml look like?

A little ugly but very readable

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
        - name: nginx
          image: nginx:1.7.9
          ports:
            - containerPort: 80
```

Remember when I said scalability
was one of the main reasons
Kubernetes exists...

Lets run This on my tiny
Chromebook!!

Have you ever seen Inception...

A Kubernetes node in a

VM Running alongside a VM with a master

In a fedora container

In a Linux VM

Running on ChromeOS

Running on top of/with linux

Running on this laptop