

Kubernetes: beyond Minikube

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#BeyondMinikube

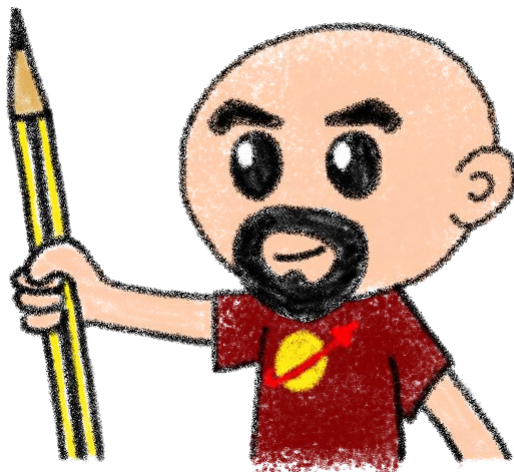
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Spaniard lost in Brittany,
developer, dreamer and
all-around geek



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Summary

What I would like to speak about:

- Orchestrating containers
- Kubernetes: some concepts
- I have deployed on Minikube, woah!
- From Minikube to prod
- Building a managed Kubernetes service



Orchestrating containers

Like herding cats... but in hard mode!



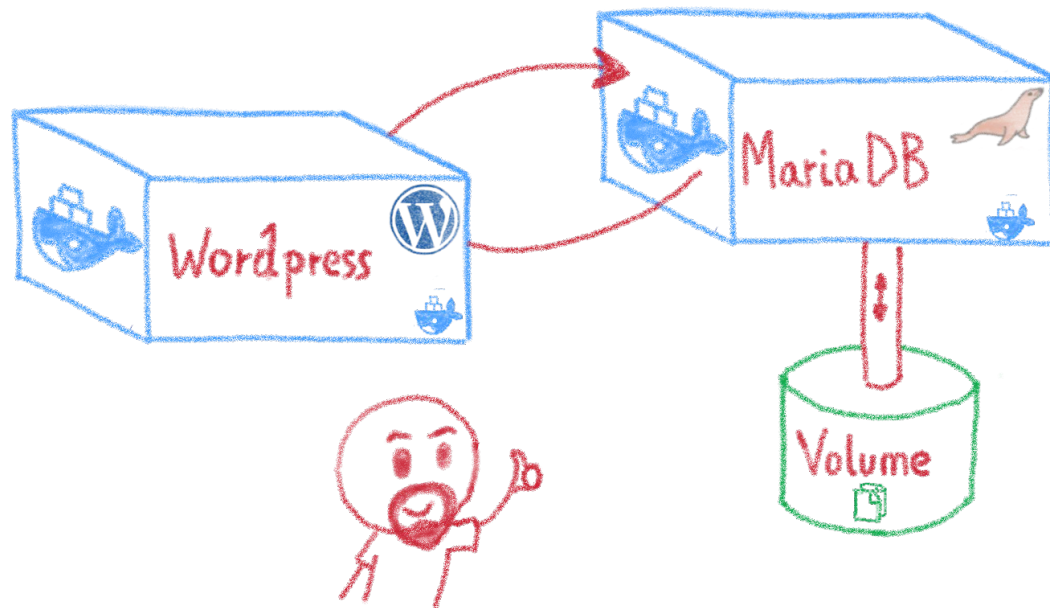
From bare metal to containers



Another paradigm shift



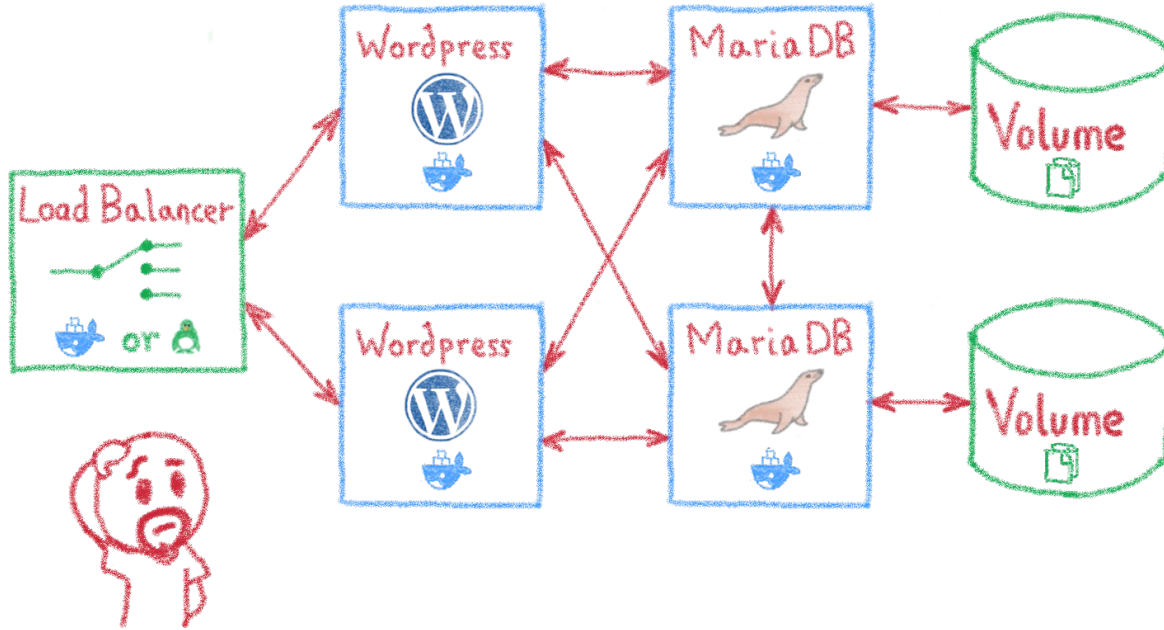
Containers are easy...



For developers



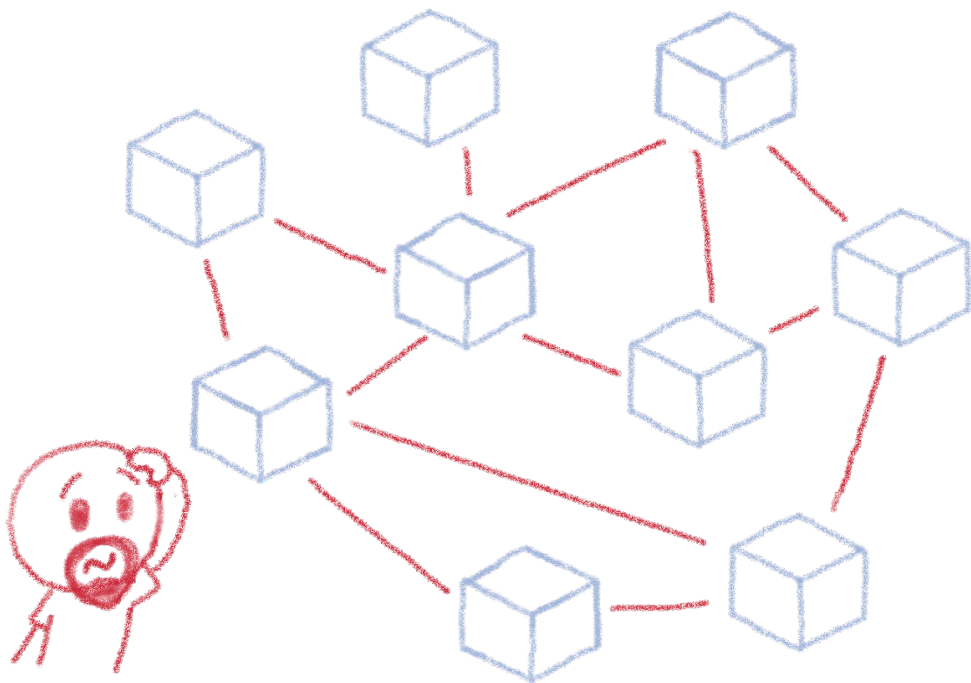
Less simple if you must operate them



Like in a production context



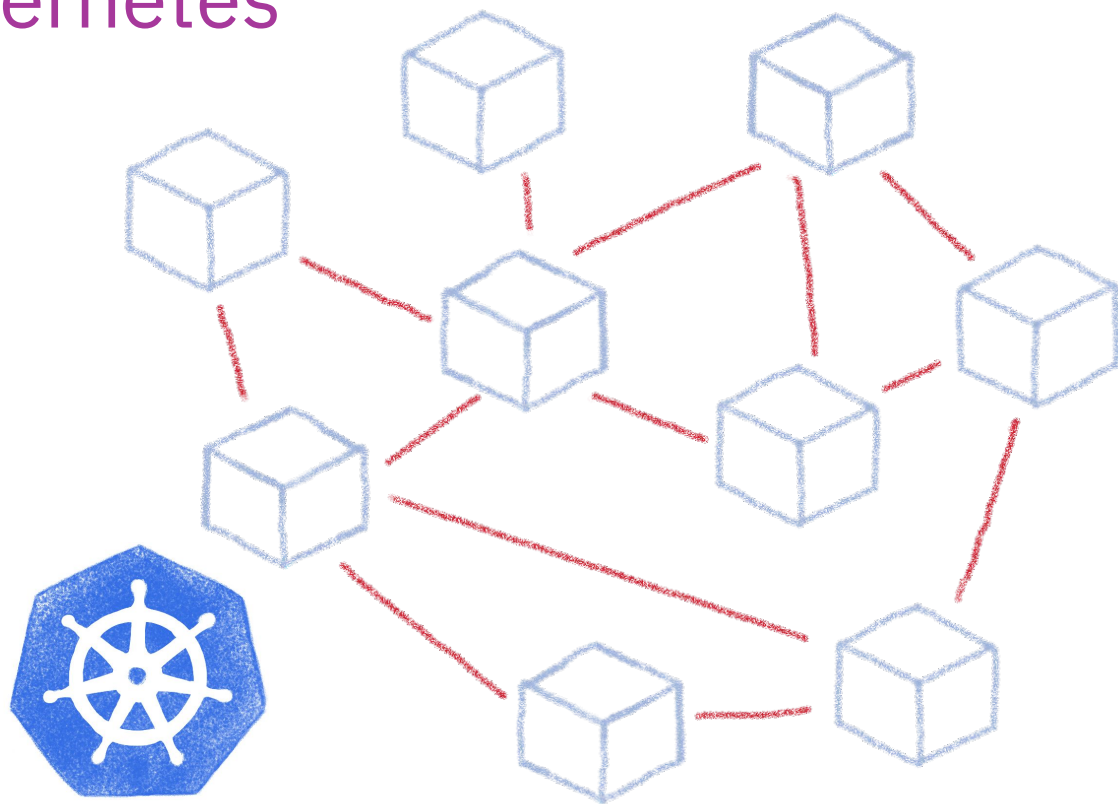
And what about microservices?



Are you sure you want to operate them by hand?



Taming microservices with Kubernetes



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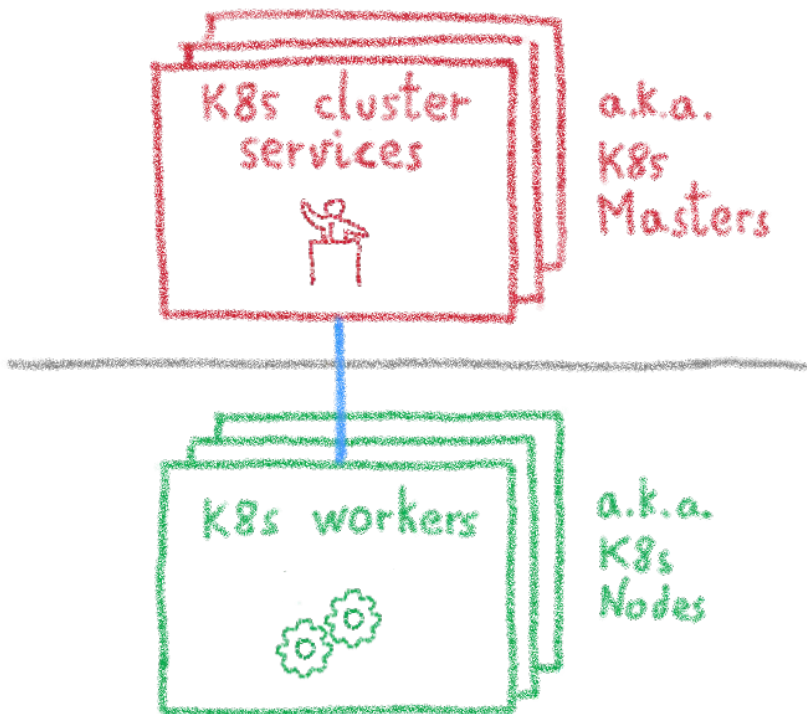
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Kubernetes

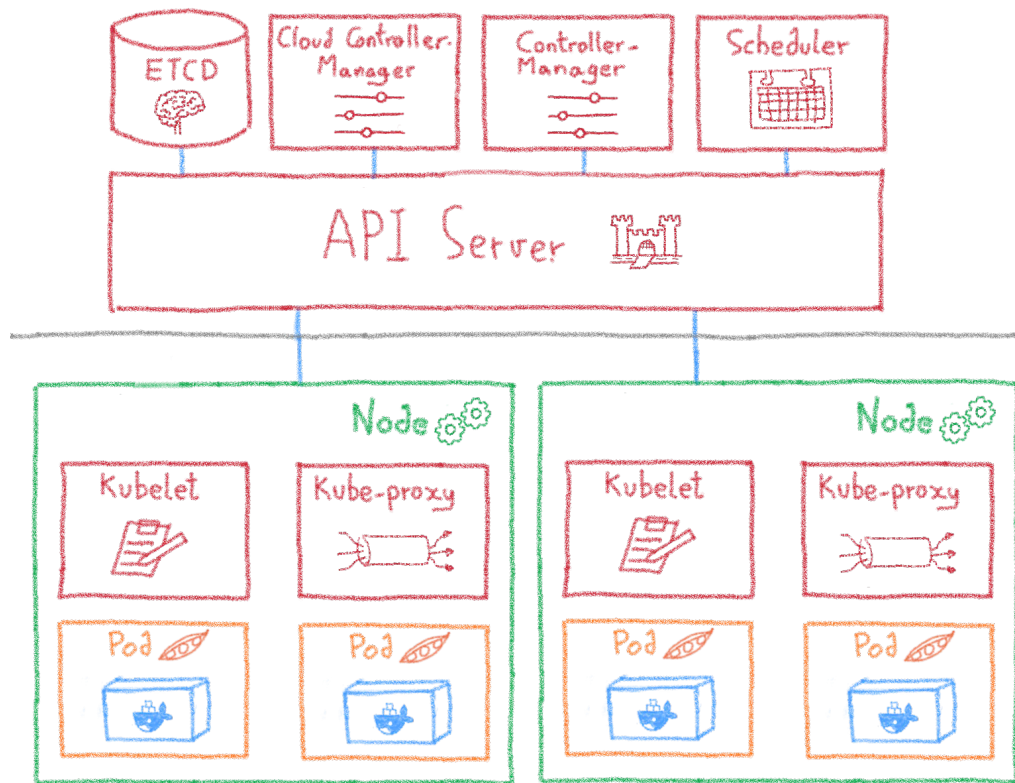
Way more than a buzzword!



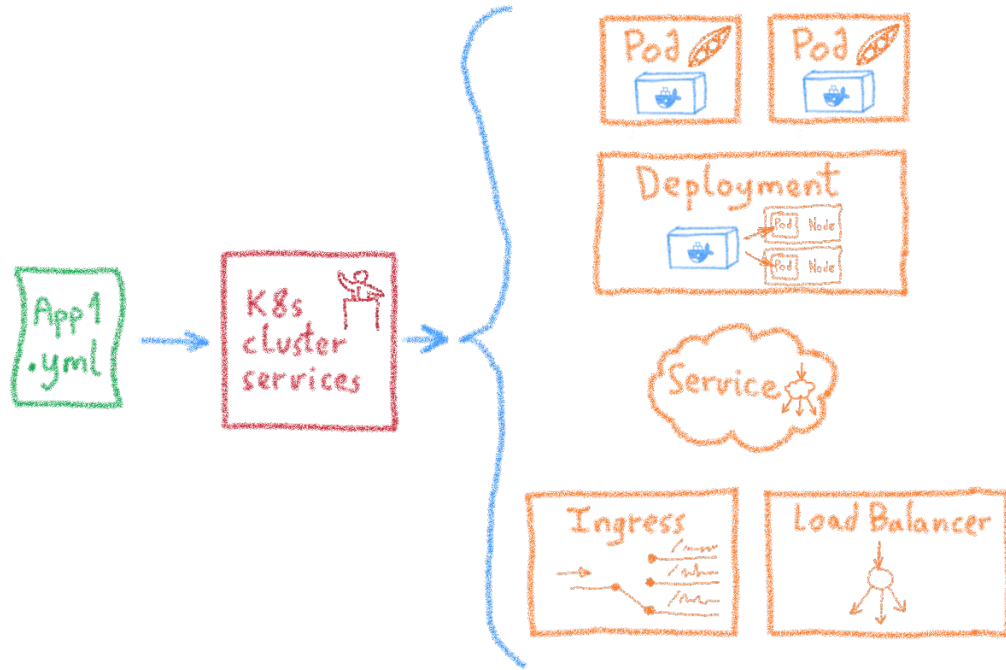
Masters and nodes



Some more details



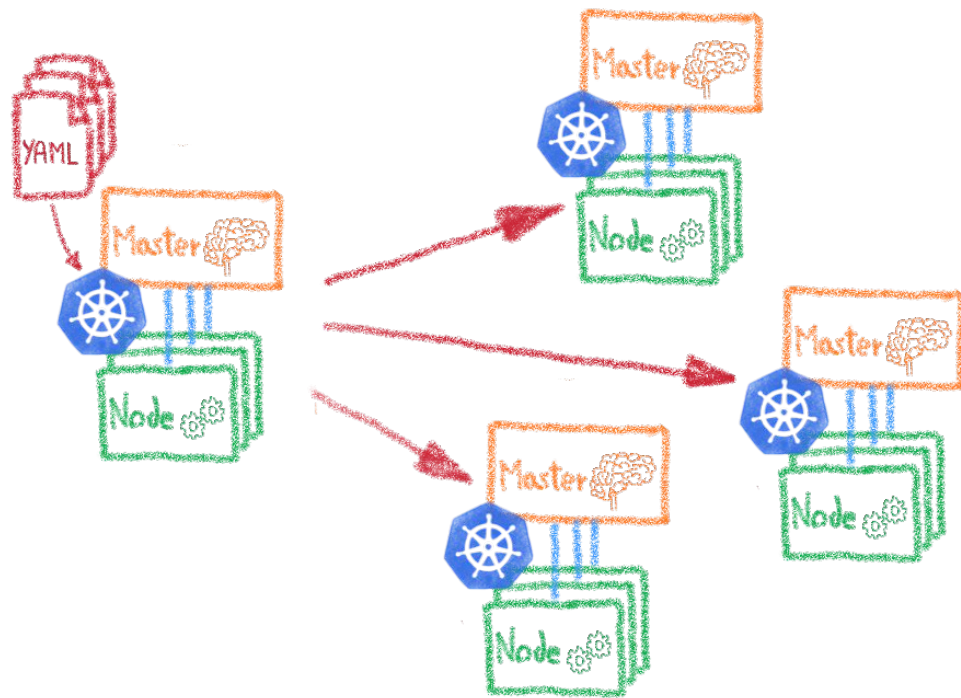
Desired State Management



Ingress
Services
Deployments
Pods
Sidecars
Replica Sets
Stateful Sets



Having identical, software defined environments



Dev envs

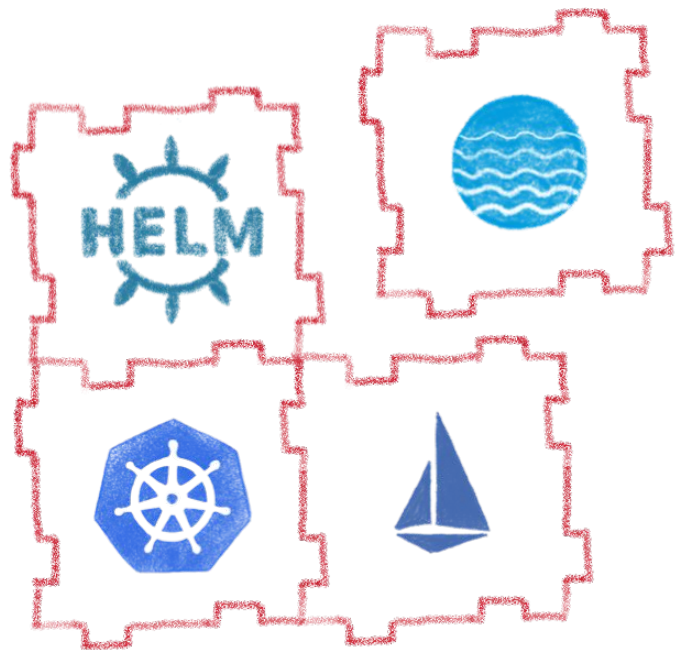
Staging

Multi-cluster

Multi-cloud



Extending Kubernetes



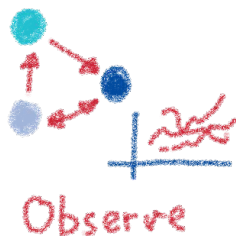
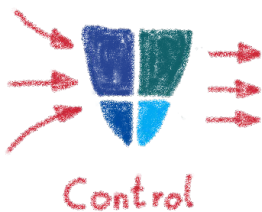
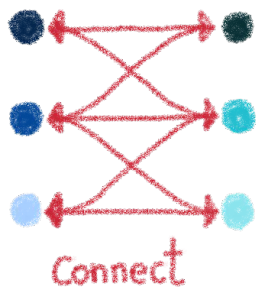
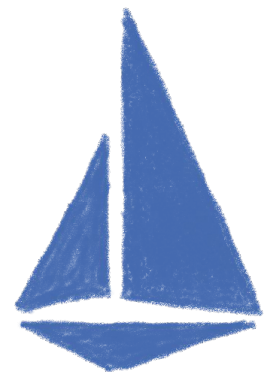
Fully extensible

- Kubernetes API
- Cluster demons
- Controllers
- Custom resources
- ...

Operators



Extension example: Istio, a service mesh for Kubernetes



Rolling upgrades

A/B Testing

Canary Testing

Edge traffic management

Multicloud service mesh

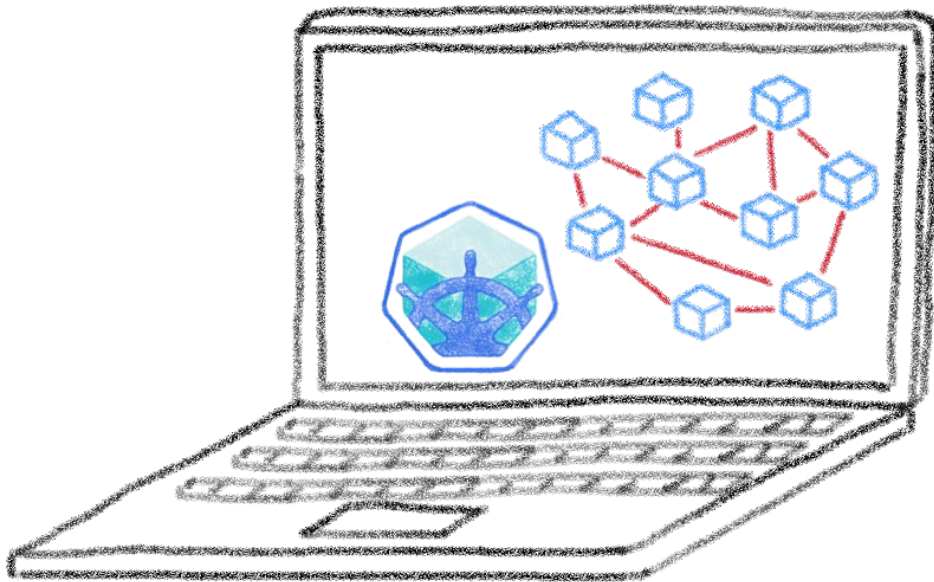


Minikube: K8s on my laptop

A great fastlane into Kubernetes



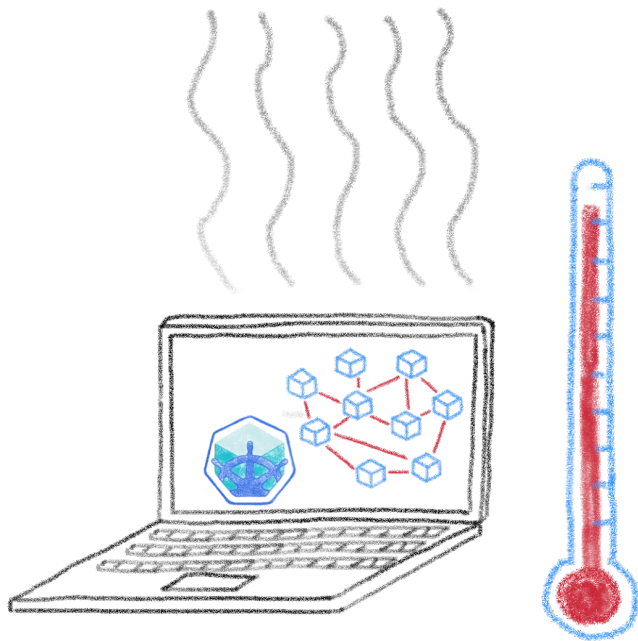
Running a full K8s in your laptop



A great learning tool



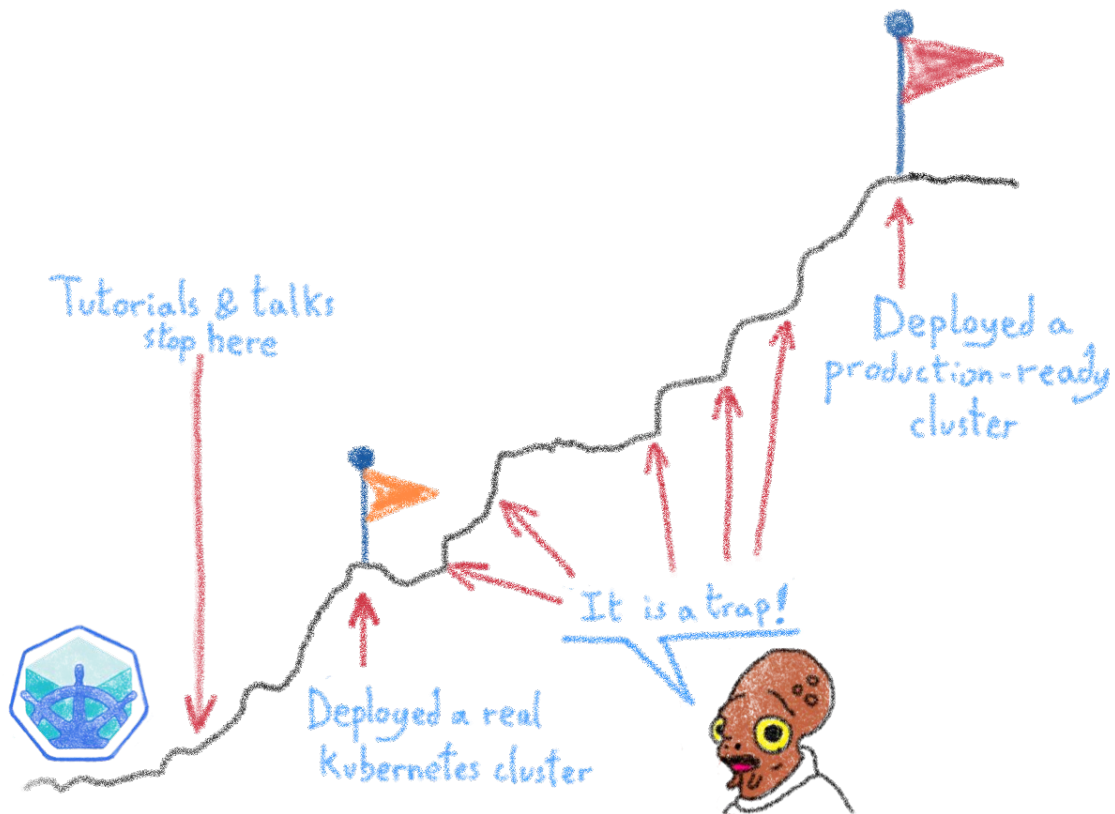
Your laptop isn't a true cluster



Don't expect real performances



Minikube is only the beginning

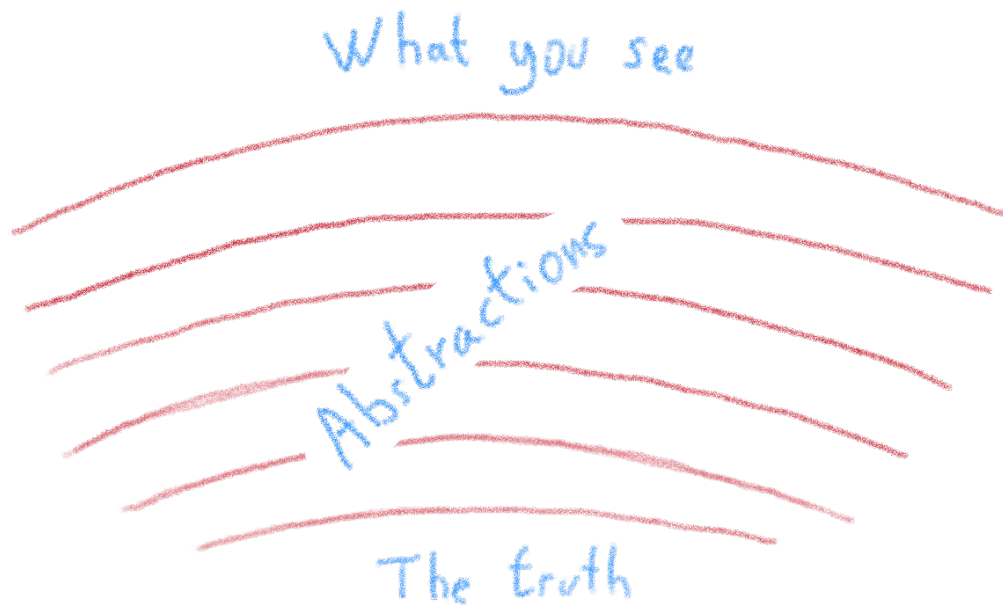


From Minikube to prod

A journey not for the faint of heart



The truth is somewhere inside...



The network is going to feel it...



Network plugins (Flannel, Calico, Weave...)

- IPAM
- iptables
- routing
- crossnode networking

Cluster IP, NodePort, Ingress

Service Meshes, Istio



The security journey

Your security journey

Set up a cluster

- Restrict access to kubectl
- Use RBAC
- Use a Network Policy
- Use namespaces
- Bootstrap TLS

Follow security hygiene

- Keep Kubernetes updated
- Use a minimal OS
- Use minimal IAM roles
- Use private IPs on your nodes
- Monitor access with audit logging
- Verify binaries that are deployed

Prevent known attacks

- Disable dashboard
- Disable default service account token
- Protect node metadata
- Scan images for known vulnerabilities

Prevent/limit impact of microservice compromise

- Set a Pod Security Policy
- Protect secrets
- Consider sandboxing
- Limit the identity used by pods
- Use a service mesh for authentication & encryption

Mattias Gees
@MattiasGees

Your security journey with Kubernetes by @MayaKaczorowski
#GoogleNext18

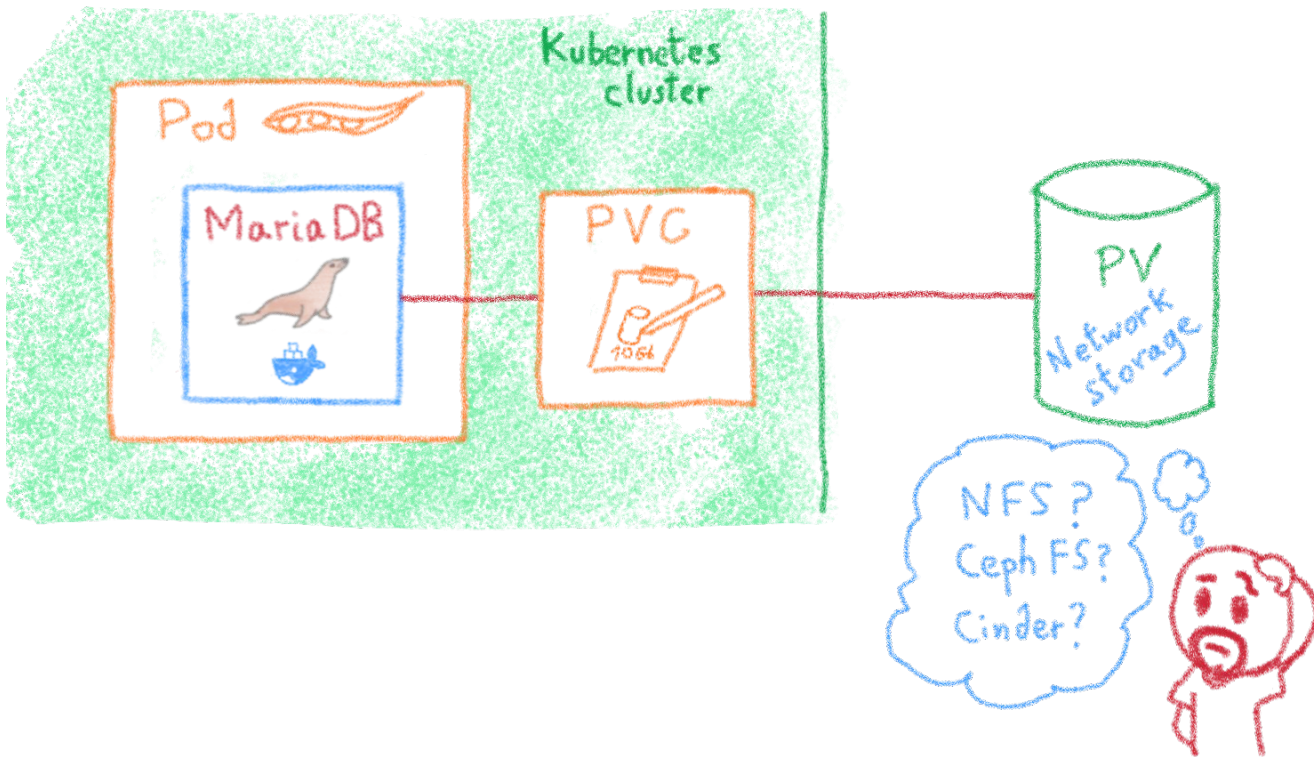
319 12:59 PM - Oct 11, 2018

Open ports (e.g. etcd 2379/tcp)
Kubernetes API (e.g. Tesla hacking)
Exploits (lots of CVEs)
RBAC (e.g. badly defined roles)

Are you kidding me?



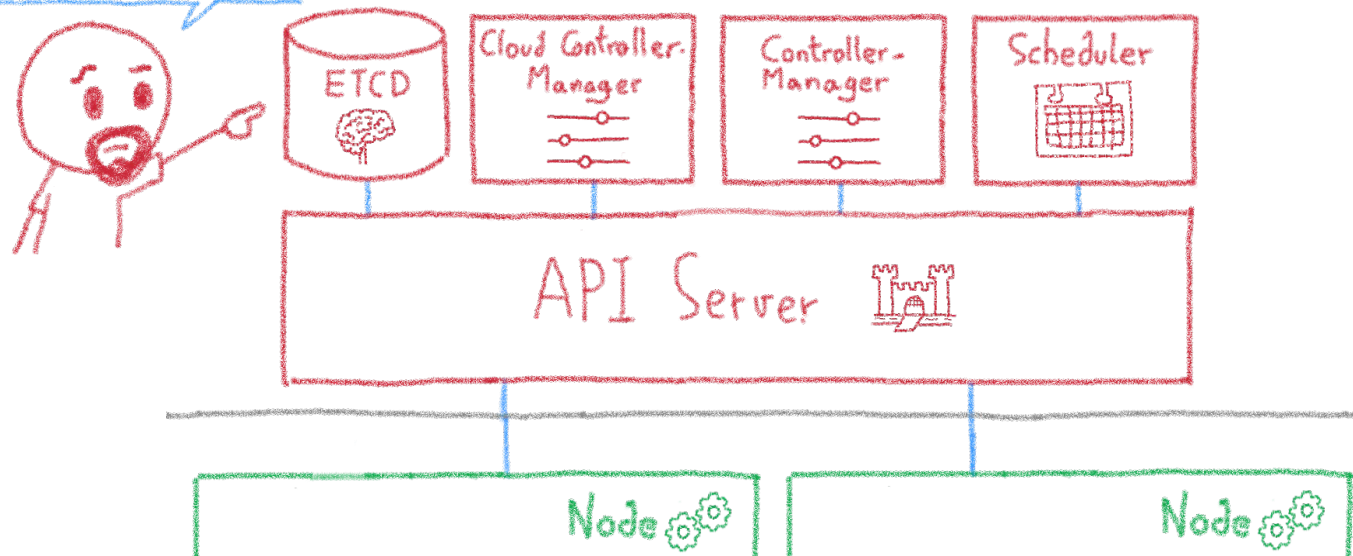
The storage dilemma



The ETCD vulnerability

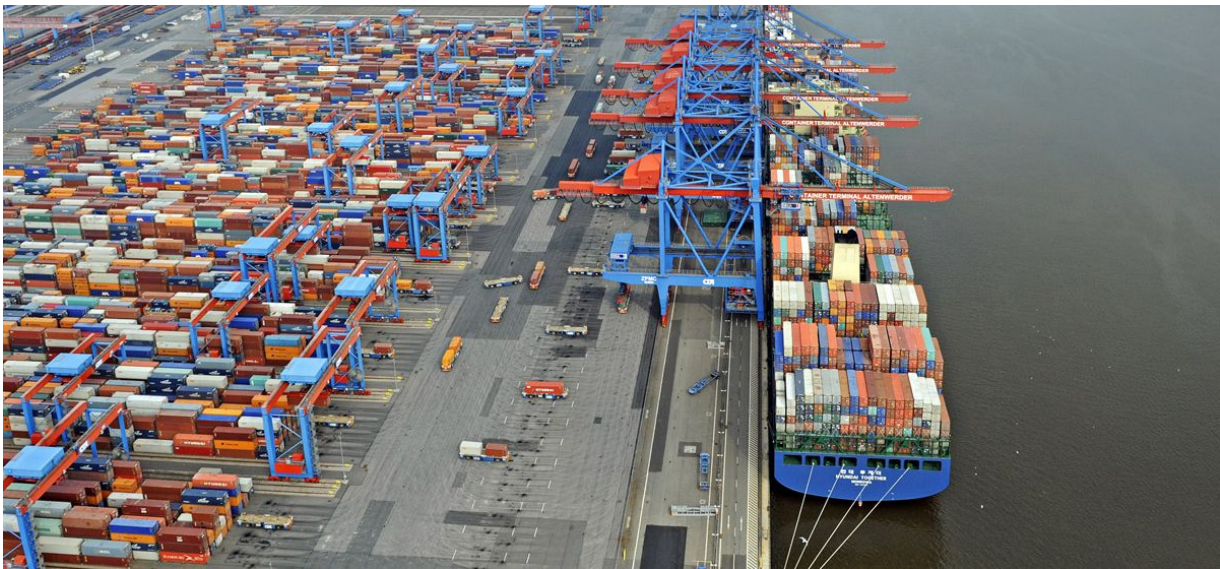


A single instance ETCD?
Are you sure?

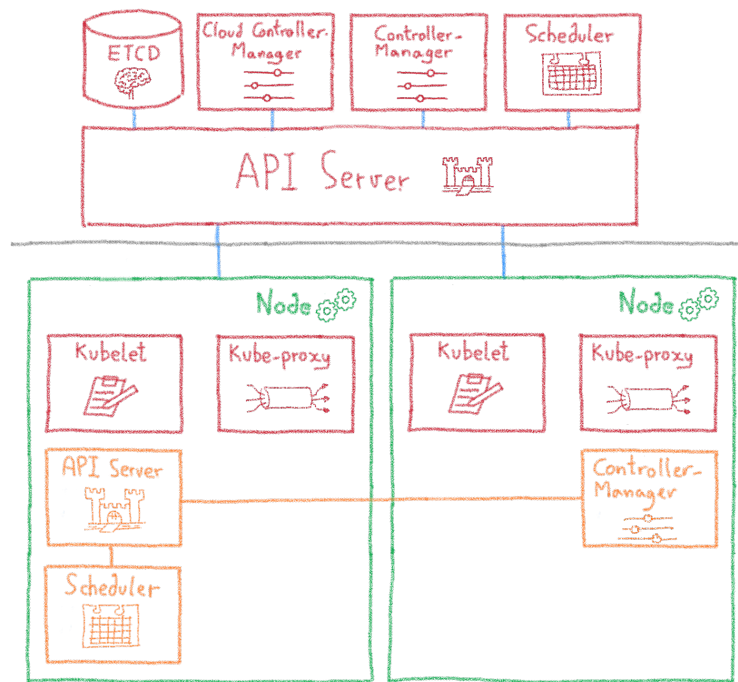


Managed Kubernetes

Don't try it at home, folks!



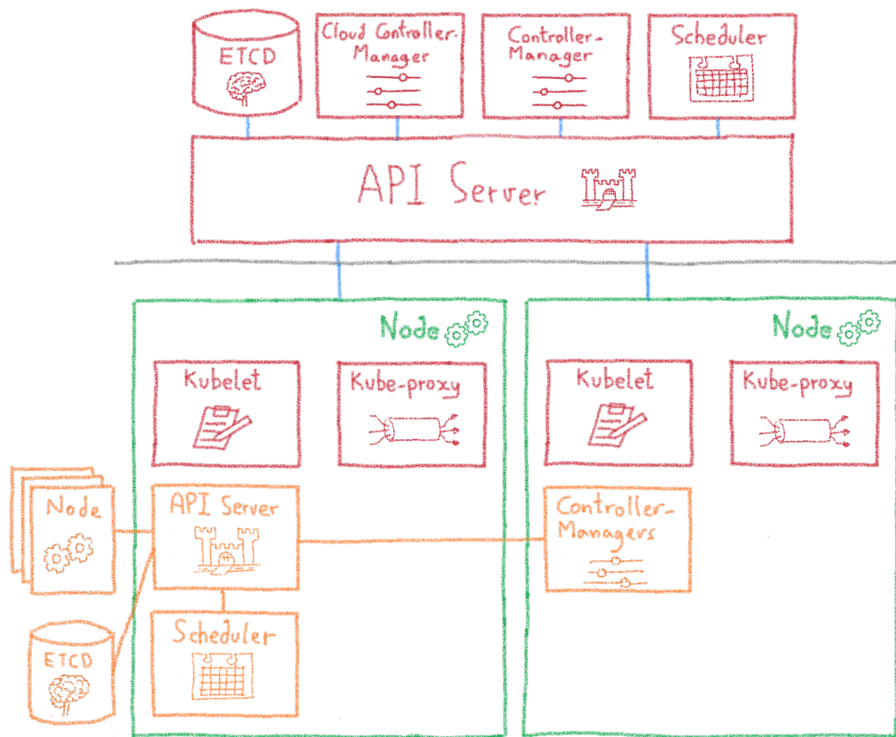
Kubinception: running K8s on K8s



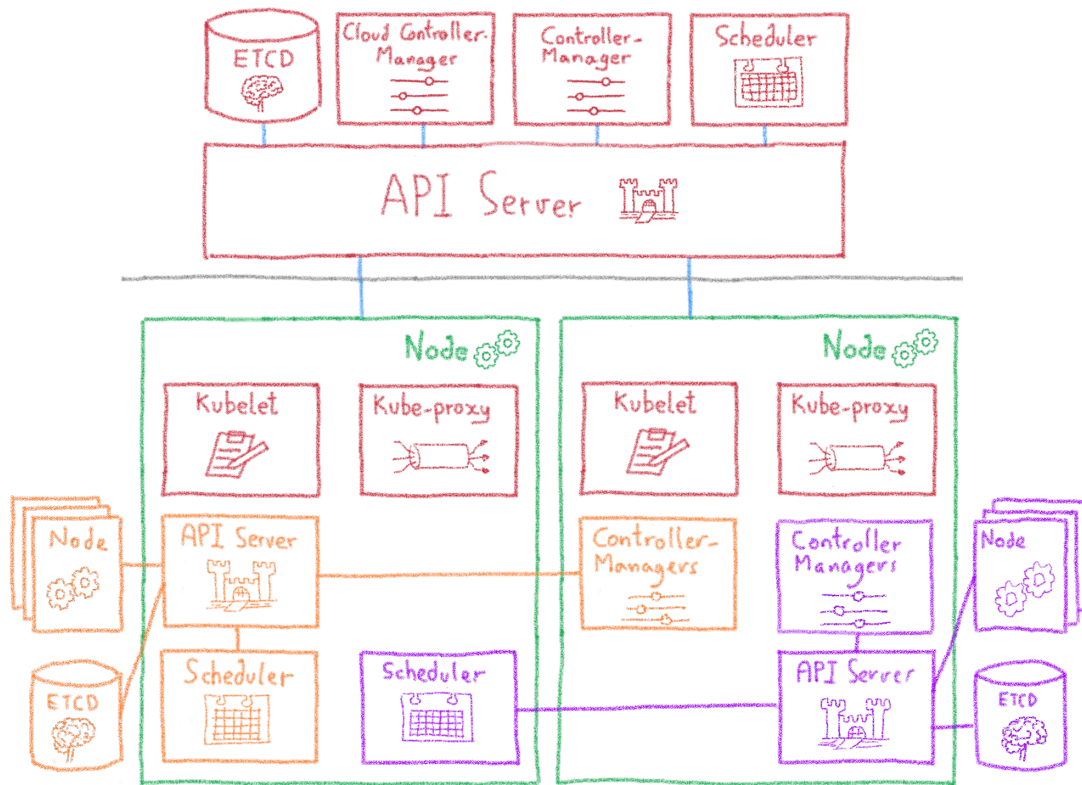
Using Kubernetes to run Kubernetes



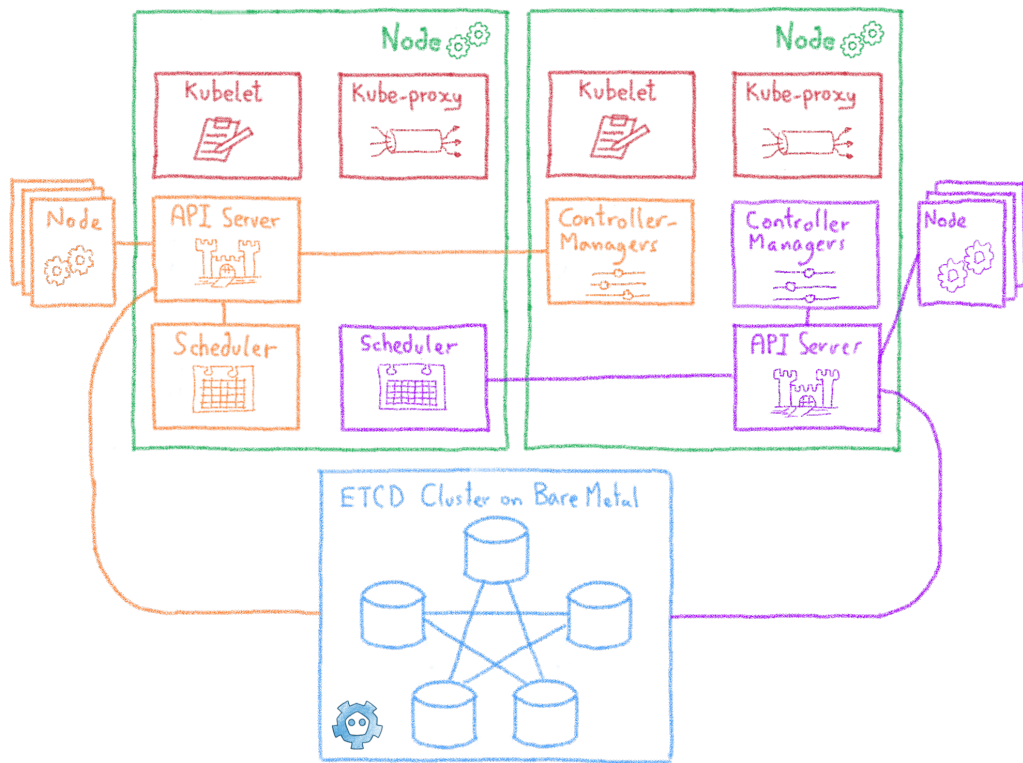
Kubinception: where are the nodes?



Kubinception with several customers



And the ETCD?

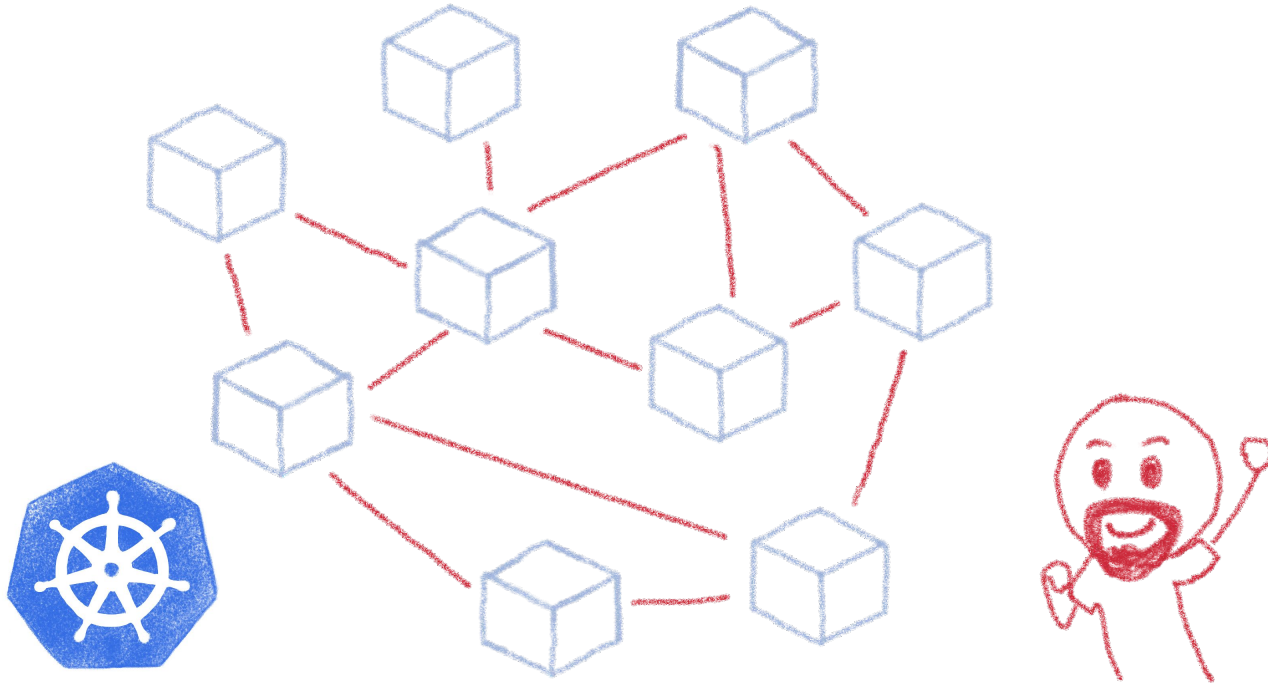


Conclusions

And the point was?



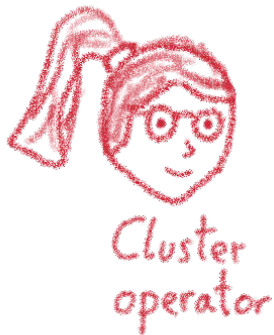
Kubernetes is powerful



It can make Developers' and DevOps' lifes easier



Different roles



Very different skill sets and knowledge needed



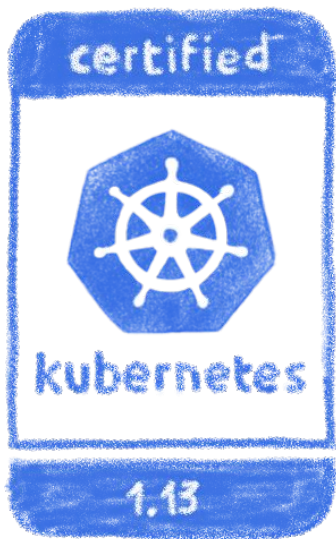
Most companies don't need to operate the clusters



As they don't build and rack their own servers!



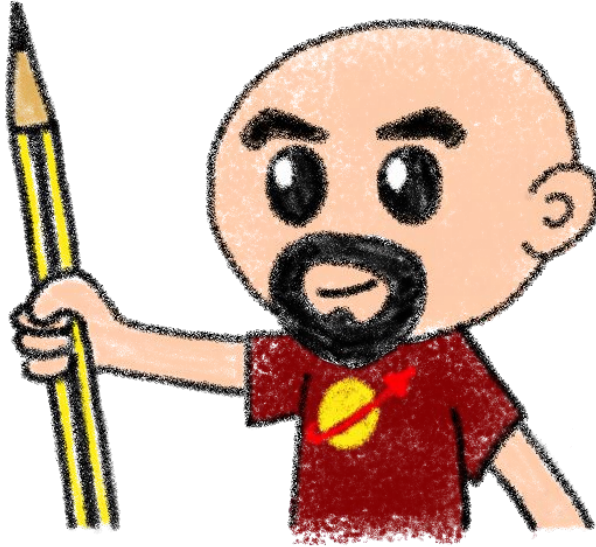
If you don't need to build it,
choose a certified managed solution



You get the cluster, the operator get the problems



Do you want to try?



Send me an email to get some vouchers...
horacio.gonzalez@corp.ovh.com

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