Introduction to Kubernetes

Aakansha Priya

Hey, I'm Aakansha!

Developer Relations @EmpathyOps

Organiser @KubeHuddle Toronto

KCNA Certified I Preparing for CKA

Love community management, hosting x-spaces, travelling, speaking at conferences, painting & music!

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Have you heard
about Containers?
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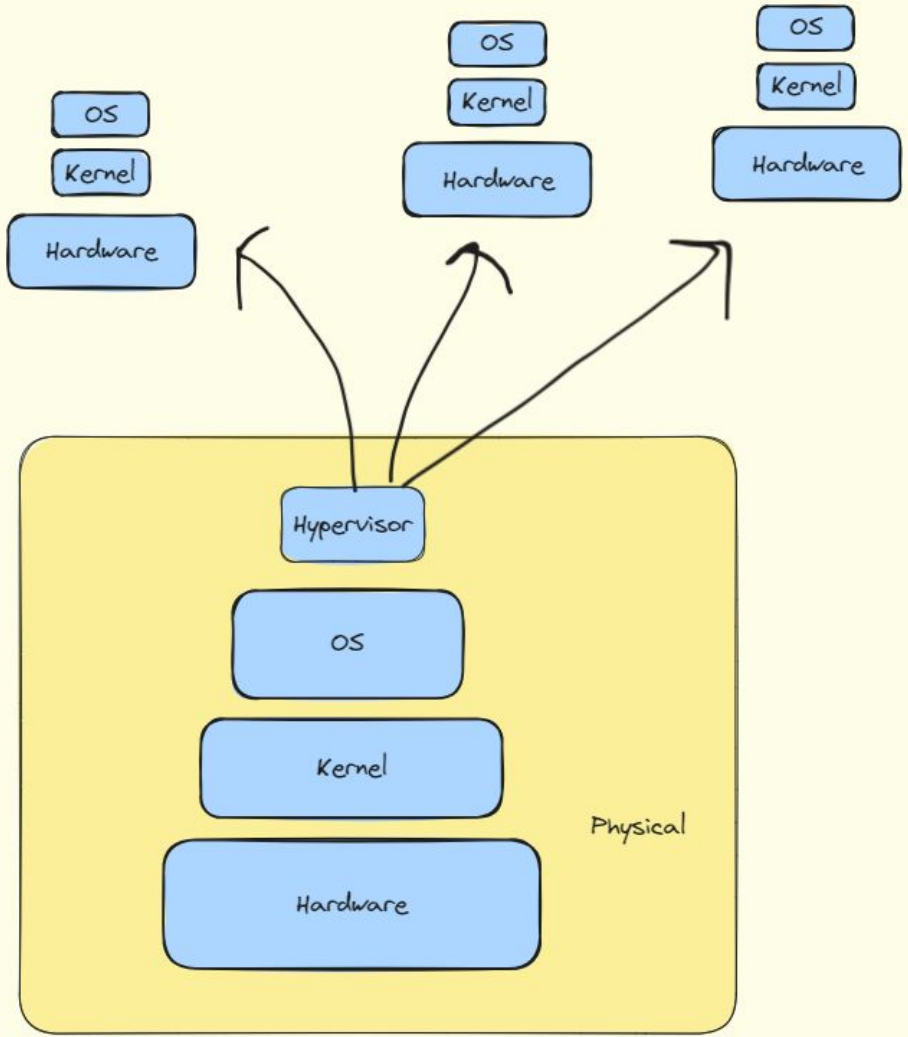
That's a Virtual Machine



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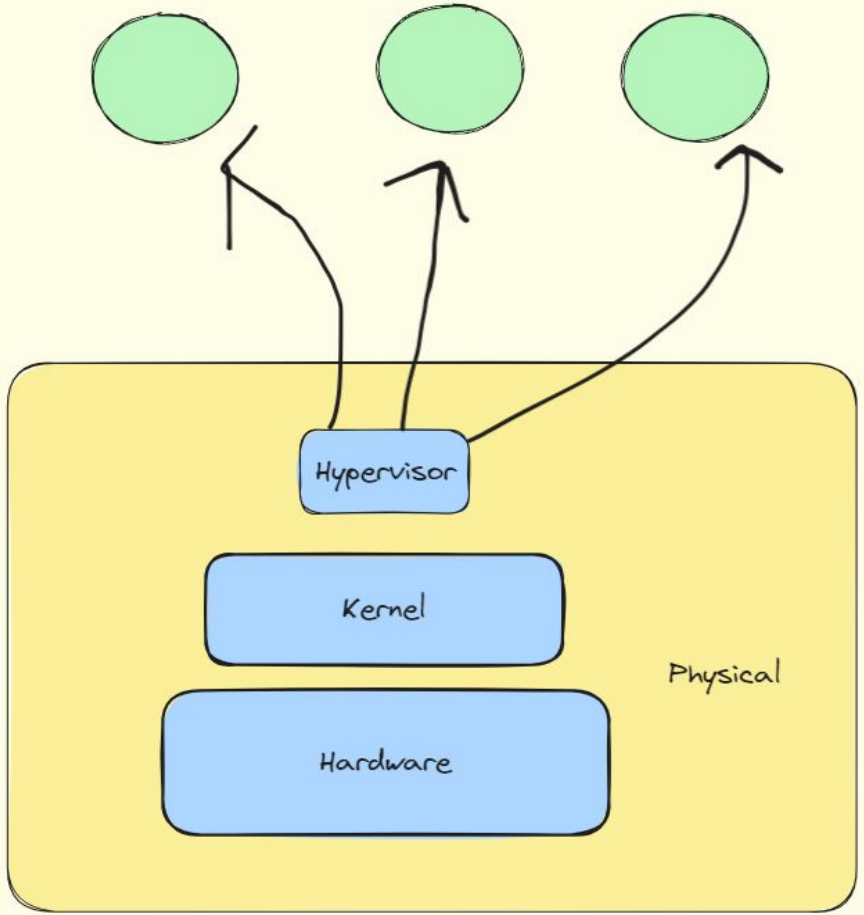
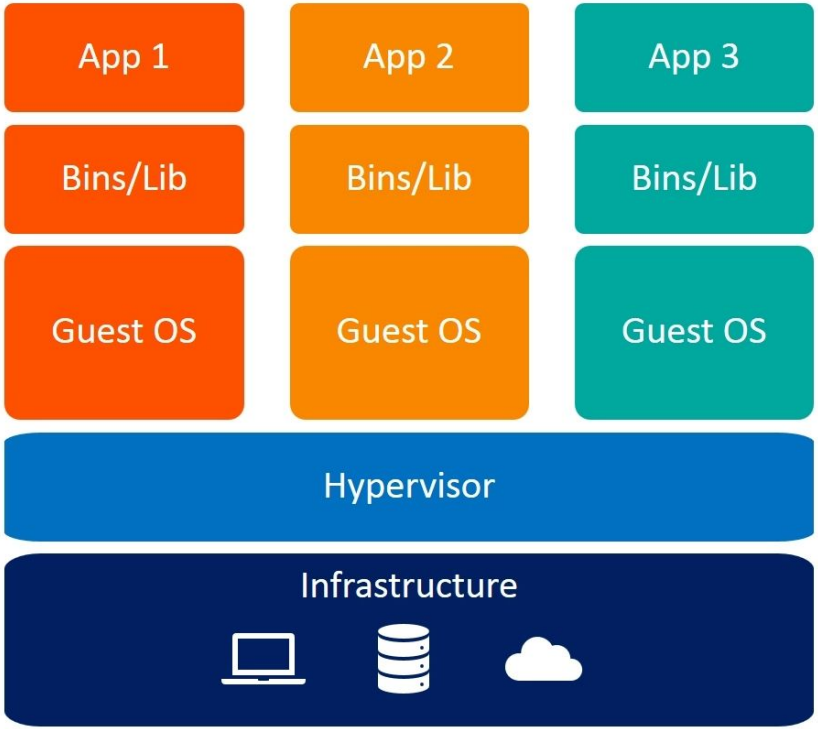
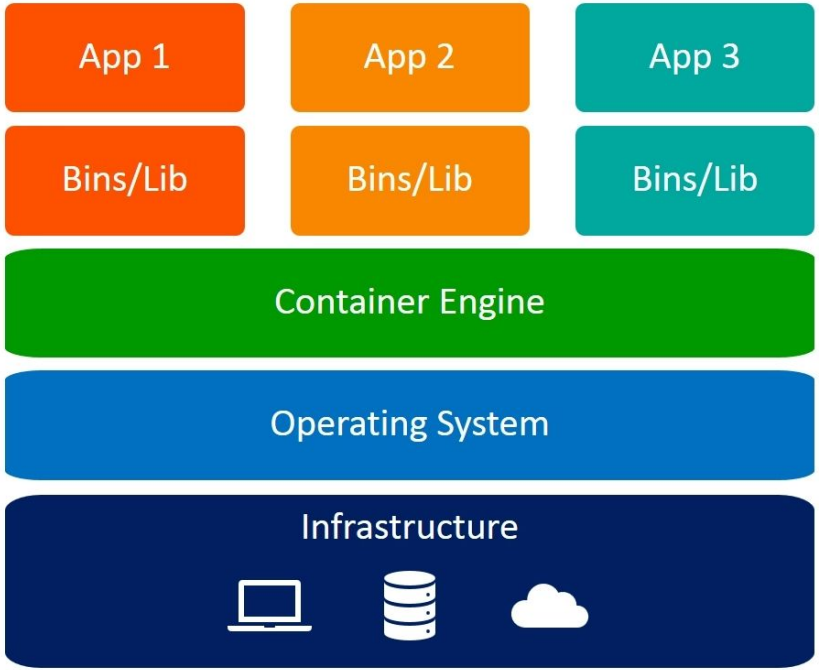
And that's a Container



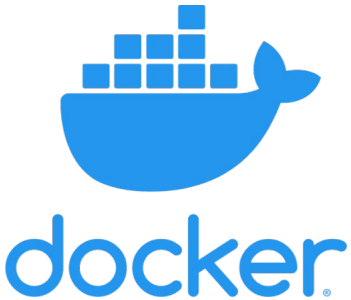


Virtual Machines



Containers

Why are we talking about containers?



They create and manage containers

Kubernetes entered the chat - As an orchestrator

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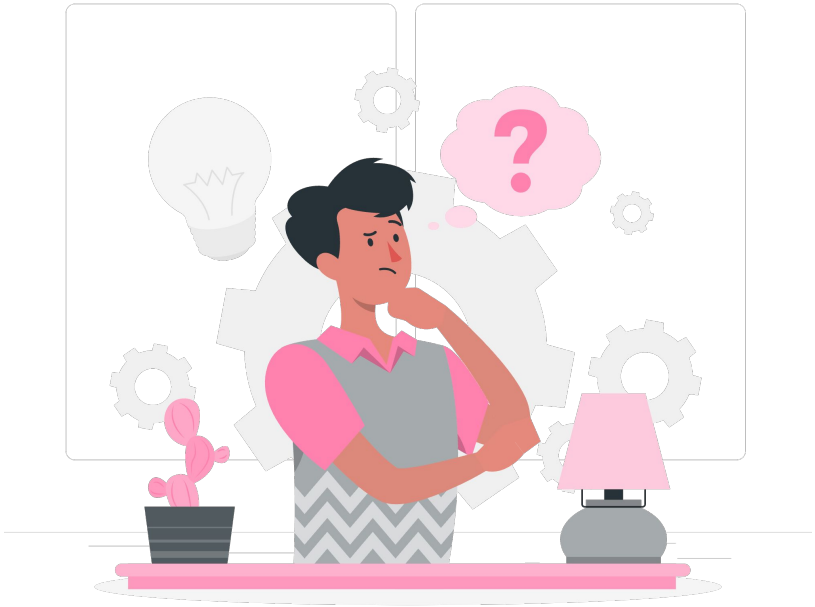
What is a Container Orchestrator?

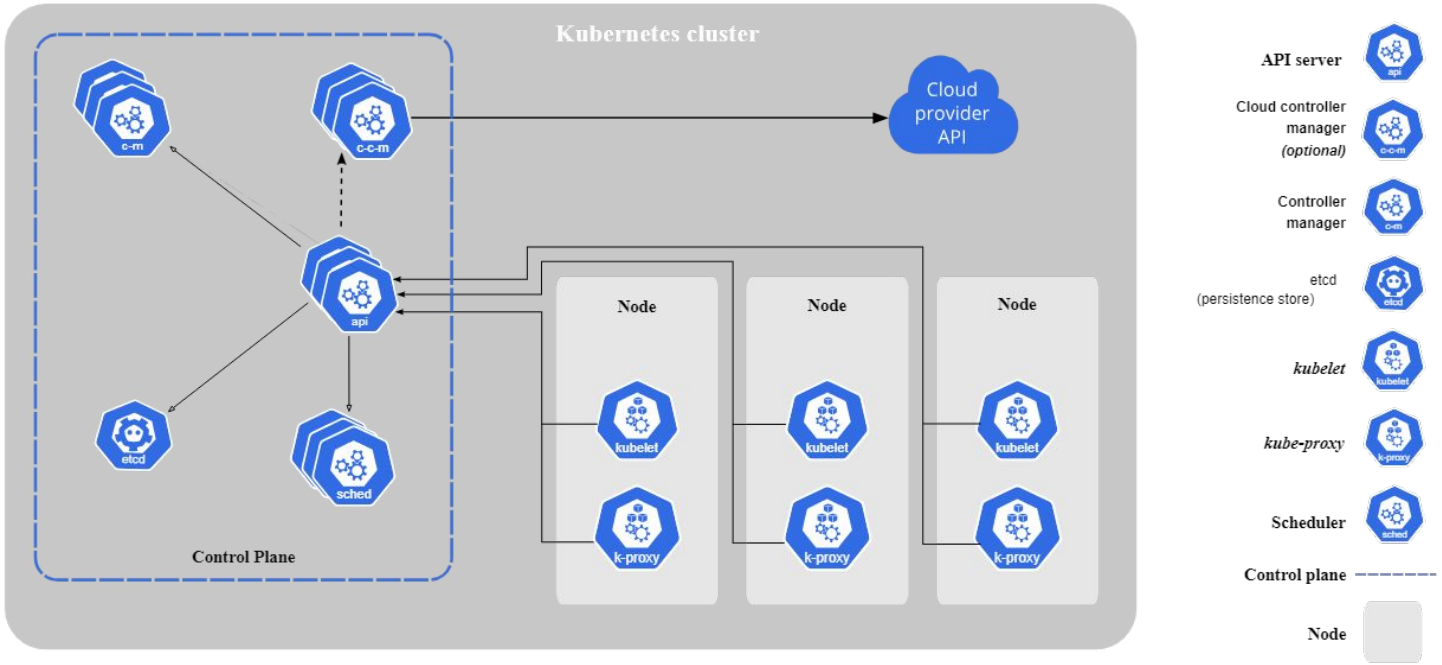
A container orchestrator can help with

- Deployment
- Scaling
- Standards and Frameworks
- Integration with Core Components

How does it work?



Starting from the top - Nodes



Core Kubernetes Architecture

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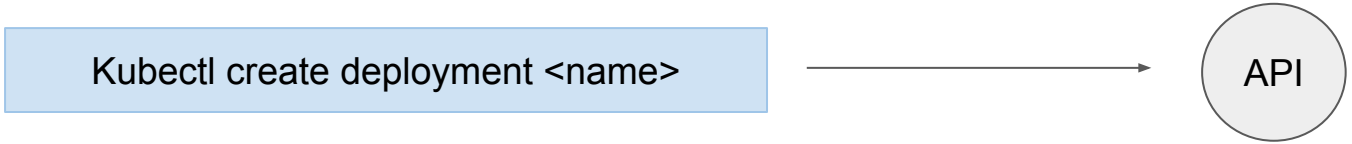
Control Plane & Worker Nodes

- Nodes are just computers
- A cluster is a bunch of nodes that work together
- Master Node/Control Plane has the core components of Kubernetes
- Worker nodes are where we put our applications

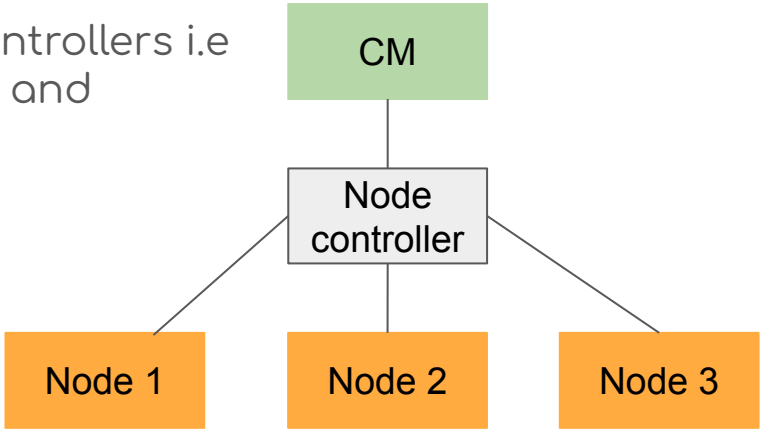
KubeAPI Server: Central Point

- Acts as a **entry point** for the cluster
- All external communications go to the api-server
- The api-server forwards the requests to appropriate components
- It's like the leader of the cluster
- Stores all data in a persistent storage backend i.e **etcd**



Controller Manager

- K8S has controllers which monitor the state of your cluster
- These are either built in, or you can create a custom controller
- Controller Manager controls all the controllers i.e Replication controller, Node Controller and Deployment controller

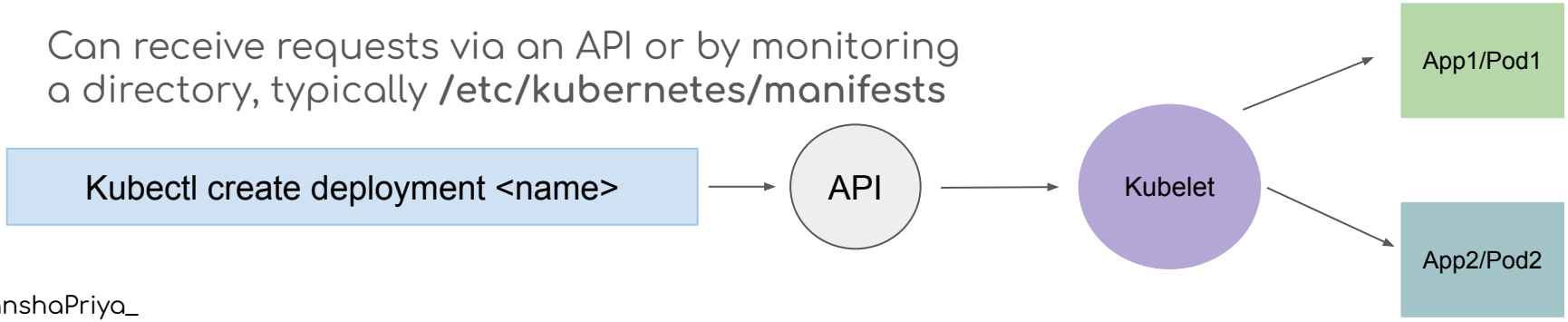


Cloud Controller Manager

- Comes into the picture when using a cloud managed k8s cluster
- Not available on all K8s setups, typically found in Public Cloud K8s offerings
- Bridges functionality of the Cloud Provider to K8s
- Cloud Controller Manager manages all cloud resources
- Eg; Volumes, Network stacks, connected VMs, etc

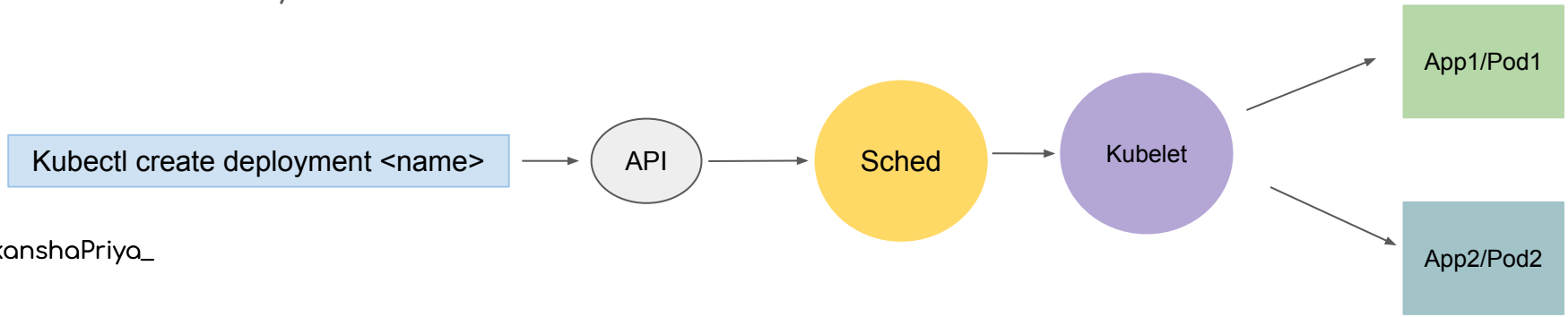
Kubelet - The cluster builder

- The Kubelet runs on Worker nodes and on the Control Plane. Every single node
- Maintains the Pods
- Makes use of a Pod Spec, a description of a Pod in YAML or JSON
- Starts, Stops, Creates, Recreates containers that are running in a node
- Can receive requests via an API or by monitoring a directory, typically **/etc/kubernetes/manifests**



Kube-Scheduler

- Decides where to run a particular application
- Can be configured to schedule applications on a particular node based on constraints & resources
- K8S has a default scheduler
- Can create your own custom scheduler and use



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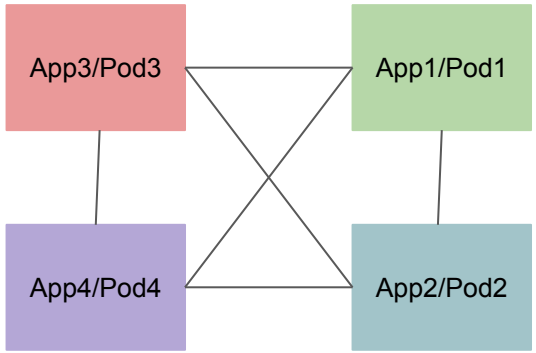
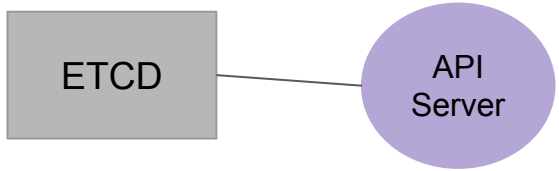
Kube-Proxy - The cluster connector

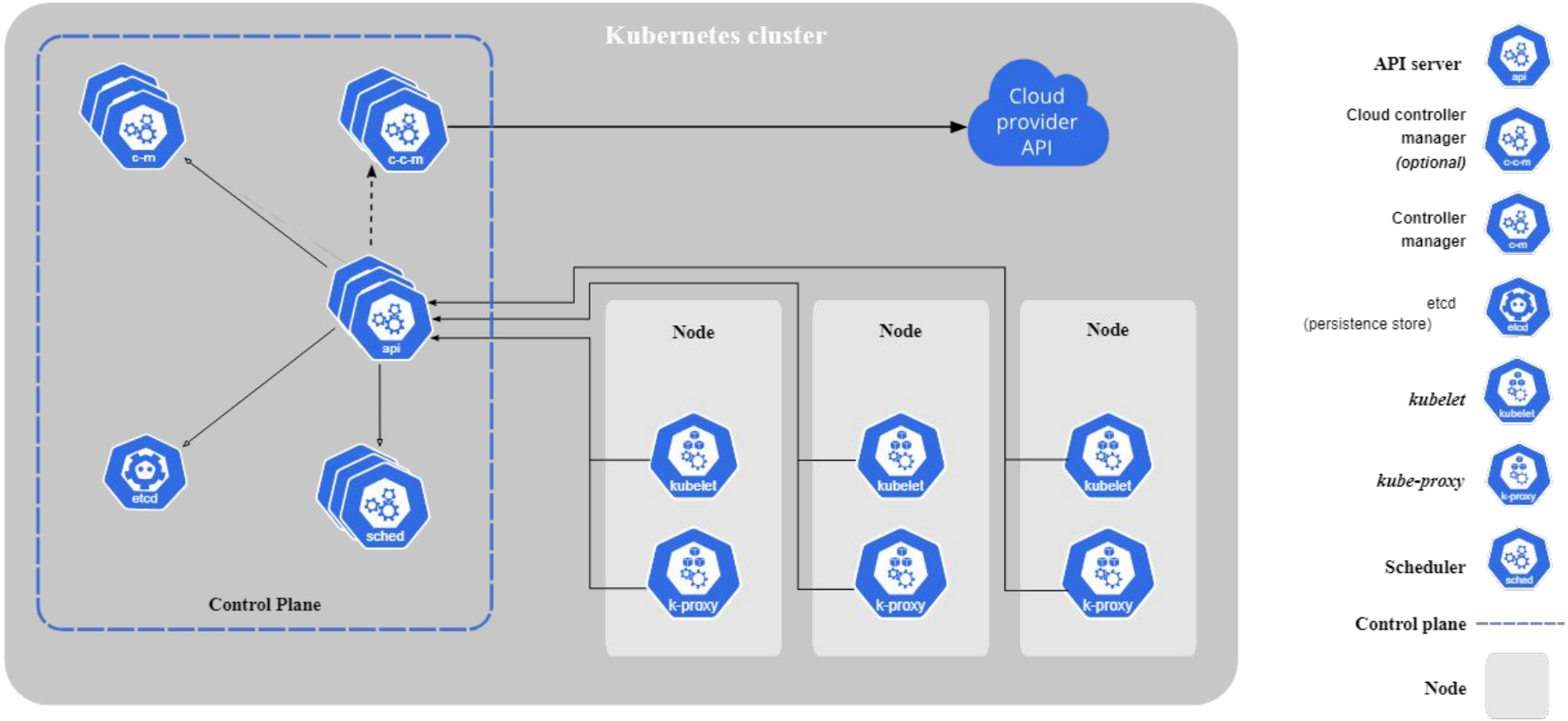
- Runs as a DaemonSet on every instance in the cluster
- Enables communication/networking within the cluster
- Ensures that every single application can talk to all other applications
- If it didn't exist, or has a problem, you cannot talk to Kubernetes



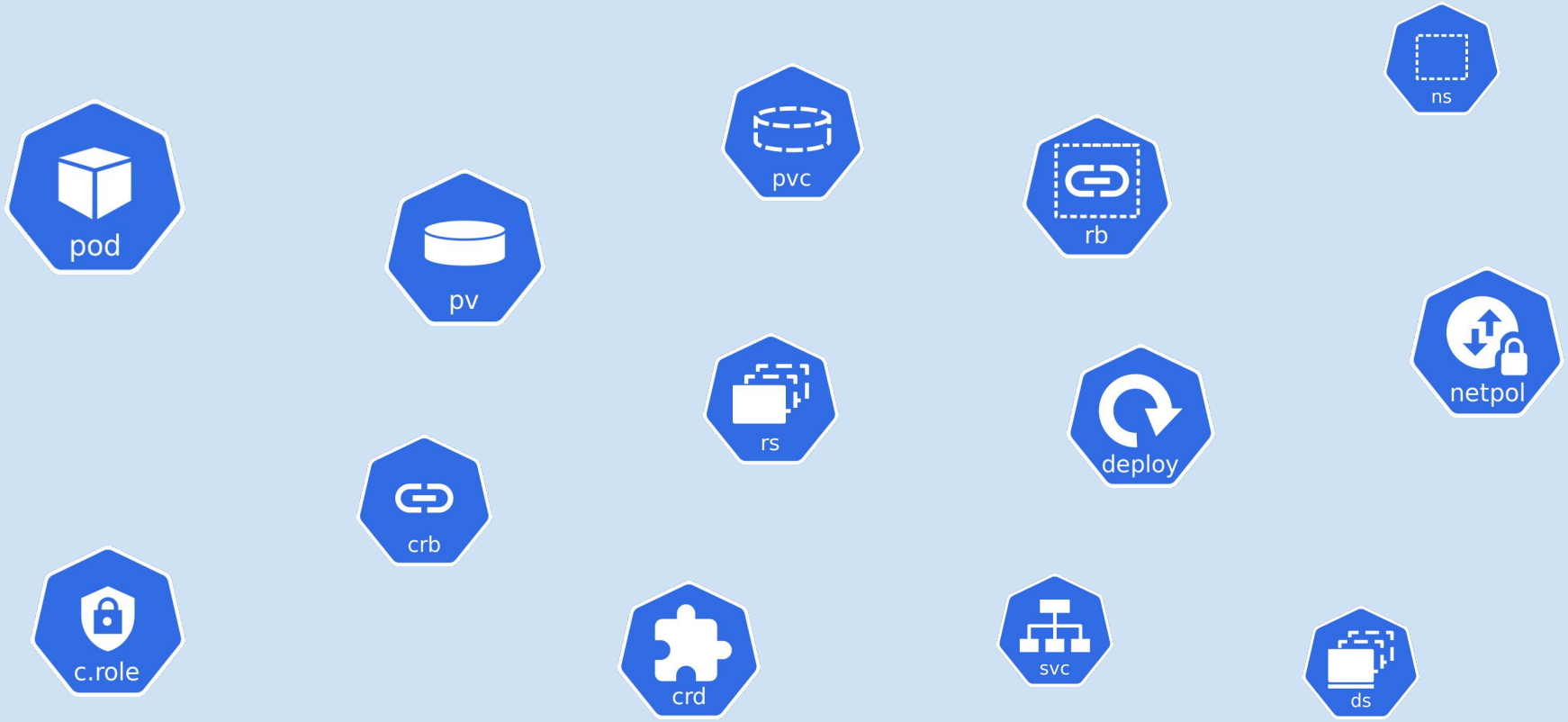
ETCD: The Source of Truth

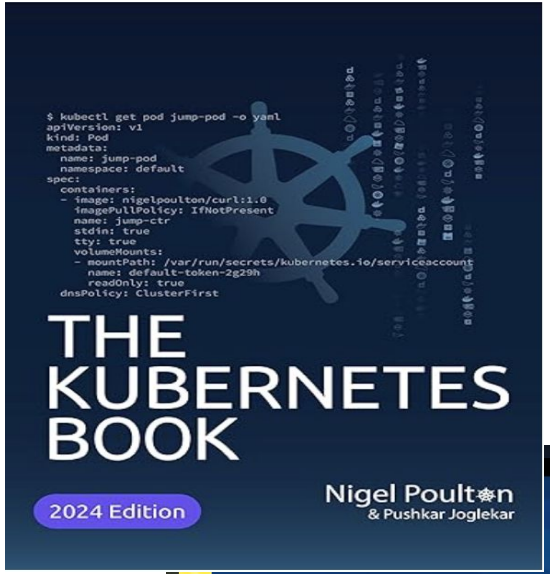
- It's the memory of Kubernetes, Key-value store
- Every action, state of a cluster resource, failures, etc is stored within the etcd
- If etcD goes down, you basically lose the entire cluster
- In production setup - multiple instances as an odd number, ideally 5 nodes. Backups are recommended!

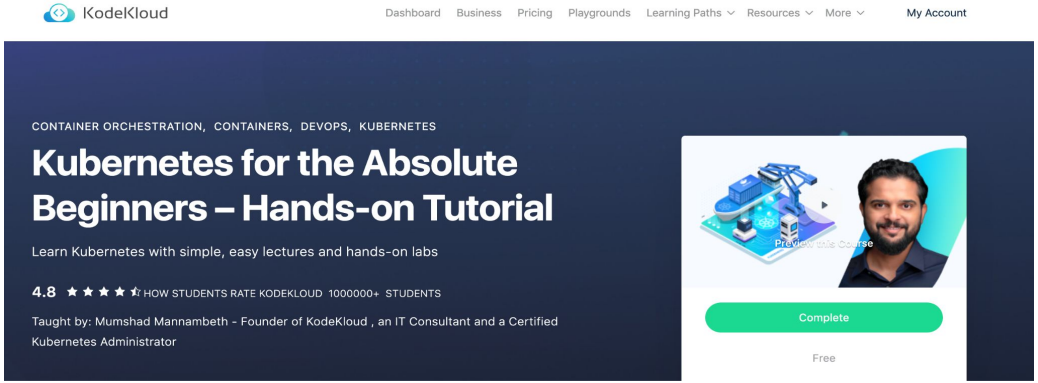


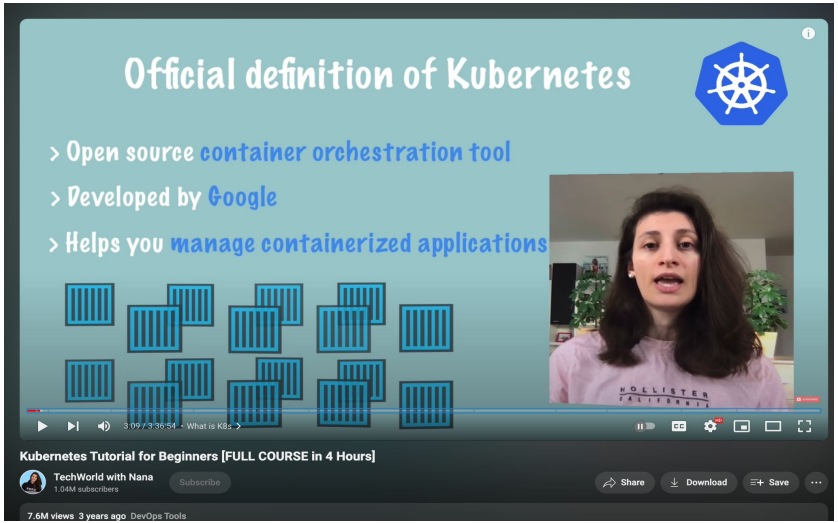


Bonus - The different Kubernetes resources









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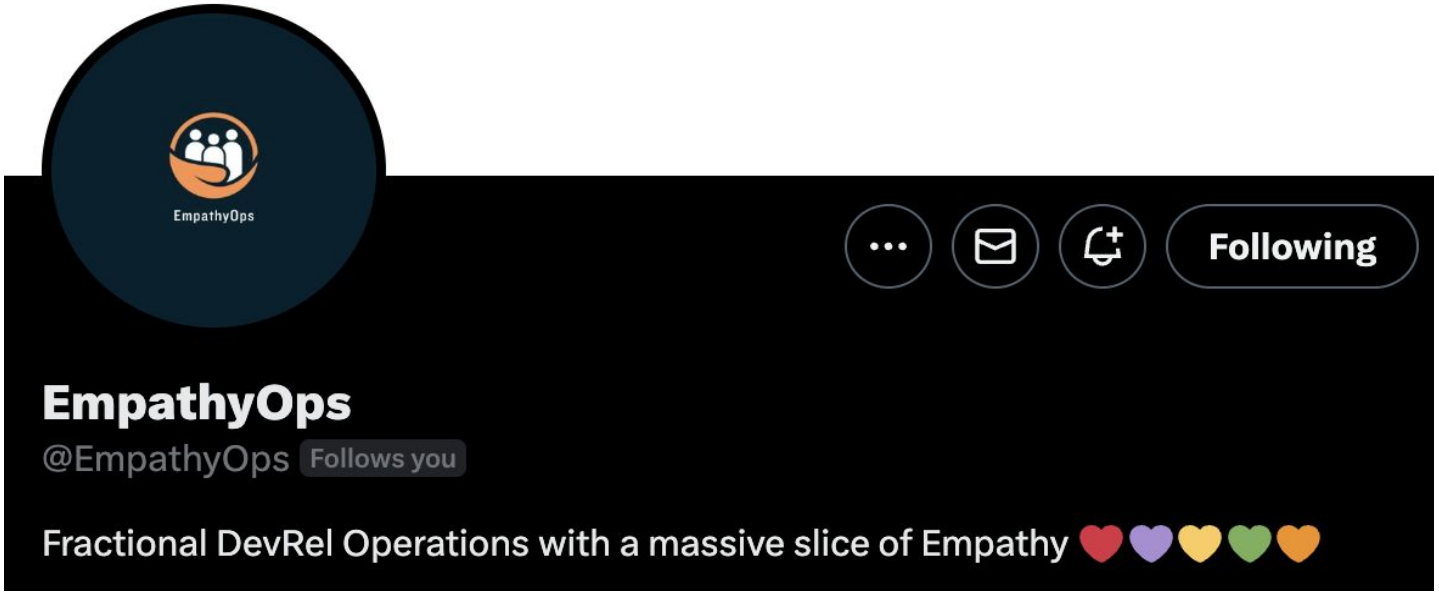
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Following
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Follows you
Fractional DevRel Operations with a massive slice of Empathy

Thank you! :)

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