POWERING POTENTIAL

BASICS OF KUBERNETES

AGENDA

1. Define Kubernetes
2. Cluster Structure
3. Adoption
4. CNCF
5. Labs

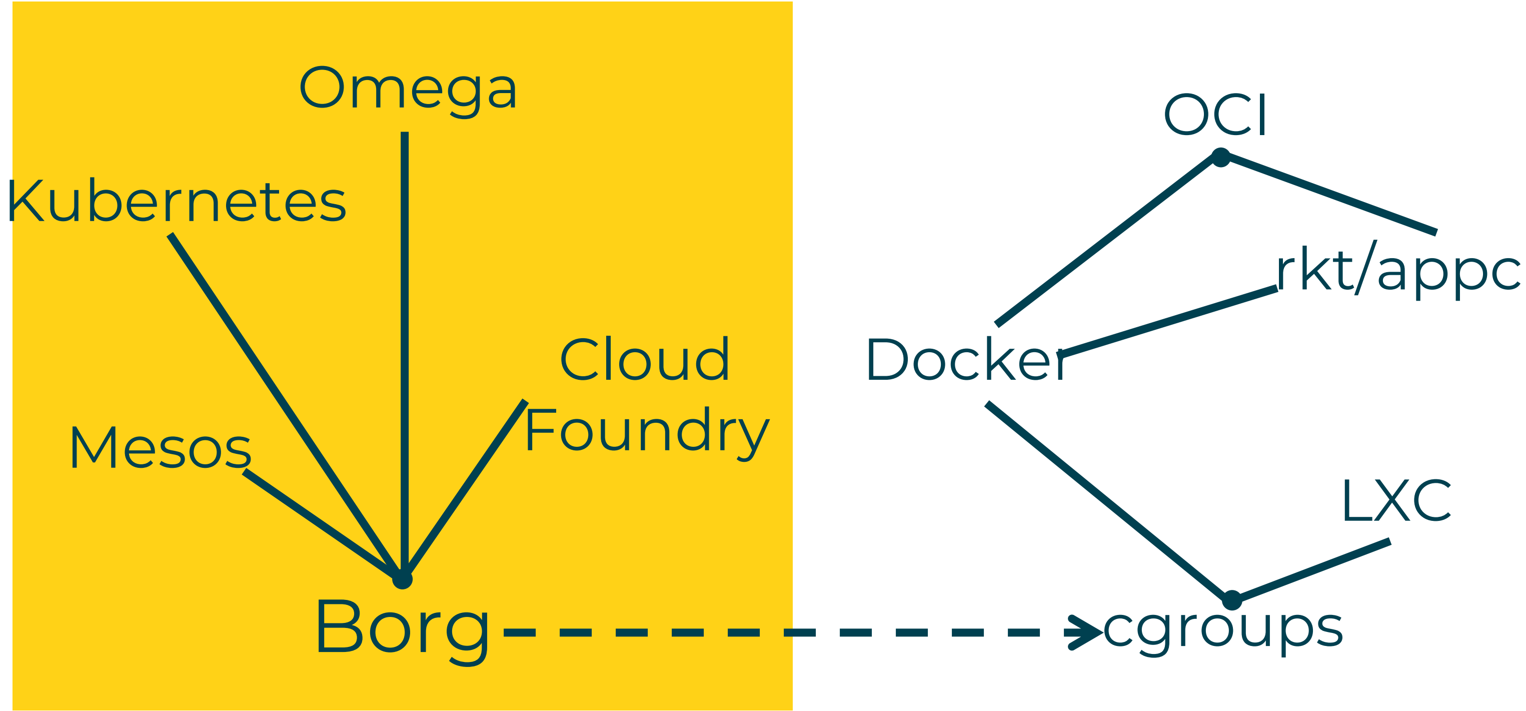
WHAT IS KUBERNETES?

- Orchestration
- http://kubernetes.io…

  "Open-source software for automating deployment, scaling, and management of containerized applications"
- Easy to run, potentially complex to integrate
- Built with lessons from Google
- Open and extensible
- From Greek κυβερνητης, pilot or Helmsman

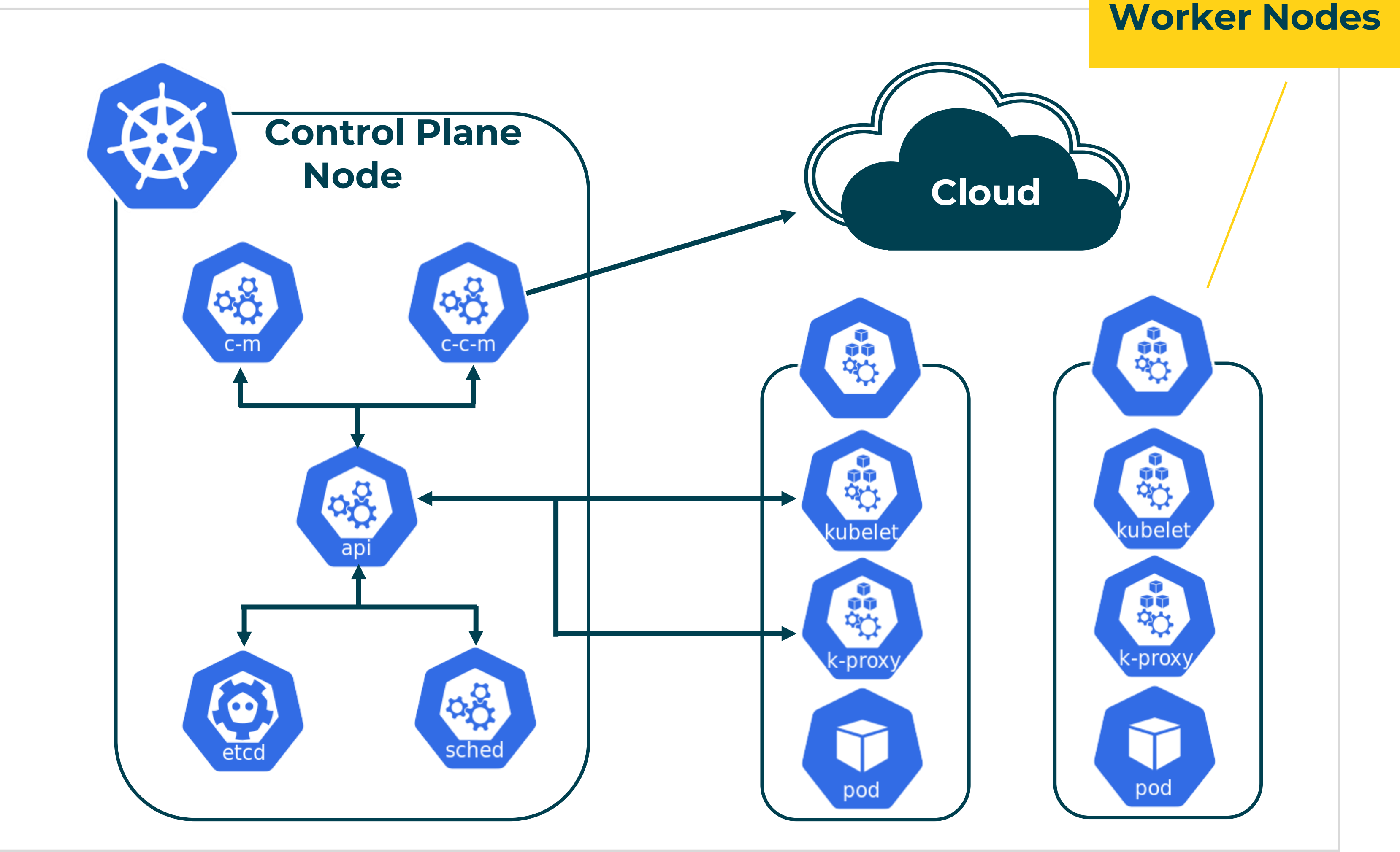
BORG HERITAGE

- Orchestration system to manage all Google applications at scale
- Described publicly in 2015



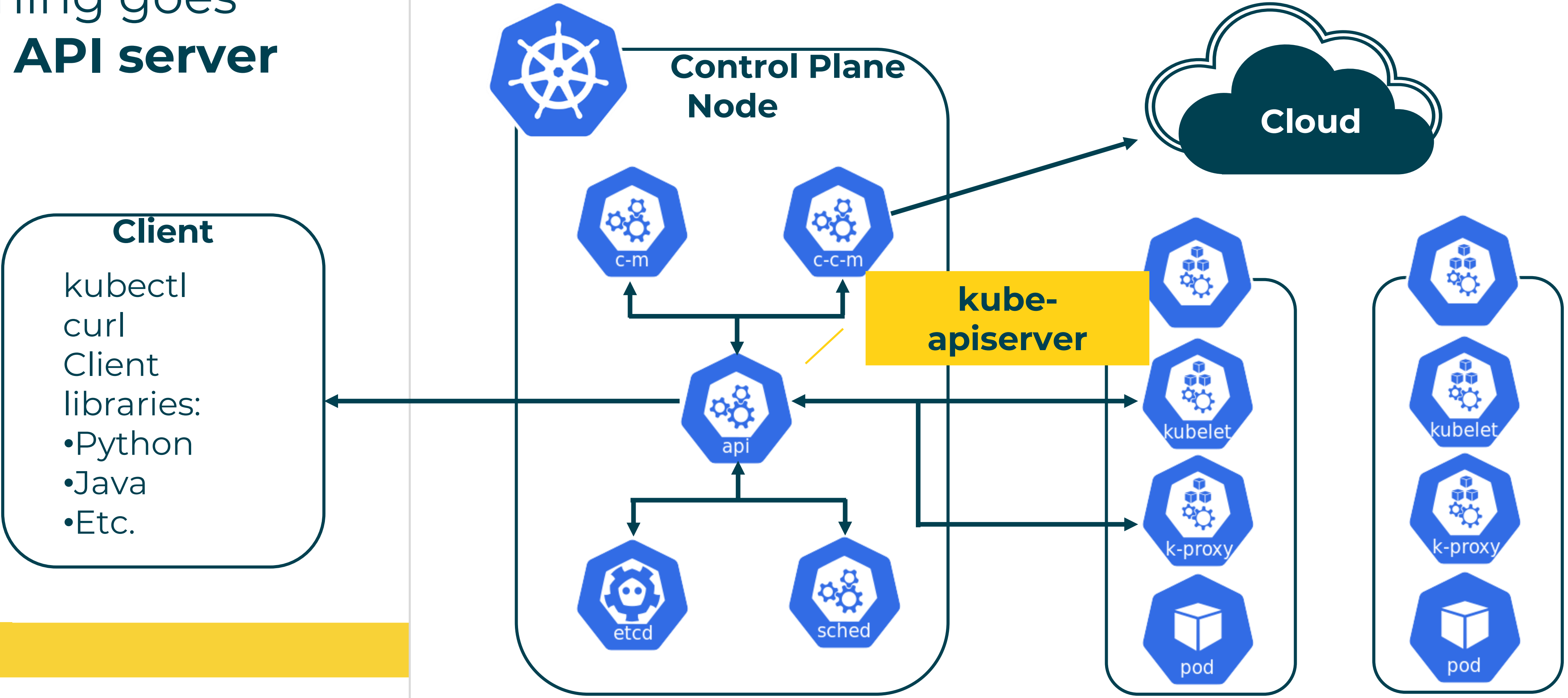
KUBERNETES ARCHITECTURE

- Central manager
  - API server
  - Scheduler
  - Controllers
  - etcd storage syster
- Worker nodes



KUBERNETES ARCHITECTURE

Everything goes via the **API server**



Client

kubectl
curl
Client libraries:
- Python
- Java
- Etc.

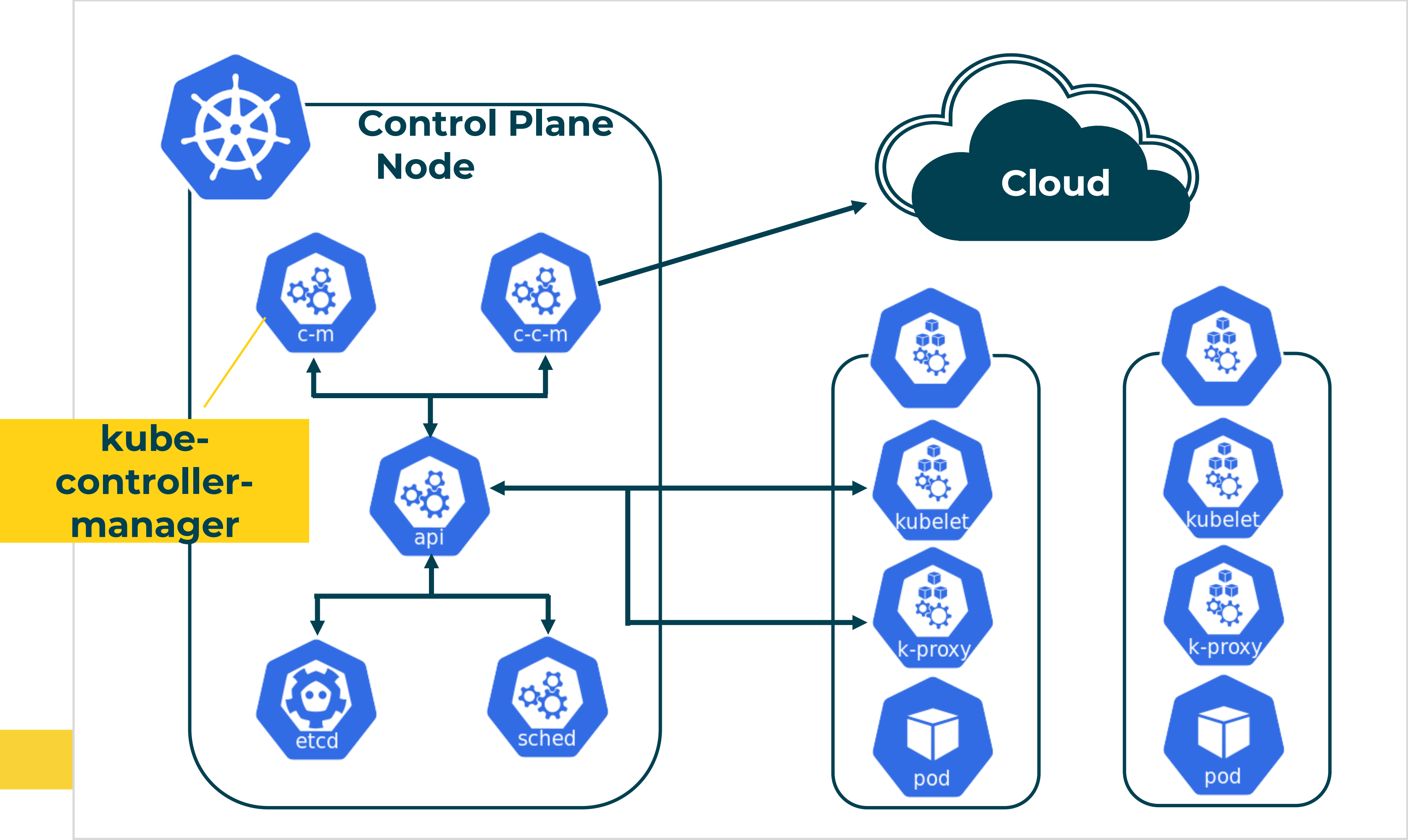
Control Plane Node

Cloud

kube-apiserver

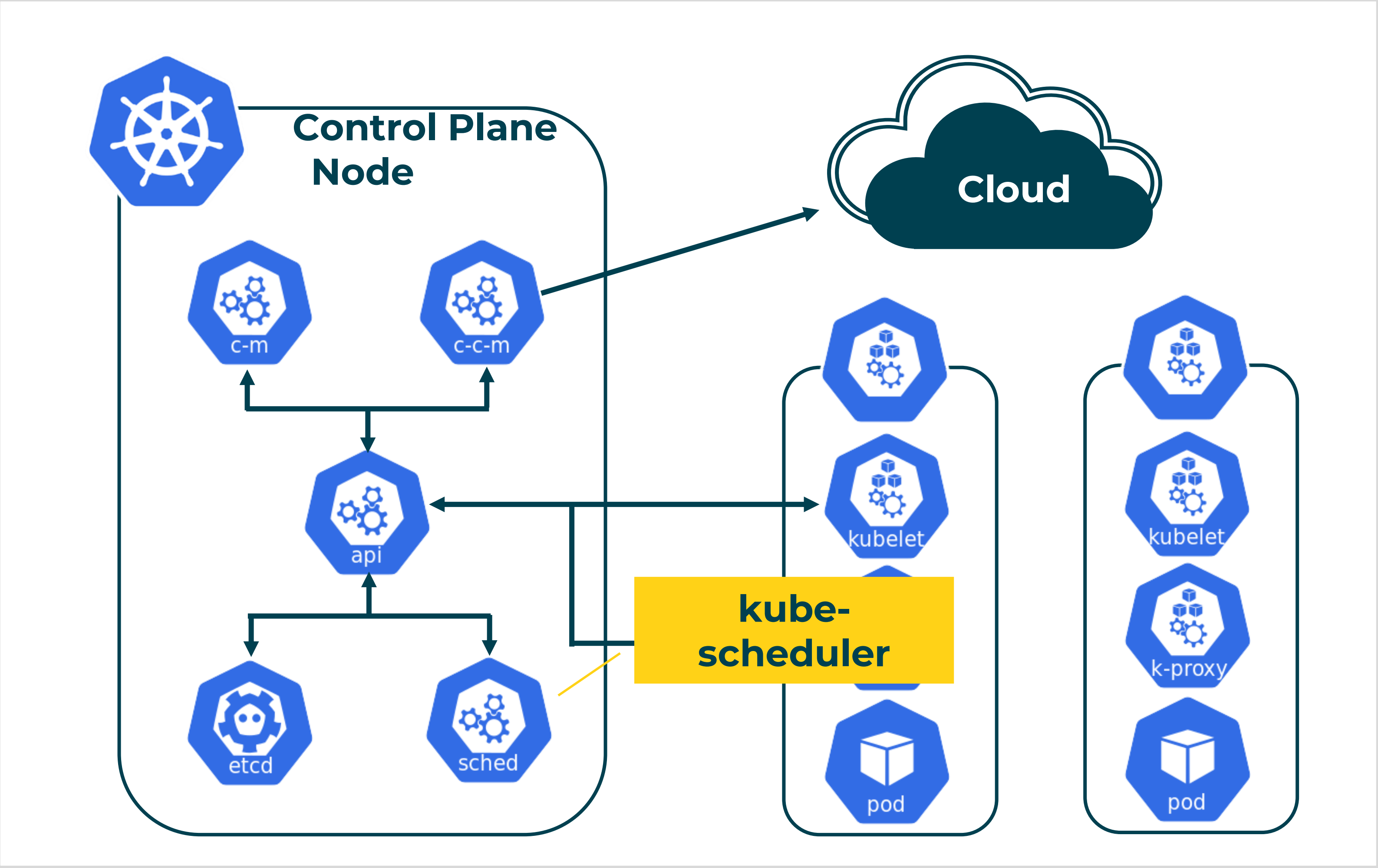
KUBERNETES ARCHITECTURE

Controller Manager continuously polls for desired state, compares with current state and tells the API server what to do make the two the same



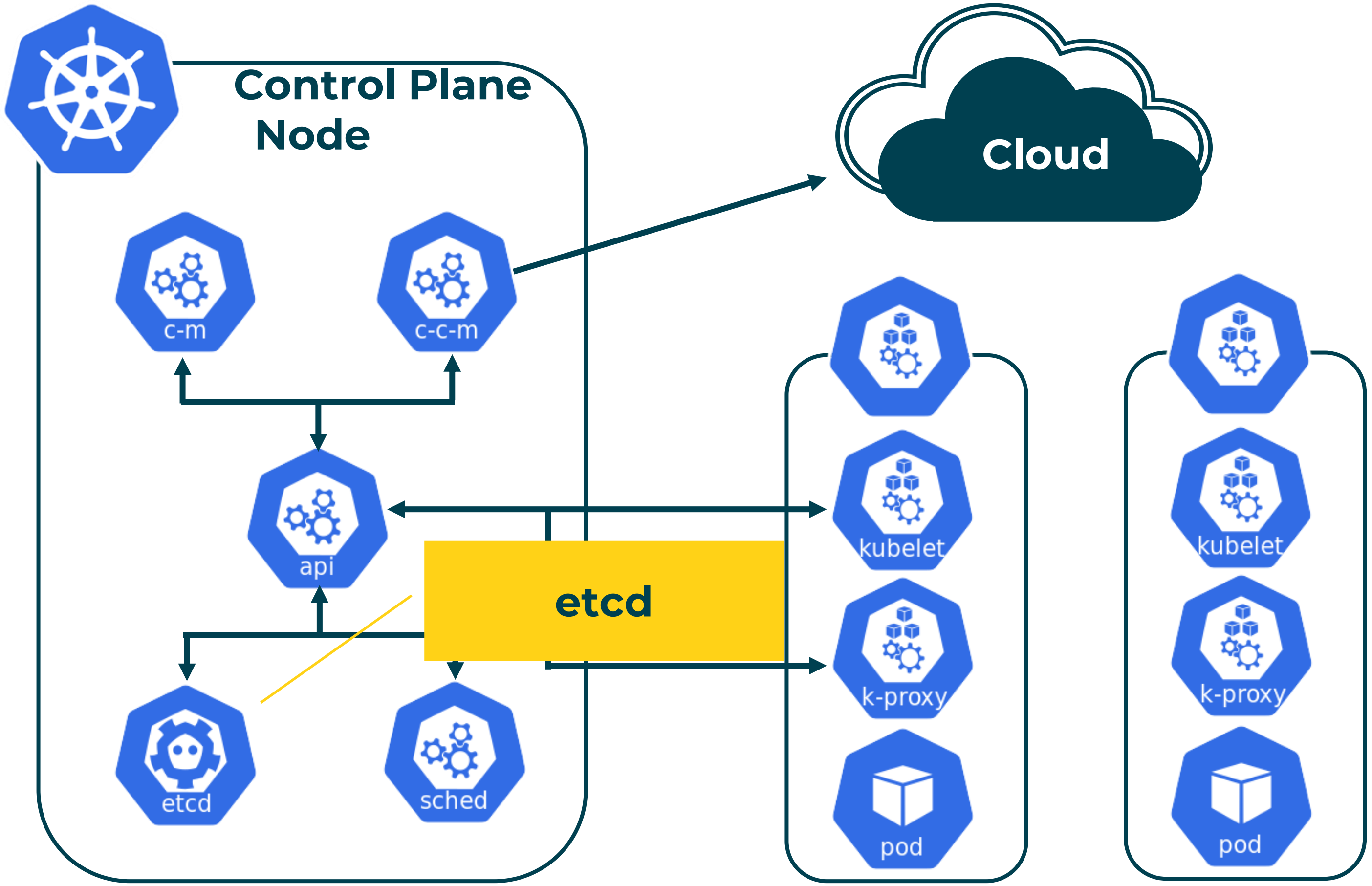
KUBERNETES ARCHITECTURE

Scheduler receives the requests and then looks for a suitable node to run it on



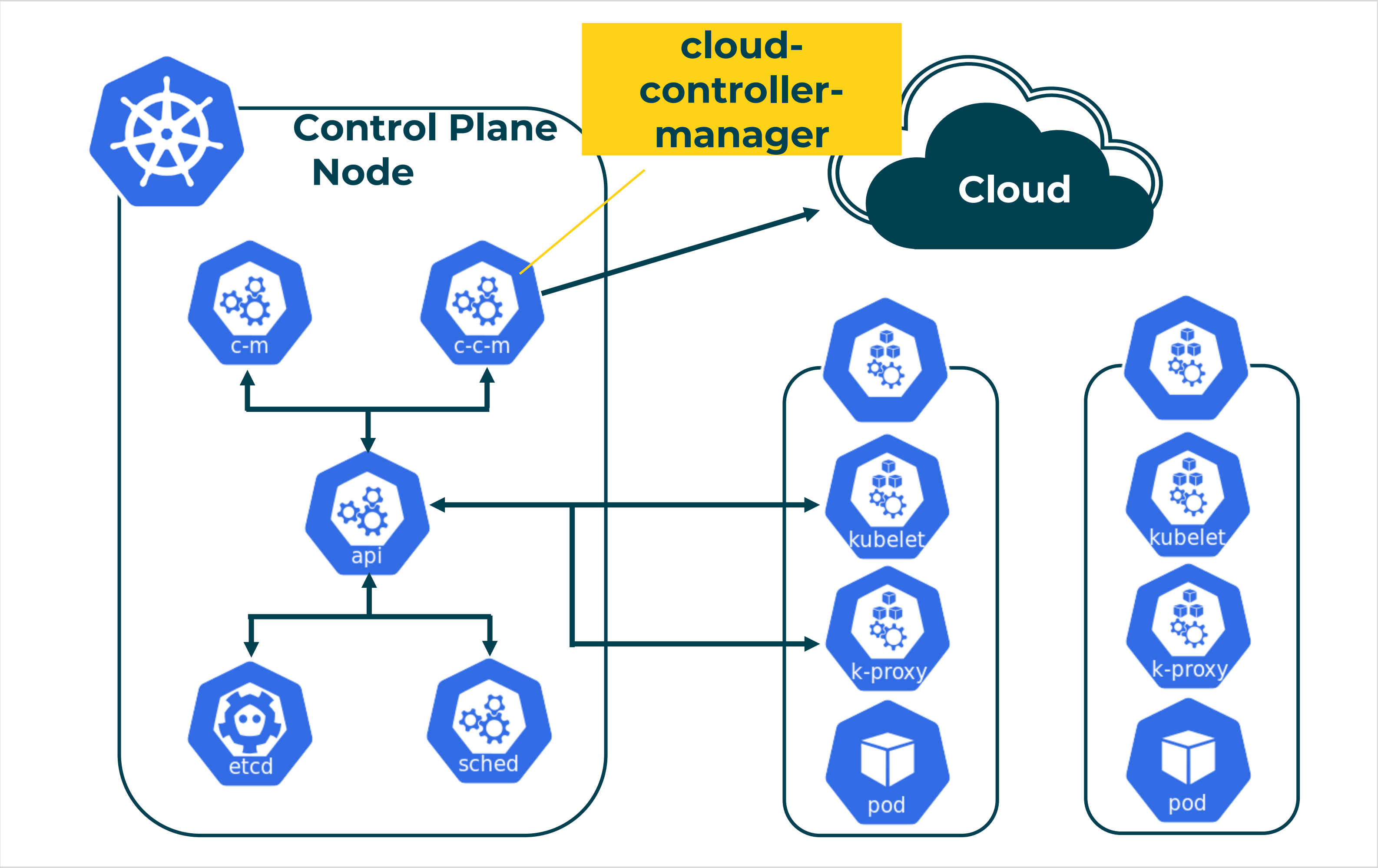
KUBERNETES ARCHITECTURE

The **etcd** database stores the desired state of the cluster.



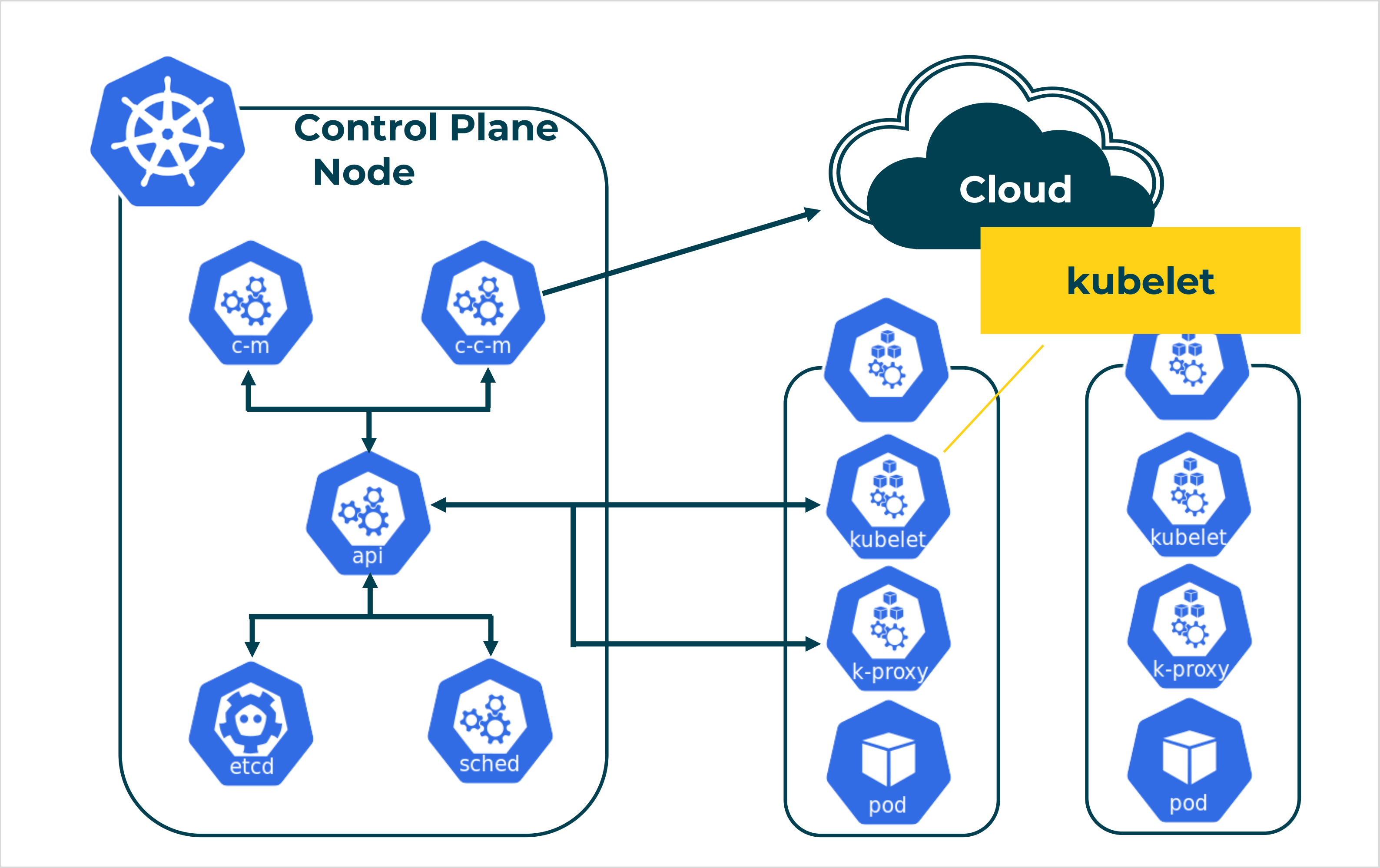
KUBERNETES ARCHITECTURE

If you're running K8s in the cloud, **c-c-m** exposes vendor-specific services like load balancing and storage services



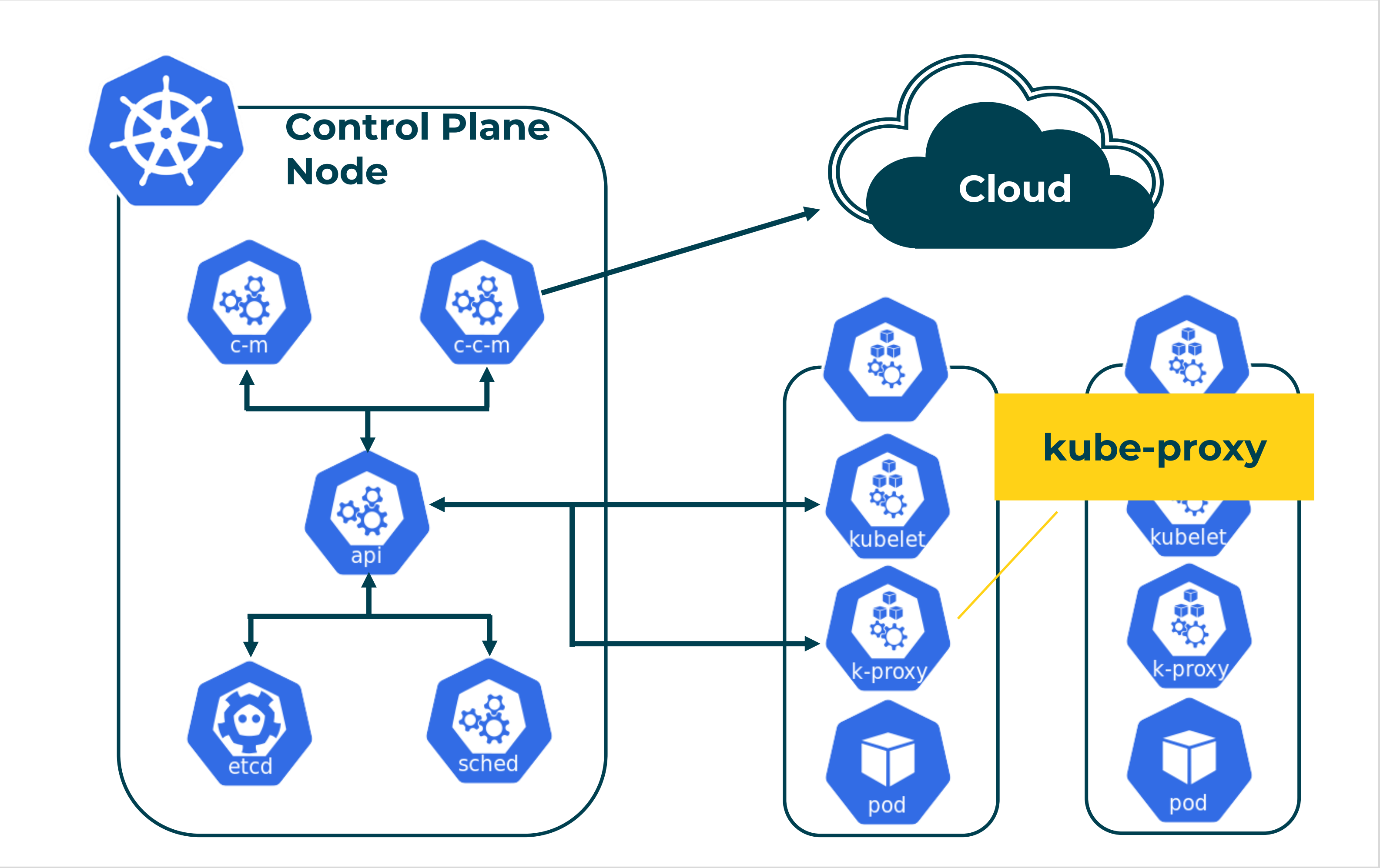
KUBERNETES ARCHITECTURE

kubelet is the agent running on every node and is responsible for managing the containers running on its node



KUBERNETES ARCHITECTURE

kube-proxy manages networking to expose containers on the network



GKE ARCHITECTURE

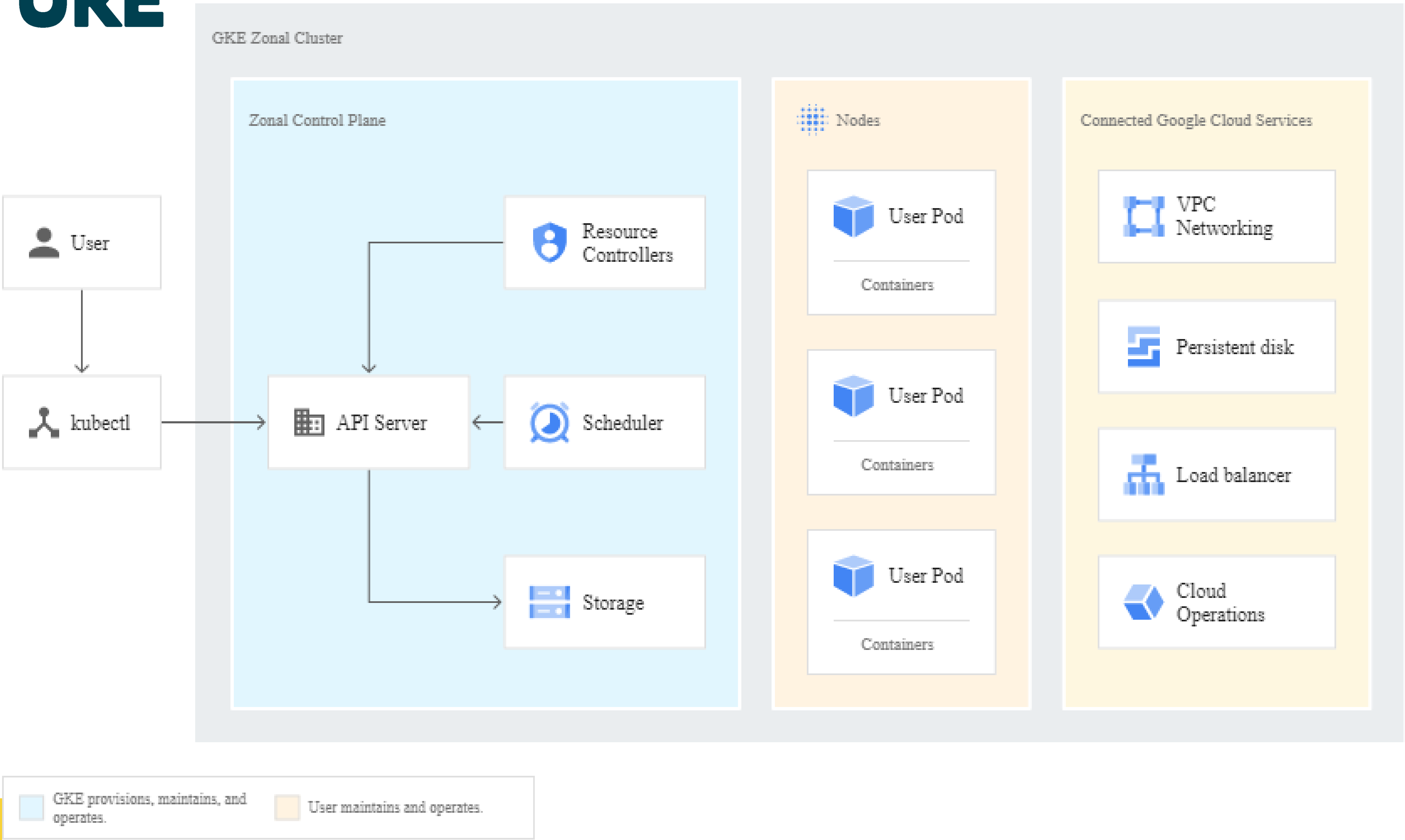


Image retrieved from: https://cloud.google.com/kubernetes-engine/docs/concepts/cluster-architecture

GKE AUTOPILOT ARCHITECTURE

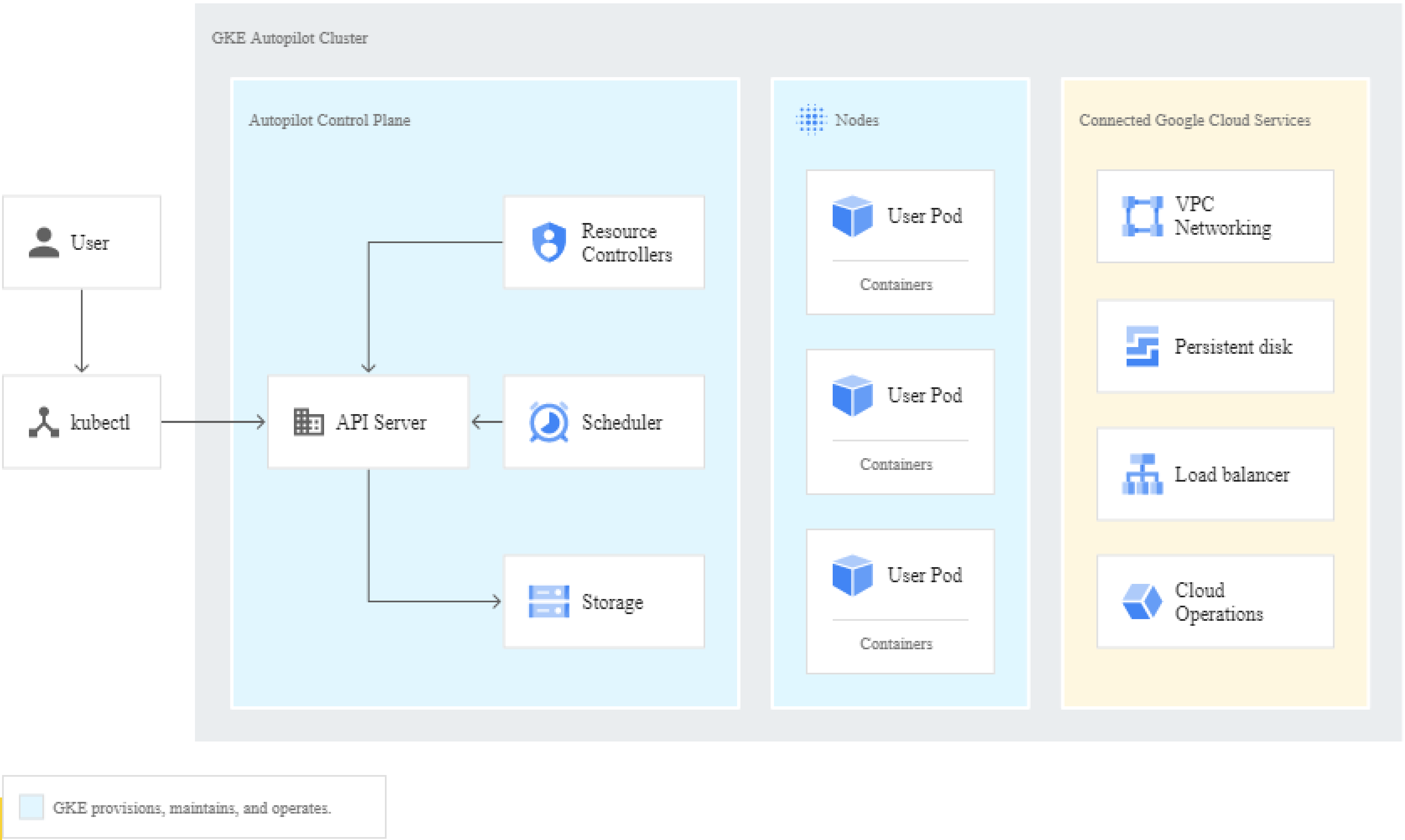


Image retrieved from: https://cloud.google.com/kubernetes-engine/docs/concepts/autopilot-architecture

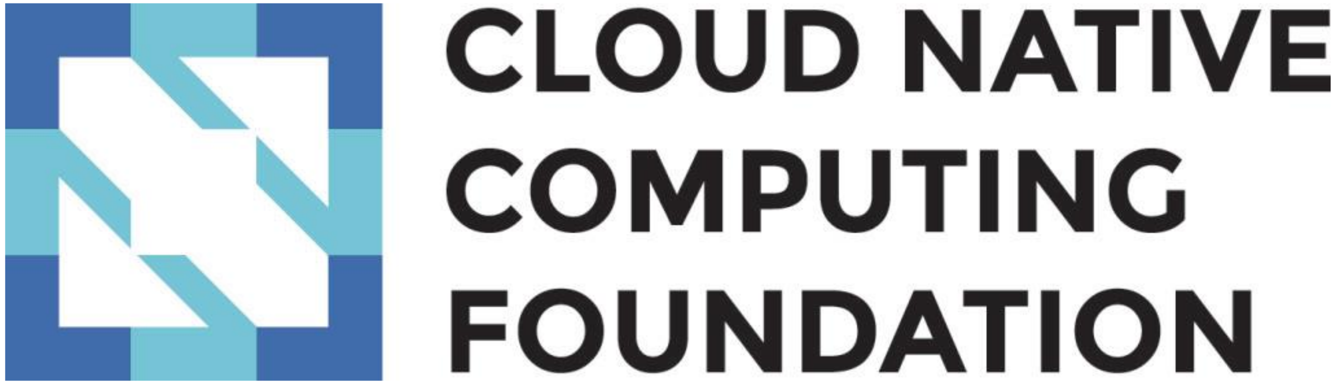
TERMINOLOGY

- Pod
- Controller
    - ReplicaSet
    - Deployment
    - DaemonSet
    - Jobs
    - Service
- Node

INNOVATION

- Given to open source June 2014
- Thousands of contributors
- More than 100K commits
- Tens of thousands on Slack
- Currently three month major release cycle
- Constant change

CLOUD NATIVE COMPUTING FOUNDATION



RESOURCE RECOMMENDATIONS

- The Borg Paper
- John Wilkes speech
- Local community hangout
- Slack channel
- Stack Overflow community

LAB

GETTING STARTED WITH GKE LAB 2 – DEPLOYING GKE