Kubernetes (k8s) Workshop

What’s K8s

Why K8s?

- We run application in container
- We need **container orchestration platform** to cluster machine (Single machine is nothing)
- We have set of workload (containers) to run and set of machines on cluster need to be orchestrated and scheduled. All workloads need to communicate with each other

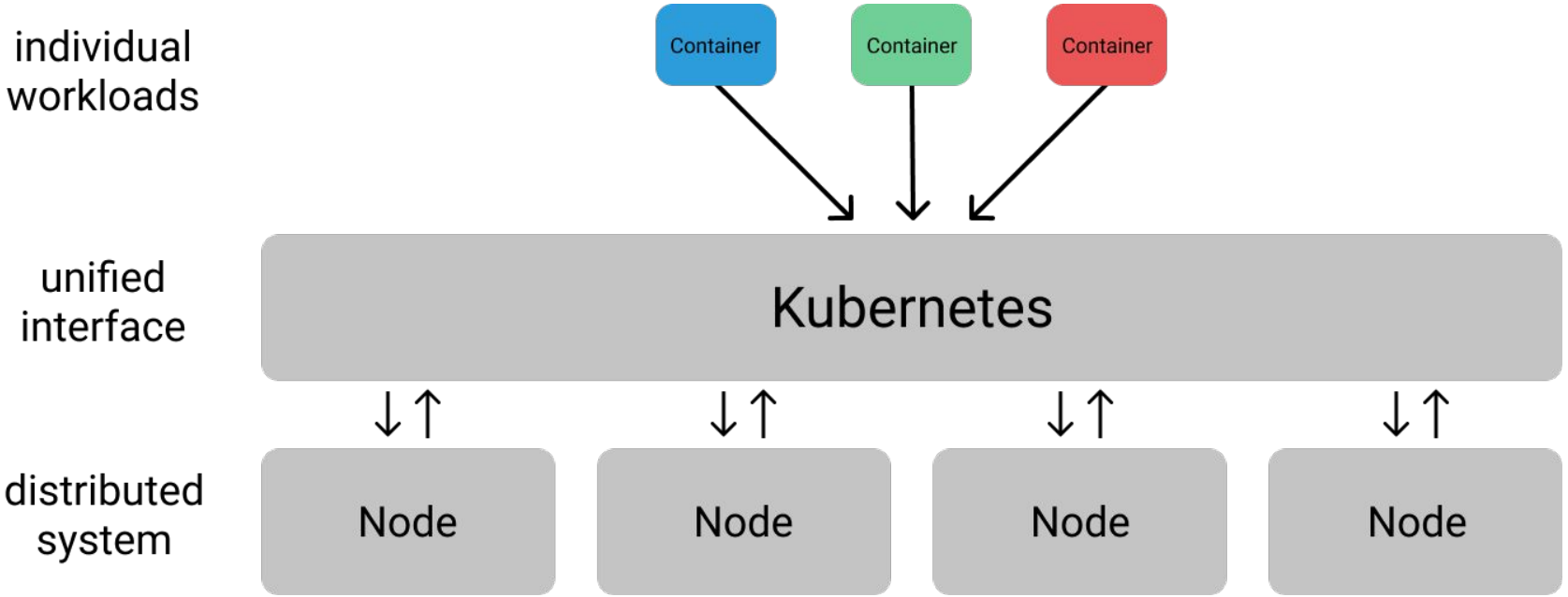
Design principles

Declarative:

- Resources defined in Yaml (manifest)
- The definition is a ***desired state*****.** This lets K8s automation work to ensure the ***actual state*** of our system reflect to desires
- If K8s detects ***actual state*** of the system doesn't meet the expectation. It will intervene on your behalf to fix the problem. Called **self-healing**

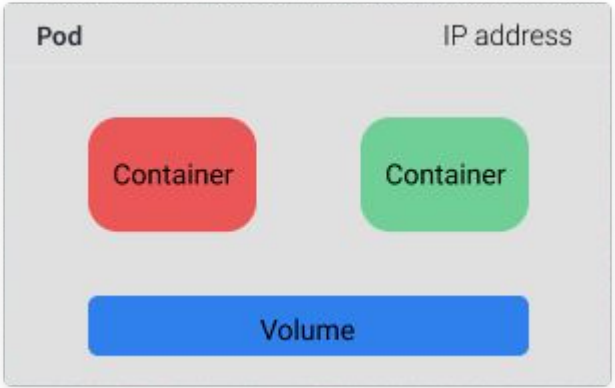
Design principles

Distributed

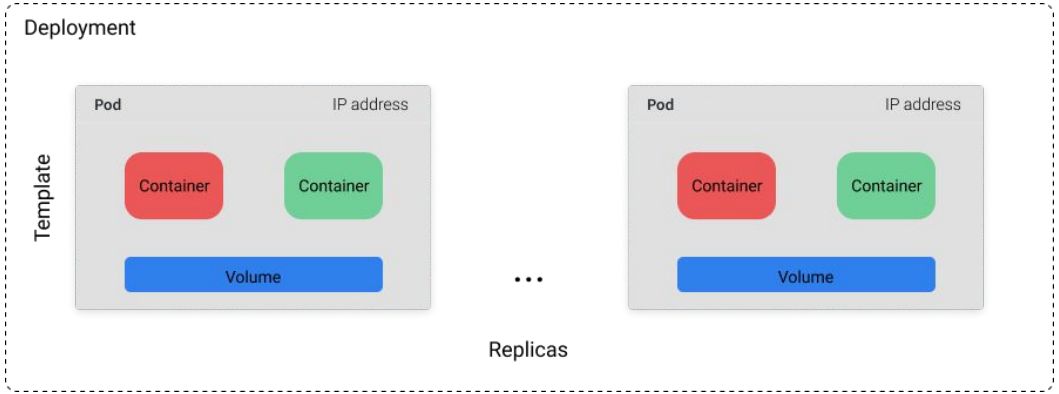


Basic Objects (resources)

Pod:

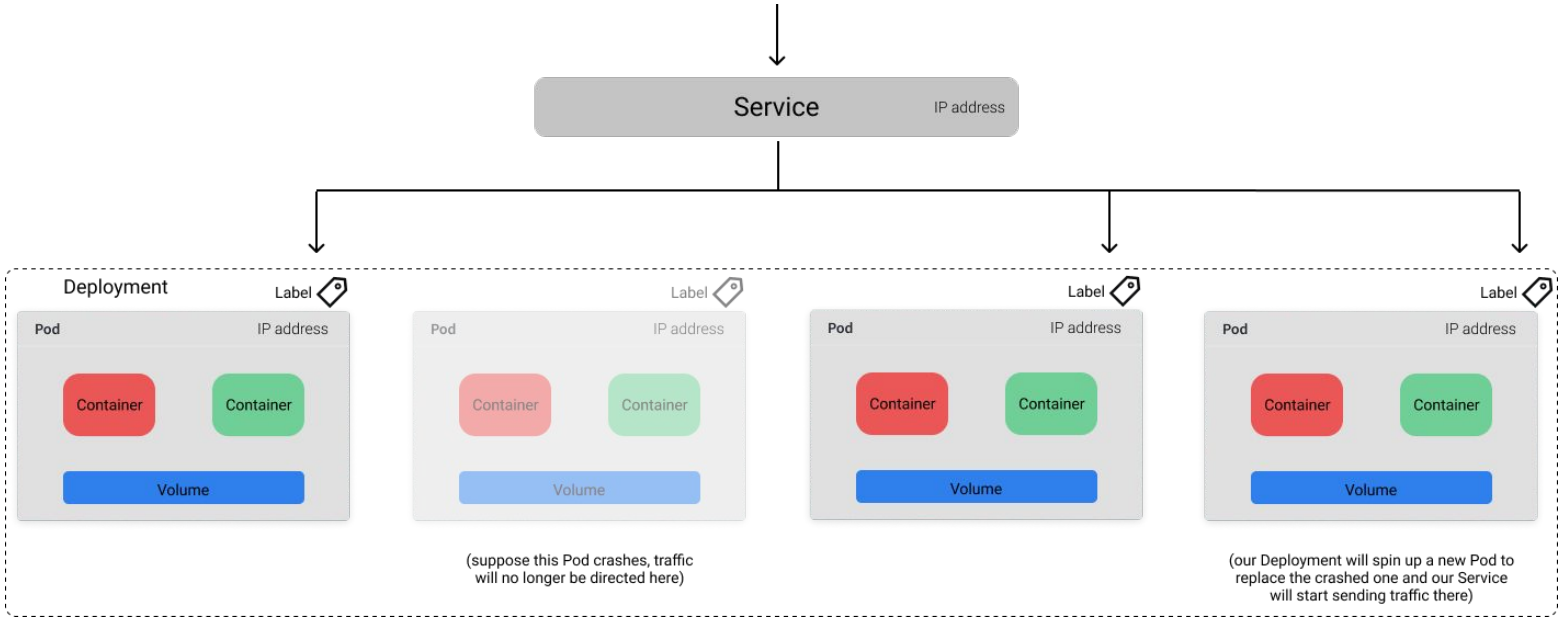


Deployment:



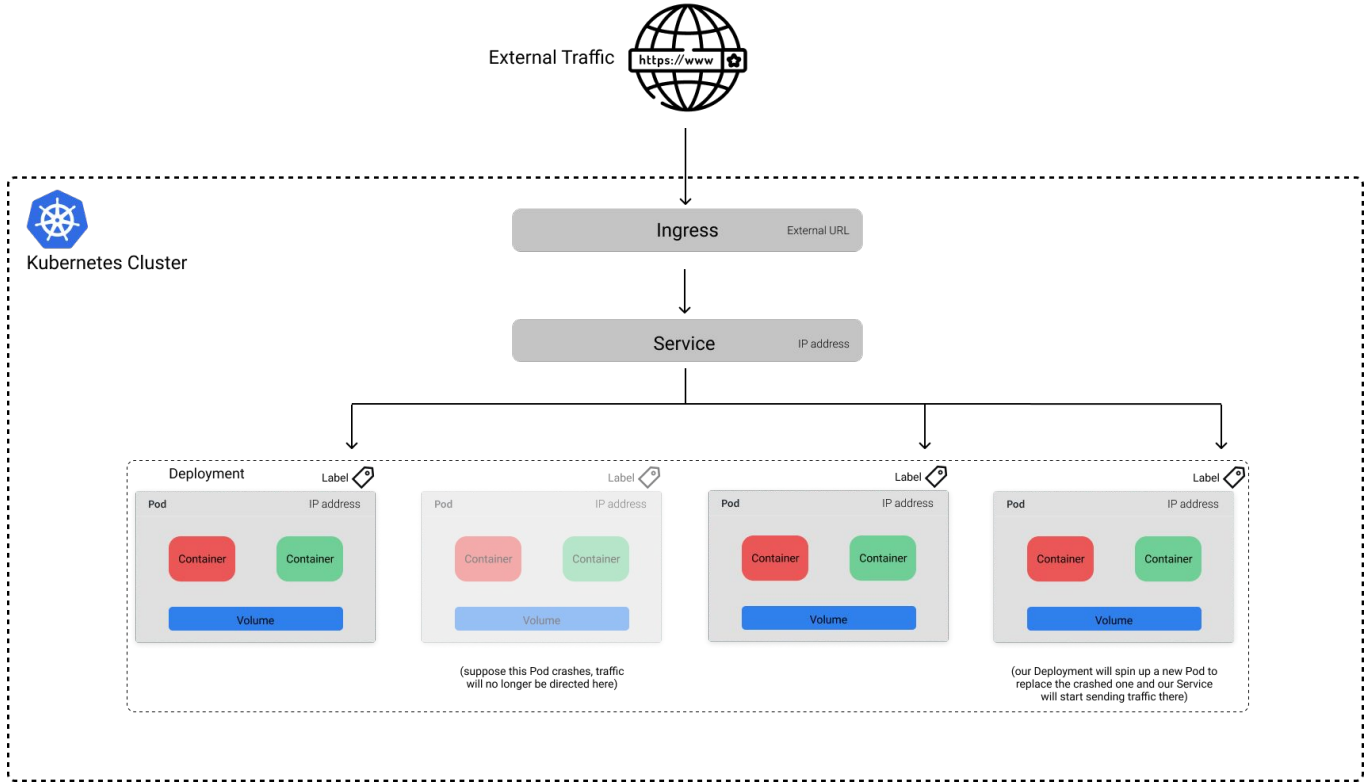
Basic Objects (resources)

service:



Basic Objects (resources)

ingress:



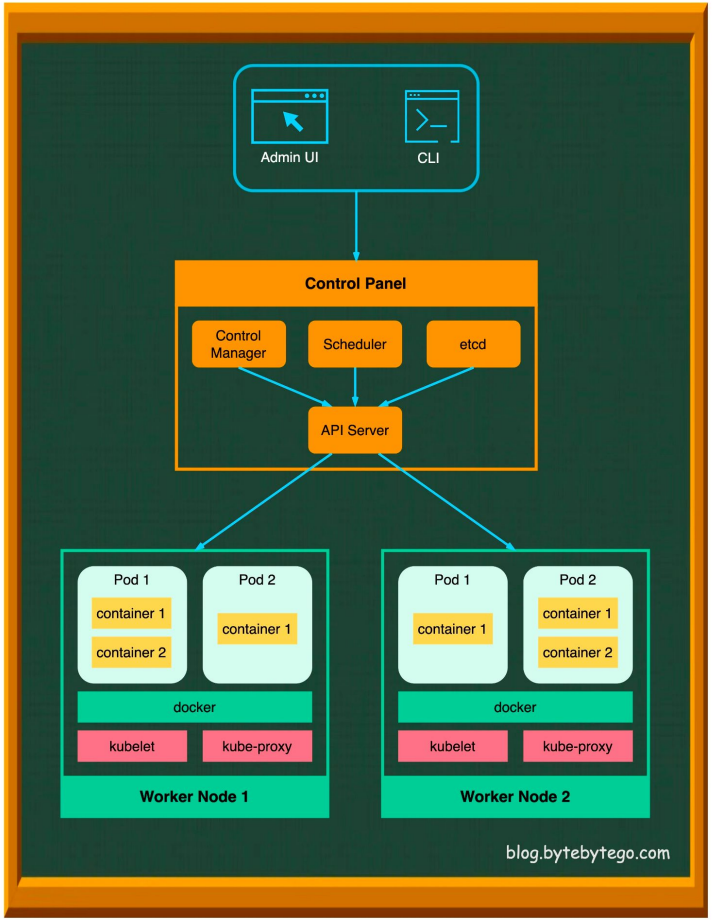
Basic Objects (resources)

Other:

- Job
- ConfigMap
- Secrets
- …. etc …..

What is k8s?

blog.bytebytego.com



Control Plane Components

1. **API Server**
   The API server talks to all the components in the k8s cluster. All the operations on pods are executed by talking to the API server.

2. **Scheduler**
   The scheduler watches the workloads on pods and assigns loads on newly created pods.

3. **Controller Manager**
   The controller manager runs the controllers, including Node Controller, Job Controller, EndpointSlice Controller, and ServiceAccount Controller.

4. **Etcd**
   etcd is a key-value store used as Kubernetes' backing store for all cluster data.

Nodes

1. **Pods**
   A pod is a group of containers and is the smallest unit that k8s administers. Pods have a single IP address applied to every container within the pod.

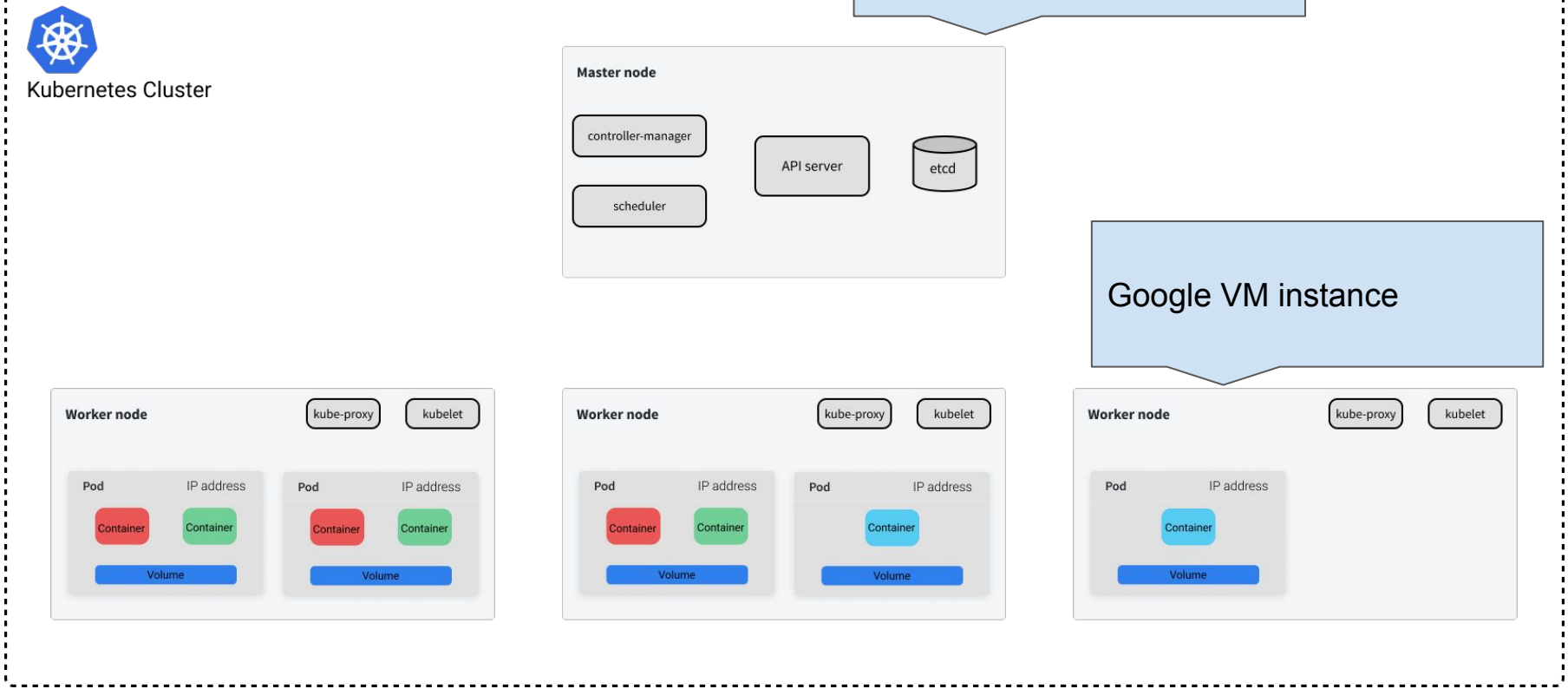
2. **Kubelet**
   An agent that runs on each node in the cluster. It ensures containers are running in a Pod.

3. **Kube Proxy**
   kube-proxy is a network proxy that runs on each node in your cluster. It routes traffic coming into a node from the service. It forwards requests for work to the correct containers.

https://twitter.com/alexxubyte/status/1672994296231002112?s=46&t=lZVzxJz_OKh0lRXW_yMS2Q

K8s Cluster overview

GKE.
Google managed
Kubernetes



Useful resources

Cartoon: https://www.youtube.com/watch?v=9wvEwPLcLcA

Documentary: https://www.youtube.com/watch?v=BE77h7dmoQU

Hilter uses kubernetes: https://www.youtube.com/watch?v=9wvEwPLcLcA