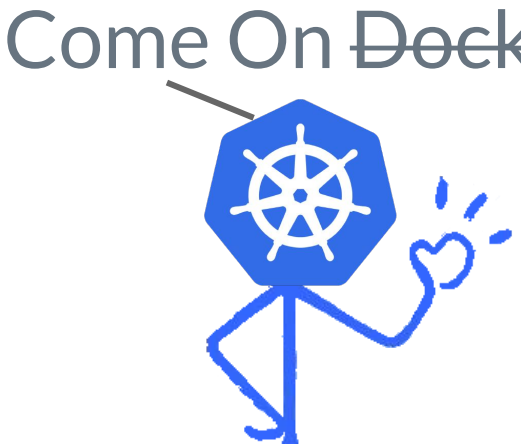
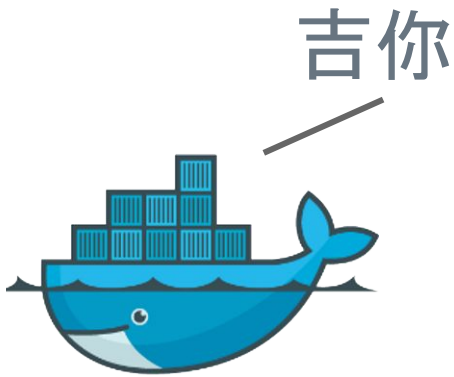




Kubernetes : Sweets and Bitters

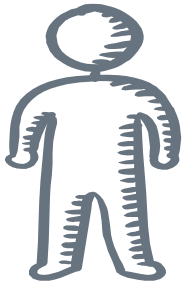
Hello!

I am Tom Tsai

I am here because I want to give life to the servers

- Startup (DevOps)
- Trend Micro (QA, DevOps)
- DevOps Lecturer

Have You Organization Adopted Any Container Orchestration ?

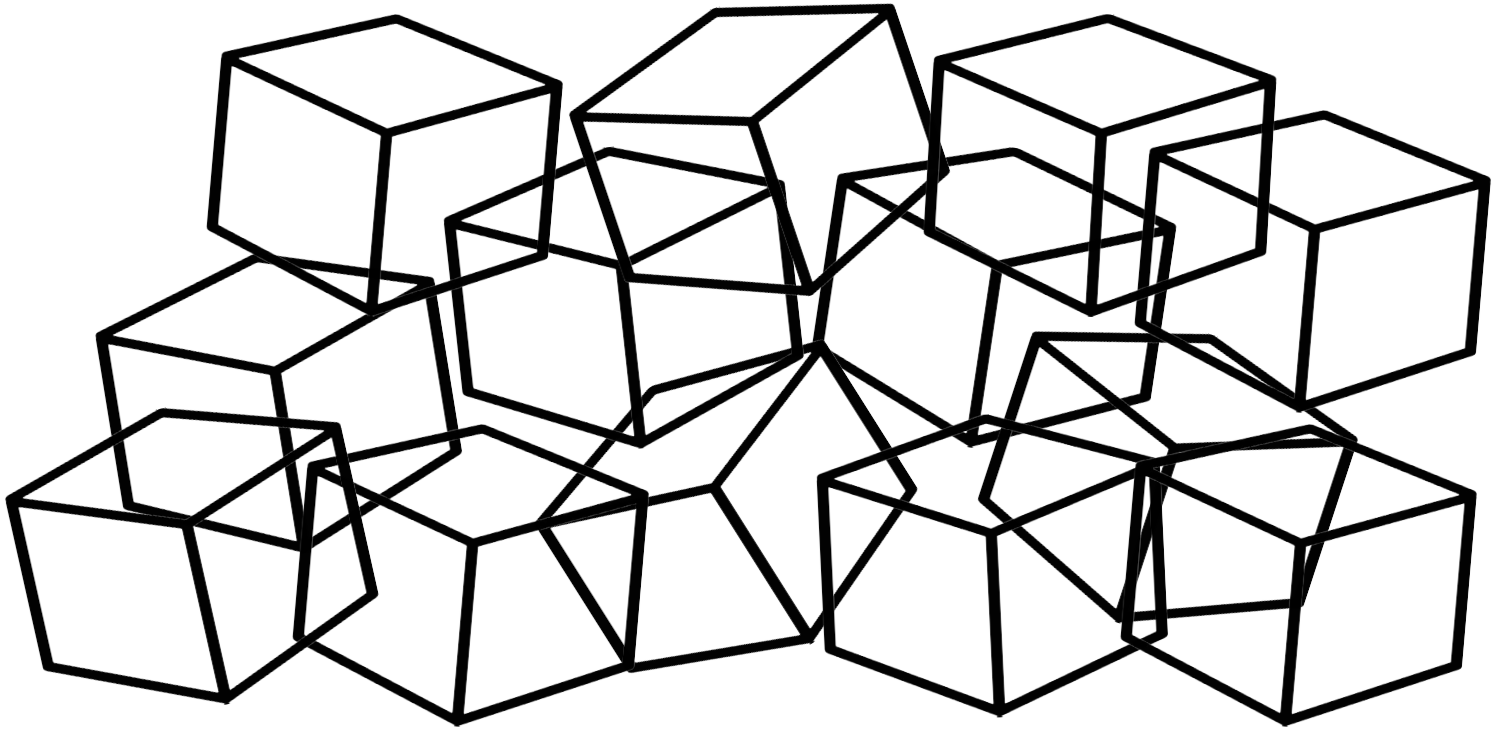


Outline

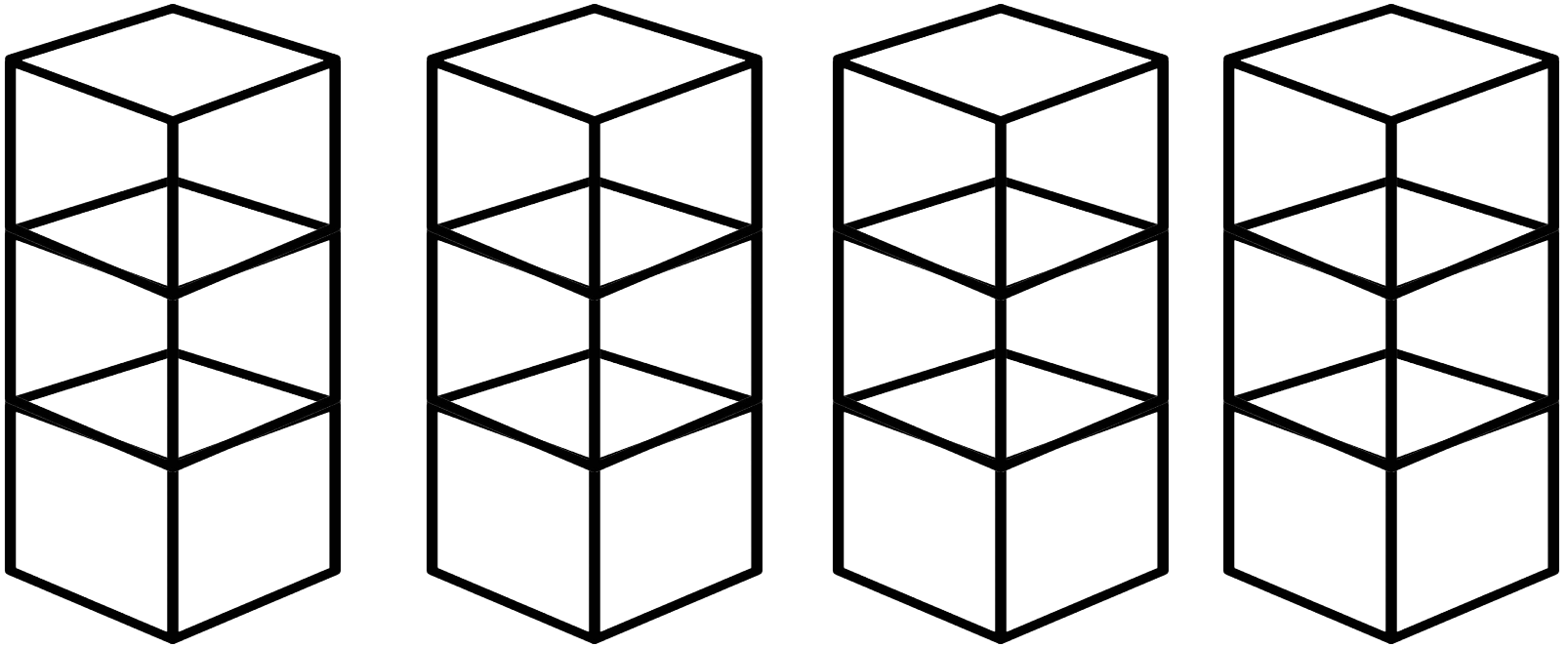
- Kubernetes Introduction
- Access Kubernetes API
- Kubernetes CI/CD Pipeline
- Container High Availability
- Kubernetes Misc
- Q & A

1.

Kubernetes Introduction

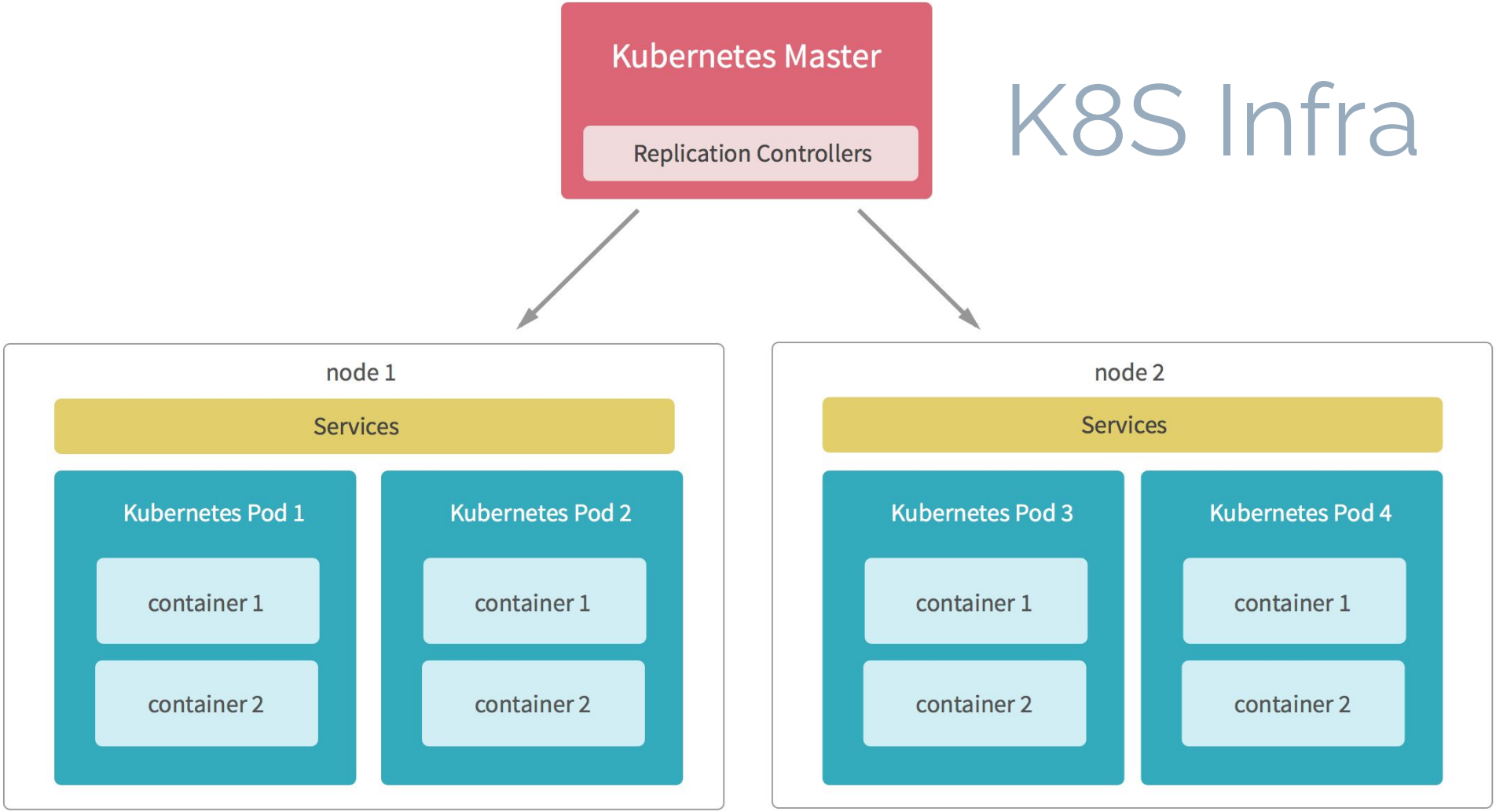


Without Kubernetes



With Kubernetes

K8S Infra


Kubernetes Master
Replication Controllers
node 1
Services
Kubernetes Pod 1
container 1
container 2
Kubernetes Pod 2
container 1
container 2
node 2
Services
Kubernetes Pod 3
container 1
container 2
Kubernetes Pod 4
container 1
container 2

Kubernetes Terminology

Pod

A group of one or more containers

Replica Set

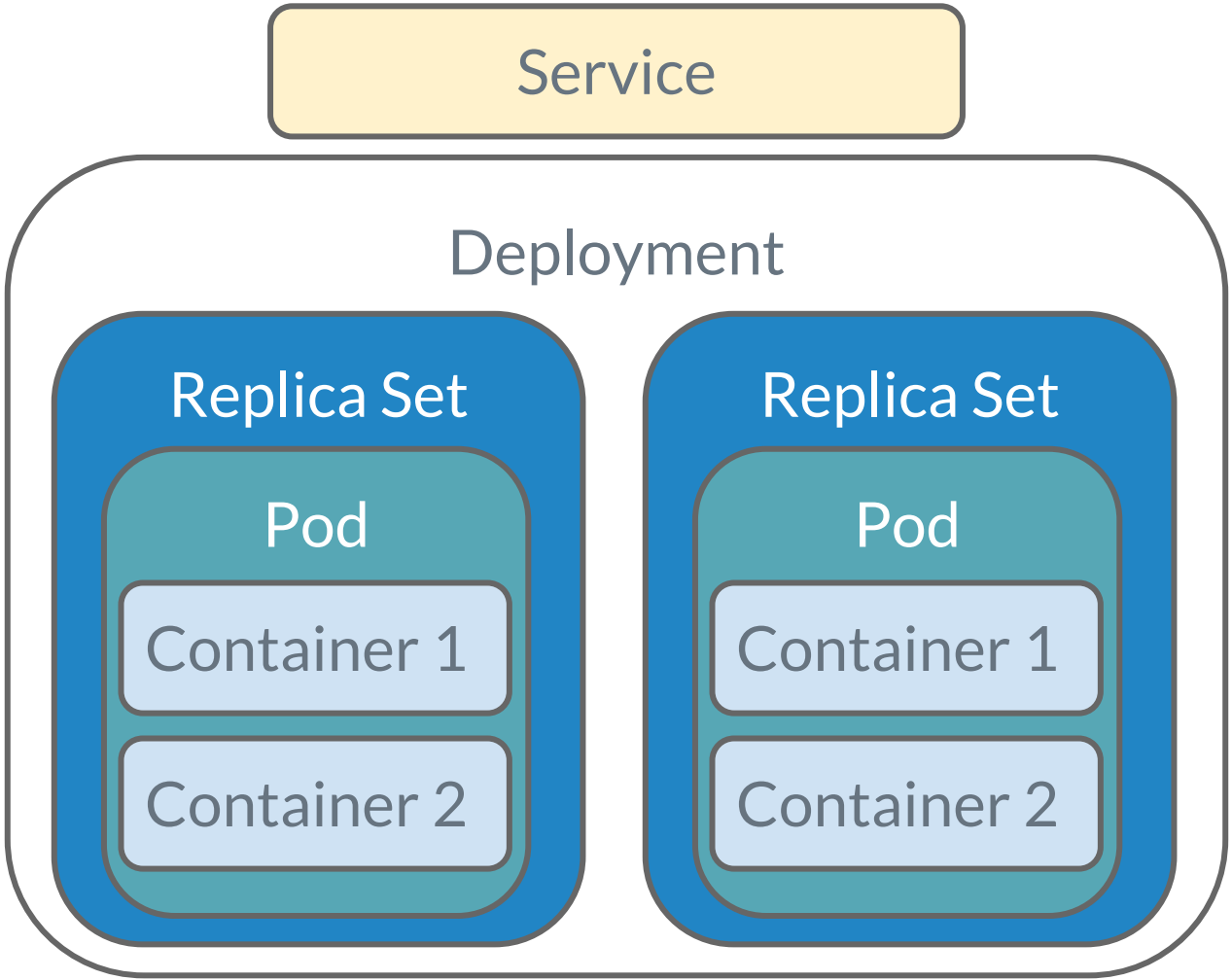
Ensures that a specified number of pod “replicas” are running

Deployment

Provides declarative updates for Pods and Replica Sets

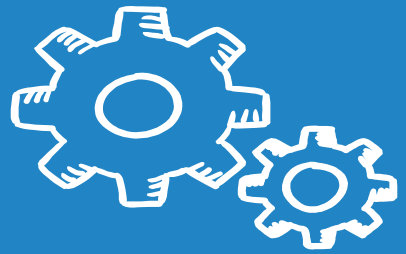
Service

a logical set of Pods and a policy by which to access them

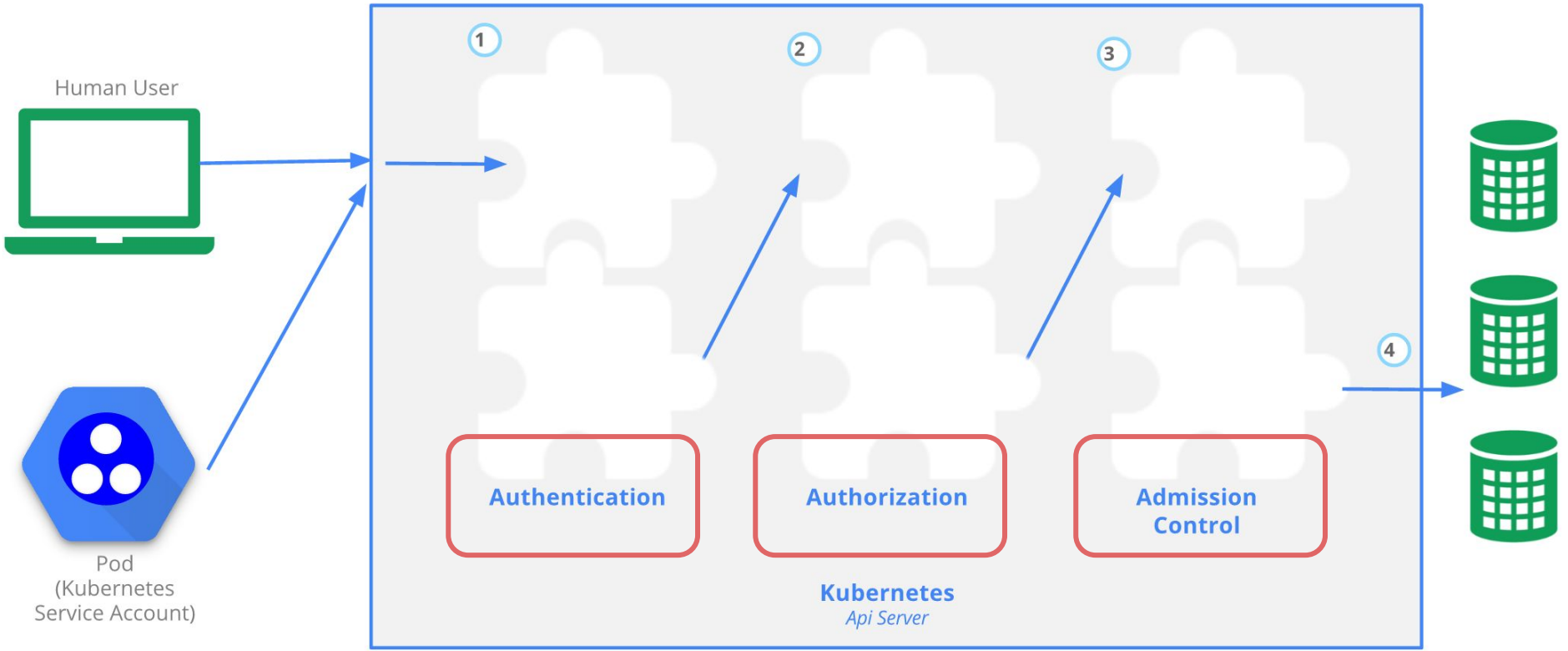

Service
Deployment
Replica Set
Pod
Container 1
Container 2
Replica Set
Pod
Container 1
Container 2

2.

Access Kubernetes API



Access Kubernetes API



User Account V.S. Service Account

User Account

Authorization Mode

- AlwaysDeny, AlwaysAllow, ABAC
- ABAC Mode
  - user, readonly, resource, namespace
  - {"user":"bob", "resource": "pods", "readonly": true, "ns": "projectCaribou"}

Real Practice

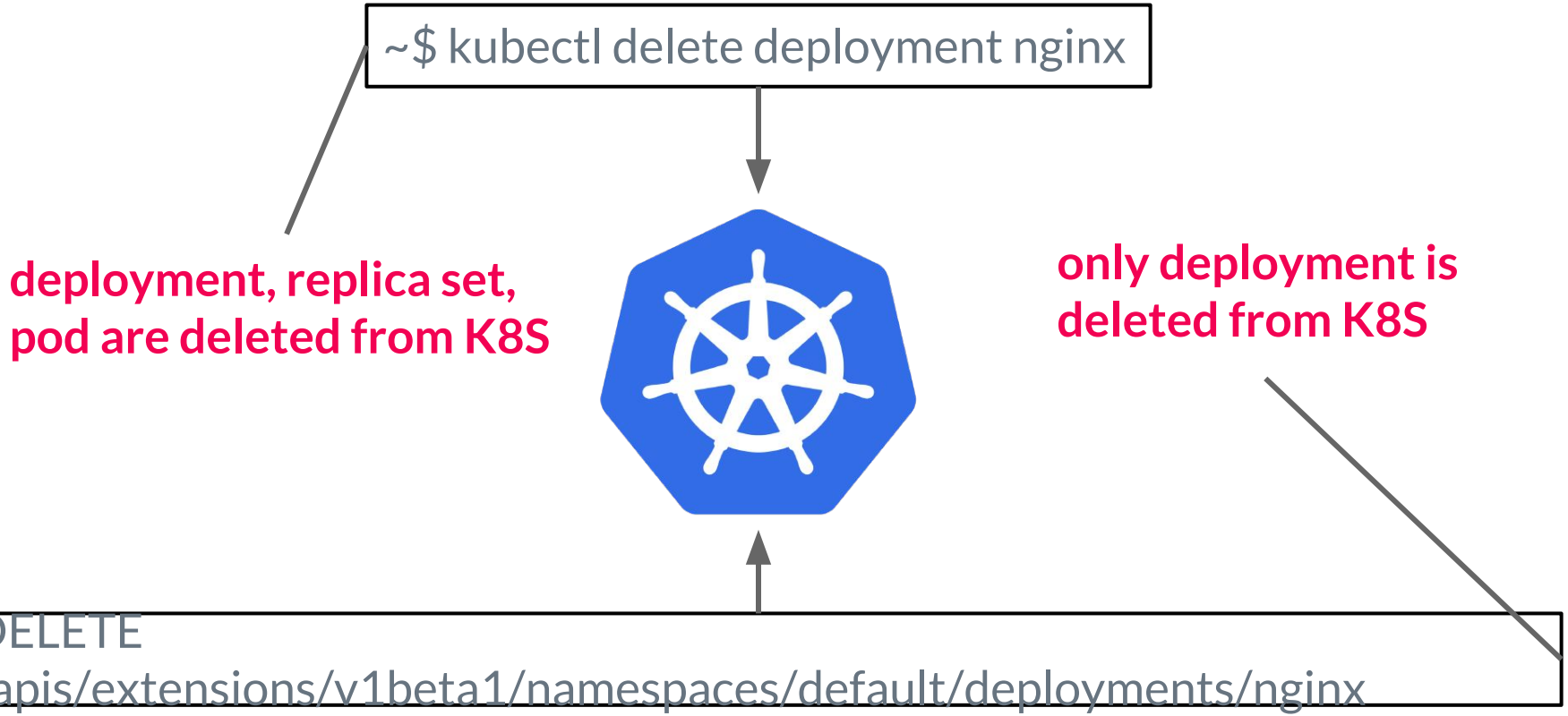
	Alpha (readonly)	Staging (readonly)	Prod (readonly)
Jenkins	False	False	False
Human	False	True	True

Kubectl V.S. Restful API

~$ kubectl delete deployment nginx

DELETE /apis/extensions/v1beta1/namespaces/default/deployments/nginx

Kubectl V.S. Restful API



3.
Kubernetes CI/CD Pipeline

Jenkins Integrate With Kubernetes

1. Create Deployment
2. Update Image ver.
3. Create Service
4. Of course, Testing

K8S Restful API

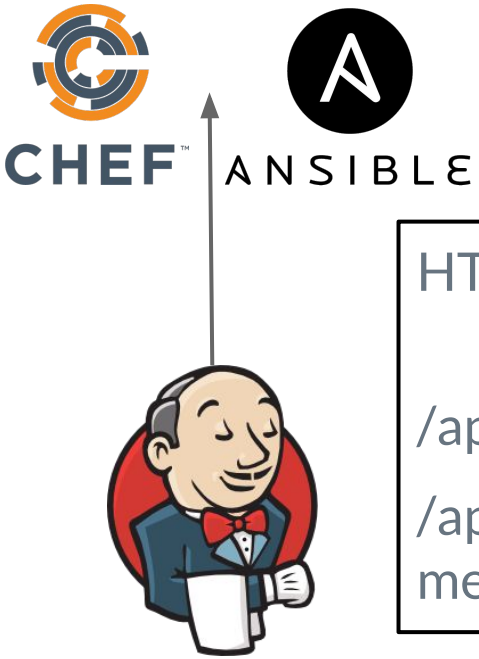
Actually Happened... (1/3)

Using Template Language to create Deployment, Service YAML File

- Chef: ERB
- Ansible: Jinja2

```
...
containers:
- name: nginx
  image: "10.1.1.1:500/web/nginx:{{ image_tag }}"
...
```

Actually Happened...(2/3)

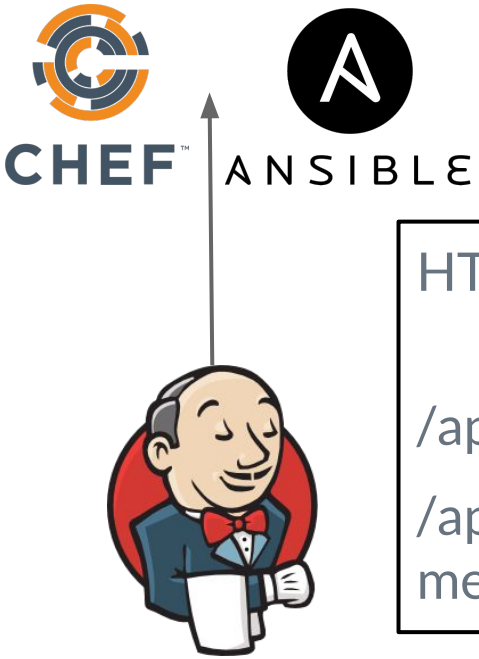


HTTP POST (Reference)

/api/v1/namespaces/{namespace}/services/{name}

/apis/extensions/v1beta1/namespaces/{namespace}/deployments/{name}

Actually Happened...(3/3)

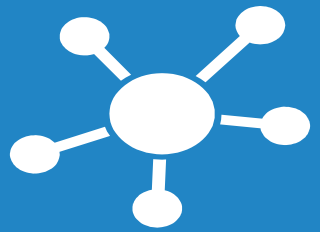


HTTP PATCH (Reference)

/api/v1/namespaces/{namespace}/services/{name}

/apis/extensions/v1beta1/namespaces/{namespace}/deployments/{name}

4.
Container High Availability



Container Alive V.S. Service Alive

- **Container Alive != Service Alive**
- When Container Dead, Restarting Pod Automatically
- When Service Dead ?

Liveness Probes

- Check Whether Service Alive Or Not
- Restart Pod If Service Unavailable
- Exec Liveness
- Http Liveness

Readiness Probes

- Check Whether Service Alive Or Not
- Bind Pod If Service Ready
- Unbind Pod If Service Unavailable
- Exec Liveness
- Http Liveness

Termination Notice

- Grace Terminate Container
- Send SIGTERM to applications
- pre-stop lifecycle hook

5.

Kubernetes Misc

Daemon Set

- Daemon Set ensures that all (or some) nodes run a copy of a pod
- Rolling Update Issue

Deploy Daemon Set Workaround

- Replace Instead Of Rolling Update
- Deployment + hostPort Instead Of Daemon Set

```
ports:
- containerPort: 9999
  name: for-deployment
  hostPort: {{ 2000 |random(start=1000, step=10) }}
```

Troubleshooting

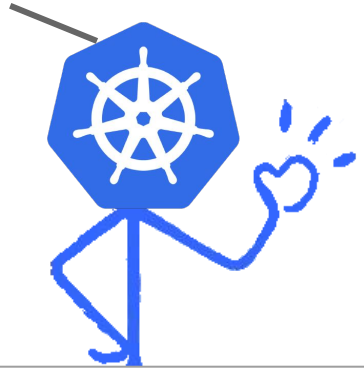
- Official Support Document
  - ~$ kubectl get {resource_type} | grep {name}
  - ~$ kubectl logs {pod_name}
  - ~$kubectl describe {resource_type} {name}
  - ~$kubectl edit {resource_type} {name}
  - ~$ kubectl exec -it {pod_name} bash

Update V.S. Replace

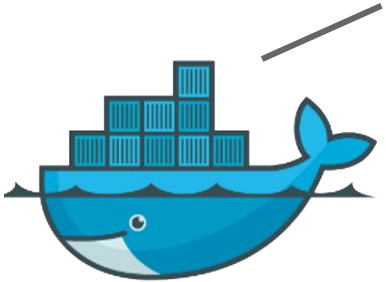
- Rolling Update K8S Resource First, Reduce Service Downtime
- Increase terminationGracePeriodSeconds if needed
- But It’s Necessary To Replace Resource Sometimes...

Capability

Unfortunately, I annot disclose these details.



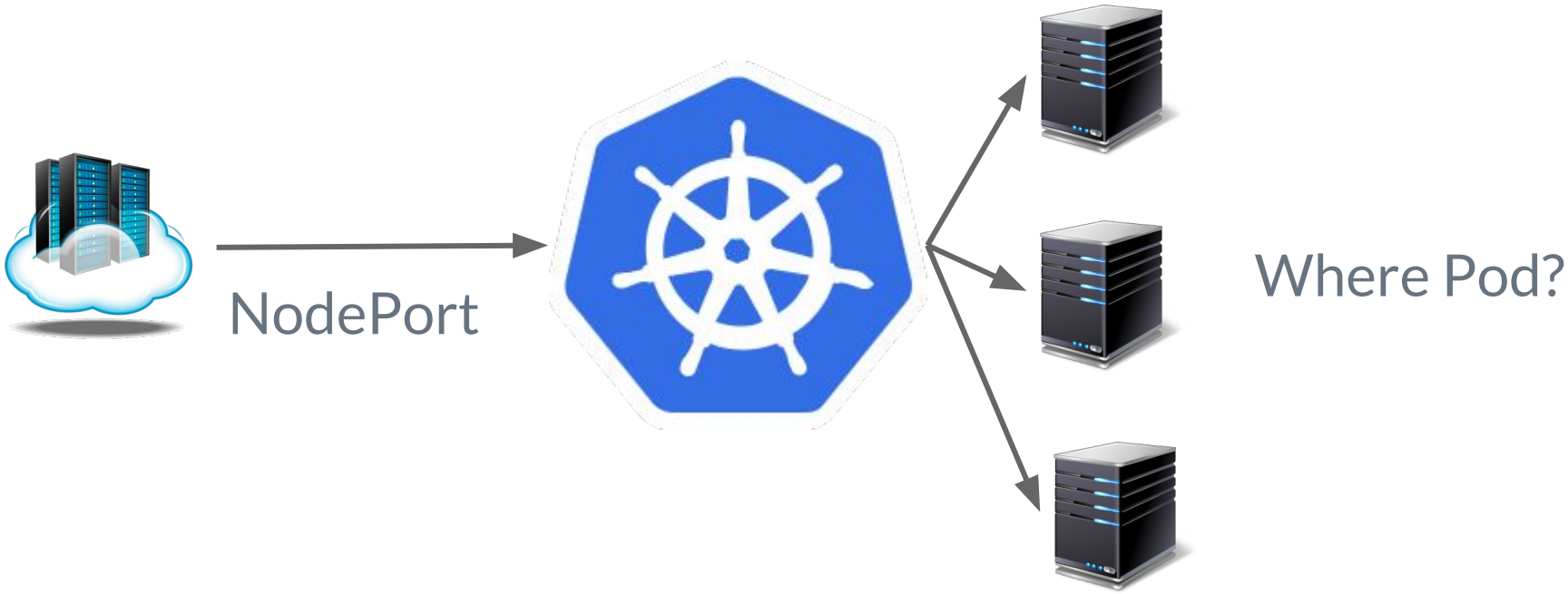
你 Pod 數有多高？



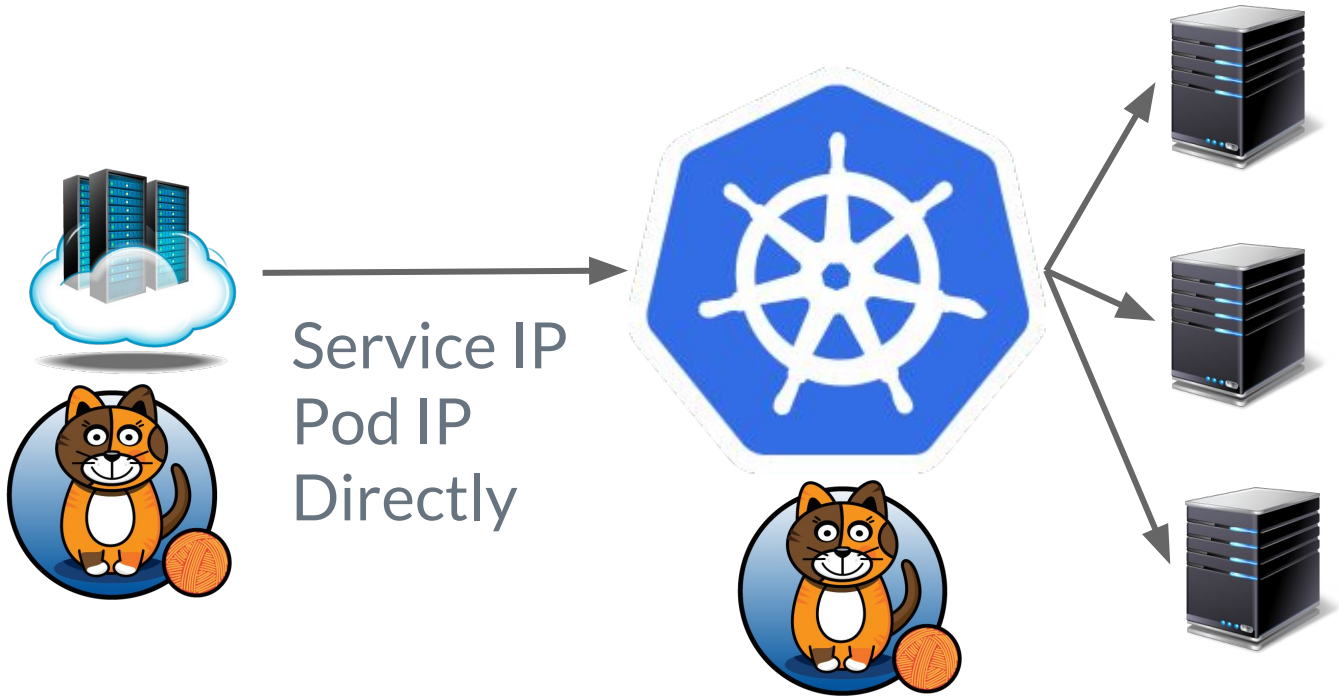
Which Loading Is Higher?

Pod Number	Container Per Pod
100	10
10	100

Access K8S From External



Access K8S From External



Thanks!

Any questions?

You can find me at:

 smalltown20110306

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