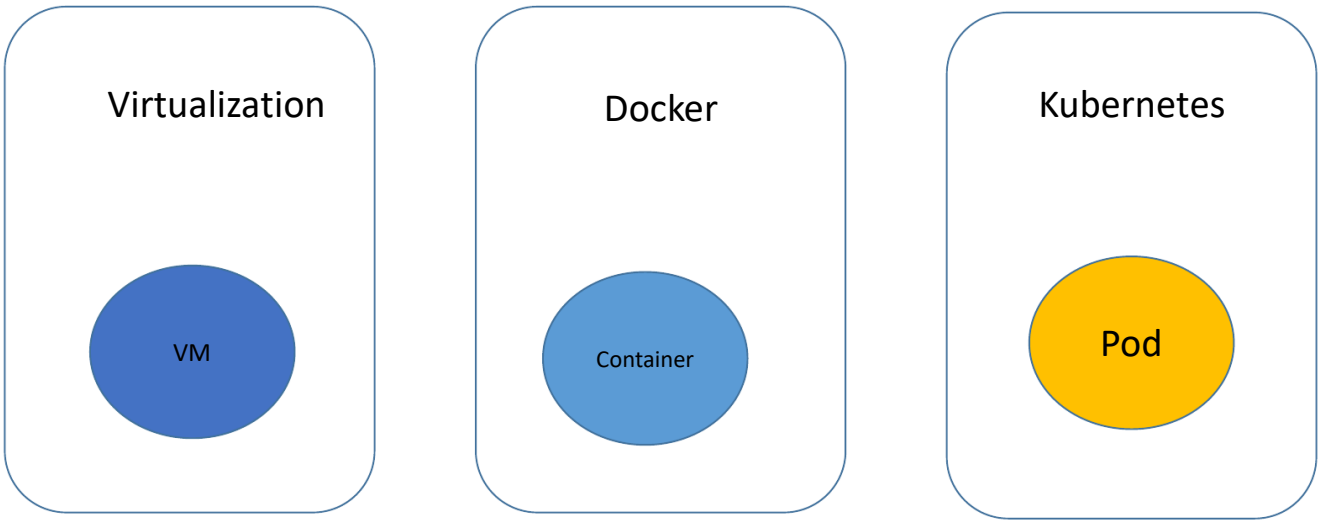
Demystifying the Nuts & Bolts of Kubernetes Architecture

Pods101

Pod - Concepts

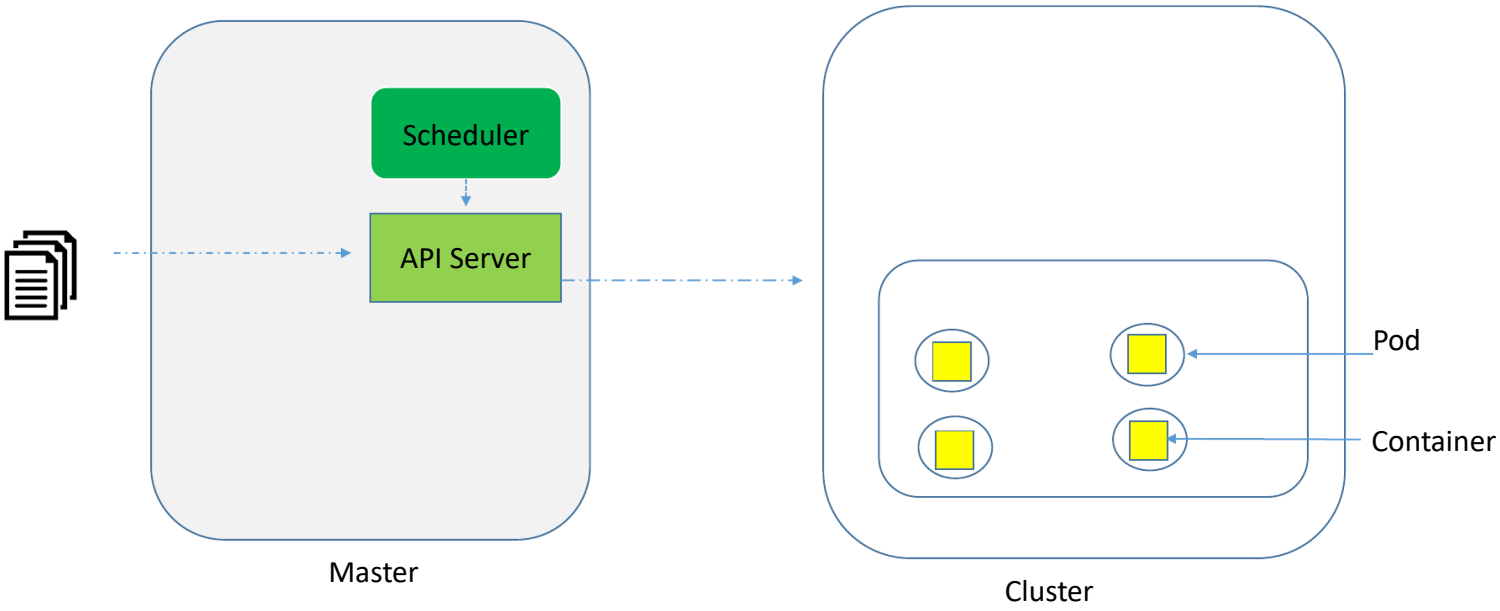
- What is Pod?
- Pod Deployment
- Multi-Container
- Pod Networking
- Inter-Pod & Intra-Pod Networking
- Pod Lifecycle
- Pod Manifest File
- A Typical Pod creation Workflow

Atomic Unit of Scheduling



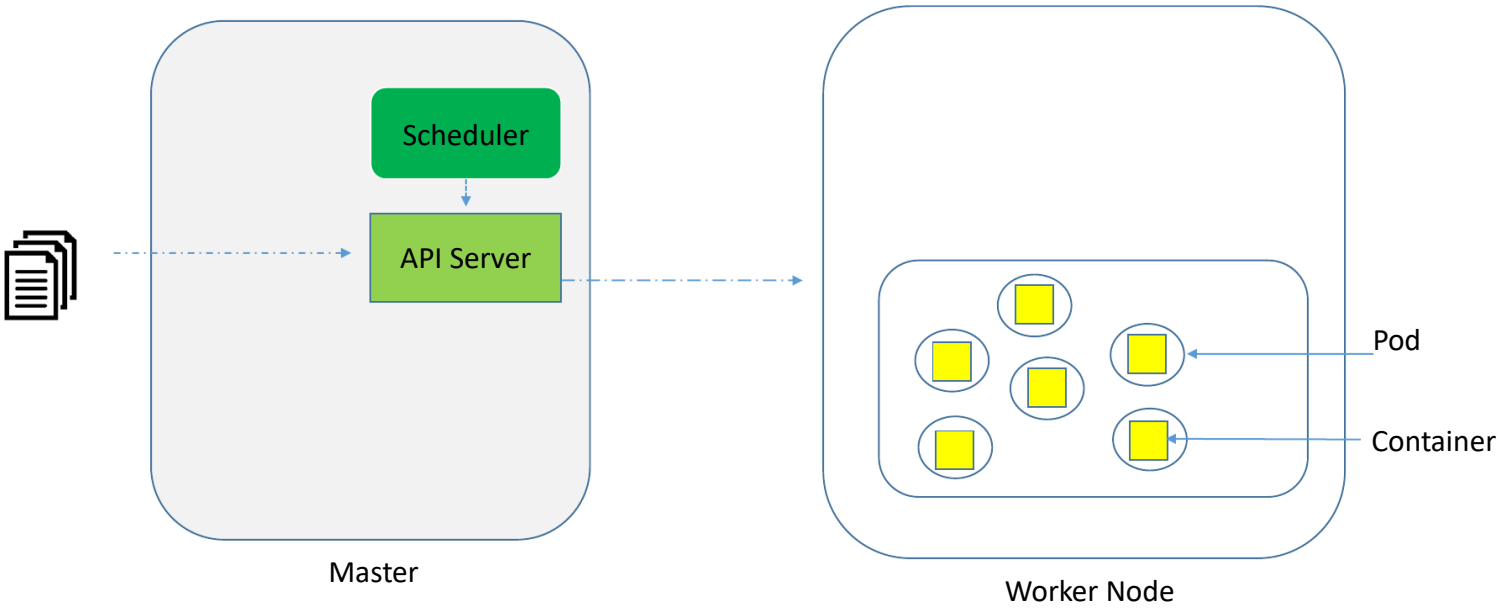
docker

How Pods are deployed?



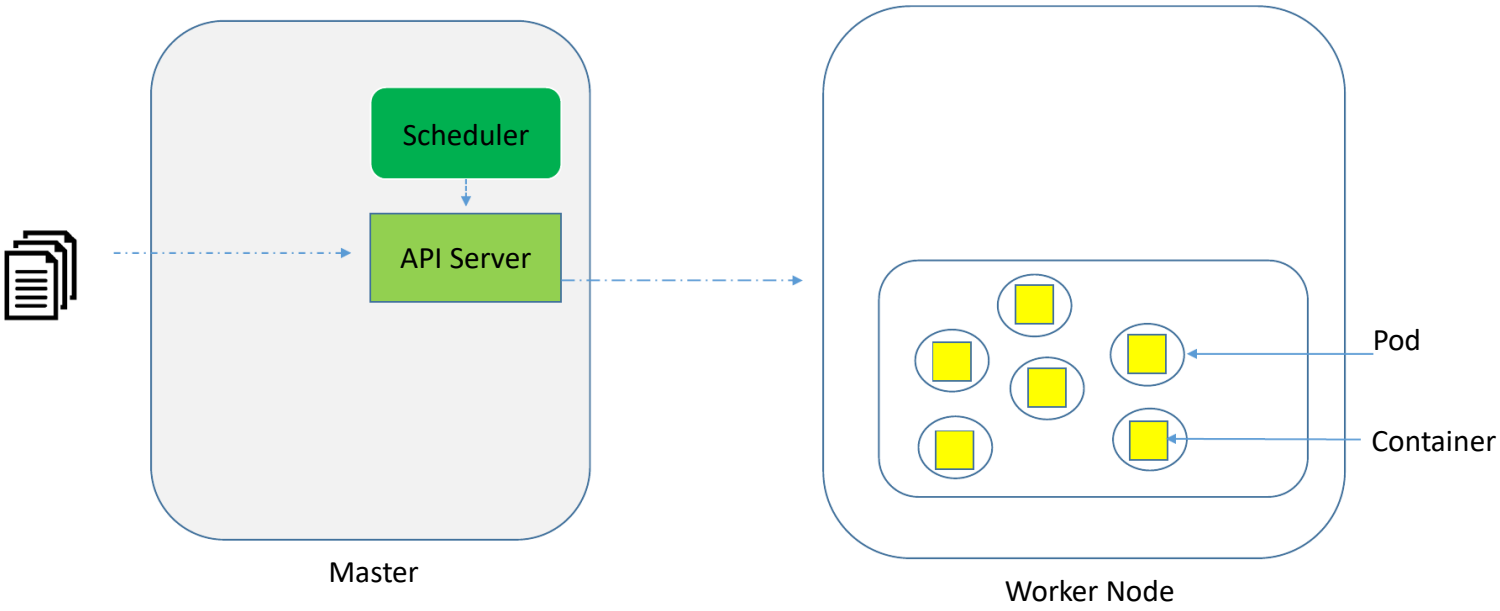
docker

Scaling the Pods to accommodate increasing traffic



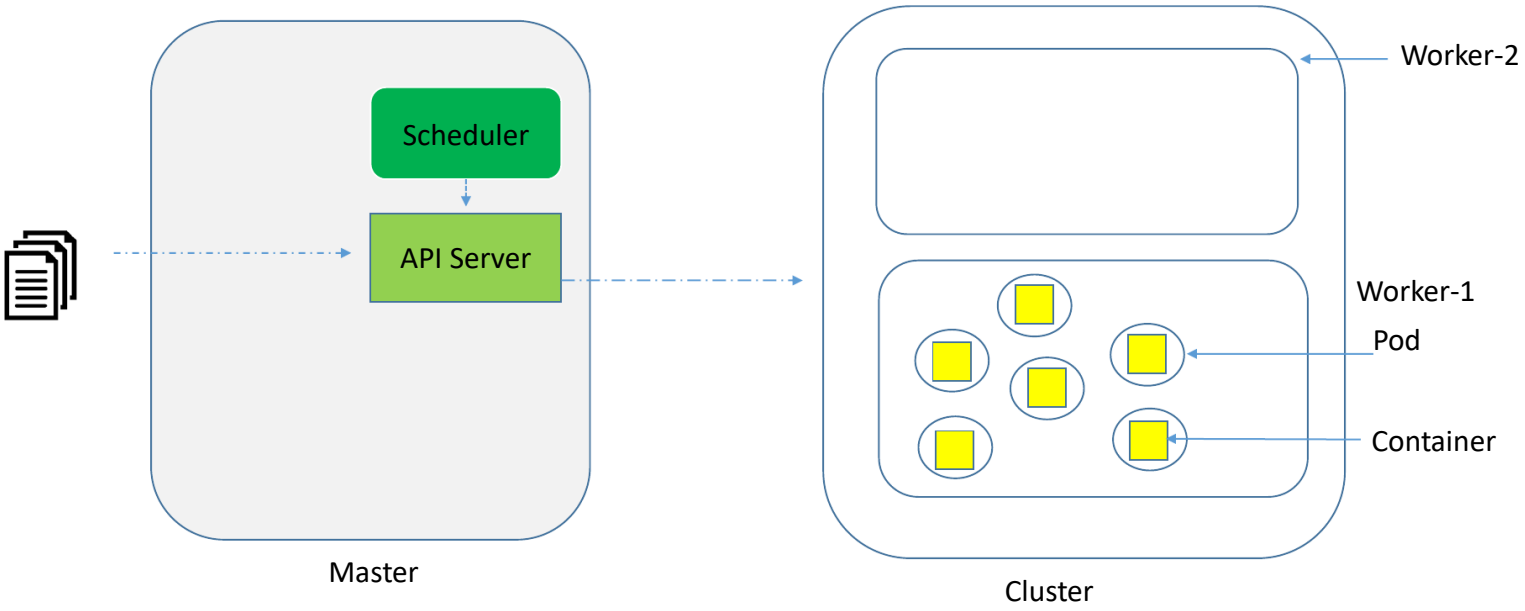
docker

What if node resources is getting insufficient?



docker

What if node resources is getting insufficient?



docker

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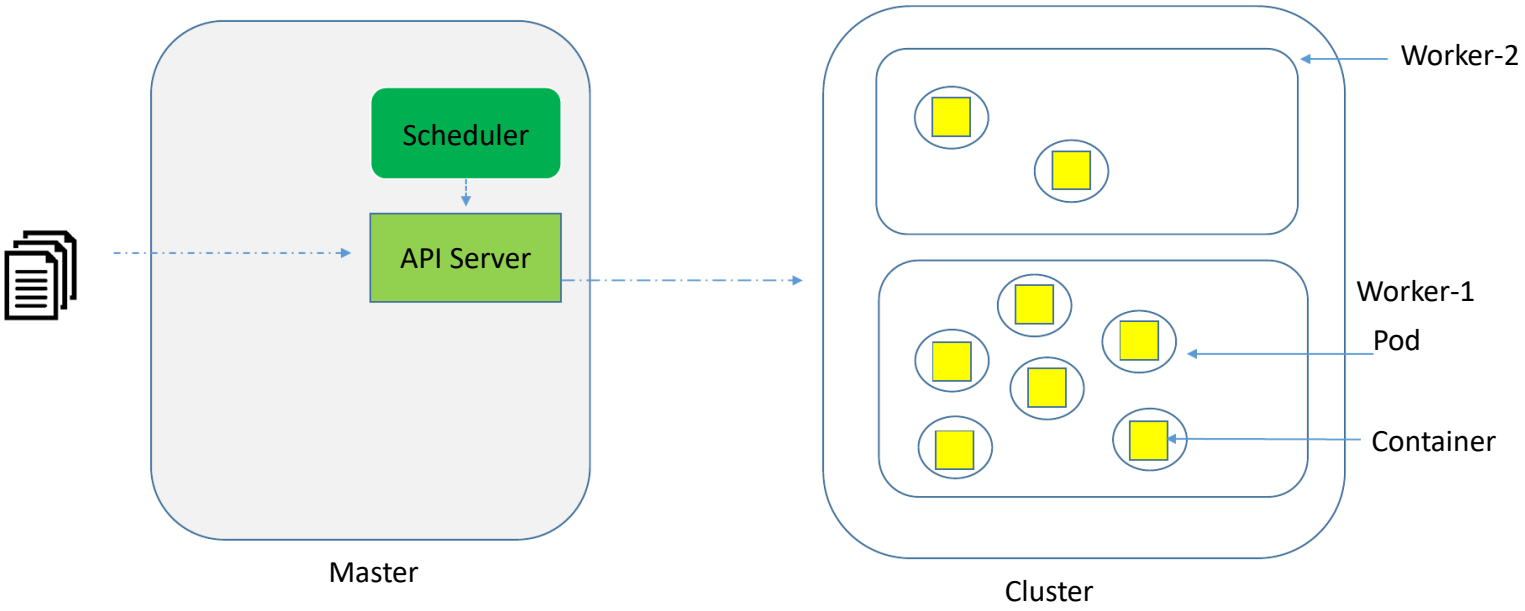
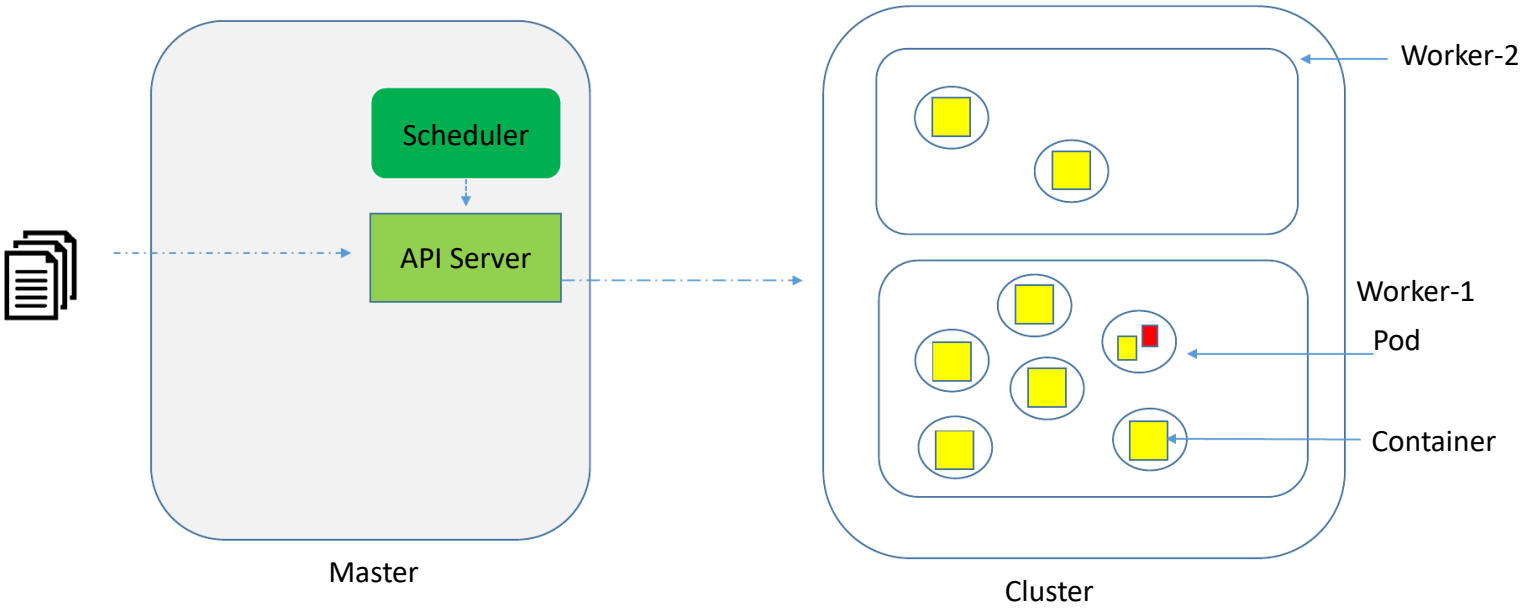


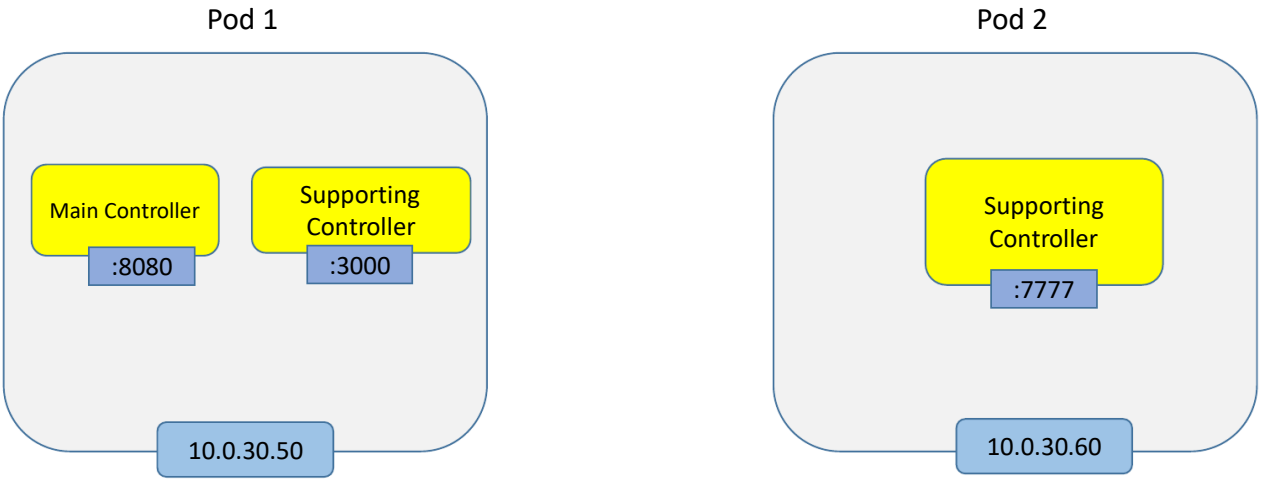
docker

2 Containers in a same Pod



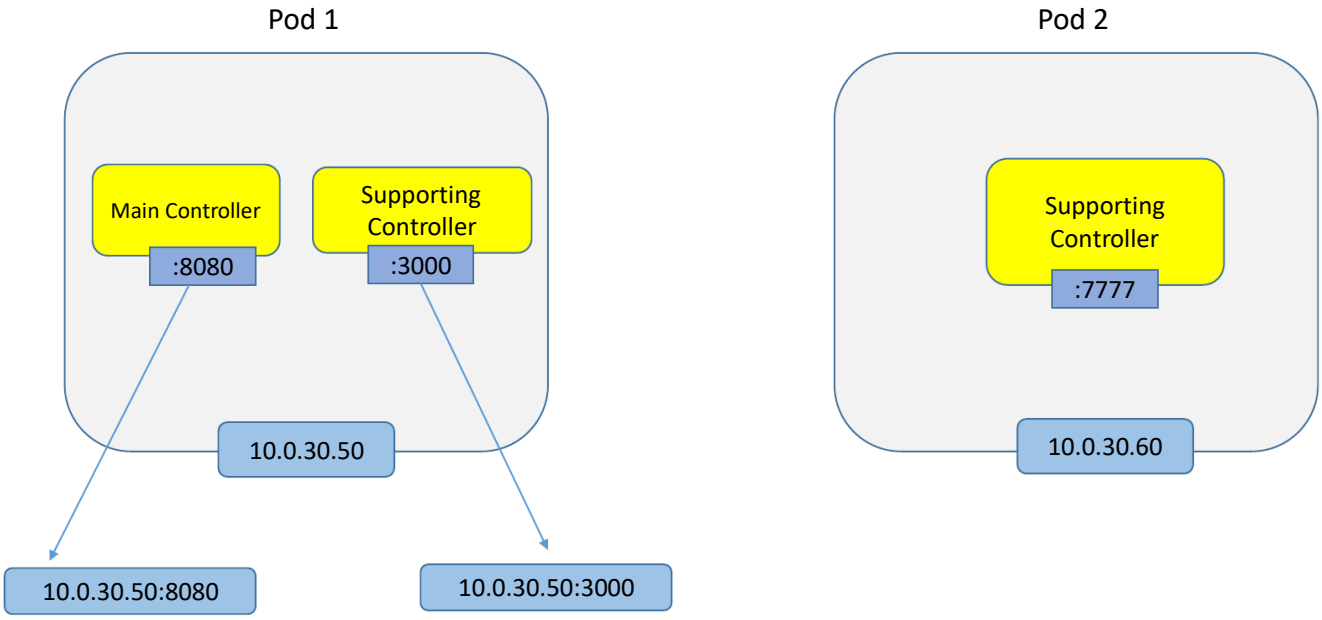
docker

Pod Networking



How does these containers inside Pods communicate with External World?

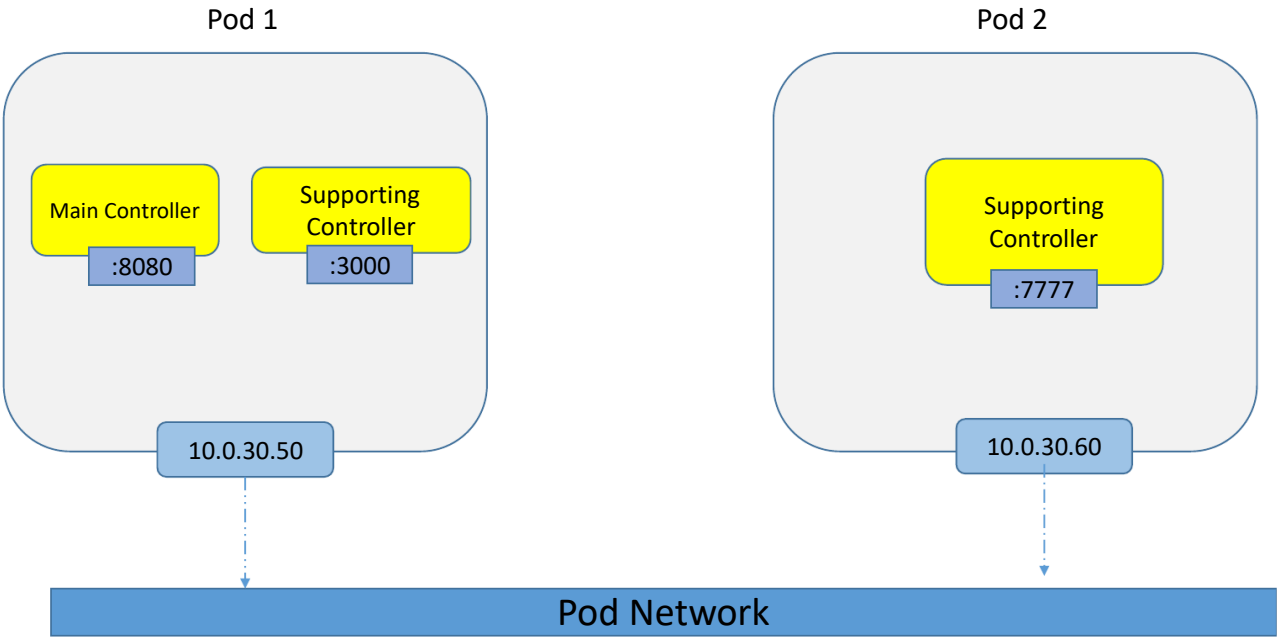
Network Namespace



How does one Pod talk to another Pod?

Welcome to Inter-Pod Communication..

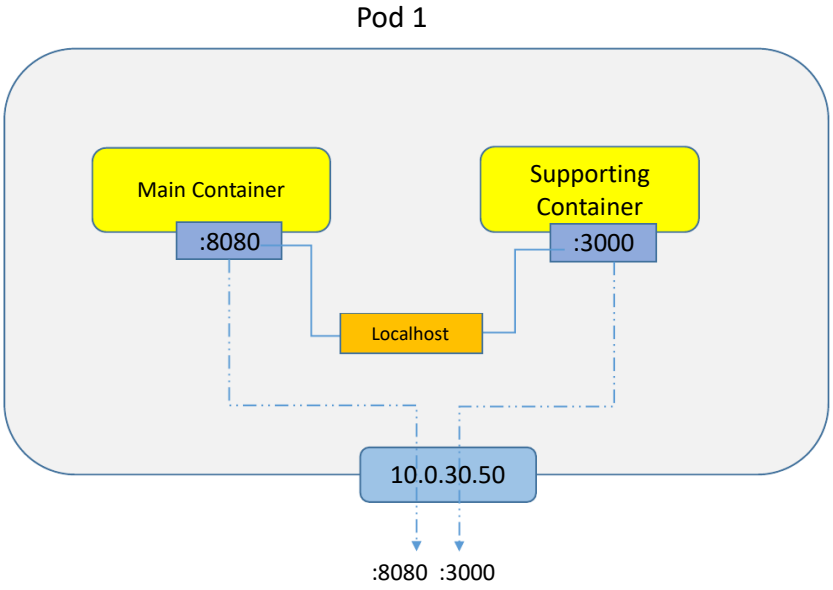
Pod Networking



docker

How does Intra-Pod communication take place?

Intra-Pod Communication



A Look at Pod Manifest

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  labels:
    name: nginx-pod
spec:
  containers:
  - name: nginx
    image: nginx:latest
    ports:
    - containerPort: 80
```

Create the pod as shown below:

```
$ kubectl create -f templates/pod.yaml
pod "nginx-pod" created
```

Get the list of pod:

```
$ kubectl get pods
NAME        READY     STATUS    RESTARTS   AGE
nginx-pod   1/1       Running   0          22s
```

Get a shell to a running Container

```
[node1 lab01-creating-nginx-pod]$ kubectl get po
NAME        READY   STATUS    RESTARTS   AGE
nginx-pod   1/1     Running   0          3m22s
[node1 lab01-creating-nginx-pod]$ kubectl exec -it nginx-pod -- /bin/bash
```

Verifying the Operating System

```
root@nginx-pod:/# ls
bin  boot  dev  etc  home  lib  lib64  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr
root@nginx-pod:/# cat /etc/os-release
PRETTY_NAME="Debian GNU/Linux 9 (stretch)"
NAME="Debian GNU/Linux"
VERSION_ID="9"
VERSION="9 (stretch)"
ID=debian
HOME_URL="https://www.debian.org/"
SUPPORT_URL="https://www.debian.org/support"
BUG_REPORT_URL="https://bugs.debian.org/"
```

Get a shell to a running Container

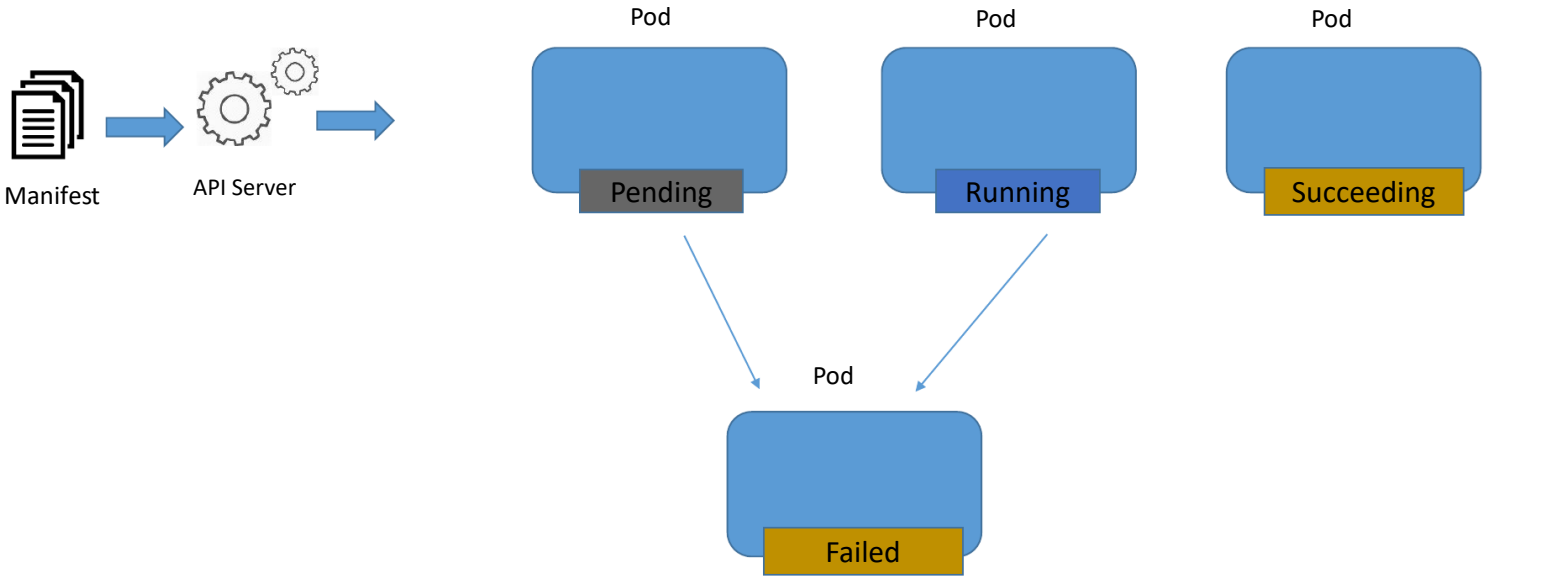
```
root@nginx-pod:/# echo Hello shell demo > /usr/share/nginx/html/index.html
```

Verifying the index page

```
[node1 lab01-creating-nginx-pod]$ kubectl get po
NAME        READY   STATUS    RESTARTS   AGE
nginx-pod   1/1     Running   0          13m
[node1 lab01-creating-nginx-pod]$ kubectl get po -o wide
NAME        READY   STATUS    RESTARTS   AGE   IP          NODE    NOMINATED NODE   READINESS GATES
nginx-pod   1/1     Running   0          13m   10.44.0.1   node2   <none>           <none>
[node1 lab01-creating-nginx-pod]$ curl 10.44.0.1:80
Hello shell demo
[node1 lab01-creating-nginx-pod]$
```

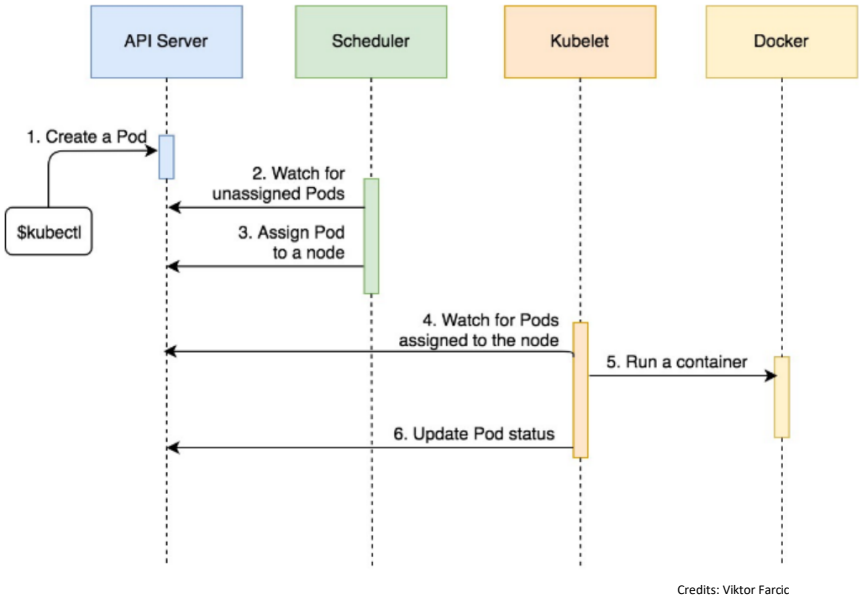
Stages of Life Cycle of Pod

Lifecycle of a Pod



docker

A Typical Pod Creation WorkFlow



Credits: Viktor Farcic

docker

Demo

- Deploying Your First Nginx Pod
- Viewing Your Pod
- Where is your Pod running on?
- Pod Output in JSON
- Executing Commands against Pod
- Terminating a Pod
- Adding a 2nd container to a Pod

References

- https://kubelabs.collabnix.com
- https://kubetools.collabnix.com

Thank You