Etcd - metadata store

scheduler - scheduling

controller - brain

kubelet - agent run on each container (workers)

container runtime → Docker

- kube-apiserver is only available in the Master

```
kubectl run hello-minikube
kubectl cluster-info
kubectl get nodes
```

```
kubectl get nodes -o wide
```

- To know the OS version running on the containers.

- Pods

- Smallest object in kubernetes
  pods runs on node

- When traffic is increased new seperate pods can be added onto the node to keep up with the traffic.

- We do not add pods to existing containers to scale up.

- Helper containers are usually put into same pod.

pod = group of whales (Docker icon)

- With pods we can manage multiple containers which are inside that pod. for ex. stoping pod will stop all the container

within that pod.

- kubectl get pods

To view all running pods.

- kubectl describe pod nginx

name of pod

To view detailed info on pod

- kubectl run hello-minikube
- kubectl cluster-info
- kubectl get nodes

- To run kubectl

Name for an img.

- kubectl run nginx --image = nginx

- To run k8 container with image nginx

- To list pods Available

- kubectl get pods

- More details on the pod.

```
kubectl describe pod nginx
```

- Pods with YAML

To create a YAML file

```
kubectl create -f pod-defination.yaml
```

YAML files contains

```
apiVersion: v1
kind:
metadata:
spec:
```

To check the nodes where this nodes are placed on -

kubectl get pods -o wide

Creating image in kubernetes

YAML defination for the pod

- kubectl run redis --image=redis123 --dry-run=client -o yaml > redis.yaml

creating a pod

- kubectl create -f redis.yaml

4 kubernetes Controller

- Replication controller
  - High Availability
  - Increase Scalability

- Replication Controller ← old
- Replica set ← new

# Replicas

- To view the number of replicas

  — `kubectl get replicasets`

  OR

  — `kubectl get rs`

To describe replicaset

`kubectl describe replicaset new-rs-set`

name

Replica set has
spec:
template:
replicas:
only in replica set → selector:

Scaling of replica → can be done automatically
edit file then

1. – kubectl replace -f replicaset-defination.yml

2. – kubectl scale --replicas=6 -f replicaset-defination.yml

```
> kubectl create -f replicaset-definition.yml
> kubectl get replicaset
> kubectl delete replicaset myapp-replicaset
> kubectl replace -f replicaset-definition.yml
> kubectl scale --replicas=6 -f replicaset-definition.yml
```

*Also deletes all underlying PODs

3. changing in memory replicaset

kubectl edit replicaset my-app
↑
App name
Works only if we have

vim editor on system.

To see the replicaset description

- kubectl describe replicaset myapp-replicaset

* You cannot create a pod with same label as replicaset. it will automatically terminate

- You can scale up or down using multiple way

① By changing the in-memory yaml file in that case you don't need to run extra commands
ex.

- kubectl edit replicaset myapp-replicaset
(needs vim)
↑ App name.

② By changing the replica.yaml file

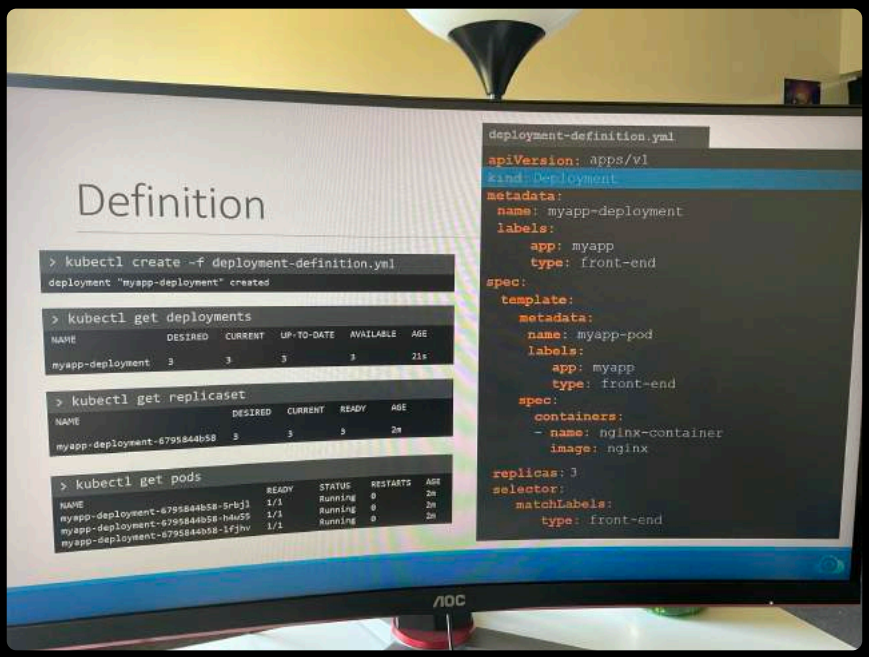
By simply going into yaml file and setting different number for replica
after change you have to replace the yaml file.

- kubectl replace replicaset -f replica.yaml

③. By using command

- kubectl scale --replicas=6 replica.yaml.

* kubectl deployments



kubectl get all

* Rollout Commands

- kubectl rollout status deployment/ my-app deployment

- kubectl rollout history deployment/ myapp-deployment

① • Rolling update is the default deployment strategy.
→ Which means updates will be rolled out one-by-one.

To rollout we simply make changes into deployment-defination for ex. changin nginx 1.6 → nginx 1.7 and once done we simply run

- kubectl apply -f deployment-defination.yaml.

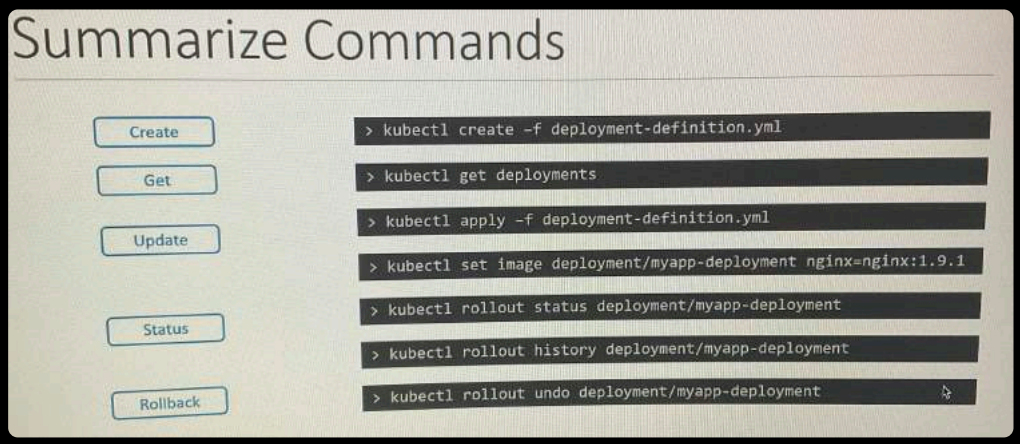
② Recreate strategy – not default

We delete all the previous pods and create new pods all at once

disadvantage – Downtime

* Rollback a change.

• kubectl rollout undo deployment/myapp-deployment




• When we mis-configure or give wrong image name in that case the default rollout try to rollout update on one image and when it find out that it is not possible due to there is no image it get stuck and out of that 5 replicas only 4 are running

and remaining one is stuck waiting for image to fetch which does not exist.

We can fix such errors by using undo

- kubectl rolling undo -f ./deployment.yaml

or

- kubectl rolling undo deployment myapp-deployment.

## * Networking

- All pods are internally connected.
- kubernetes cluster does not create a connection directly that's why we need an external networking tools.

- kubernetes cluster may have same ip's directly that's why we need an external networking tools.

- kubernetes services

Service is an mapping tool in k8 to map internal port to communicate with outside local connections

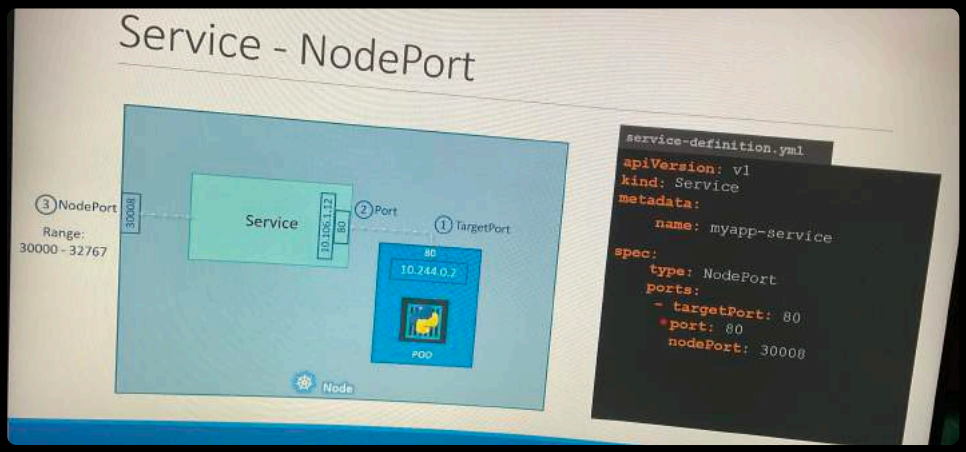
Service types

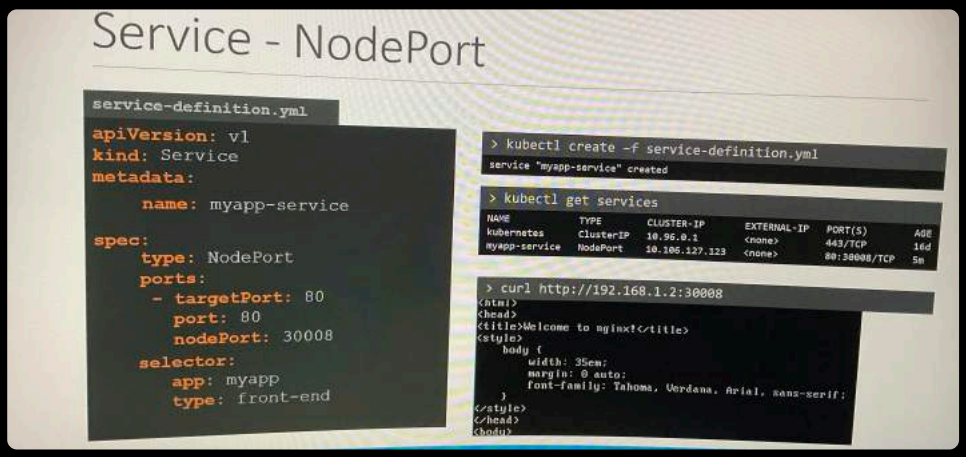
① Nodeport - Makes internal port acessible

② cluster IP -
creates virtual IP to communicate

③ Load Balancers

① NodePort -

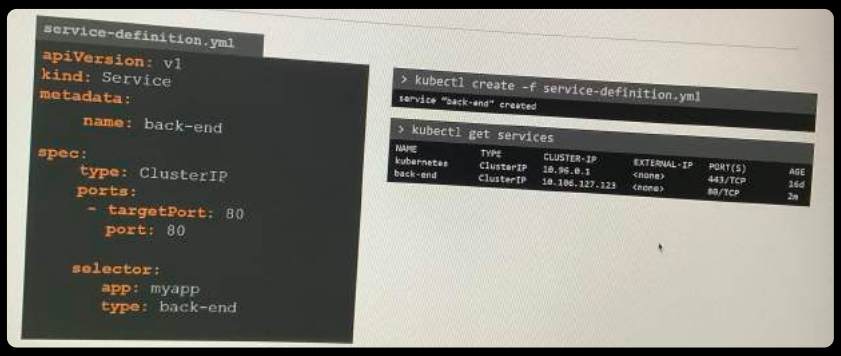

Service - NodePort
③ NodePort
Range:
30000 - 32767
30008
Service
10.106.1.12
80
② Port
① TargetPort
80
10.244.0.2
POD
Node
service-definition.yml
apiVersion: v1
kind: Service
metadata:
name: myapp-service
spec:
type: NodePort
ports:
- targetPort: 80
port: 80
nodePort: 30008


Service - NodePort
service-definition.yml
apiVersion: v1
kind: Service
metadata:
name: myapp-service
spec:
type: NodePort
ports:
- targetPort: 80
port: 80
nodePort: 30008
selector:
app: myapp
type: front-end
> kubectl create -f service-definition.yml
service "myapp-service" created
> kubectl get services
NAME kubernetes ClusterIP 10.96.0.1 <none> 443/TCP 16d
myapp-service NodePort 10.106.127.123 <none> 80:30008/TCP 5m
> curl http://192.168.1.2:30008
<title>Welcome to nginx!</title>
width: 35em;
margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif;

② clusterIP

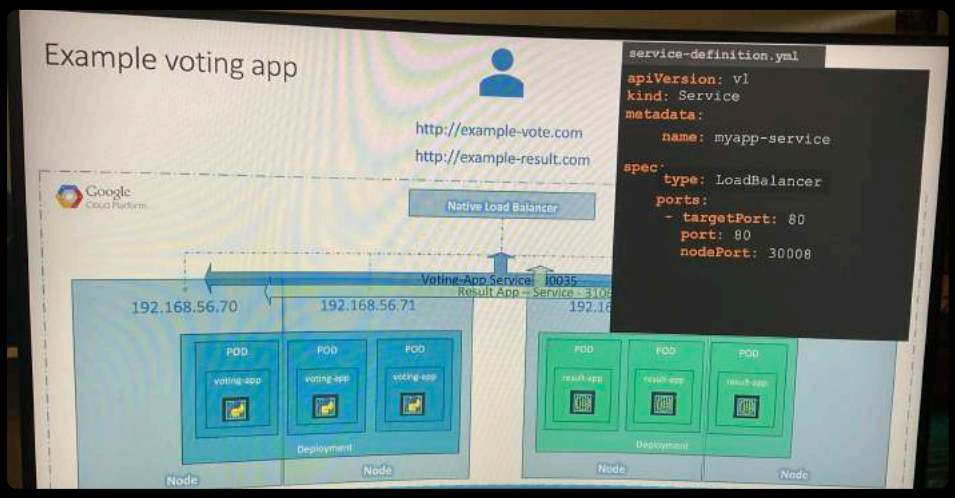
Basically a single entry-point for communication.

Default by kubernetes service.




③ LoadBalancers –

- only works with supported cloud platform



- Entrypoints 0 out means there is issue with naming betn pods.
  make sure labels are same for apps.

- Microservices -

- docker run --links can be used for linking ← old method and may get depricated in the future.

- Deploying

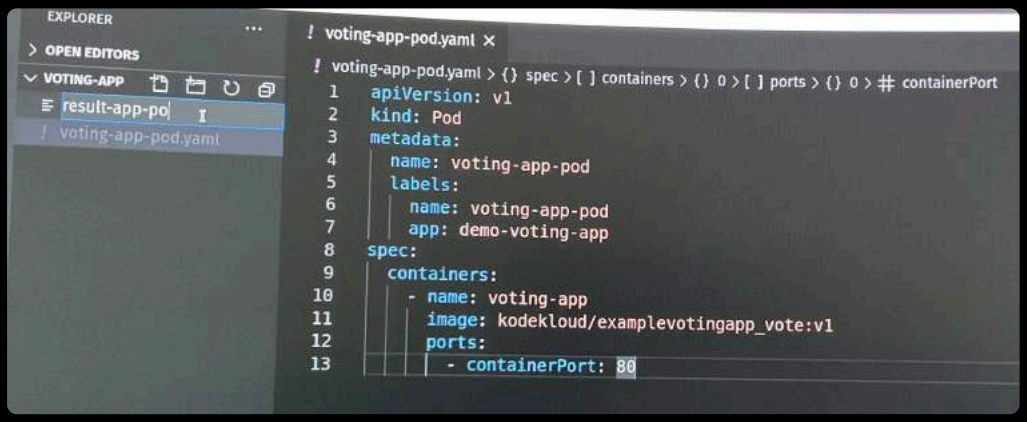
Kubernetes definition files are used to define the desired state of Kubernetes objects such as pods, deployments, services, and so on. There are different types of definition files used in Kubernetes, including:

1. Pod definition file: This file is used to define a single pod in Kubernetes. It includes details such as the container image to use, the command to run, the environment variables to set, and so on.
2. Deployment definition file: This file is used to define a deployment in Kubernetes. A deployment is a higher-level object that manages a set of pods, making it easy to manage rolling updates, scaling, and more.
3. Service definition file: This file is used to define a service in Kubernetes. A service provides a stable endpoint for accessing a set of pods, allowing for easy load balancing and service discovery.
4. ConfigMap definition file: This file is used to define a ConfigMap in Kubernetes. A ConfigMap is a key-value store for storing configuration data that can be used by pods and other Kubernetes objects.
5. Secret definition file: This file is used to define a Secret in Kubernetes. A Secret is a secure way to store sensitive information such as passwords, API keys, and so on.

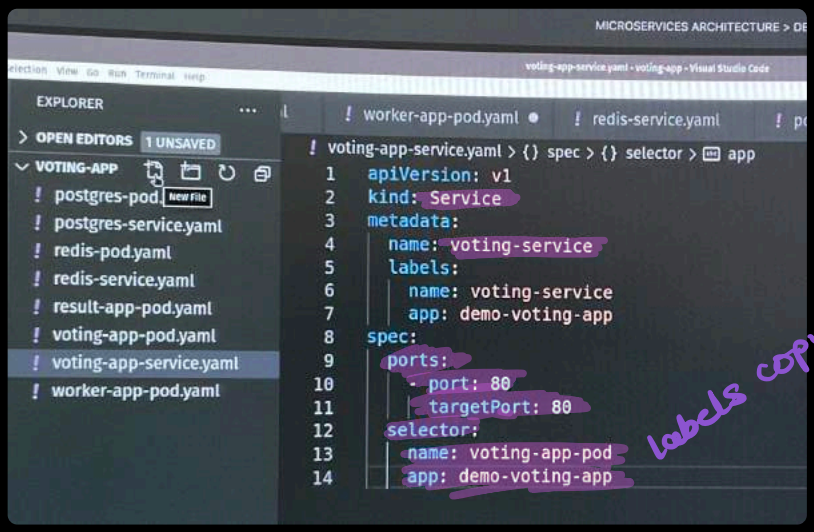
Each type of definition file serves a specific purpose and includes different fields and configurations depending on the object being defined. By using these files, Kubernetes operators can declaratively specify the desired state of their applications, making it easier to manage and maintain their infrastructure.

Based on different working of files we might have different content among files

Pod - defination files




Voting App - service.yaml




labels copy from defination.

Deployments → Replicasets