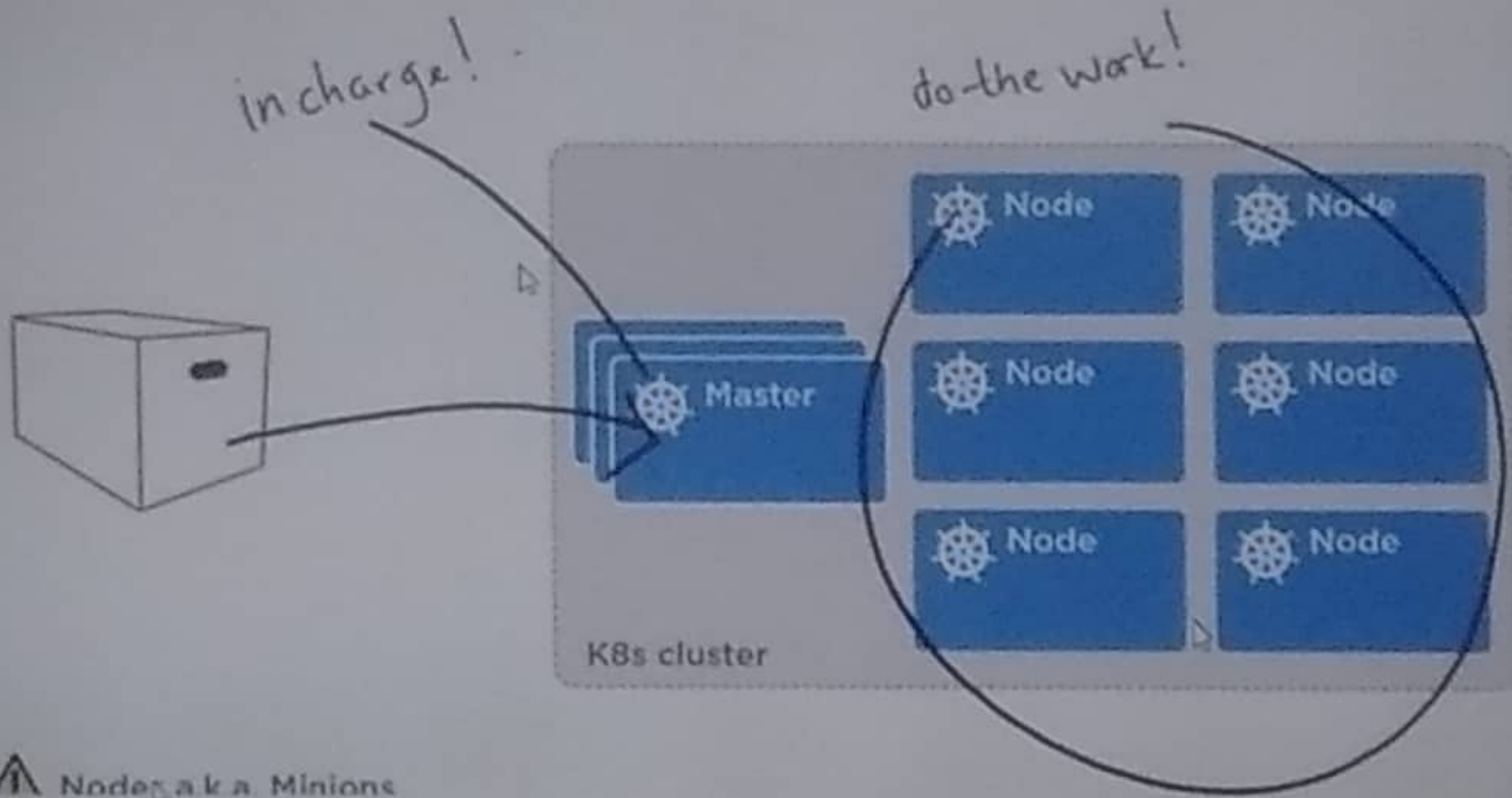




kubernetes

- Kubernetes is a orchestration tool
- By using this we can achieve high
 1. availability
 2. scalability
 3. Desired state



▲ Nodes a.k.a. Minions



Master



Four Components

API Server: Authentication person
make a decision

Cluster Storage: memory

Controller: Monitoring

Scheduler: Work Assign to Nodes

Cluster store

Persistent storage

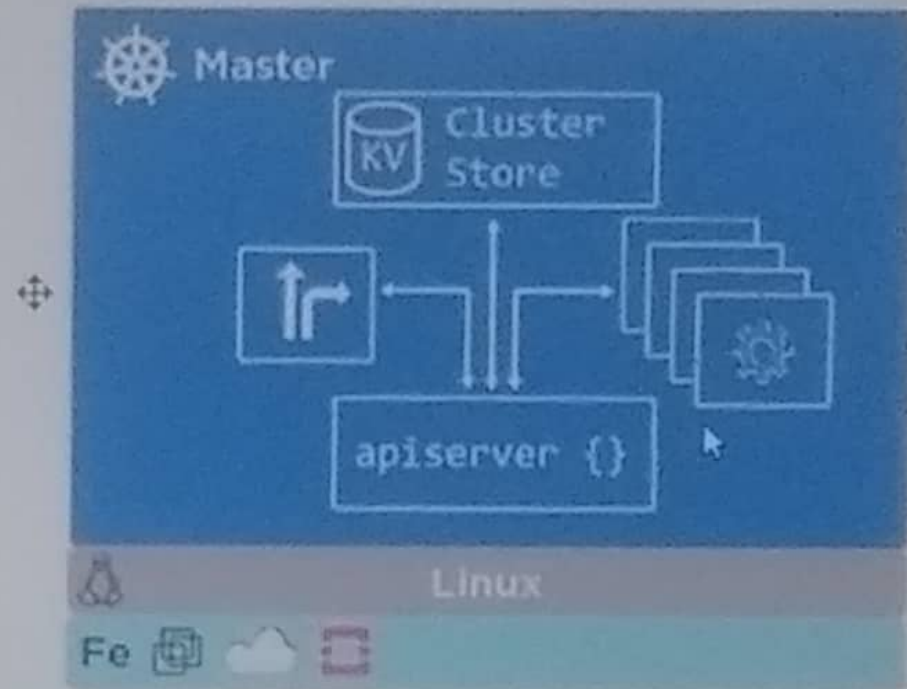
Cluster state and config

Uses etcd

Distributed, consistent,
watchable...

The *"source of truth"* for
the cluster

Have a backup plan for it!



Cluster Storage keep every information in cluster as a Key:Value

E.g apiserver is a brain which takes decision based on memory

kube-controller-manager

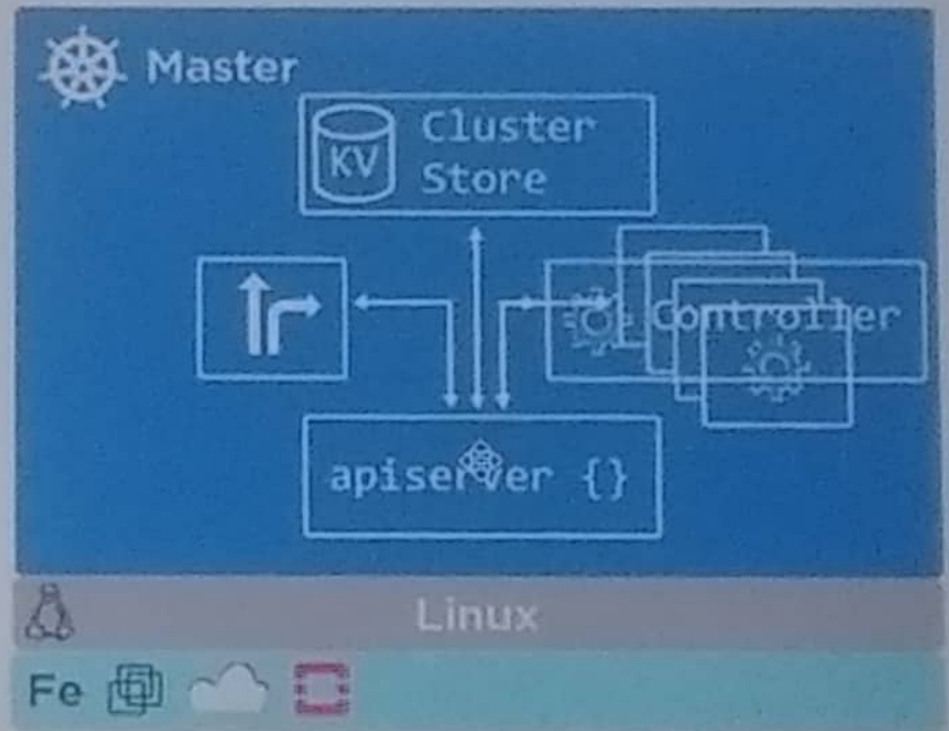
Monitoring

Controller of controllers

- Node controller
- Endpoints controller
- Namespace controller
- ...

Watches for changes

Helps maintain *desired state*



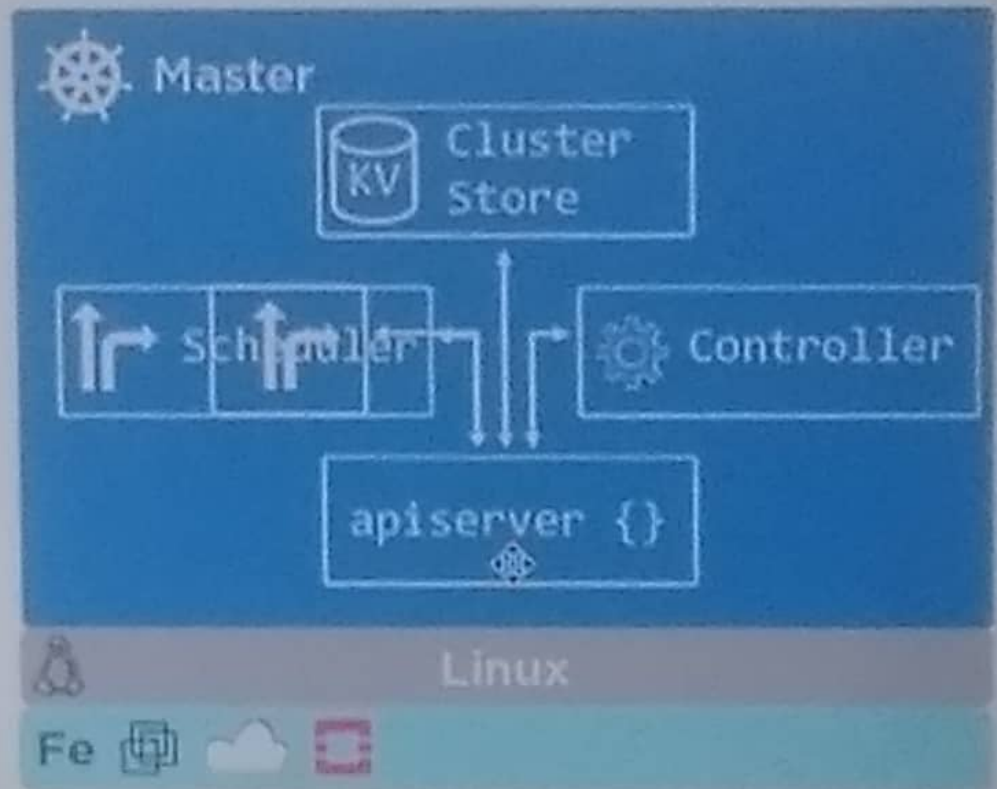
Kubernetes Controller If any changes takes update cluster Storage as a Key:value

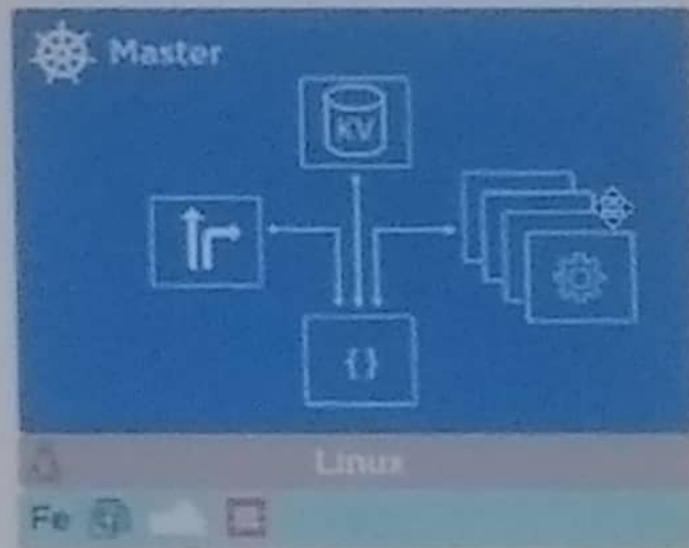
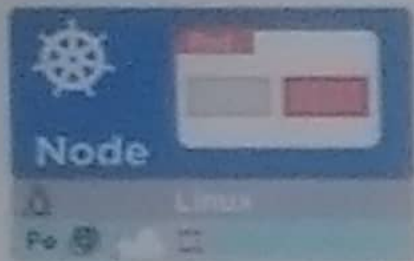
kube-scheduler

Watches apiserver for new pods

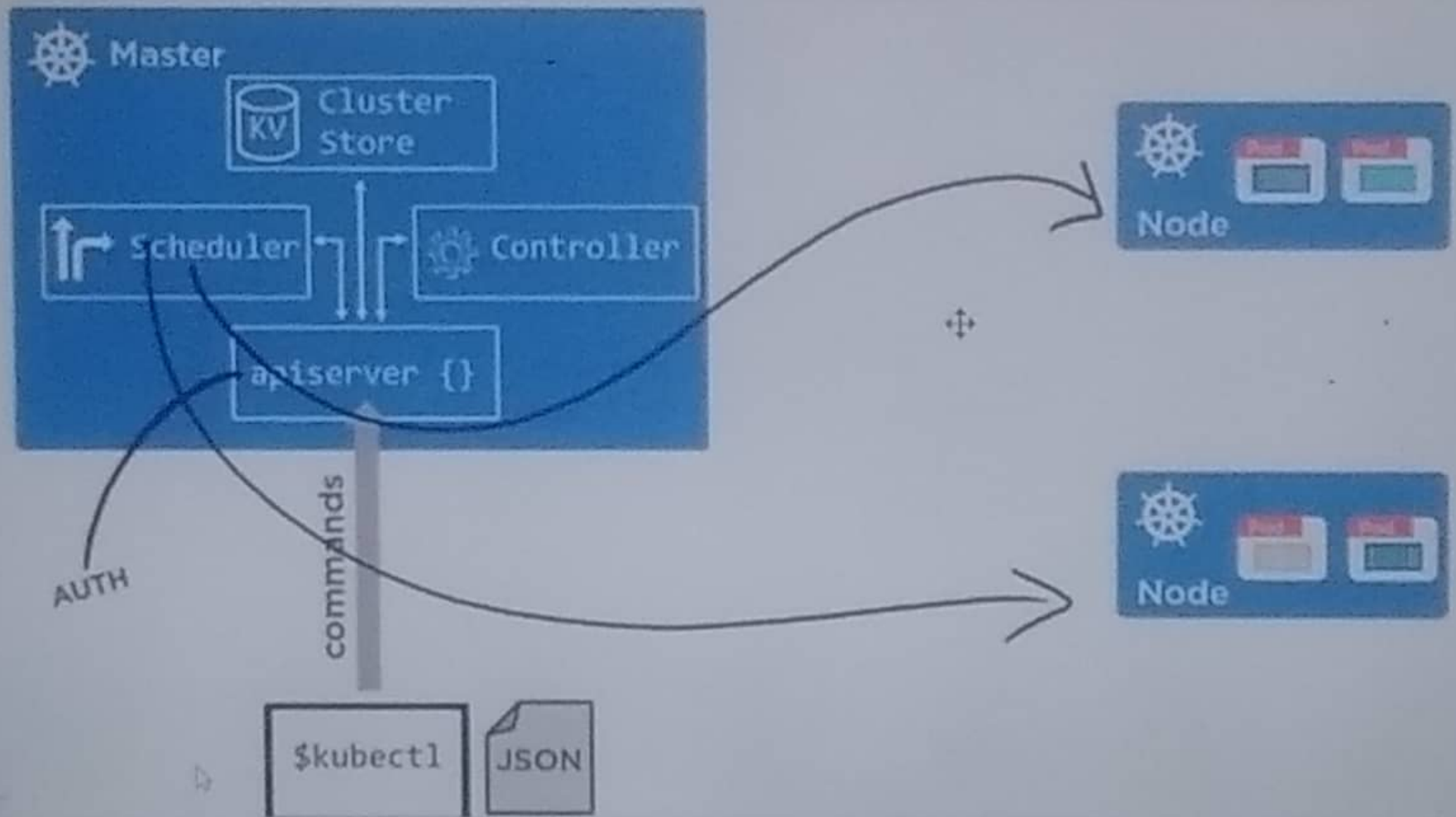
Assigns work to nodes

- affinity/anti-affinity
- constraints
- resources
- ...





Don't run user workloads on
"Master"



Node



Kubelet

Main Kubernetes agent



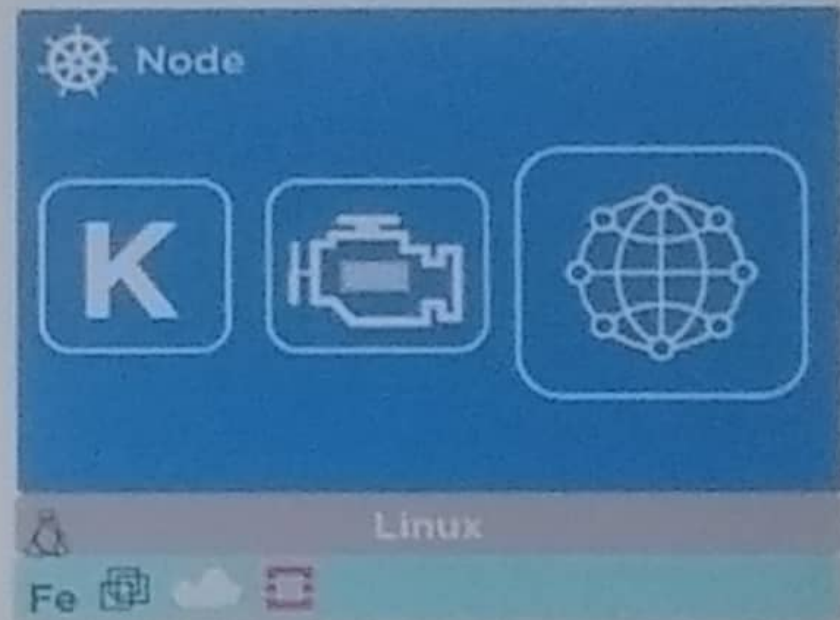
Container engine

Docker or rkt

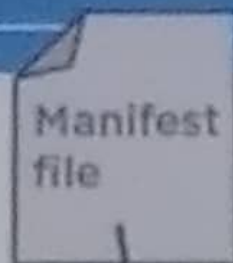


kube-proxy

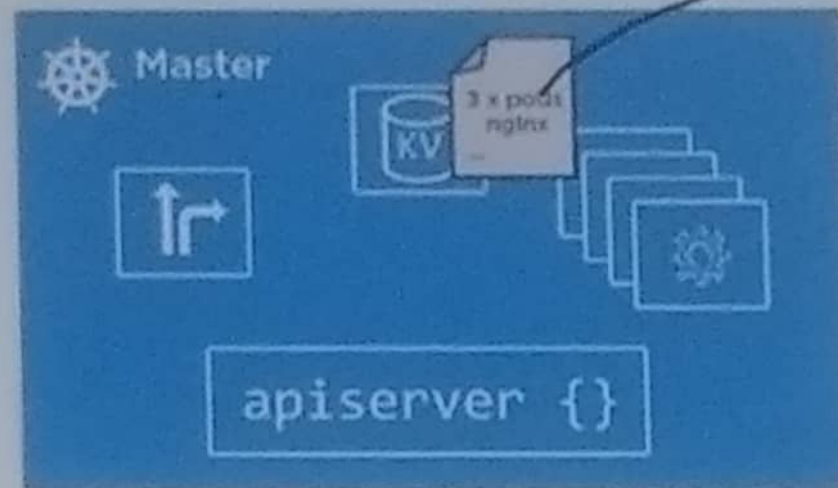
Kubernetes networking



Declarative Model & Desired State



YAML or JSON
Describe desired



Desired state/
record of intent
• 3 x nginx pods

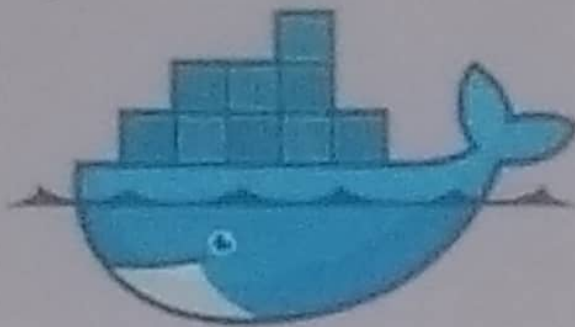


Actual state
• 3 x nginx pods





VM



Container



Pod

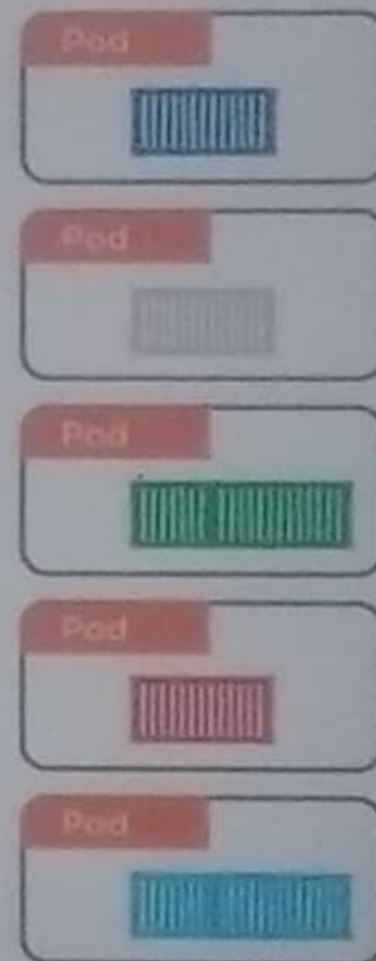
Atomic units of scheduling

Minimal atomic unit in kubernetes is pod



Containers always run
inside of pods

Pods can have multiple
containers
(advanced use-case)



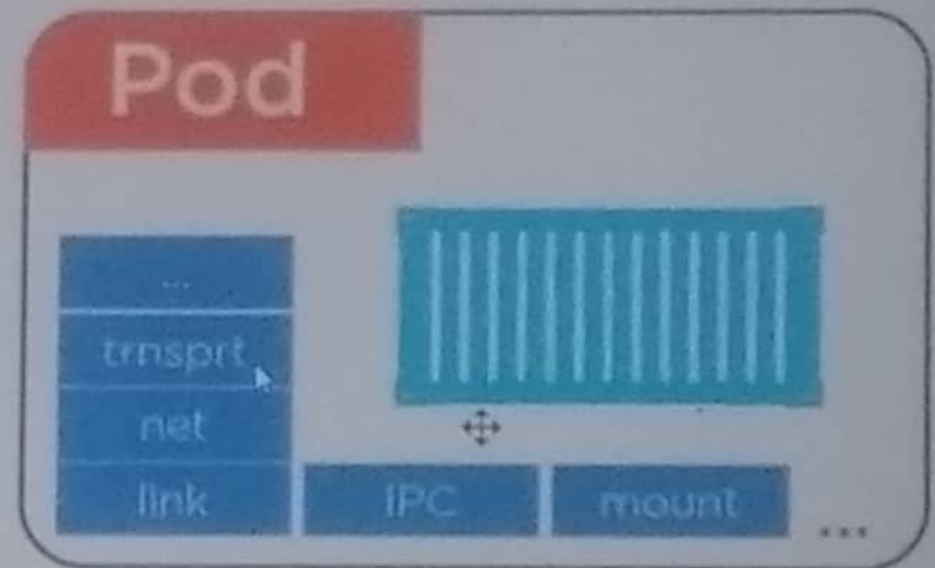
We Recommend only one container in one pod

Ring-fenced environment

- Network stack
- Kernel namespaces
- ...

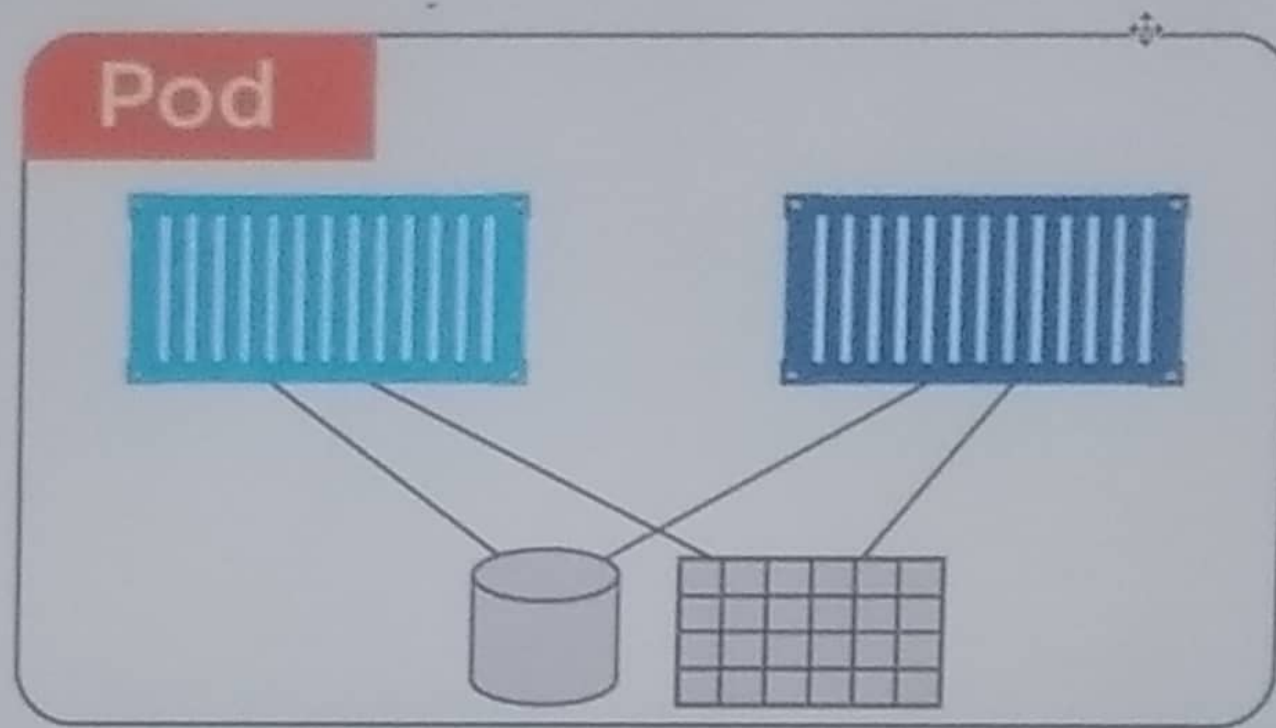
n containers

All containers in pod share the pod environment



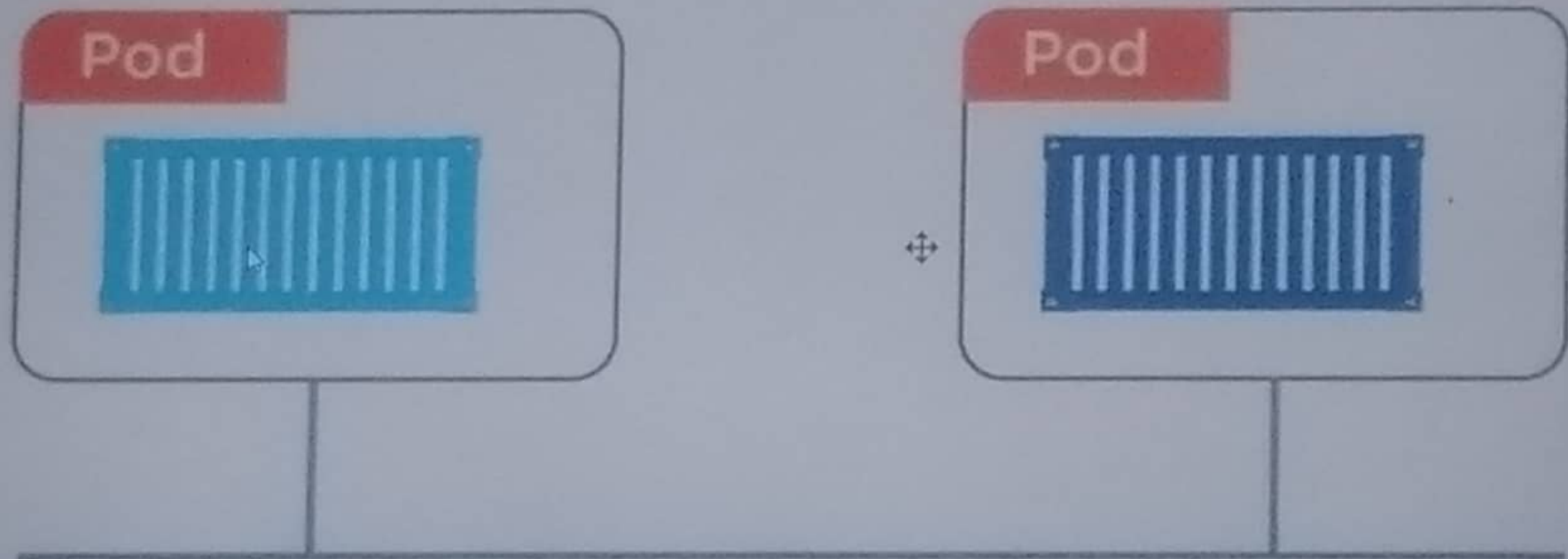
We Recommend only one container in one pod

Tight Coupling



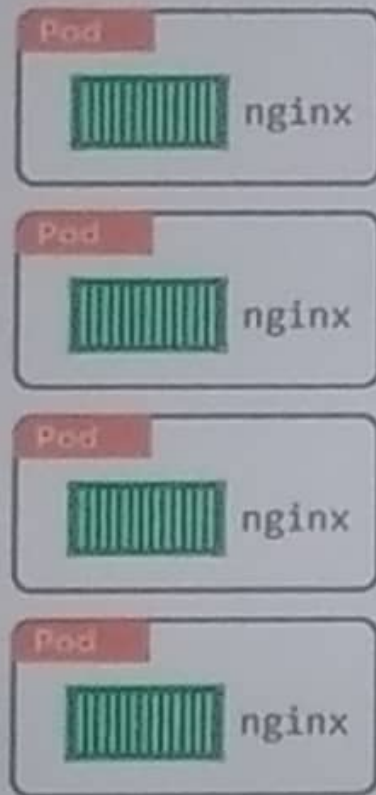
In Tight couple if any wrong in one container it affects second container

Loose Coupling

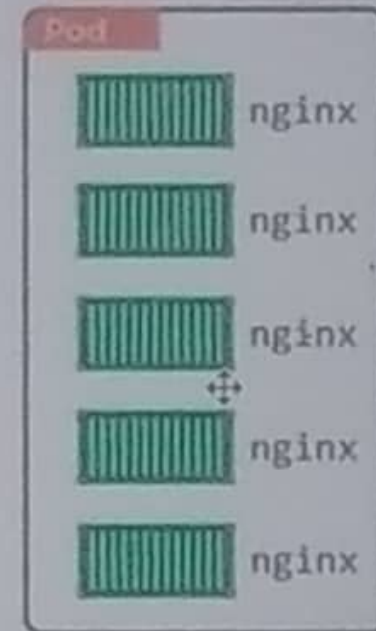


Most Recommend Method

Pods and Scaling

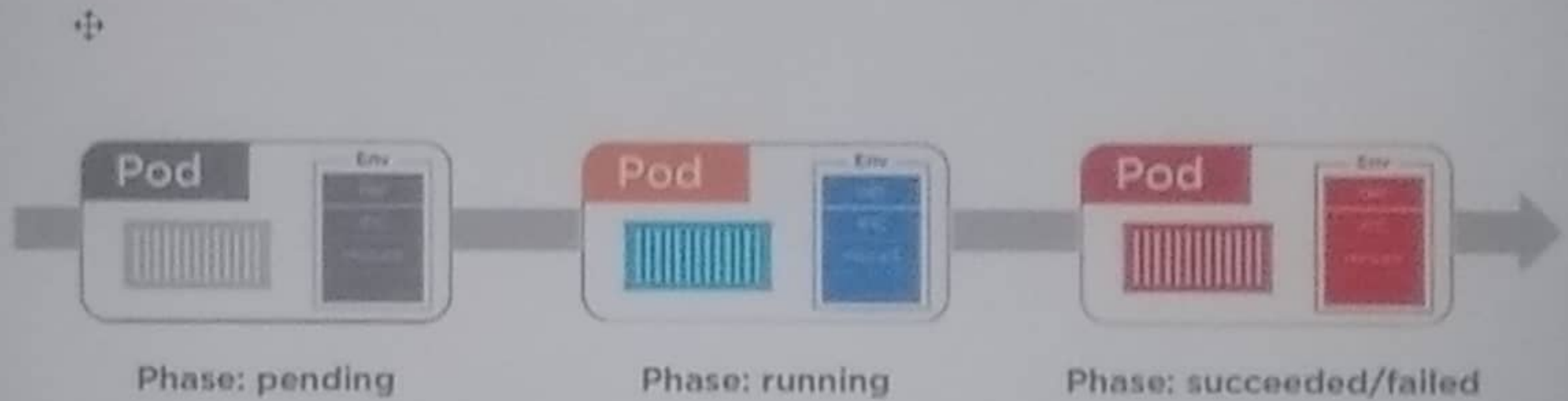


Most Recommend



Not Recommend

Pod Lifecycle



To setup cluster we need

1. To implement this we need three service : One master and two nodes
2. On master and each node we have to install Docker
3. Install Kubernetes on master and each node
 1. Kubeadm
 2. Kubelet
 3. kubectl
4. After Installing Kubernetes one should be master and 2 Nodes by running `init kubeadm` unit on master we get a document by using this document we can configure this cluster

Kubernetes - Google Slides

instances | C2 Management |

docs.google.com/presentation/d/1gZDinOFUJ-e-xkq3V45yHGM-gP1-C26A4DzFvAMEAo/edit#slide=id.g135510ae4b_0_14

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51

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53

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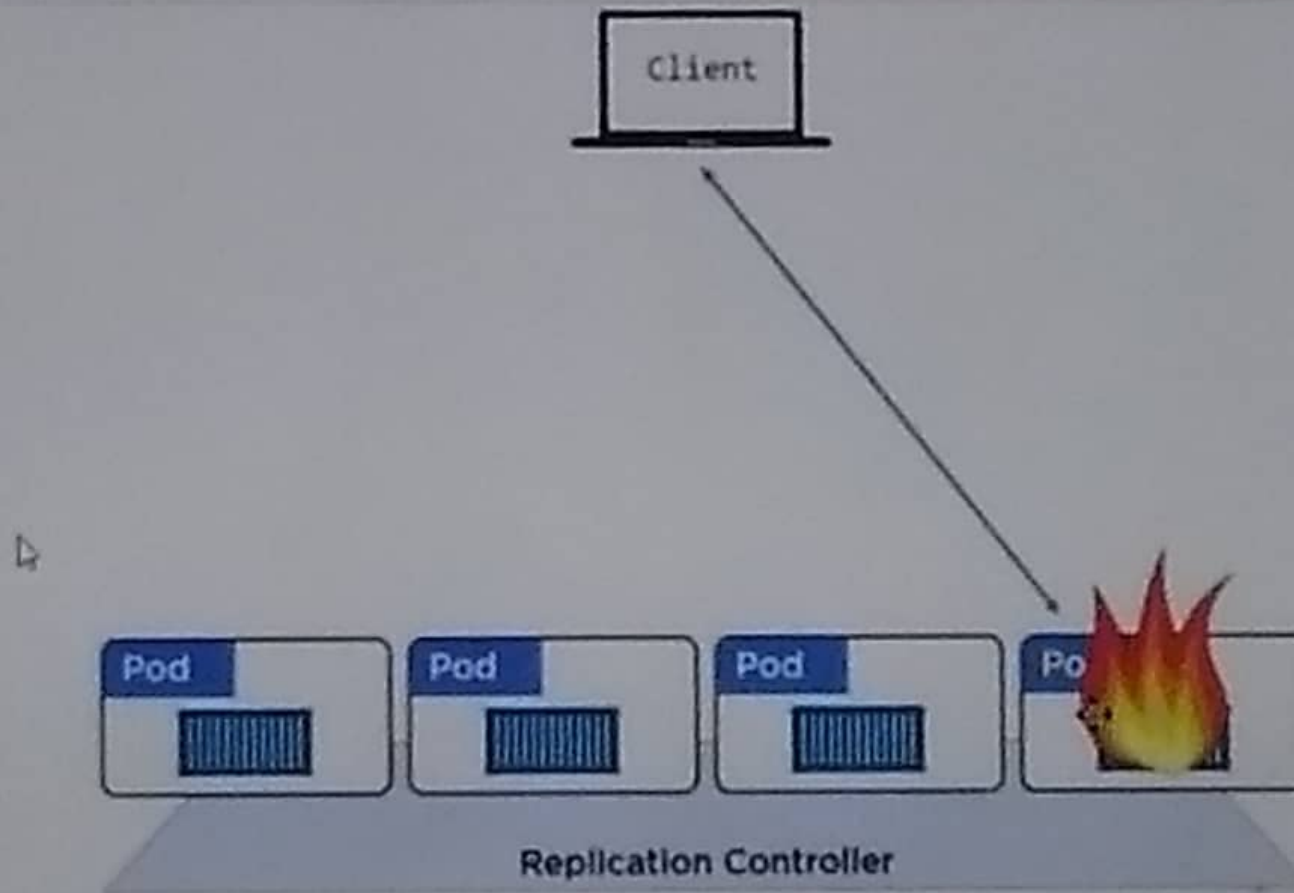
STEPS TO CREATE REPLICATION CONTROLLER

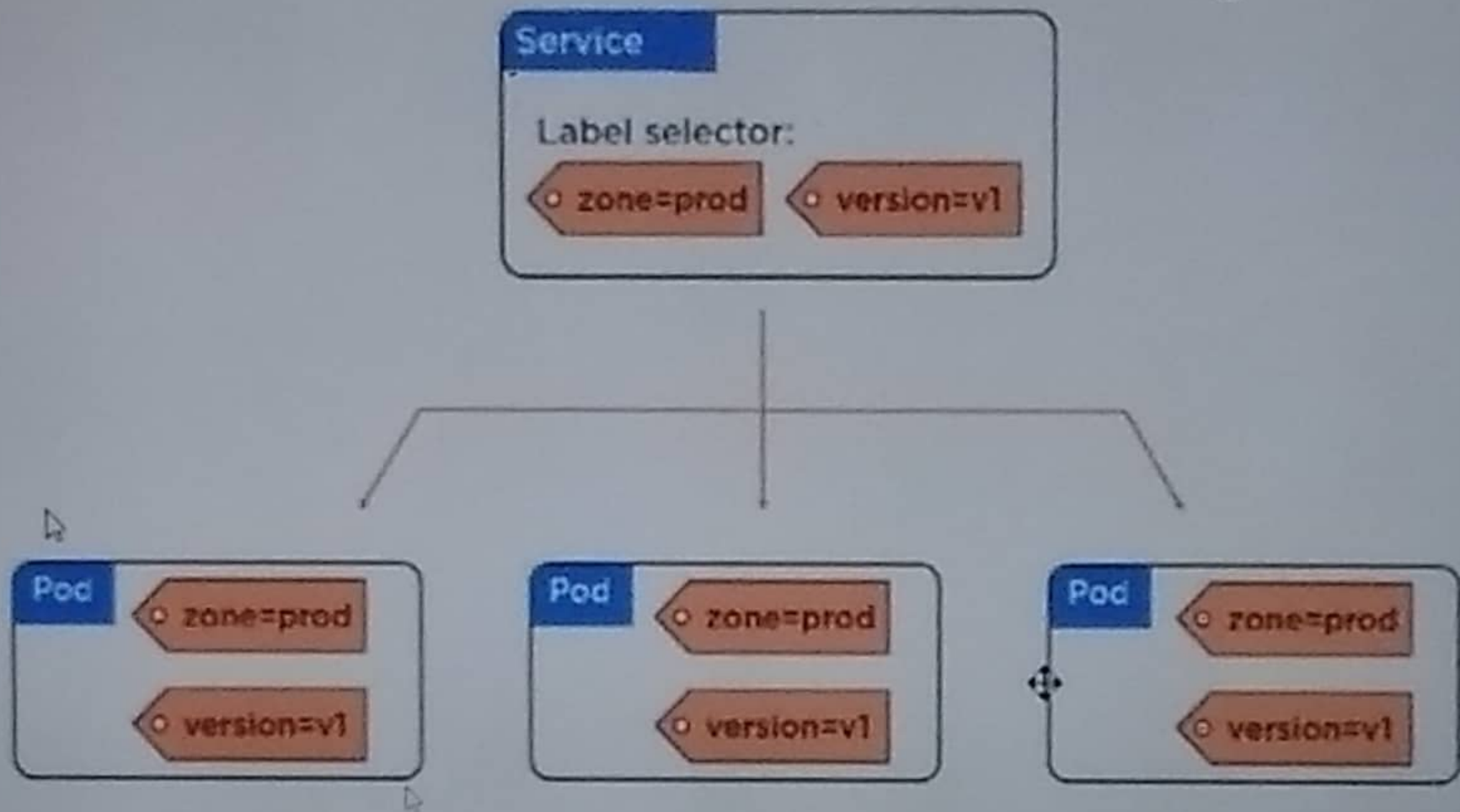
Execute following commands

```
kubectl create -f rc.yml
kubectl get rc -o wide
kubectl describe rc
kubectl apply -f rc.yml
kubectl get rc
kubectl get pods
Kubectl delete rc/rcname
```

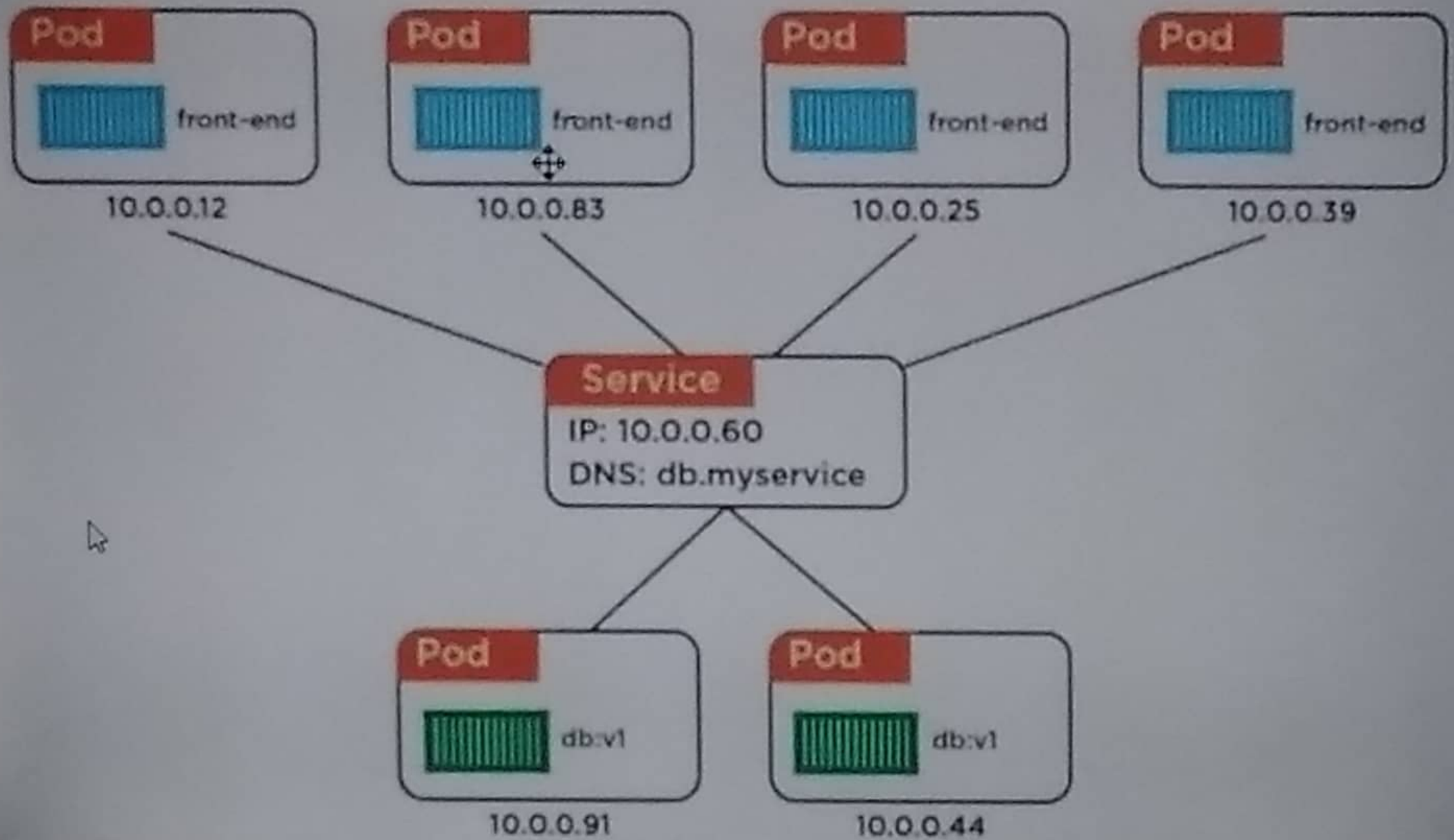
How we are going to assess pods from laptop if any pod delete

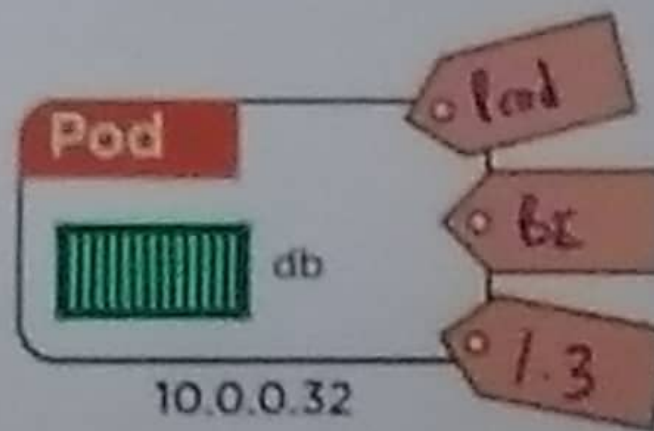
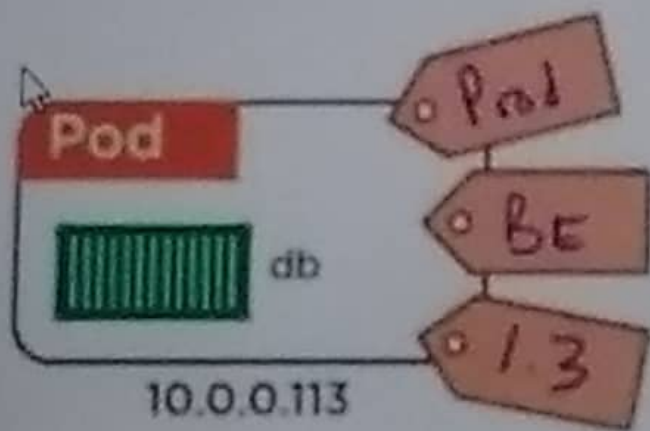
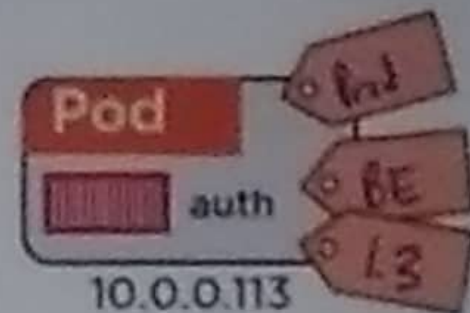
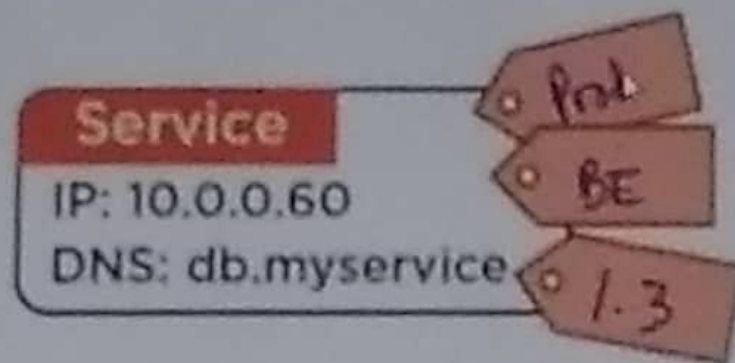
RC will create new pod with new IP

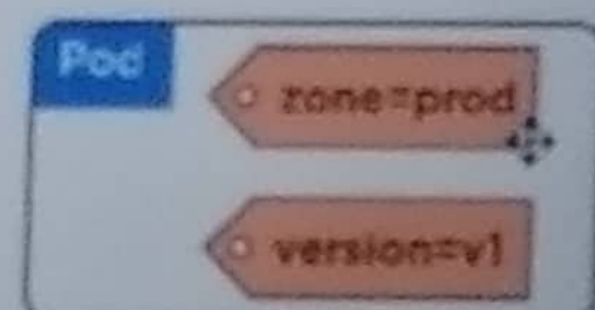
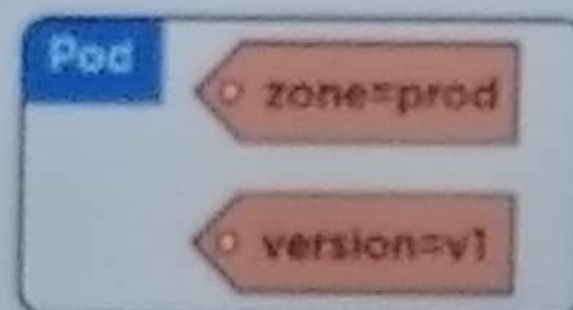
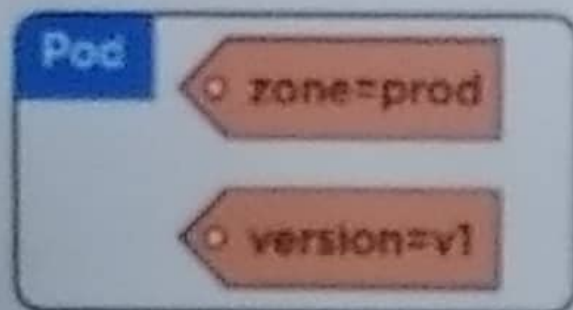
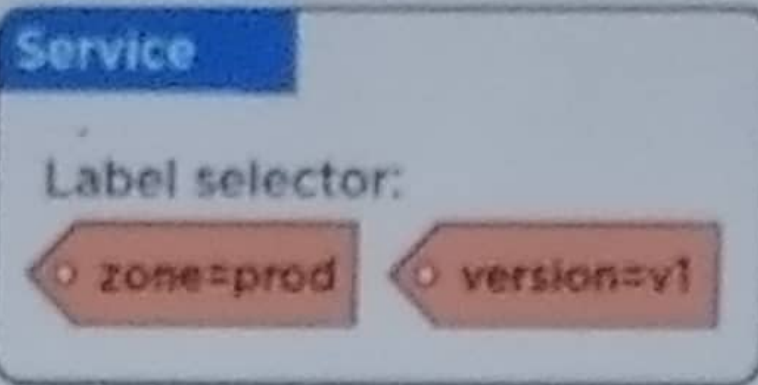


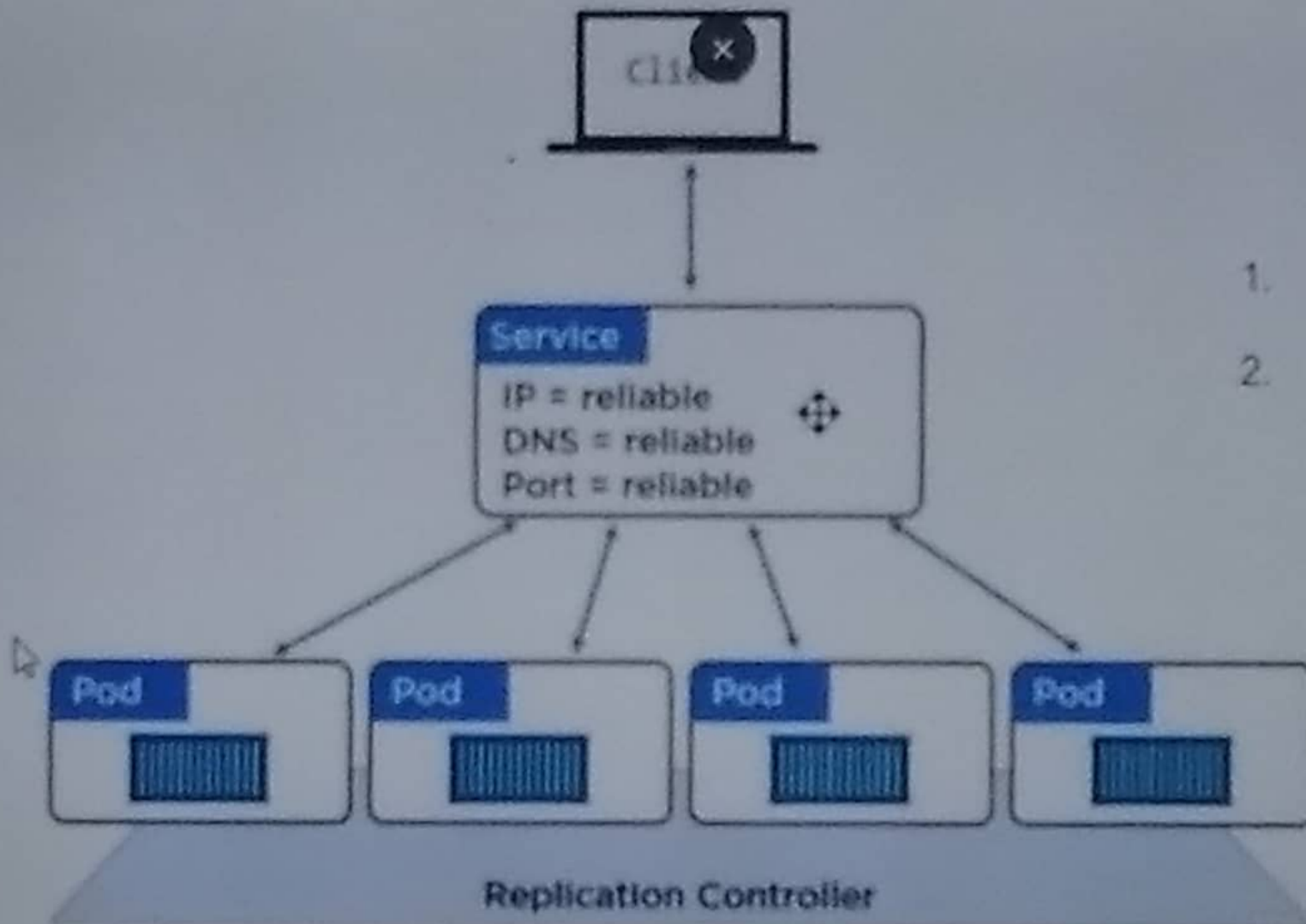


Service will solve this by giving fixed network, fixed IP by mapping of Labels









1. After creating pods using RC
2. We will create Service

```

services list & 9 2024/04/22
# mynginx.yml
# myredis.yml
# mymysql.yml
# mymysql.yml
# mymysql.yml

# mymysql.yml > {} spec > {} selector > {}
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: mynginx-svc
5    labels:
6      app: mynginx-svc
7  spec:
8    type: NodePort
9    ports:
10     - port: 8080
11       nodePort: 30080
12       protocol: TCP
13  selector:
14    app: mynginx-svc

```

Project Name	Project ID	Project Manager	Project Status	Project Start Date	Project End Date	Project Budget	Project Progress
Project A	101	John Doe	Completed	2023-01-01	2023-03-31	\$100,000	100%
Project B	102	Jane Smith	In Progress	2023-04-01	2023-06-30	\$200,000	75%
Project C	103	Mike Johnson	On Hold	2023-07-01	2023-09-30	\$150,000	20%
Project D	104	Sarah Brown	Planned	2023-10-01	2023-12-31	\$120,000	0%
Project E	105	David Wilson	Completed	2023-01-15	2023-04-15	\$80,000	100%
Project F	106	Emily Davis	In Progress	2023-05-01	2023-08-31	\$180,000	60%
Project G	107	Chris Miller	On Hold	2023-09-01	2023-11-30	\$90,000	10%
Project H	108	Alexander Lee	Planned	2023-12-01	2024-01-31	\$60,000	0%
Project I	109	Olivia White	Completed	2023-02-01	2023-05-31	\$110,000	100%
Project J	110	Benjamin Green	In Progress	2023-06-01	2023-09-30	\$130,000	50%

✓ MYK8S_NT_E_7_28APRIL22

! mypods.yml

! myRC.yml

! mysvc.yml

U

① README.md

! mysvc.yml > {} spec > {} selector > [m]

1 apiVersion: v1

2 kind: Service

3 metadata:

4 name: mynginx-svc

5 labels:

6 app: myonlinestore

7 spec:

8 type: NodePort

9 ports:

10 - port: 8080

11 nodePort: 30001

12 protocol: TCP

13 selector:

14 app: myonlinestore

Service Name

Label Name

Specification for port
Forwarding

Node responsible
communication

Container Port No

Node Port No

Keep Label same at 4 Location same

```
File Edit Selection View Go Run Terminal Help
myrc.yml - k8s_TPM - Visual Studio Code

EXPLORER
src
myrc.yml
mysvc.yml
README.md

myrc.yml
1 apiVersion: v1
2 kind: ReplicationController
3 metadata:
4   name: myonlineapp-rc
5 spec:
6   replicas: 3
7   selector:
8     app: nginx 1
9   template:
10    metadata:
11     labels:
12      app: nginx
13      version: 2.6.2 2
14    spec:
15     containers:
16     - name: nginx-container
17       image: nginx
18       ports:
19       - containerPort: 8080
20
mysvc.yml
1 apiVersion: v1
2 kind: Service
3 metadata:
4   name: mysvc-svc
5 labels:
6   app: nginx 3
7 spec:
8   type: NodePort
9   ports:
10    - port: 8080
11      nodePort: 30001
12      protocol: TCP
13   selector:
14     app: nginx 4
```

1. Kubectl create -f myRC.yml
2. Kubectl create -f mySvc.yml

Change Replicas 3 to 5 and use command
Kubectl apply -f myRC.yml

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1 2 3 4 5 6

Install Powershell

Name	Id	Version	Source
PowerShell	Microsoft.PowerShell	7.3.0.0	winget
PowerShell Preview	Microsoft.PowerShell.Preview	7.3.101.0	winget

Open powershell as a run as administrator

Install chocolatey by googling install chocolatey → install → copy link and past in powershell

Google → openjdk 8 using chocolatey in windows copy past below command on powershell

```
choco install openjdk8
```

Install maven → just type install maven in powershell

34°C Partly sunny 10:19 10-01-2021

docs.google.com/presentation/d/1qvZDnOfUJ-xokq9V48iyHGm-gPHCZ6A4DzfivMEAo/edit#slide=id.g19d08234bfc_0_0

Kubernetes

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Install Powershell

Name	Id	Version	Source
PowerShell	Microsoft.PowerShell	7.3.0.0	winget
PowerShell Preview	Microsoft.PowerShell.Preview	7.3.101.0	winget

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Google → openjdk 8 using chocolatey in windows copy past below command on powershell

```
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```

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Connect to instance X | My Drive - Google D... X | Kubernetes - Google X | Command to do... X

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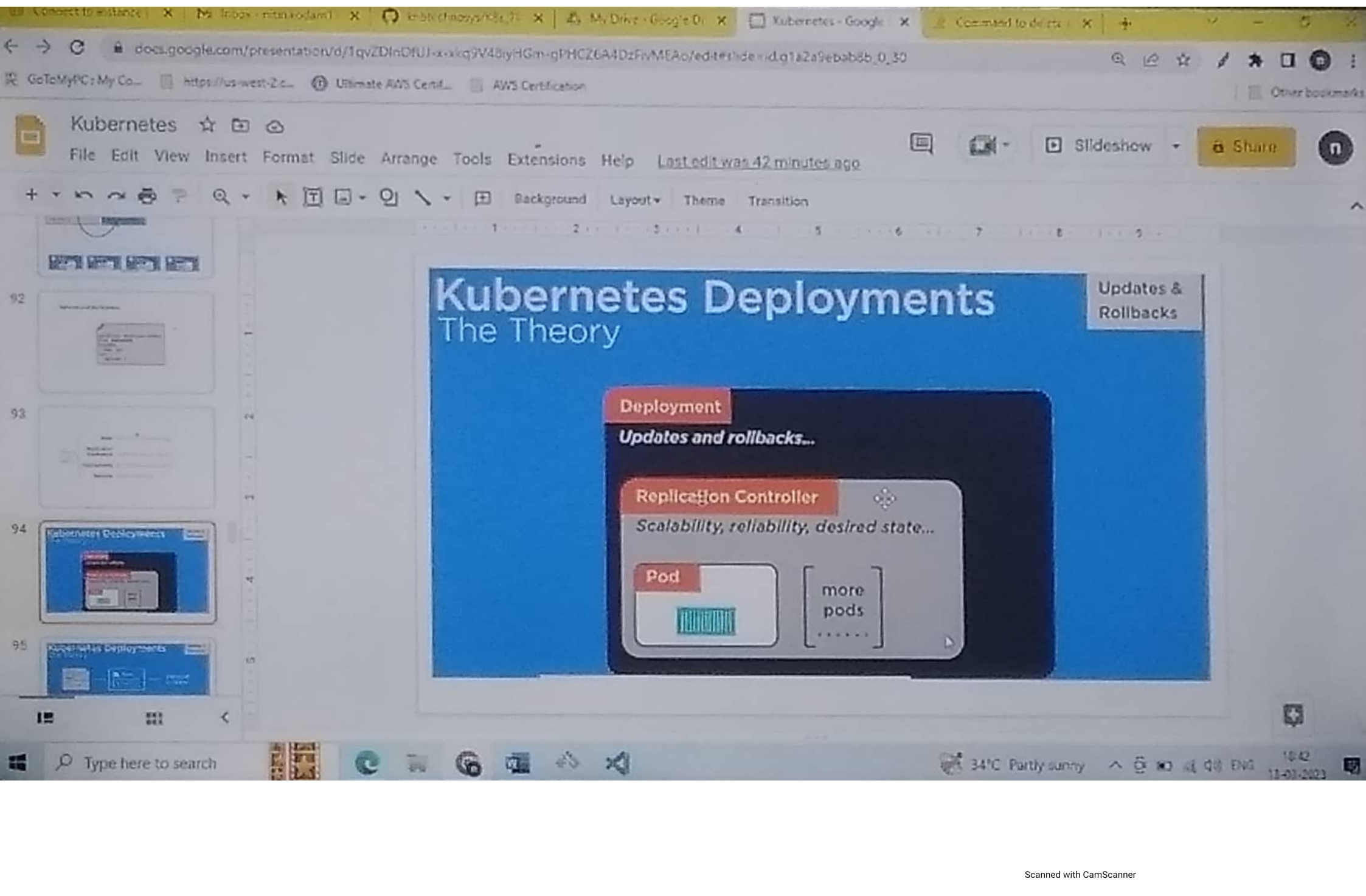
93

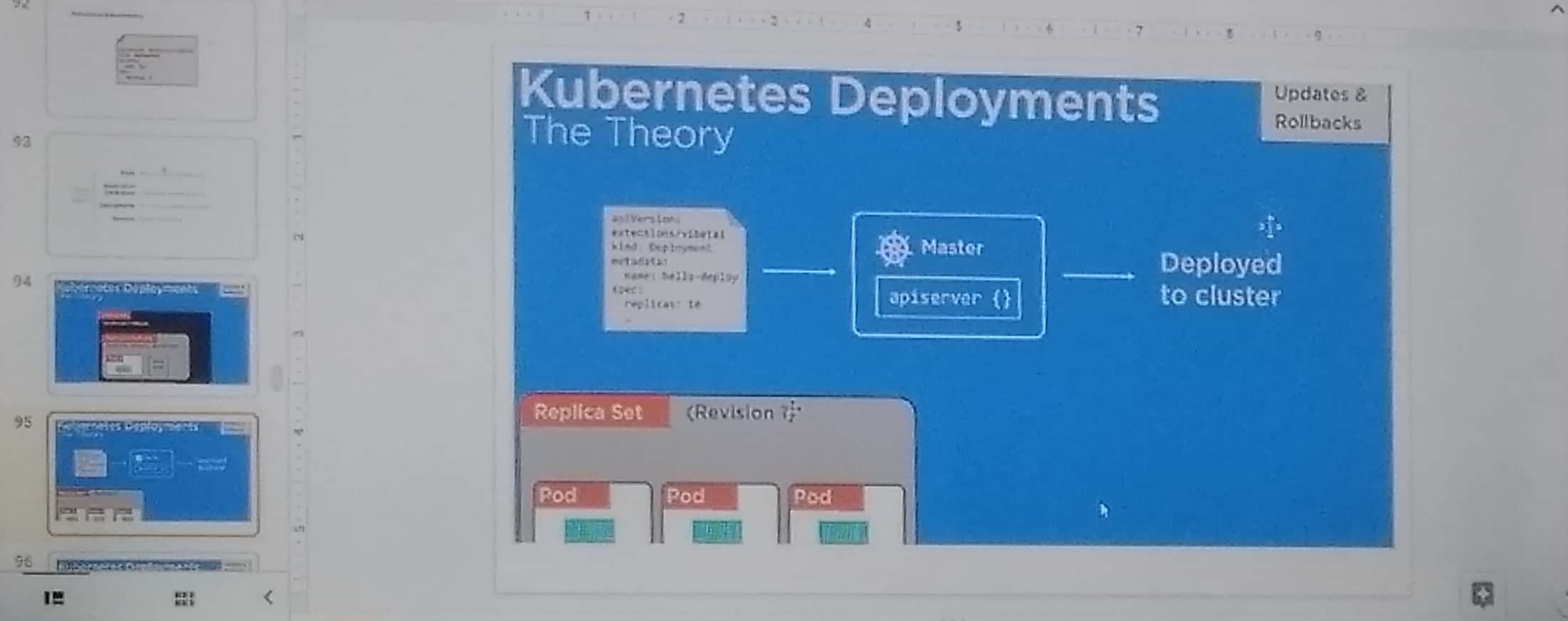
94 Kubernetes Deployments

Objects in the K8s API

- Pods** Atomic unit of scheduling
- Replication Controllers** Scale pods, desired state etc
- Deployments** RC + rolling updates, rollbacks
- Services** Stable networking

34°C Partly sunny 10:41 12.02.2021





Manifest file for deploy

Represents Deploy

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: myjavaapp-deploy
  labels:
    app: myjavaapp
```

Represents RC

```
spec:
  replicas: 3
  selector:
    matchLabels:
      app: myjavaapp
```

Represents
Pods

```
template:
  metadata:
    labels:
      app: myjavaapp
```

Represents
container

```
spec:
  containers:
    - name: myjavaapp-container
      image: nbktechnosys/myjavaimages1dec22:1
      ports:
        - containerPort: 8080
```

```

mysvc.yml      ! mysvcdeploy.yml U
! mysvcdeploy.yml > {} metadata > {} labels > version
  io.k8s.api.core.v1.Service (v1@service.json)
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: vertex-svc
5    labels:
6      app: myvertexapp 1
7      version: 2.6.1
8  spec:
9    type: NodePort
10   ports:
11     - port: 8080
12       nodePort: 30001
13       protocol: TCP
14   selector:
15     app: myvertexapp 2
16     version: 2.6.1

```

Delete Version

Delete Version

```

! mysvc.yml      ! myRC.yml      ! mydeploy.yml 1, U
! mydeploy.yml > {} spec > {} template > {} metadata
  io.k8s.api.apps.v1.Deployment (v1@deployment.json)
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: myjavaapp-deploy
5    labels:
6      app: myjavaapp 3
7  spec:
8    replicas: 3
9    selector:
10     matchLabels:
11       app: myjavaapp 4
12   template:
13     metadata:
14       labels:
15         app: myjavaapp 5
16     spec:
17       containers:
18         - name: myjavaapp-container
19           image: nbktechnosys/myjavaimages1dec22:1
20           ports:
21             - containerPort: 8080
22

```

mysvc.yml ! mysvcdeploy.yml U

! mysvcdeploy.yml > {} metadata > {} labels > version

io.k8s.api.core.v1.Service (v1@service.json)

```
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: vertex-svc
5    labels:
6      app: myvertexapp 1
7      version: 2.6.1
8  spec:
9    type: NodePort
10   ports:
11     - port: 8080
12       nodePort: 30001
13       protocol: TCP
14   selector:
15     app: myvertexapp 2
16     version: 2.6.1
```

Delete Version

Delete Version

mysvc.yml ! myRC.yml ! mydeploy.yml U

! mydeploy.yml > {} spec > {} template > {} metadata

io.k8s.api.apps.v1.Deployment (v1@deployment.json)

```
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: myjavaapp-deploy
5    labels:
6      app: myjavaapp 3
7  spec:
8    replicas: 3
9    selector:
10     matchLabels:
11       app: myjavaapp 4
12   template:
13     metadata:
14       labels:
15         app: myjavaapp 5
16     spec:
17       containers:
18         - name: myjavaapp-container
19           image: nbktechnosys/myjavaimages1dec22:1
20           ports:
21             - containerPort: 8080
22
```


Instances (EC2 Management Co... x My Drive - Google Drive x Kubernetes - Google Slides x Log in with your account x +

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Kubernetes

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For Roll Back Commands

```
UNDO ROLLED back
kubectl describe deploy myjavaapp-deploy
kubectl rollout undo deployment myjavaapp-deploy --to-revision=1
kubectl get deploy
kubectl rollout status deployments myjavaapp-deploy
```

```
root@ip-172-31-2-143: ~
root@ip-172-31-2-143:~# kubectl rollout undo deployment vertex-deploy --to
```

Type here to search 35°C Mostly cloudy 19:29 14-03-2023