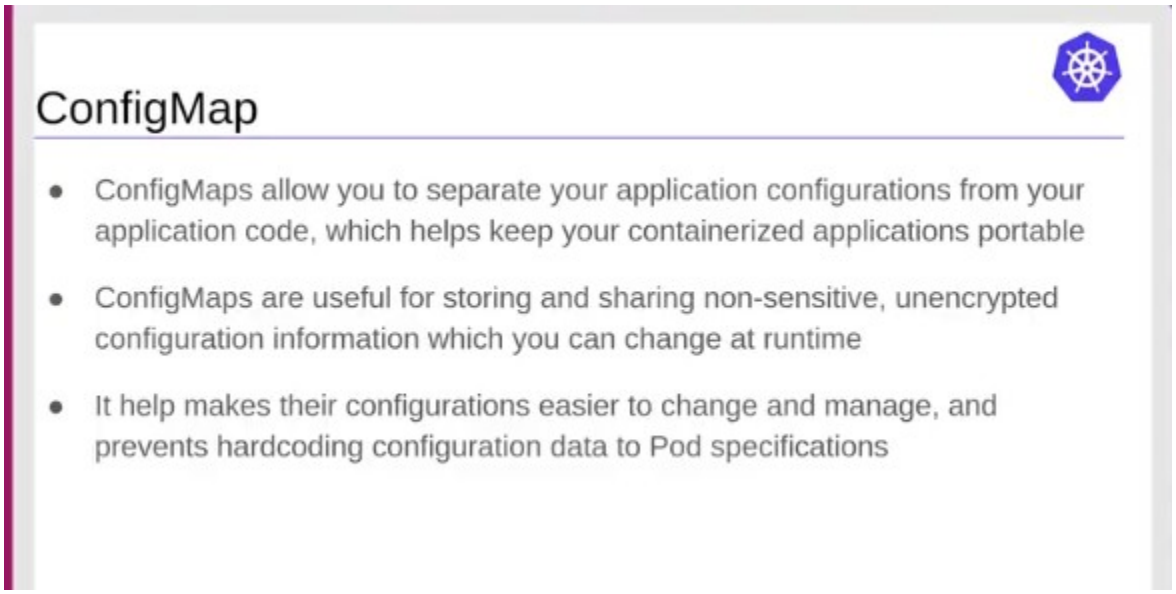
Kubernetes Lesson 6

Configuring Applications & Deployments

Video 1. "ConfigMap"



Video 2. "ConfigMap from Literals"

- ***kubectl create configmap myfirstcm --from-literal=fname=Rizwan --from-literal=lname=Sheikh***

Through this *command we create a resource from-literal tag with the string values*

Video 3. "ConfigMap from File"

- ***kubectl create cm myfirstcmwithfile --from-file=user.txt***

This command is used to create the ***CM*** *from file. But in in this case we not mentioned the Key for our values indeed these values are in the file and by default the CM choose the key name that we used as a file name.*

But if we *want to give the a specific name for so this below command is used.*

- ***kubectl create cm myfirstcmwithfile2 –from-file=Bio=user.txt***

Video 4. "ConfigMap from env File"

If we want *to make sure that we have not to give the key for values as externally so we used cm form env file except cm form file. So firstly create a file with the extension of .env because it is best practice for creating the cm from env file* ***Other extensions*** *are valid but best practice is to use .env* ***e.g. cmfromevnfile.env***

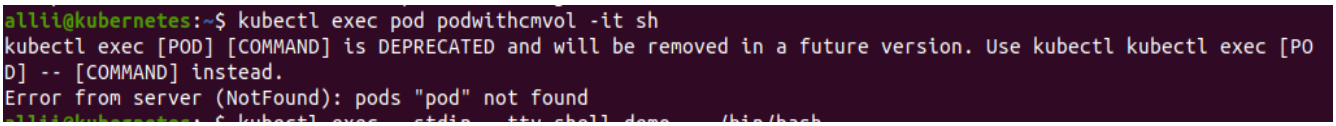
- ***kubectl create cm cmfromenvfile –from-env-file=cm.env***

This is the command that which is used for creating the configmap resource from env file.

Video 5. "ConfigMap as Volume"

- ***kubectl exec pod podwithcmvol -it sh***

This command *is deprecated and now the other new one updated command is useful for go into the container's filesystem. You can see from picture below.*



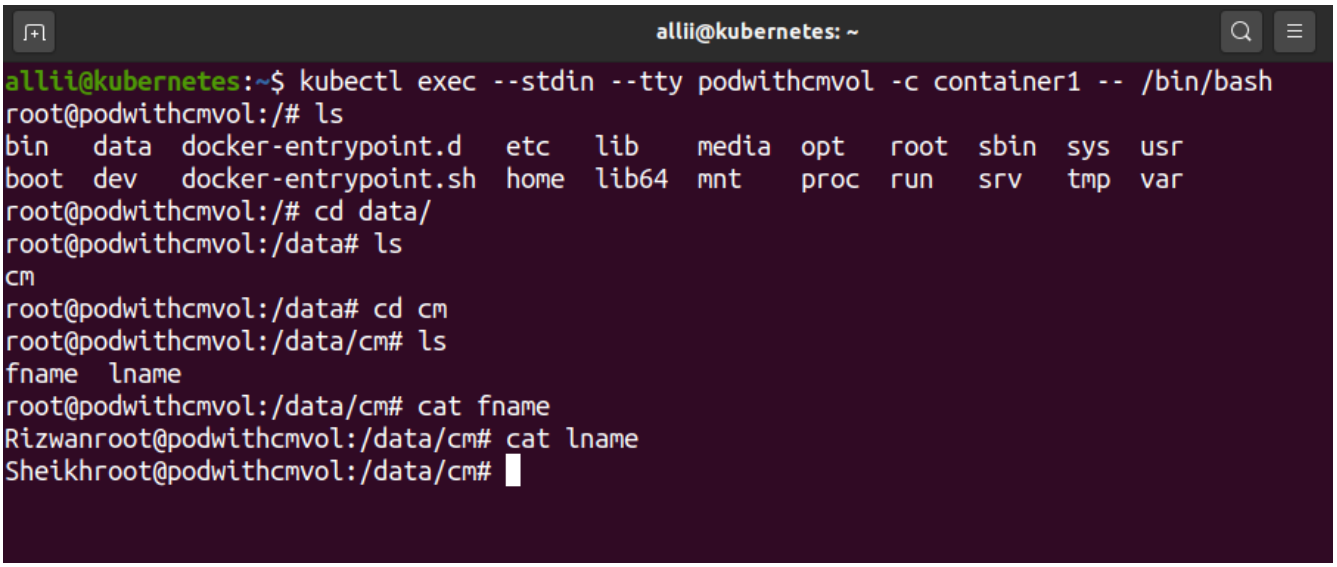
Note: *Now this command is used to go into the container's inside filesystem.*

Get a shell to the running container:

```
kubectl exec --stdin --tty shell-demo -- /bin/bash
```

> **Note:** The double dash (`--`) separates the arguments you want to pass to the command from the kubectl arguments.

- ***kubectl exec --stdin --tty podwithcmvol -c container1 -- /bin/bash***



So it is proved *that files that we stored in the configmap through any method like from literal, from file or from env file, is now accessible by container that which is in the pod through* ***configMap Volume resource.***
So now we *can make access through our programming language that will be use for out application and can be use for the configuration settings.*

This one is the method one *that how to reach our files under the access of the our container the second method will be discuss in the next video.*

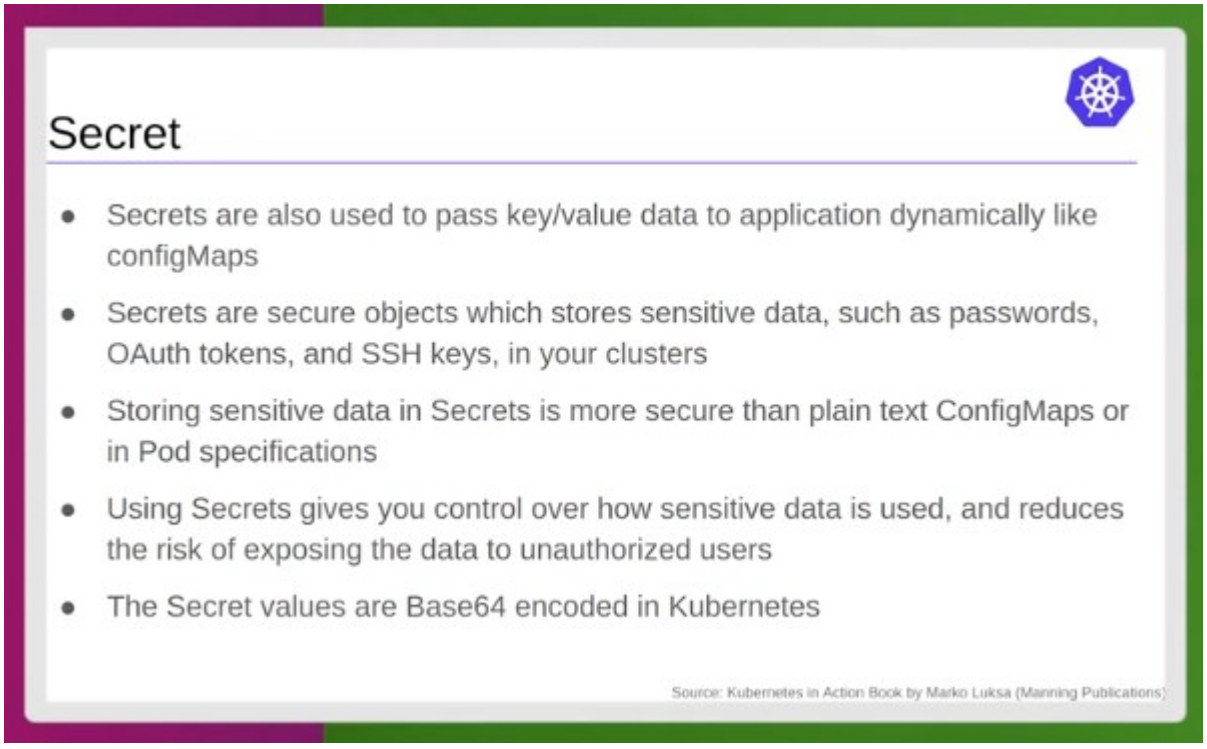
Video 6. "ConfigMap as env Variables"

There are two *method to reaches the configurationmap to the container's filesystem firstly using the environmental variables and second is the volumes.*

```
allii@kubernetes:~$ cat podcmenv.yaml
apiVersion: v1
kind: Pod
metadata:
  name: podcmenv
  labels:
    app: envexample
spec:
  containers:
  - name: container1
    image: aamirpinger/node-app-image
    envFrom:
    - configMapRef:
        name: cmfromenvfile
```

```
allii@kubernetes:~$ cat podwithcm.yaml
apiVersion: v1
kind: Pod
metadata:
  name: podwithcmvol
spec:
  volumes:
  - name: cmvol
    configMap:
      name: myfirstcm
  containers:
  - name: container1
    image: nginx
    volumeMounts:
    - name: cmvol
      mountPath: /data/cm
    imagePullPolicy: IfNotPresent
```

Video 7. "Secrets"



Secrets are used to *send the most sensitive data (passwords, SSH Keys etc.) in encrypted form to the container. This information does nor send in the string form.*

It works like the configmap *but little bit different form that the configmap prints the data over the terminal and every user can easily see the data but in the secrets whole data send in the encrypted form and only authorized users can use that data.*

Video 8. "Secret from Literals"

DNS Subdomain Names

Most resource types require a name that can be used as a DNS subdomain name as defined in RFC 1123. This means the name must:

- contain no more than 253 characters
- contain only lowercase alphanumeric characters, '-' or '.'
- start with an alphanumeric character
- end with an alphanumeric character

Creating your own Secrets

Creating a Secret Using `kubectl`

Secrets can contain user credentials required by Pods to access a database. For example, a database connection string consists of a username and password. You can store the username in a file `./username.txt` and the password in a file `./password.txt` on your local machine.

```
# Create files needed for the rest of the example.
echo -n 'admin' > ./username.txt
echo -n '1f2d1e2e67df' > ./password.txt
```

The `kubectl create secret` command packages these files into a Secret and creates the object on the API server. The name of a Secret object must be a valid DNS subdomain name.

- ***kubectl create secret generic myfirstsecret --from-literal=username=Rizwansheikh --from-literal=api=test_db-aws.com***

This is the command *that used to send data to the pod in encrypted form through from literal.*

- ***echo dGVzdF9kYi1hd3MuY29t | base64 -d***

This is *the command that is used to dencrypt the data.*

Video 9. "Secret from File"

- ***kubectl create secret generic secretfromfile --from-file=Bio=keyval.txt***

This command used *to create secret form file*

Video 10. "Secret from env File"

- ***kubectl create secret generic secretfromenvfile --from-env-file=keyval.txt***

This command used *to create secret form env file*

Video 11. "Secret as Volume"

```
apiVersion: v1
kind: Pod
metadata:
  name: podwithsecvol
spec:
  volumes:
  - name: secvol
    secret:
      secretName: myfirstsecret
  containers:
  - name: container1
    image: nginx
    imagePullPolicy: IfNotPresent
    volumeMounts:
    - name: secvol
      mountPath: /usr/share/nginx/html
```

Through this configuration *we make secret volume type and send the sensitive data to the pod and then the container use the data.*

Video 12. "Secret as env Variable"

```
apiVersion: v1
kind: Pod
metadata:
  name: podwithenv
spec:
  containers:
  - name: container1
    image: nginx
    imagePullPolicy: IfNotPresent
    env:
    - name: USERNAME
      value: alliiriizzvvii
    - name: COURSENAME
      value: kubernetes
```

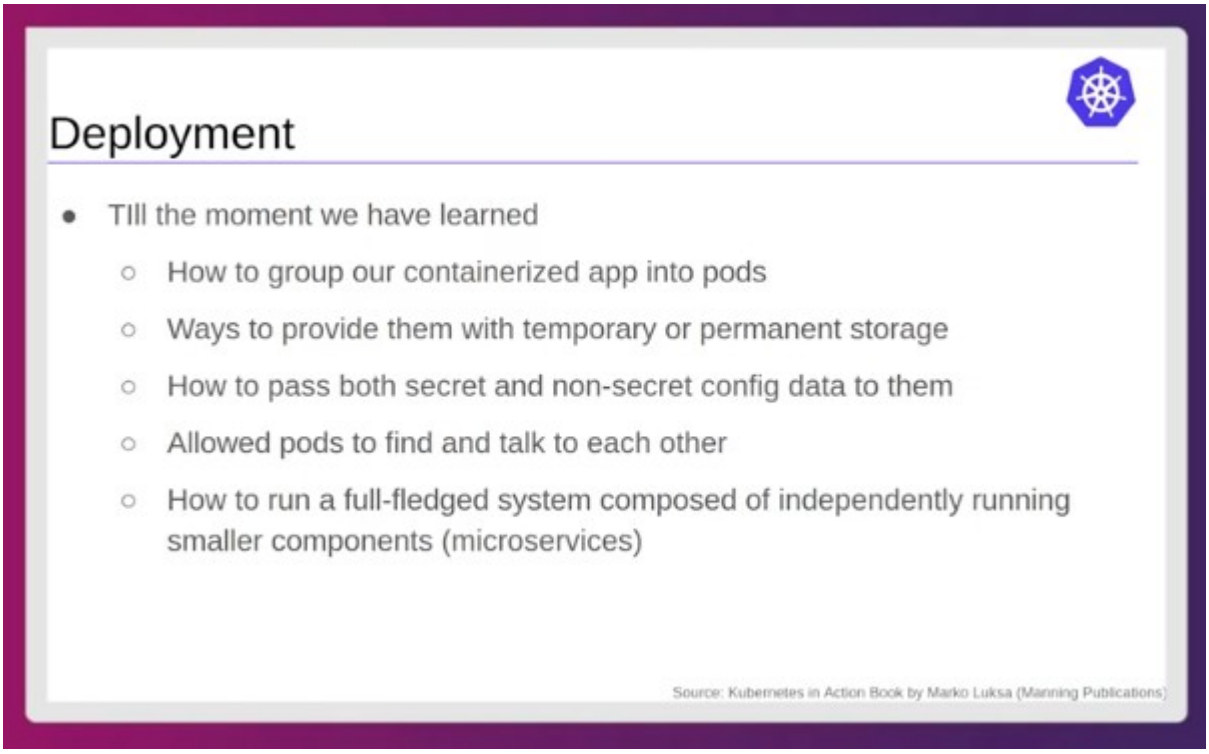
Video 13. "Environment Variable"

```
apiVersion: v1
kind: Pod
metadata:
  name: podwithenv
spec:
  containers:
  - name: container1
    image: nginx
    imagePullPolicy: IfNotPresent
    env:
    - name: USERNAME
      value: alliiriizzvvii
    - name: COURSENAME
      value: kubernetes
```

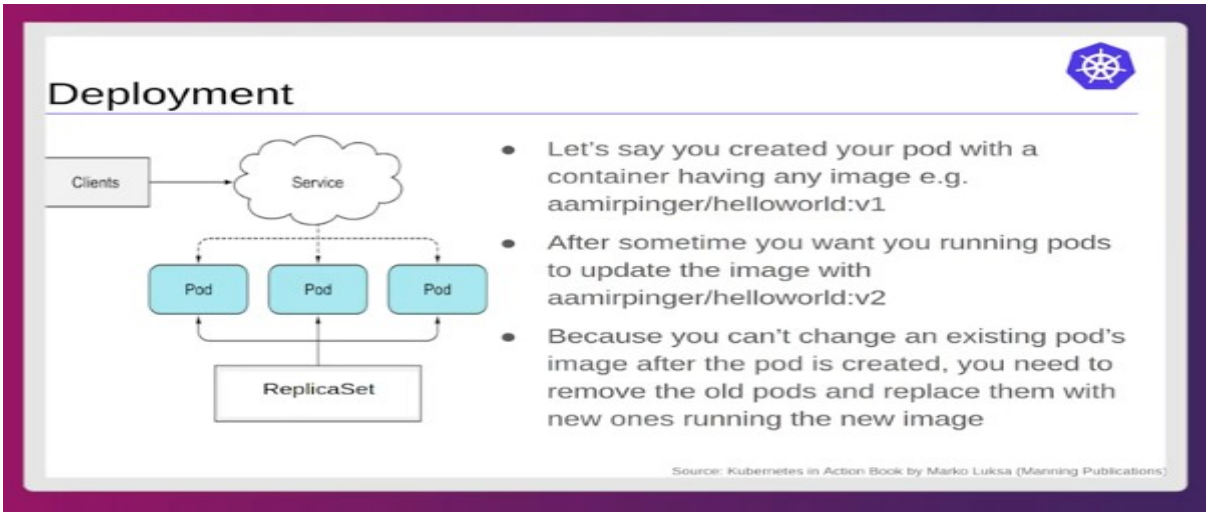
- ***kubectl exec podwithenv env***

This command is used to check the env from the container's filesystem. We can use the ls with this command for checking the list of the files and folders inside the container
e.g. ***kubectl exec podwithenv ls***

Video 14. "Deployment"



Video 15. "Deployment Use Case"



Theory Based Video.

Video 16. "Deployment Strategies Pros and Cons"

This Video is theory Based.

Video 17. "What Strategy to Choose-"

This Video is theory Based.

Video 18. "Deployment Example Part 1"

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: deployexample
spec:
  replicas: 4
  selector:
    matchLabels:
      app: frontend
  template:
    metadata:
      labels:
        app: frontend
    spec:
      containers:
      - name: container1
        image: aamirpinger/hi
        ports:
        - containerPort: 80
        imagePullPolicy: IfNotPresent
```

Video 19. "Deployment Example Part 2"

- ✔ *In this video we will discuss that how to **change/update** our image and that updated image automatically reach under the access of the users.*

For doing this we will change the image in the deployment template and then the deployment resource will automatically change the image using one strategy out of three.
*We can change only the tag of the image for example initially **V1** was as a tag of the image and after that we can replace with **V2** tag*

OR

We can change the image totally.

- ***kubectl set image deploy deployexample container1=aamirpinger/flag***

By using this command we will assign the new image and then the kubernetes will change the Image with the help of the deployment resource.

***NOTE: The kubernetes** uses Rolling Update as the default strategy. Firstly deletes the one pod and then the replicaSet makes the new pod for the replacement of the missing one pod.*
So when the user accesses the app through provided external IP the replicaset diverts the some of the user on the old pods and some of them on the new pods and the replicaset do this till the all the old pods delete and the new pod with updated version are not created.

Video 20. "Deployment Example Part 3"

Theory Based..

Video 21. "Deployment Helper Commands"

- ***kubectl rollout pause deployment deployexample***

***This command** will **pause** the process of the deployment.*

- ***kubectl rollout resume deployment deployexample***

***This command** will **resume** the process of the deployment.*

- ***kubectl rollout status deployment deployexample***

***This command** will show the **status** of process of the deployment.*

- ***kubectl rollout history deployment deployexample***

This command *will show deployment history*

- ***kubectl rollout history deployment deployexample --revision=1***

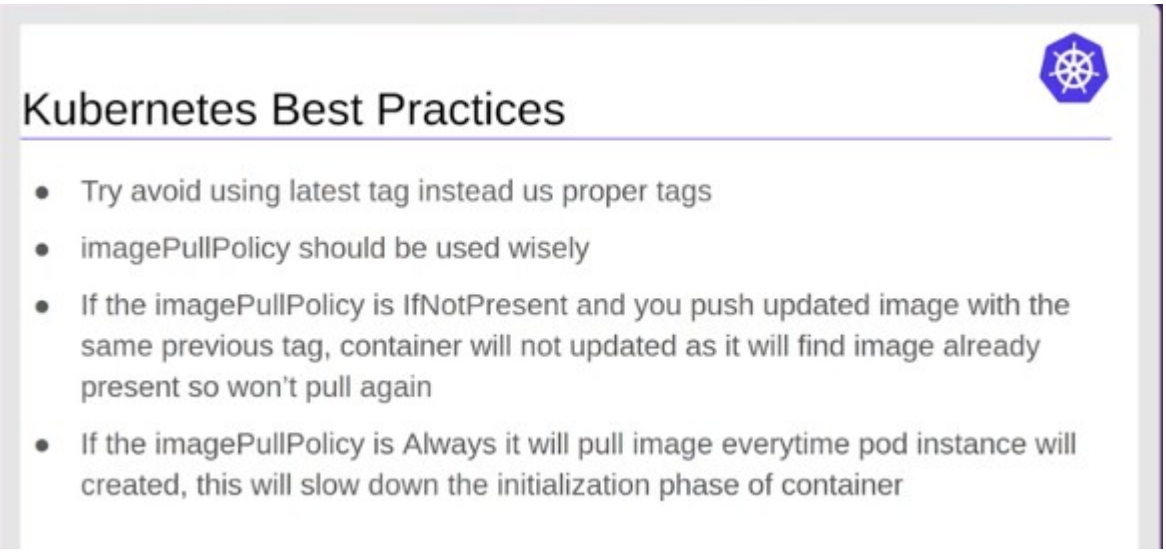
By using this command we will see the the revisions history and make the difference from each other.

- ***kubectl rollout undo deployment deployexample –to-revision=1***

Note: If we *will not mention the number of the revisions so by default the kubernetes will choose last time used revision* ***But we*** *can choose by our own wish for example there are 7 time revisions have made so we can choose 3 to roll back.*

Video 22. "Kubernetes Best Practices"

Always avoid form latest tag *because if we use the latest tag it's not meaning that the docker will pull the targeted image form the registry. The docker understands latest means the most recent image if the tag of the image is v4, latest means last image you pushed the tag is v4. It is possible tht there are available more one images with latest tag and over write too. Always choose v1,v2,v3 and so on for giving the tag to image simultaneously.*



Be careful when choosing the ***imagePullPolicy.***

1. ***ImagePullPolicy: Always***

This means that the kubernetes will always download the new image when creating new instance of the application for example if we created the ***replicaset count: 3*** *so the kubernetes will download the image three times for making three pods with same image.* ***But this policy*** *has a drawback that the image will always be download newly and out resources will consume many*

2. *ImagePullPolicy: IfNotPresent*

If the image is available on our system so the kubernetes will not download the image again. ***This Policy has one drawback*** *means if you pushed 2nd image with same tag so the kubernetes will not download the most recent image from the repository because the kubernetes will understands the you said that the same tag that is already downloaded.*
But this policy *has a drawback if the image has latest tag that which is downloaded already and you have uploaded three more images with latest tag so the kubernetes will not download the new image because it sense that the image is available with this tag already,it has no concern that the code in existence image is old*

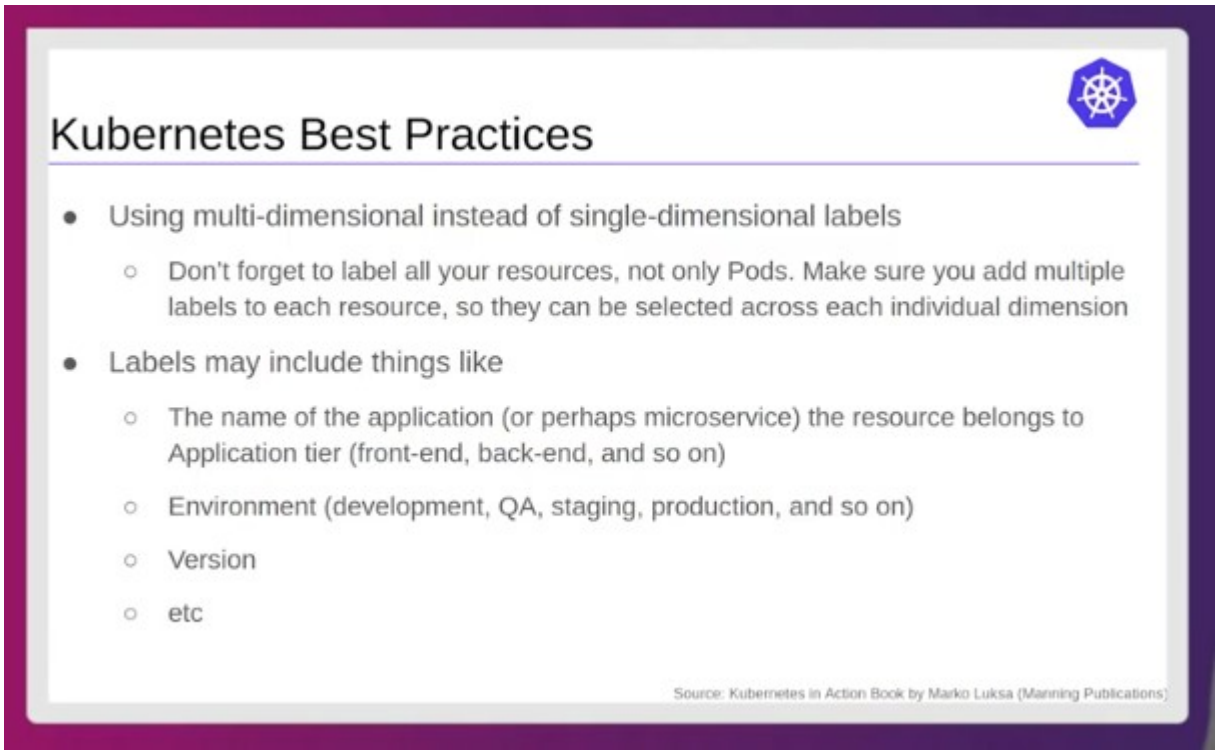
Kubernetes Depends All About On Tags So Choose Wisely During Building An Image And When Describing The ImagePullPolicy.

3. *ImagePullPolicy: Never*

This means that if *the image is available on our system means server so the kubernetes will use that image but if the image is not available so the throw the error that I can not make container due to none availability of image on the system..*
In This Policy The Kubernetes *will never download the image form any image registry like docker hub or rkt.*
But this policy *has a drawback if the image will not on our system the will not be download and the container will not run.*

Labels

Always use labels when creating any resource.



Manageable Size Of Image

Your image's size should always be small means microservices based and we can easily build the communication between them through cluster ip..
There are some of benefits of small image.
For example if the container restart and this means the container will be create new so if the imagePullPolicy is Always so the image will be download hurry and load too.
And if the kubernetes shift our pod one worker node to another worker OR our replica count increases or decreases so the image Is small in size then image will be download and load hurry.

Annotations

So Always use annotations in your app because these are helpful for fixing different problems and contact details of the maintainer/creater.

Handling Application Logs

Here Kubernetes Course Completed.

Alhamdolillah!

Kubernetes Lesson6

Completed.

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Thank You Happy Learning.