

AGENDA – CONTROLLER



- 1) Create folder “6) 09 November Kubernetes”.
- 2) Create pod.yaml file

```
File Edit Selection View Go Run ... 6)
EXPLORER
  6) 09 NOVEMBER KUBERNE...
    CONTROLLER
      ! pod.yaml
! pod.yaml x
CONTROLLER > ! pod.yaml
1  apiVersion: v1
2  kind: Pod
3  metadata:
4    name: nginx-pod
5    namespace: default
6  spec:
7    containers:
8      - image: nginx
9        name: nginx-container
10      ports:
11        - containerPort: 80
```

- 3) connect to pod

az login

az account set --subscription 48f88df7-0d53-4866-a66f-82eb0ac469e3

az aks get-credentials --resource-group rgtrees --name k8trees --overwrite-existing

- 3) **kubectl apply -f pod.yaml** = create pod

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl apply -f pod.yaml
pod/nginx-pod created
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

4) **kubectl get pods**

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
nginx-pod     1/1     Running   0           4m57s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> |
```

5) RESTARTS = 0 means error nhi aaya ek bhi baar ya container nhi mara

```
pod/nginx-pod created
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
nginx-pod     1/1     Running   0           4m57s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> |
```

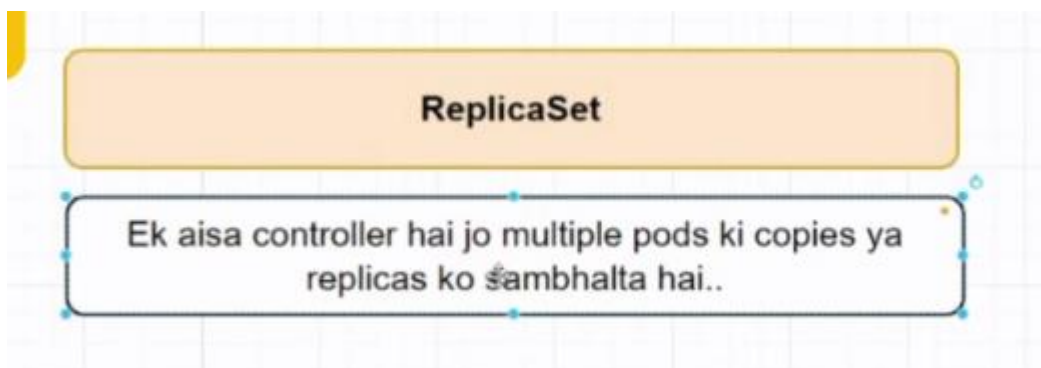
```
pod/nginx-pod created
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
nginx-pod     1/1     Running   0           4m57s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> |
```

6) work done by pod for container = workdone by controller for pod ----- means automatically creating container and pod

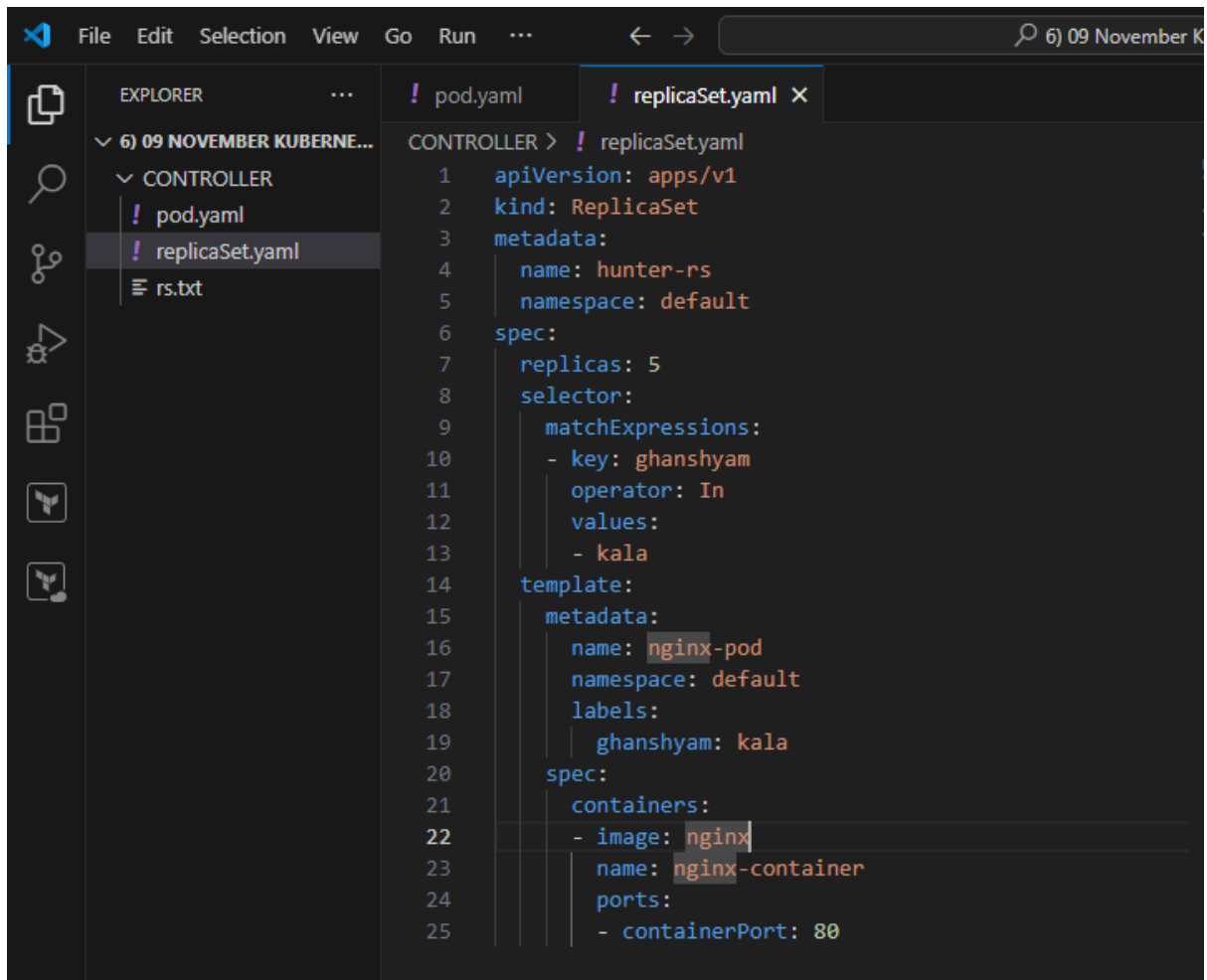
+++++

AGENDA – REPLICASET

1)



2) make replicaSet.yaml file



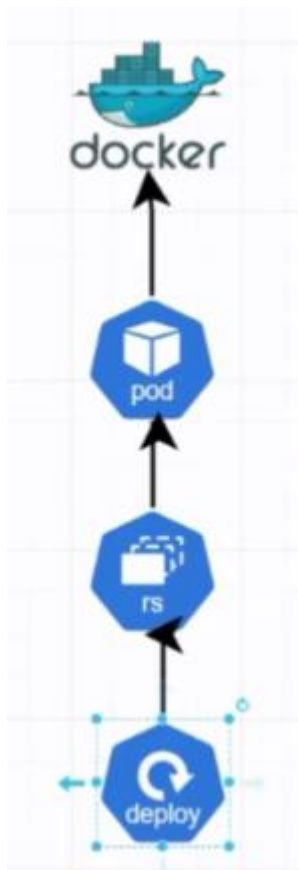
The image shows a screenshot of the Visual Studio Code editor. The Explorer sidebar on the left shows a project named '6) 09 NOVEMBER KUBERNE...' with a folder 'CONTROLLER' containing files 'pod.yaml', 'replicaSet.yaml', and 'rs.txt'. The 'replicaSet.yaml' file is selected and its content is displayed in the main editor. The YAML content is as follows:

```
1  apiVersion: apps/v1
2  kind: ReplicaSet
3  metadata:
4    name: hunter-rs
5    namespace: default
6  spec:
7    replicas: 5
8    selector:
9      matchExpressions:
10     - key: ghanshyam
11       operator: In
12       values:
13         - kala
14    template:
15      metadata:
16        name: nginx-pod
17        namespace: default
18        labels:
19          ghanshyam: kala
20      spec:
21        containers:
22        - image: nginx
23          name: nginx-container
24          ports:
25            - containerPort: 80
```

3) extract replicaset docs

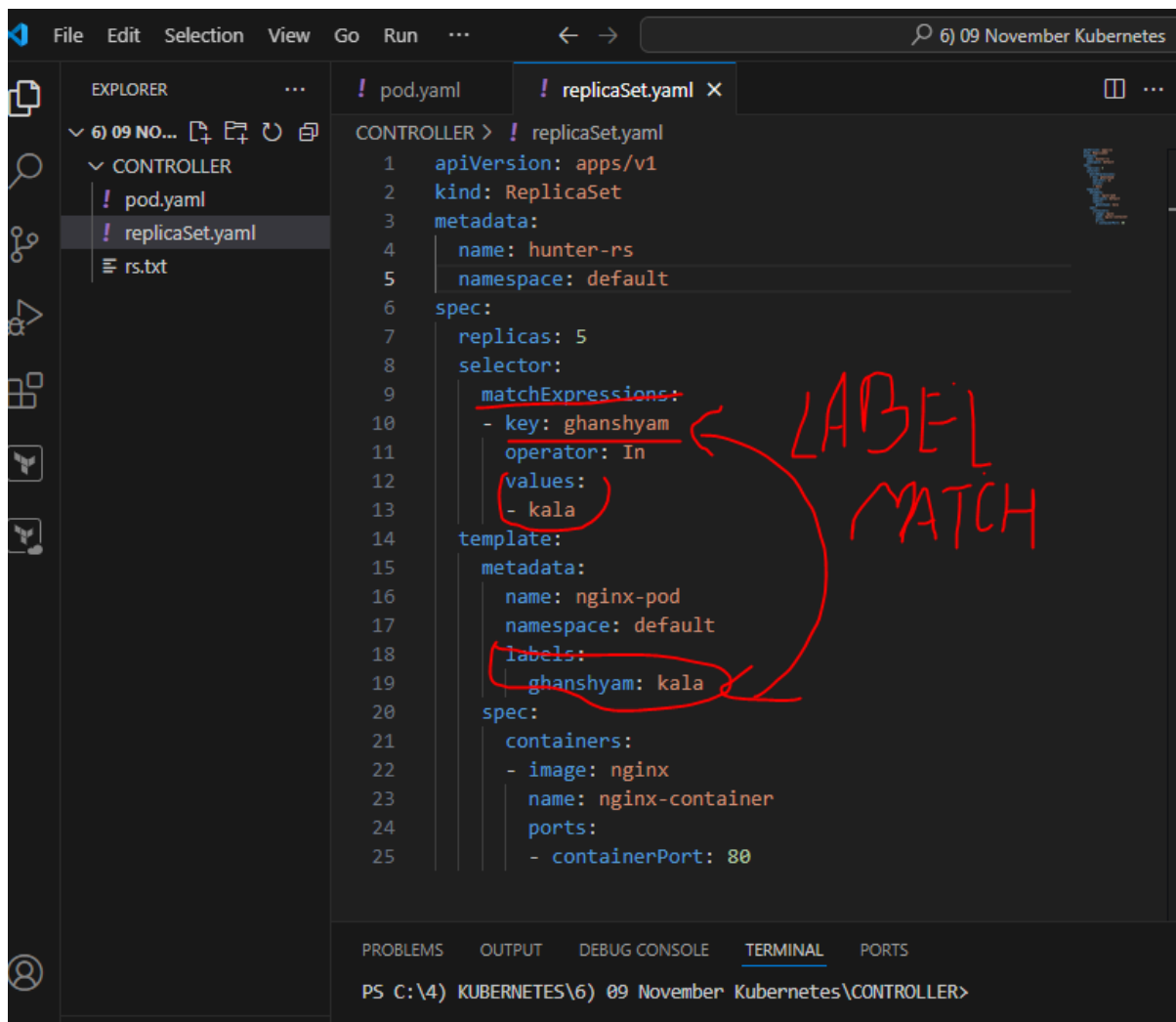
kubectl explain replicaset --recursive > rs.txt

4) flow



```
replicas: 1 - Kitne pod bnane hai?  
selector:  
template: Kaisa pod bnana hai?
```

5) Label on pod is necessary not on replica set basically "matchExpressions:" is considered as Label only on replicaset



6) **kubectl apply -f replicaSet.yaml** = create replica set

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl apply -f replicaSet.yaml
replicaset.apps/hunter-rs created
```

kubectl get rs

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get rs
NAME          DESIRED  CURRENT  READY  AGE
hunter-rs     5        5        5      109s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

kubectl get pods = so 5 pods or replicas are running

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
NAME           READY  STATUS   RESTARTS  AGE
hunter-rs-dpnh 1/1    Running  0         3m4s
hunter-rs-hcnrr 1/1    Running  0         3m4s
hunter-rs-kwnwr 1/1    Running  0         3m4s
hunter-rs-q9xb6 1/1    Running  0         3m4s
hunter-rs-zrpzf 1/1    Running  0         3m4s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

7) Deleting one pod to check whether it gets auto created by replica set or not

kubect1 delete pod hunter-rs-dpngh

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubect1 get pods
NAME                READY   STATUS    RESTARTS   AGE
hunter-rs-hcnrr     1/1    Running   0           5m31s
hunter-rs-htcbv     1/1    Running   0           18s
hunter-rs-kwnwr     1/1    Running   0           5m31s
hunter-rs-q9xb6     1/1    Running   0           5m31s
hunter-rs-zrpzf     1/1    Running   0           5m31s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

So we can see still count is 5 and 1 pod got auto created by replica set or controller

8) Suppose deleting whole replica set then all pod will also be deleted

kubect1 get rs

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubect1 get rs
NAME        DESIRED   CURRENT   READY   AGE
hunter-rs   5         5         5       11m
```

kubect1 delete rs hunter-rs

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubect1 delete rs hunter-rs
replicaset.apps "hunter-rs" deleted
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

kubect1 get pods

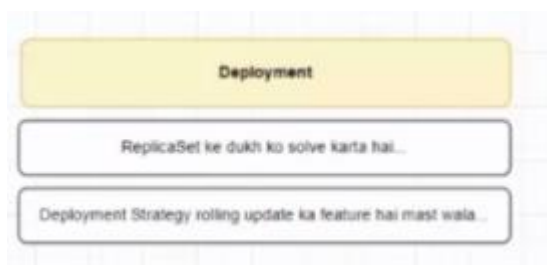
```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubect1 get pods
No resources found in default namespace.
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

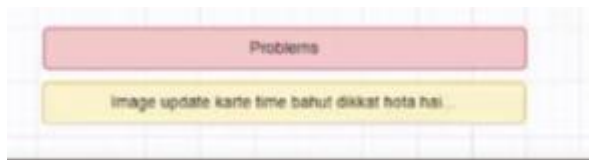
+++++

AGENDA= DEPLOYMENT

1) In replicaset fraction time downtime comes = sab pod ko maar deta hai fir dobara recreate krna chalu krta hai

2) In Deployment no downtime come = ek ko maarta hai ek ko jinda krta hai





3) Write yaml with matchLabel also

```

28
29 apiVersion: apps/v1
30 kind: ReplicaSet
31 metadata:
32   name: hunter-rs
33   namespace: default
34 spec:
35   replicas: 10
36   selector:
37     matchLabels: #####3#####3 With matchLabels
38     ghanshyam: kala
39   template:
40     metadata:
41       name: nginx-pod
42       namespace: default
43       labels:
44         ghanshyam: kala
45     spec:
46       containers:
47       - image: nginx
48         name: nginx-container
49         ports:
50         - containerPort: 80
51
52
  
```

4) **kubectl apply -f replicaSet.yaml**

```

PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl apply -f replicaSet.yaml
replicaset.apps/hunter-rs created
  
```

Kubectl get rs

```

PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get rs
NAME          DESIRED  CURRENT  READY  AGE
hunter-rs     10       10       10     117s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
  
```

5) **kubectl get pods**

```

PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
hunter-rs-2lk6t 1/1     Running   0           2m46s
hunter-rs-4kv85 1/1     Running   0           2m46s
hunter-rs-c7h6g 1/1     Running   0           2m46s
hunter-rs-h9qhc 1/1     Running   0           2m46s
hunter-rs-lx4gt 1/1     Running   0           2m46s
hunter-rs-nn2kz 1/1     Running   0           2m46s
hunter-rs-r7bpg 1/1     Running   0           2m46s
hunter-rs-tj5x1 1/1     Running   0           2m46s
hunter-rs-tqgzg 1/1     Running   0           2m46s
hunter-rs-xxz2z 1/1     Running   0           2m46s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
  
```

6) Now change replicas as 5

```

namespace: default
spec:
  replicas: 5
  selector:
    matchLabels:
      ghanshyam: kala
  template:

```

kubect1 apply -f replicaSet.yaml = again run that will configure like it will delete another 5 pods

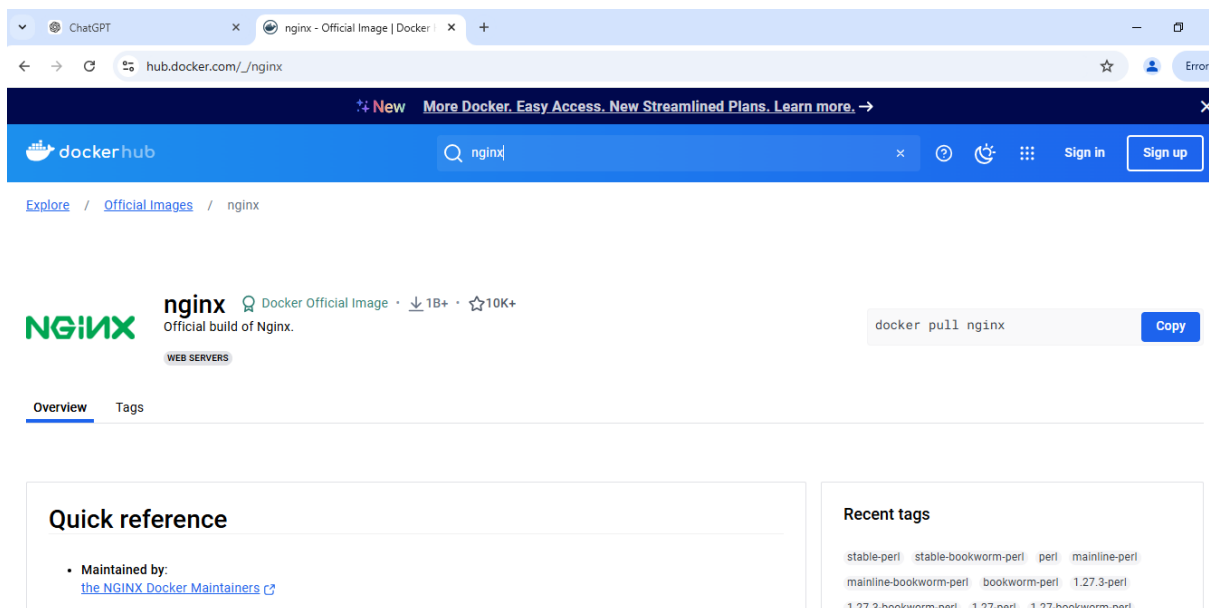
kubect1 get pods

```

PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubect1 get pods
NAME                READY   STATUS    RESTARTS   AGE
hunter-rs-c7h6g     1/1     Running   0           7m18s
hunter-rs-h9qhc     1/1     Running   0           7m18s
hunter-rs-r7bpg     1/1     Running   0           7m18s
hunter-rs-tggzg     1/1     Running   0           7m18s
hunter-rs-xxz2z     1/1     Running   0           7m18s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>

```

7) Go to docker hub and search “nginx”



The screenshot shows the Docker Hub interface for the 'nginx' image. The page header includes the Docker Hub logo and a search bar. The main content area displays the 'nginx' image as the 'Official build of Nginx'. Below this, there is a 'docker pull nginx' command and a 'Copy' button. The 'Quick reference' section indicates that the image is maintained by 'the NGINX Docker Maintainers'. The 'Recent tags' section lists various tags, including 'stable-perl', 'stable-bookworm-perl', 'perl', 'mainline-perl', 'mainline-bookworm-perl', 'bookworm-perl', '1.27.3-perl', '1.27.3-bookworm-perl', '1.27-perl', and '1.27-bookworm-perl'.

hub.docker.com/_/nginx/tags

Explore / Official Images / nginx

nginx Docker Official Image · 1B+ · 10K+
Official build of Nginx.

docker pull nginx [Copy](#)

Overview **Tags**

Sort by: Newest

TAG

[stable-perl](#)
Last pushed 10 days ago by [dojankv](#)

docker pull nginx:stable-perl [Copy](#)

Digest	OS/ARCH	Vulnerabilities	Compressed size
1b1a0112737a	linux/386	0 0 0 53 2	76.14 MB
6b38122e6cb8	linux/amd64	0 0 0 53 2	77.93 MB
11b3f27123be	linux/arm/v5	4 3 5 39 3	71.33 MB

8) Use above image

```
spec:
  containers:
  - image: nginx:stable-perl
    name: nginx-container
  ports:
```

9) **kubectl describe pod hunter-rs-c7h6g** = check pod is using which image

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl describe pod hunter-rs-c7h6g
Name:          hunter-rs-c7h6g
Namespace:     default
Priority:       0
Service Account: default
Node:          aks-agentpool-10692884-vmss000005/10.244.0.5
Start Time:    Sat, 04 Jan 2025 20:59:00 +0530
Labels:        ghanshyam=kala
Annotations:   <none>
Status:        Running
IP:            10.244.0.208
IPs:
  IP:          10.244.0.208
Controlled By: ReplicaSet/hunter-rs
Containers:
  nginx-container:
    Container ID:  containerd://18ea608a034a239d2463bae9bdc403d614143b24c88fad43c738c79c73bd43ab
    Image:         nginx
    Image ID:      docker.io/library/nginx@sha256:42e917aaa1b5bb40dd0f6f7f4f857490ac7747d7ef73b391c774a41a8b994f15
    Port:         80/TCP
    Host Port:    0/TCP
    State:        Running
      Started:    Sat, 04 Jan 2025 20:59:06 +0530
    Ready:        True
    Restart Count: 0
    Environment:  <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-wfrhc (ro)
Conditions:
  Type                               Status
  PodReadyToStartContainers          True
  Initialized                         True
```

10) As image we had update in yaml, so lets run below command which seems like in pod our image should get updated but we will find that still pods are running on old image only i.e. nginx

kubectl apply -f replicaSet.yaml

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl apply -f replicaSet.yaml
replicaset.apps/hunter-rs configured
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
```

kubectl get pods

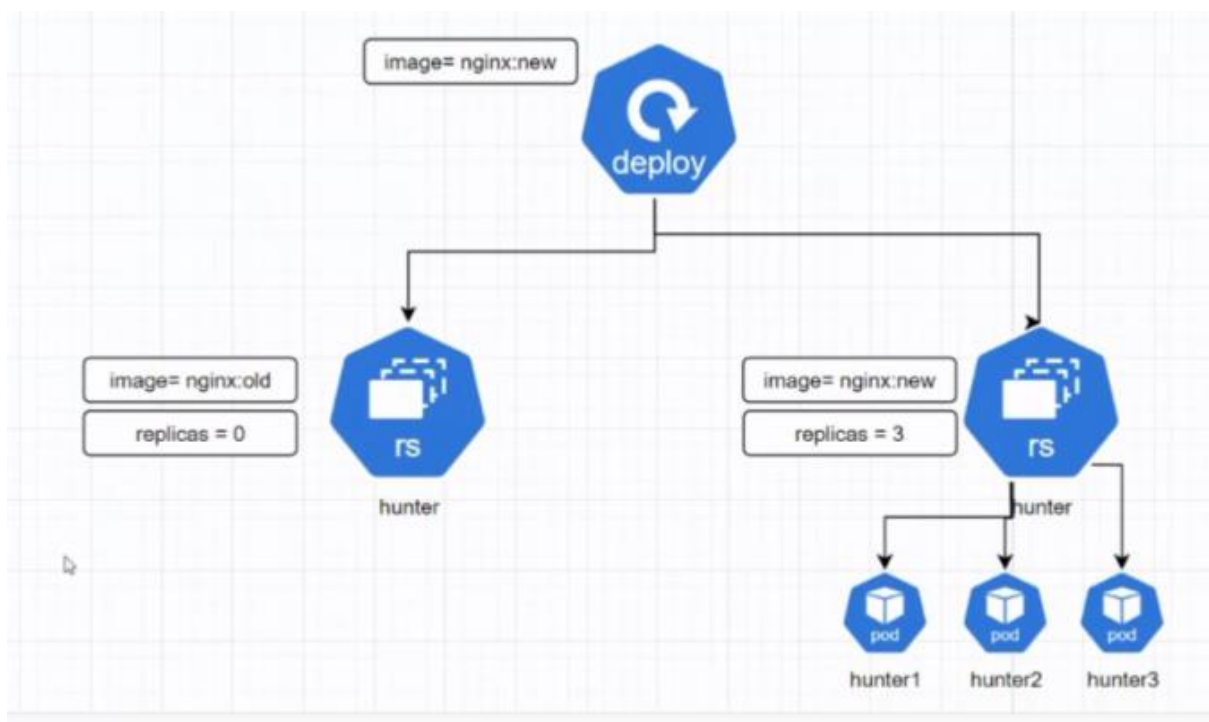
```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
hunter-rs-c7h6g 1/1 Running 0 23m
hunter-rs-r7bpg 1/1 Running 0 23m
hunter-rs-tqgzg 1/1 Running 0 23m
hunter-rs-xxz2z 1/1 Running 0 23m
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl describe hunter-rs
```

kubectl describe pod hunter-rs-c7h6g

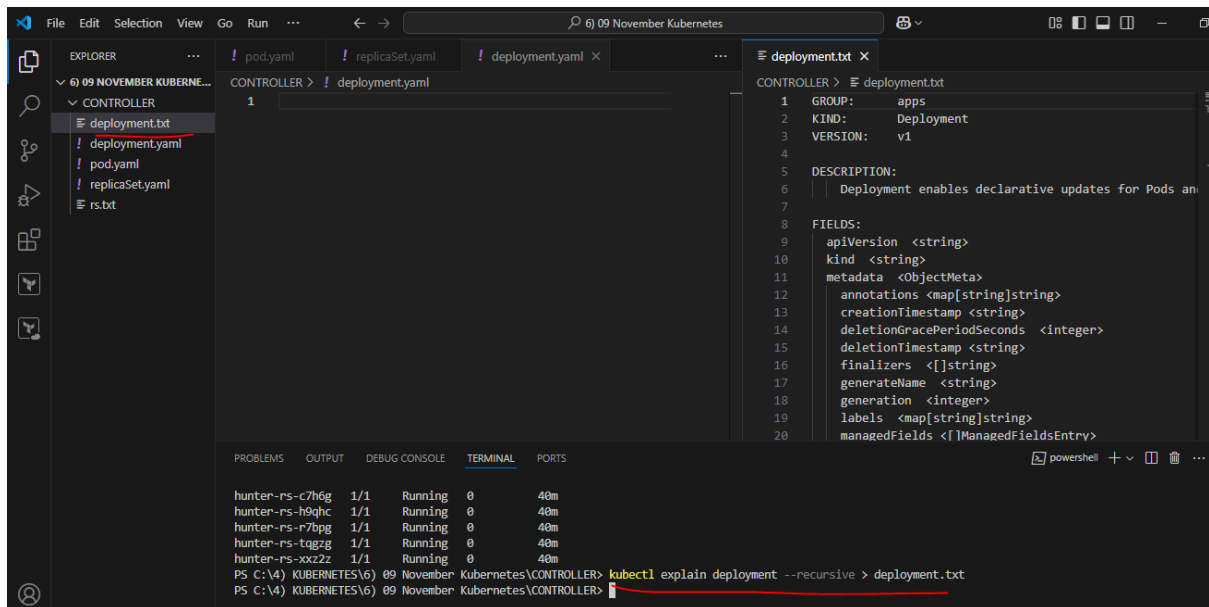
```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl describe pod hunter-rs-c7h6g
Name:          hunter-rs-c7h6g
Namespace:     default
Priority:       0
Service Account: default
Node:          aks-agentpool-10692884-vmss000005/10.224.0.5
Start Time:    Sat, 04 Jan 2025 20:59:00 +0530
Labels:        ghanshyam=kala
Annotations:    <none>
Status:        Running
IP:            10.244.0.208
IPs:
  IP:          10.244.0.208
Controlled By: ReplicaSet/hunter-rs
Containers:
  nginx-container:
    Container ID:  containerd://18ea608a034a239d2463bae9bdc403d614143b24c88fad43c738c79c73bd43ab
    Image:         nginx
    Image ID:      docker.io/nginx@sha256:42e917aaa1b5bb40dd0f6f7f4f857490ac7747d7ef73b391c774a41a8b994f15
    Port:         80/TCP
```

So image cannot be updated so easily

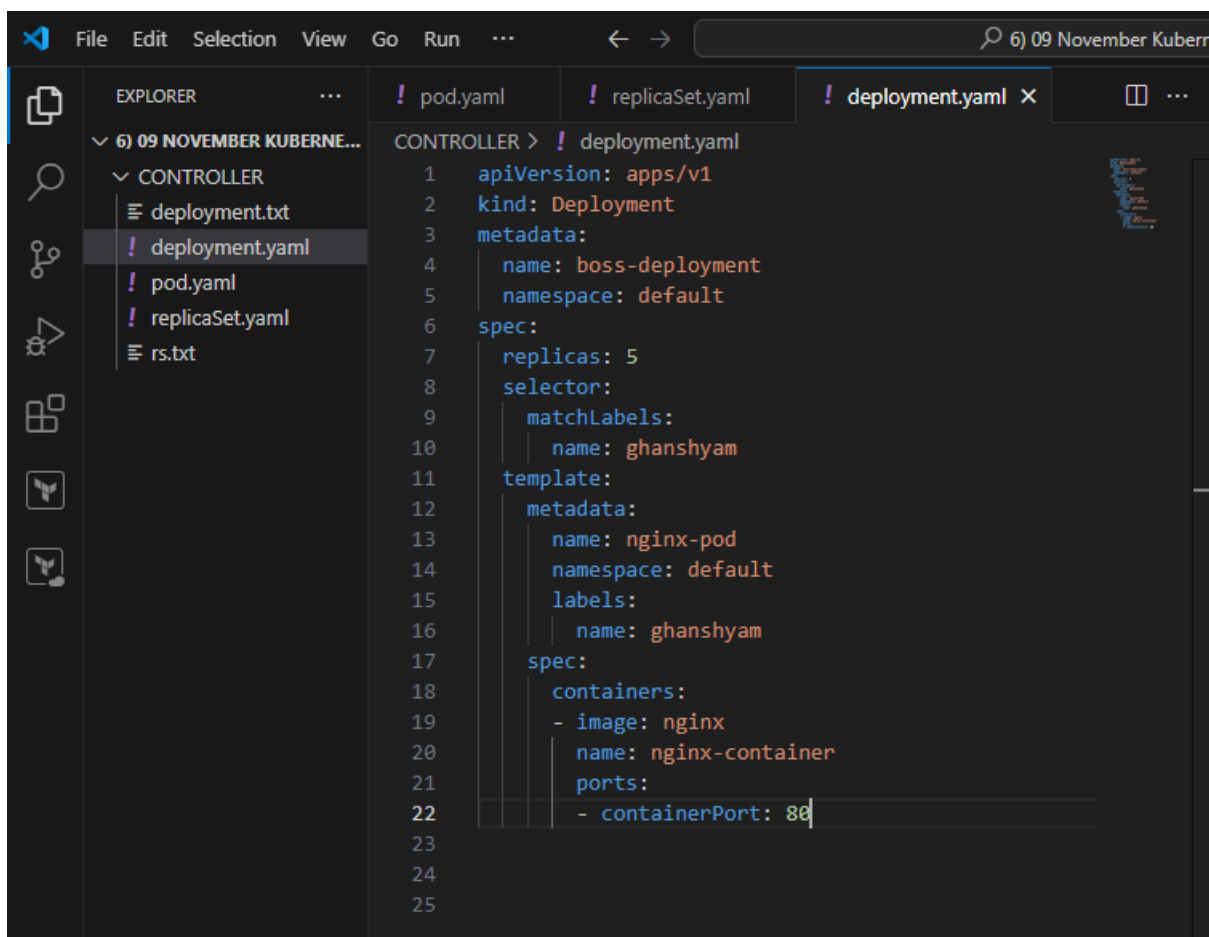
11) DEPLOYMENT = Deployment makes replica set under it then replica set makes pods under it.



12) Create deployment.yaml



13)



14) `kubectl apply -f deployment.yaml` = deployment created

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl explain deployment
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl apply -f deployment.yaml
deployment.apps/boss-deployment created
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> 
```

kubectl get deployment

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get deployment
NAME                READY    UP-TO-DATE    AVAILABLE    AGE
boss-deployment      5/5      5             5            7m42s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> 
```

15) kubectl get pods

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
NAME                                READY    STATUS    RESTARTS    AGE
boss-deployment-54685f4666-2wnft    1/1      Running   0           2m14s
boss-deployment-54685f4666-6q6qs    1/1      Running   0           2m14s
boss-deployment-54685f4666-h287g    1/1      Running   0           2m14s
boss-deployment-54685f4666-ltdcz    1/1      Running   0           2m14s
boss-deployment-54685f4666-zfw8l    1/1      Running   0           2m14s
hunter-rs-c7h6g                     1/1      Running   0           140m
hunter-rs-h9qhc                     1/1      Running   0           140m
hunter-rs-r7bpg                     1/1      Running   0           140m
hunter-rs-tqgzg                     1/1      Running   0           140m
hunter-rs-xxz2z                     1/1      Running   0           140m
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> 
```

16) kubectl get rs

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get rs
NAME                                DESIRED    CURRENT    READY    AGE
boss-deployment-54685f4666          5          5          5        4m19s
hunter-rs                            5          5          5        142m
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> 
```

17) kubectl delete rs hunter-rs

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl delete rs hunter-rs
replicaset.apps "hunter-rs" deleted
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> 
```

18) kubectl get rs = deployment ke sath ek replicaset bhi banta hai

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get rs
NAME                                DESIRED    CURRENT    READY    AGE
boss-deployment-54685f4666          5          5          5        11m
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> 
```

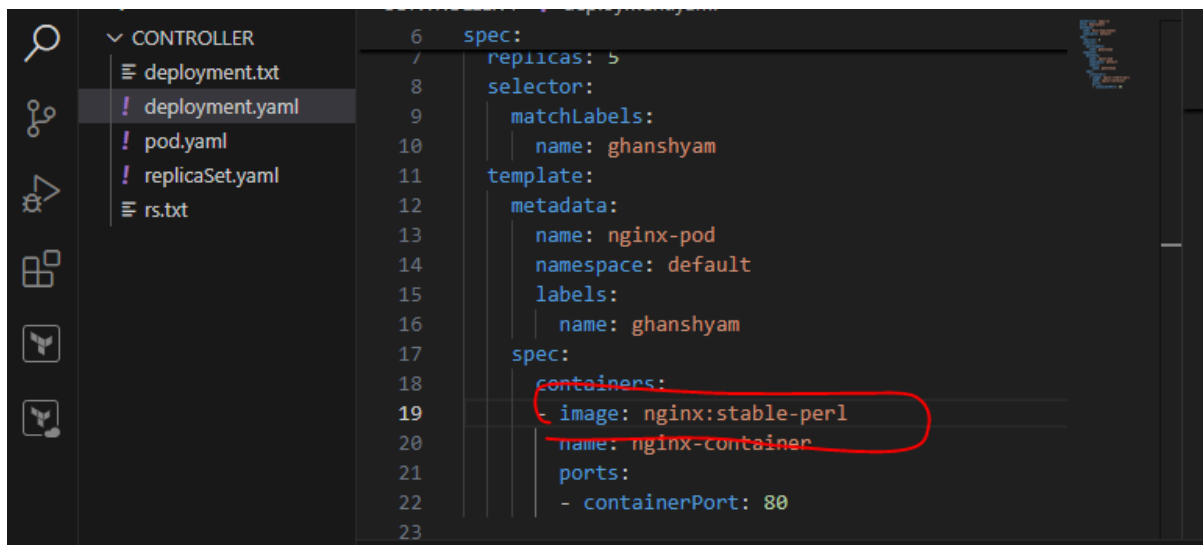
19) kubectl get pods

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
boss-deployment-54685f4666-2wnft    1/1     Running   0           18m
boss-deployment-54685f4666-6q6qs    1/1     Running   0           18m
boss-deployment-54685f4666-h287g    1/1     Running   0           18m
boss-deployment-54685f4666-ltdcz    1/1     Running   0           18m
boss-deployment-54685f4666-zfw8l    1/1     Running   0           18m
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> 
```

20) kubectl describe pod boss-deployment-54685f4666-2wnft

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl describe pod boss-deployment-54685f4666-2wnft
Name:                boss-deployment-54685f4666-2wnft
Namespace:           default
Priority:              0
Service Account:      default
Node:                aks-agentpool-10692884-vmss000004/10.224.0.4
Start Time:           Sat, 04 Jan 2025 23:17:13 +0530
Labels:               name=ghanshyam
                     pod-template-hash=54685f4666
Annotations:          <none>
Status:               Running
IP:                  10.244.1.216
IPs:                  IP: 10.244.1.216
                     Controlled By: ReplicaSet/boss-deployment-54685f4666
Containers:
  nginx-container:
    Container ID:   containerd://59fc2505cbb260d446caef80d51508f5814f96cd590ba195620f608ce4b0d848
    Image:          nginx
```

21) Now lets update image on yaml



```
6 spec:
7   replicas: 5
8   selector:
9     matchLabels:
10      name: ghanshyam
11   template:
12     metadata:
13       name: nginx-pod
14       namespace: default
15     labels:
16       name: ghanshyam
17     spec:
18       containers:
19         - image: nginx:stable-perl
20           name: nginx-container
21         ports:
22         - containerPort: 80
23
```

kubectl apply -f deployment.yaml

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl apply -f deployment.yaml
deployment.apps/boss-deployment configured
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> 
```

22) kubectl get deployment

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get deployment
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
boss-deployment 5/5     5            5           24m
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

23) **kubectl get rs**

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get rs
NAME                                DESIRED   CURRENT   READY   AGE
boss-deployment-54685f4666         0         0         0       25m
boss-deployment-6c76969dff         5         5         5       2m26s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

Here it shows that old replica set has 0 but new rs has 5

24) **kubectl get pods**

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
boss-deployment-6c76969dff-4ffkg   1/1     Running   0          5m41s
boss-deployment-6c76969dff-ff4cr   1/1     Running   0          5m34s
boss-deployment-6c76969dff-g8jsb   1/1     Running   0          5m41s
boss-deployment-6c76969dff-jbhpx   1/1     Running   0          5m34s
boss-deployment-6c76969dff-xjskd   1/1     Running   0          5m41s
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER>
```

25) **kubectl describe pod boss-deployment-6c76969dff-4ffkg**

```
PS C:\4) KUBERNETES\6) 09 November Kubernetes\CONTROLLER> kubectl describe pod boss-deployment-6c76969dff-4ffkg
Name:          boss-deployment-6c76969dff-4ffkg
Namespace:     default
Priority:       0
Service Account: default
Node:          aks-agentpool-10692884-vmss000004/10.224.0.4
Start Time:    Sat, 04 Jan 2025 23:39:56 +0530
Labels:        name=ghanshyam
               pod-template-hash=6c76969dff
Annotations:   <none>
Status:        Running
IP:            10.244.1.150
IPs:           IP: 10.244.1.150
Controlled By: ReplicaSet/boss-deployment-6c76969dff
Containers:
  nginx-container:
    Container ID: containerd://c7e96dbaaf7394f263bb9c5b8c03bf1d512434223161d2c59d09f23f5bec17c
    Image:        nginx:stable-perl
```

26) SEARCH = kubectl lens



27) ROLLING UPDATE = when we update image in yaml and when we apply then in new replica set pod updates or transfers one by one. So no downtime comes in it.

28)

