

## Create a pod with the name redis and with the image redis.

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl run nginx --image=nginx
pod/nginx created
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl run redis --image=redis
pod/redis created
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
nginx     1/1     Running   0           60s
redis     1/1     Running   0           17s
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

## Create a pod with the name nginx and with the image “nginx123” Use a pod-definition YAML file

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  labels:
    name: nginx
spec:
  containers:
  - name: nginx
    image: nginx123
    resources:
      limits:
        memory: "128Mi"
        cpu: "500m"
    ports:
    - containerPort: 80
```

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f ./nginx-pod.yml
pod/nginx-pod created
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

## 4- - What is the nginx pod status?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods -o wide
NAME      READY   STATUS             RESTARTS   AGE   IP            NODE           NOMINATED NODE   READINESS GATES
nginx-pod 0/1     ImagePullBackOff   0           3m39s  10.244.1.20   managednode1   <none>            <none>
redis     1/1     Running            0           7m15s  10.244.1.19   managednode1   <none>            <none>
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

## Change the nginx pod image to “nginx” check the status again

```
1  apiVersion: v1
2  kind: Pod
3  metadata:
4    name: nginx-pod
5    labels:
6      name: nginx
7  spec:
8    containers:
9    - name: nginx
10      image: nginx:latest
11      resources:
12        limits:
13          memory: "128Mi"
14          cpu: "500m"
15      ports:
16      - containerPort: 80
17
```

```

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f ./nginx-pod.yml
pod/nginx-pod configured
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods

```

NAME	READY	STATUS	RESTARTS	AGE
nginx-pod	1/1	Running	0	6m22s
redis	1/1	Running	0	9m58s

```

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#

```

How many ReplicaSets exist on the system?

```

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get rs
No resources found in default namespace.
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get rs --all-namespaces

```

NAMESPACE	NAME	DESIRED	CURRENT	READY	AGE
kube-system	coredns-7db6d8ff4d	2	2	2	29m

```

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#

```

create a ReplicaSet with name= replica-set-1 image= busybox replicas= 2

```

apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: replica-set-1
spec:
  replicas: 2
  selector:
    matchLabels:
      teir: busybox
  template:
    metadata:
      labels:
        teir: busybox
    spec:
      containers:
        - name: busybox
          image: busybox

```

```

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f ./replica-set-1.yml
replicaset.apps/replica-set-1 created
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#

```

### Scale the ReplicaSet replica-set-1 to 3 PODs.

```
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: replica-set-1
spec:
  replicas: 3
  selector:
    matchLabels:
      teir: busybox
  template:
    metadata:
      labels:
        teir: busybox
    spec:
      containers:
        - name: busybox
          image: busybox
```

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f ./replica-set-1.yml
replicaset.apps/replica-set-1 configured
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get rs
NAME             DESIRED   CURRENT   READY   AGE
replica-set-1    3         3         0       102s
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

### How many PODs are READY in the replica-set-1?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME             READY   STATUS              RESTARTS   AGE
nginx-pod        1/1     Running             0          23m
redis            1/1     Running             0          27m
replica-set-1-5qmx 0/1     CrashLoopBackOff    6 (2m18s ago) 8m15s
replica-set-1-85klm 0/1     CrashLoopBackOff    6 (25s ago) 6m41s
replica-set-1-g4frn 0/1     CrashLoopBackOff    6 (2m ago) 8m15s
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

### - Delete any one of the 3 PODs then check How many PODs exist now?

#### Why are there still 3 PODs, even after you deleted one?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME             READY   STATUS              RESTARTS   AGE
nginx-pod        1/1     Running             0          23m
redis            1/1     Running             0          27m
replica-set-1-5qmx 0/1     CrashLoopBackOff    6 (2m18s ago) 8m15s
replica-set-1-85klm 0/1     CrashLoopBackOff    6 (25s ago) 6m41s
replica-set-1-g4frn 0/1     CrashLoopBackOff    6 (2m ago) 8m15s
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl delete pod replica-set-1-5qmx
pod "replica-set-1-5qmx" deleted
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME             READY   STATUS              RESTARTS   AGE
nginx-pod        1/1     Running             0          24m
redis            1/1     Running             0          27m
replica-set-1-85klm 0/1     CrashLoopBackOff    6 (78s ago) 7m34s
replica-set-1-g4frn 0/1     CrashLoopBackOff    6 (2m53s ago) 9m8s
replica-set-1-hthx 0/1     Completed           0          3s
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

## How many Deployments and ReplicaSets exist on the system?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get deployments
No resources found in default namespace.
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get deployments --all-namespaces
NAMESPACE   NAME        READY   UP-TO-DATE   AVAILABLE   AGE
kube-system  coredns     2/2     2             2           52m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

## create a Deployment with name= deployment-1 image= busybox replicas= 3

```
io.k8s.api.apps.v1.Deployment (v1@deployment.json)
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: deployment-1
5  spec:
6    replicas: 3
7    selector:
8      matchLabels:
9        app: busybox
10   template:
11     metadata:
12       labels:
13         app: busybox
14     spec:
15       containers:
16       - name: busybox
17         image: busybox
18         command: ["/bin/sh"]
19         args: ["-c", "sleep 3600"]
20       resources:
21         limits:
22           memory: "128Mi"
23           cpu: "500m"
24
```

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f ./deployments.yml
deployment.apps/deployment-1 created
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

## How many Deployments and ReplicaSets exist on the system now?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get deployments --all-namespaces
NAMESPACE   NAME        READY   UP-TO-DATE   AVAILABLE   AGE
default     deployment-1 2/3     3             2           3m22s
kube-system  coredns     2/2     2             2           63m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get rs --all-namespaces
NAMESPACE   NAME                               DESIRED   CURRENT   READY   AGE
default     deployment-1-7bb9d99546            3         3         2       3m24s
default     replica-set-1                      3         3         3       27m
kube-system  coredns-7db6d8ff4d                2         2         2       62m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

How many pods are ready with the deployment-1?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-7bb9d99546-dm44j      0/1     Pending   0           5m59s
deployment-1-7bb9d99546-fp9kp      1/1     Running   0           5m59s
deployment-1-7bb9d99546-rkpnv      1/1     Running   0           5m59s
nginx-pod                          1/1     Running   0           45m
redis                              1/1     Running   0           48m
replica-set-1-4h7wc                1/1     Running   0           14m
replica-set-1-pv2kq                1/1     Running   0           14m
replica-set-1-w22kc                1/1     Running   0           14m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

Update deployment-1 image to nginx then check the ready pods again

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f ./deployments.yml
deployment.apps/deployment-1 configured
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-77847c5988-bkzq2      0/1     ContainerCreating   0           2s
deployment-1-7bb9d99546-dm44j      1/1     Running            0           20m
deployment-1-7bb9d99546-fp9kp      1/1     Running            0           20m
deployment-1-7bb9d99546-rkpnv      1/1     Running            0           20m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-77847c5988-4gcw9      0/1     Pending          0           1s
deployment-1-77847c5988-bkzq2      1/1     Running          0           6s
deployment-1-77847c5988-v9v29      1/1     Running          0           3s
deployment-1-7bb9d99546-dm44j      1/1     Terminating     0           20m
deployment-1-7bb9d99546-fp9kp      1/1     Terminating     0           20m
deployment-1-7bb9d99546-rkpnv      1/1     Running           0           20m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-77847c5988-4gcw9      0/1     Pending          0           4s
deployment-1-77847c5988-bkzq2      1/1     Running          0           9s
deployment-1-77847c5988-v9v29      1/1     Running          0           6s
deployment-1-7bb9d99546-dm44j      1/1     Terminating     0           20m
deployment-1-7bb9d99546-fp9kp      1/1     Terminating     0           20m
deployment-1-7bb9d99546-rkpnv      1/1     Running           0           20m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-77847c5988-4gcw9      0/1     Pending          0           11s
deployment-1-77847c5988-bkzq2      1/1     Running          0           16s
deployment-1-77847c5988-v9v29      1/1     Running          0           13s
deployment-1-7bb9d99546-dm44j      1/1     Terminating     0           20m
deployment-1-7bb9d99546-fp9kp      1/1     Terminating     0           20m
deployment-1-7bb9d99546-rkpnv      1/1     Running           0           20m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-77847c5988-4gcw9      1/1     Running          0           49s
deployment-1-77847c5988-bkzq2      1/1     Running          0           54s
deployment-1-77847c5988-v9v29      1/1     Running          0           51s
deployment-1-7bb9d99546-rkpnv      1/1     Terminating     0           21m
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

## Run kubectl describe deployment deployment-1 and check events

## What is the deployment strategy used to upgrade the deployment-1?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl describe deployment deployment-1
Name: deployment-1
Namespace: default
CreationTimestamp: Mon, 10 Mar 2025 15:09:01 +0200
Labels: <none>
Annotations: deployment.kubernetes.io/revision: 5
Selector: app=busybox
Replicas: 3 desired | 3 updated | 3 total | 3 available | 0 unavailable
StrategyType: RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
  Labels: app=busybox
  Containers:
    busybox:
      Image: busybox
      Port: <none>
      Host Port: <none>
      Command:
        /bin/sh
      Args:
        -c
        sleep 3600
  Limits:
    cpu: 200m
    memory: 128Mi
  Environment: <none>
  Mounts: <none>
  Volumes: <none>
  Node-Selectors: <none>
  Tolerations: <none>
Conditions:
  Type           Status  Reason
  ----           -
  Available      True    MinimumReplicasAvailable
  Progressing    True    NewReplicaSetAvailable
OldReplicaSets: deployment-1-7bb9d99546 (0/0 replicas created), deployment-1-6b985bf454 (0/0 replicas created), deployment-1-6559bf6bff (0/0 replicas created)
NewReplicaSet: deployment-1-77847c5988 (3/3 replicas created)
Events:
  Type           Reason              Age             From              Message
  ----           -
  Normal         ScalingReplicaSet   24m            deployment-controller Scaled up replica set deployment-1-7bb9d99546 to 3
  Normal         ScalingReplicaSet   17m            deployment-controller Scaled up replica set deployment-1-6b985bf454 to 1
  Normal         ScalingReplicaSet   6m48s          deployment-controller Scaled down replica set deployment-1-6b985bf454 to 0 from 1
  Normal         ScalingReplicaSet   5m17s          deployment-controller Scaled up replica set deployment-1-6559bf6bff to 1
  Normal         ScalingReplicaSet   4m32s          deployment-controller Scaled down replica set deployment-1-6559bf6bff to 0 from 1
  Normal         ScalingReplicaSet   4m32s          deployment-controller Scaled up replica set deployment-1-77847c5988 to 1 from 0
  Normal         ScalingReplicaSet   4m29s          deployment-controller Scaled down replica set deployment-1-7bb9d99546 to 2 from 3
  Normal         ScalingReplicaSet   4m29s          deployment-controller Scaled up replica set deployment-1-77847c5988 to 2 from 1
```

## Rollback the deployment-1 What is the used image with the deployment-1?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl delete deployment deployment-1
deployment.apps "deployment-1" deleted
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f ./deployments.yaml
deployment.apps/deployment-1 created
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl rollout history deployment deployment-1
deployment.apps/deployment-1
REVISION   CHANGE-CAUSE
1          <none>

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f ./deployments.yaml
deployment.apps/deployment-1 configured
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl rollout history deployment deployment-1
deployment.apps/deployment-1
REVISION   CHANGE-CAUSE
1          <none>
2          <none>

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl rollout undo deployment deployment-1
deployment.apps/deployment-1 rolled back
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl rollout history deployment deployment-1
deployment.apps/deployment-1
REVISION   CHANGE-CAUSE
2          <none>
3          <none>

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```



```

REVISION  CHANGE-CAUSE
2          <none>
3          <none>

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl describe deployment deployment-1
Name:          deployment-1
Namespace:     default
CreationTimestamp: Mon, 10 Mar 2025 15:37:42 +0200
Labels:        <none>
Annotations:   deployment.kubernetes.io/revision: 3
Selector:      app=busybox
Replicas:      3 desired | 3 updated | 3 total | 3 available | 0 unavailable
StrategyType:  RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
  Labels:  app=busybox
  Containers:
    busybox:
      Image:        busybox
      Port:         <none>
      Host Port:    <none>
      Command:
        /bin/sh
      Args:
        -c
        sleep 3600
      Limits:

```

Create a deployment using nginx image with latest tag only and remember to mention tag i.e nginx:latest and name it as nginx-deployment. App labels should be app: nginx-app and type: front-end. The container should be named as nginx-container; also make sure replica counts are

```

nginx-deployment.yml > {} spec > {} template > {} spec > {} containers > {}
io.k8s.api.apps.v1.Deployment (v1@deployment.json)
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx-app
      tier: front-end
  template:
    metadata:
      labels:
        app: nginx-app
        tier: front-end
    spec:
      containers:
        - name: myapp
          image: nginx
          resources:
            limits:
              memory: "128Mi"
              cpu: "500m"
          ports:
            - containerPort: 80

```

```

root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# sudo kubectl apply -f ./nginx-deployment.yml
deployment.apps/nginx-deployment unchanged
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
nginx-deployment-57557d8b99-75zpp   1/1     Running   0           86s
nginx-deployment-57557d8b99-8kkvj   1/1     Running   0           4m52s
nginx-deployment-57557d8b99-vvd84   1/1     Running   0           89s
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#

```

## How many static pods exist in this cluster?

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl get pods --all-namespaces
NAMESPACE   NAME                                     READY   STATUS    RESTARTS   AGE
default     nginx-deployment-57557d8b99-75zpp      1/1     Running   0          5m17s
default     nginx-deployment-57557d8b99-8kkvj      1/1     Running   0          8m43s
default     nginx-deployment-57557d8b99-vvd84      1/1     Running   0          5m20s
kube-flannel kube-flannel-ds-6ndt6                 1/1     Running   1 (4h18m ago) 23h
kube-flannel kube-flannel-ds-h9f4h                 1/1     Running   1 (6m1s ago)  23h
kube-system coredns-7db6d8ff4d-b5nc4             1/1     Running   1 (4h18m ago) 23h
kube-system coredns-7db6d8ff4d-nhsh2             1/1     Running   1 (4h18m ago) 23h
kube-system etcd-mohamedharoon              1/1     Running   1 (4h18m ago) 23h
kube-system kube-apiserver-mohamedharoon 1/1     Running   1 (4h18m ago) 23h
kube-system kube-controller-manager-mohamedharoon 1/1     Running   1 (4h18m ago) 23h
kube-system kube-proxy-h4mpc            1/1     Running   1 (4h18m ago) 23h
kube-system kube-proxy-pgmbm            1/1     Running   1 (6m1s ago)  23h
kube-system kube-scheduler-mohamedharoon 1/1     Running   1 (4h18m ago) 23h
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```

## create a static pod nginx

```
io.k8s.api.core.v1.Pod (v1@pod.json)
1  apiVersion: v1
2  kind: Pod
3  metadata:
4    name: nginx-pod
5    labels:
6      name: static-nginx
7  spec:
8    containers:
9      - name: static-nginx
10       image: nginx:latest
11       resources:
12         limits:
13           memory: "128Mi"
14           cpu: "200m"
15       ports:
16         - containerPort: 80
17
```

pod/nginx-pod unchanged

```
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# cp ./static-pod.yml /etc/kubernetes/manifests/
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1# kubectl apply -f /etc/kubernetes/manifests/static-pod.yml
pod/nginx-pod unchanged
root@mohamedharoon:/home/mohamedharoon/Desktop/ITI/18-k8s/labs/lab1#
```