

Kubernetes-Lab 1

```
! mypod.yml x
! mypod.yml > {} spec > {} template > {} spec > [ ] containers > {} 0
io.k8s.api.apps.v1.ReplicaSet (v1@replicaset.json)
1  apiVersion: apps/v1
2  kind: ReplicaSet
3  metadata:
4    name: replica-set-1
5  spec:
6    replicas: 2
7    selector:
8      matchLabels:
9        app: busybox
10   template:
11     metadata:
12       labels:
13         app: busybox
14     spec:
15       containers:
16       - name: busybox-container
17         image: busybox
18         command: ["sleep", "infinity"]
```

1- Install k8s cluster (minikube) (optional you can use <https://www.katacoda.com/courses/kubernetes/playground>)

```
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~$ minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured
```

2- Create a pod with the name redis and with the image redis.

```
! mypod.yml 1 x
! mypod.yml > ...
io.k8s.api.core.v1.Pod (v1@pod.json)
1  apiVersion: v1
2  kind: Pod
3  metadata:
4    name: redis
5  spec:
6    containers:
7    - name: my-redis-container
8      image: redis
9
```

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl apply -f mypod.yml
pod/redis created
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
redis     1/1     Running   0           3m11s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

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

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
nginx     0/1     ErrImagePull  0           32s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl logs nginx
Error from server (BadRequest): container "my-nginx-container" in pod "nginx" is waiting to start: trying and failing to pull image
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

Couldn't create any running containers on the pod because it failed to pull the image because no image with the name 'nginx123' exists.

4- What is the nginx pod status?

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
nginx     0/1     ErrImagePull  0           32s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl logs nginx
Error from server (BadRequest): container "my-nginx-container" in pod "nginx" is waiting to start: trying and failing to pull image
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

5- Change the nginx pod image to “nginx” check the status again

```

! mypod.yml 1 x
! mypod.yml > {} spec > [ ] containers > {} 0 > image
io.k8s.api.core.v1.Pod (v1@pod.json)
1  apiVersion: v1
2  kind: Pod
3  metadata:
4    name: nginx
5  spec:
6    containers:
7      - name: my-nginx-container
8        image: nginx
9

```

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl apply -f mypod.yml
pod/nginx configured
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
nginx     1/1     Running   0           5m19s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

6- How many ReplicaSets exist on the system?

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get rs
No resources found in default namespace.
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

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

```

! mypod.yml x
! mypod.yml > ...
1  io.k8s.api.apps.v1.ReplicaSet (v1@replicaset.json)
2  apiVersion: apps/v1
3  kind: ReplicaSet
4  metadata:
5    name: replica-set-1
6  spec:
7    replicas: 2
8    selector:
9      matchLabels:
10       app: busybox
11  template:
12    metadata:
13      labels:
14       app: busybox
15    spec:
16      containers:
17        - name: busybox-container
18          image: busybox
19

```

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl apply -f mypod.yml
replicaset.apps/replica-set-1 created
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get rs
NAME          DESIRED   CURRENT   READY   AGE
replica-set-1  2         2         0       3s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

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

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl scale replicaset replica-set-1 --replicas=3
replicaset.apps/replica-set-1 scaled
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get rs
NAME          DESIRED   CURRENT   READY   AGE
replica-set-1  3         3         0       3m24s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

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

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl scale replicaset replica-set-1 --replicas=3
replicaset.apps/replica-set-1 scaled
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get rs
NAME          DESIRED   CURRENT   READY   AGE
replica-set-1  3         3         0       3m24s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

10- 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?

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
nginx          1/1     Running   0           31m
replica-set-1-blmdn  1/1     Running   0           4m2s
replica-set-1-ds8db  1/1     Running   0           4m2s
replica-set-1-lx677  1/1     Running   0           11s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl delete pod replica-set-1-blmdn
pod "replica-set-1-blmdn" deleted
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get rs
NAME          DESIRED   CURRENT   READY   AGE
replica-set-1  3          3          3       4m53s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

Because the replicaset automatically ensures the number of running pods is as specified, so if a pod was deleted or failed for any reason, it will create another one as a replacement.

11- How many Deployments and ReplicaSets exist on the system?

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get rs
NAME          DESIRED   CURRENT   READY   AGE
replica-set-1  3          3          3       9m50s
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get deployments
No resources found in default namespace.
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```

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

```

! mypod.yml 1 x
! mypod.yml > ...
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-container
17         image: busybox
18         command: ["sleep", "infinity"]
19

```

13- How many Deployments and ReplicaSets exist on the system now?

```

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get deployments
No resources found in default namespace.
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$

```


14- How many pods are ready with the deployment-1?

```
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-86ddc756d9-7mc8k      1/1     Running   0           3m7s
deployment-1-86ddc756d9-b2j2p      1/1     Running   0           3m7s
deployment-1-86ddc756d9-stjpn      1/1     Running   0           3m7s
nginx                               1/1     Running   0           42m
replica-set-1-2lxc4                 1/1     Running   0           11m
replica-set-1-ds8db                 1/1     Running   0           15m
replica-set-1-lx677                 1/1     Running   0           11m
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$
```

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

```
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl set image deployment/deployment-1 busybox-container=nginx
kubectl get pods
deployment.apps/deployment-1 image updated
NAME                                READY   STATUS             RESTARTS   AGE
deployment-1-68cbffc9f9-8vbv5      0/1     ContainerCreating   0           0s
deployment-1-86ddc756d9-psl2d      1/1     Running             0           8m46s
deployment-1-86ddc756d9-tm6wm      1/1     Running             0           8m46s
deployment-1-86ddc756d9-xxshn      1/1     Running             0           8m46s
nginx                               1/1     Running             0           68m
replica-set-1-2lxc4                 1/1     Running             0           37m
replica-set-1-ds8db                 1/1     Running             0           41m
replica-set-1-lx677                 1/1     Running             0           38m
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$
```

```
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-55cf478479-dx9kl      1/1     Running   0           72s
deployment-1-55cf478479-fsjxc      1/1     Running   0           72s
deployment-1-55cf478479-krbqx      1/1     Running   0           72s
nginx                               1/1     Running   0           55m
replica-set-1-2lxc4                 1/1     Running   0           23m
replica-set-1-ds8db                 1/1     Running   0           28m
replica-set-1-lx677                 1/1     Running   0           24m
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$
```

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

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

```
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl describe deployment deployment-1
Name: deployment-1
Namespace: default
CreationTimestamp: Sun, 09 Feb 2025 15:23:28 +0200
Labels: <none>
Annotations: deployment.kubernetes.io/revision: 1
Selector: app=nginx
Replicas: 3 desired | 3 updated | 3 total | 3 available | 0 unavailable
StrategyType: RollingUpdate
MinReadySeconds: 0
```

17- Rollback the deployment-1

What is the used image with the deployment-1?

```
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl rollout undo deployment deployment-1
deployment.apps/deployment-1 rolled back
```

```
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$ kubectl describe deployment deployment-1 | grep Image
Image: busybox
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs$
```

18- 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 3.

```
! mypod.yml 1 x
! ~/Kubernetes-labs/mypod.yml • 1 problem in this file
io.k8s.api.apps.v1.Deployment (v1@deployment.json)
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: nginx-deployment
5  spec:
6    replicas: 3
7    selector:
8      matchLabels:
9        app: nginx-app
10       type: front-end
11   template:
12     metadata:
13       labels:
14         app: nginx-app
15         type: front-end
16     spec:
17       containers:
18         - name: nginx-container
19           image: nginx:latest
20
```

19- How many static pods exist in this cluster?

```
shehab-gamal@shehab-gamal-Lenovo-ideapad-520-151KB:~/Kubernetes-labs$ minikube ssh

minikube

$ ls /etc/kubernetes/manifests/ | wc -l
6
$
```

20- create a static pod nginx

```
mypod.yml > ...
io.k8s.api.core.v1.Pod (v1@pod.json)
1  apiVersion: v1
2  kind: Pod
3  metadata:
4    name: pod1
5  spec:
6    containers:
7      - name: nginx
8        image: nginx:1.14.2
9
```

logout

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs\$ kubectl get pods

NAME	READY	STATUS	RESTARTS	AGE
nginx	1/1	Running	1 (72m ago)	9h
pod1	1/1	Running	1 (72m ago)	7h13m
replica-set-1-2lxc4	1/1	Running	1 (72m ago)	8h
replica-set-1-ds8db	1/1	Running	1 (72m ago)	8h
replica-set-1-lx677	1/1	Running	1 (72m ago)	8h

shehab-gamal@shehab-gamal-Lenovo-ideapad-520-15IKB:~/Kubernetes-labs\$

INSERT