

## K8s lab 1

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured

[minasafwat@Dell-G5 lab1]$
```

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1 — /usr/bin/vim q2.yaml
apiVersion: v1
kind: Pod
metadata:
  name: q2-pod
spec:
  containers:
  - name: redis-container
    image: redis
```

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q2.yaml
pod/q2-pod created
[minasafwat@Dell-G5 lab1]$ kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
q2-pod    1/1     Running   0           23s
[minasafwat@Dell-G5 lab1]$
```

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1 — /usr/bin/vim q3.yaml
apiVersion: v1
kind: Pod
metadata:
  name: q3-pod
spec:
  containers:
    - name: nginx-container
      image: nginx123
```

```
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q3.yaml
pod/q3-pod created
```

4- What is the nginx pod status?

```
[minasafwat@Dell-G5 lab1]$ kubectl describe pod q3-pod
```

```
Containers:
  nginx-container:
    Container ID:
    Image:          nginx123
    Image ID:
    Port:           <none>
    Host Port:      <none>
    State:          Waiting
      Reason:       ErrImagePull
    Ready:          False
    Restart Count:  0
    Environment:    <none>
```

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1 — /usr/bin/vim q3.yaml
apiVersion: v1
kind: Pod
metadata:
  name: q3-pod
spec:
  containers:
    - name: nginx-container
      image: nginx
```

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q3.yaml
pod/q3-pod configured
[minasafwat@Dell-G5 lab1]$
```

```
Service Account: default
Node: minikube/192.168.59.100
Start Time: Sun, 09 Feb 2025 14:31:48 +0200
Labels: <none>
Annotations: <none>
Status: Running
IP: 10.244.0.72
IPs:
  IP: 10.244.0.72
Containers:
  nginx-container:
    Container ID: docker://7e85564140d08a0dfcd5819aac30f4d8151d8256e120ce33b25e15d8e070c4b5
    Image: nginx
    Image ID: docker-pullable://nginx@sha256:91734281c0ebfc6f1aea979cffe5079cfe786228a71cc6f1f46a228cde6e34
    Port: <none>
    Host Port: <none>
    State: Running
      Started: Sun, 09 Feb 2025 14:33:40 +0200
    Ready: True
```

6- How many ReplicaSets exist on the system? zero

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl get rs
No resources found in default namespace.
[minasafwat@Dell-G5 lab1]$
```

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1 — /usr/bin/vim q7.yaml
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: replica-set-1
spec:
  template:
    metadata:
      name: busybox-pod
      labels:
        label: busybox
    spec:
      containers:
        - name: busybox-container
          image: busybox
  replicas: 2
  selector:
    matchLabels:
      label: busybox
```

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q7.yaml
replicaset.apps/replica-set-1 created
[minasafwat@Dell-G5 lab1]$ kubectl get rs
NAME                DESIRED   CURRENT   READY   AGE
replica-set-1       2         2         0       12s
[minasafwat@Dell-G5 lab1]$
```

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1 — /usr/bin/vim q7.yaml
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: replica-set-1
spec:
  template:
    metadata:
      name: busybox-pod
      labels:
        label: busybox
    spec:
      containers:
        - name: busybox-container
          image: busybox
  replicas: 3
  selector:
    matchLabels:
      label: busybox
```

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ vi q7.yaml
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q7.yaml
replicaset.apps/replica-set-1 configured
[minasafwat@Dell-G5 lab1]$ kubectl get rs
NAME                DESIRED    CURRENT    READY    AGE
replica-set-1       3          3          0        62s
[minasafwat@Dell-G5 lab1]$
```

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ vi q7.yaml
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q7.yaml
replicaset.apps/replica-set-1 configured
[minasafwat@Dell-G5 lab1]$ kubectl get rs
NAME                DESIRED    CURRENT    READY    AGE
replica-set-1       3          3          0        62s
[minasafwat@Dell-G5 lab1]$
```

```
[minasafwat@Dell-G5 lab1]$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
q2-pod	1/1	Running	0	17m
q3-pod	1/1	Running	0	15m
replica-set-1-4z5pr	0/1	CrashLoopBackOff	2 (47s ago)	83s
replica-set-1-6tcm2	0/1	CrashLoopBackOff	2 (56s ago)	83s
replica-set-1-g2nlm	0/1	ContainerCreating	0	28s

```
[minasafwat@Dell-G5 lab1]$
```

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?

Because replicaSet will maintain the number of pods (replicas = 3) even if one of them deleted.

```
minasafwat@Dell-G5:~/labs/k8s/lab1
```

```
[minasafwat@Dell-G5 lab1]$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
q2-pod	1/1	Running	0	18m
q3-pod	1/1	Running	0	16m
replica-set-1-4z5pr	0/1	Completed	4 (51s ago)	2m19s
replica-set-1-6tcm2	0/1	Completed	4 (54s ago)	2m19s
replica-set-1-g2nlm	0/1	CrashLoopBackOff	2 (27s ago)	84s

```
[minasafwat@Dell-G5 lab1]$ kubectl delete pod replica-set-1-4z5pr
```

pod "replica-set-1-4z5pr" deleted

```
[minasafwat@Dell-G5 lab1]$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
q2-pod	1/1	Running	0	18m
q3-pod	1/1	Running	0	16m
replica-set-1-6tcm2	0/1	CrashLoopBackOff	4 (42s ago)	2m51s
replica-set-1-g2nlm	0/1	CrashLoopBackOff	3 (28s ago)	116s
replica-set-1-qhqj2	0/1	ContainerCreating	0	2s

```
[minasafwat@Dell-G5 lab1]$
```

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

Deployments : zero

Replicasets : 1

```
minasafwat@Dell-G5:~/labs/k8s/lab1
```

```
[minasafwat@Dell-G5 lab1]$ kubectl get replicaset
```

NAME	DESIRED	CURRENT	READY	AGE
replica-set-1	3	3	0	5m4s

```
[minasafwat@Dell-G5 lab1]$ kubectl get deployment
```

No resources found in default namespace.

```
[minasafwat@Dell-G5 lab1]$
```

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1 — /usr/bin/vim q12.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: deployment-1
spec:
  replicas: 3
  template:
    metadata:
      name: busybox-pod
      labels:
        label: busybox-label
    spec:
      containers:
        - name: busybox
          image: busybox
  selector:
    matchLabels:
      label: busybox-label

~
```

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q12.yaml
deployment.apps/deployment-1 created
[minasafwat@Dell-G5 lab1]$ kubectl get deployments
NAME                READY    UP-TO-DATE    AVAILABLE    AGE
deployment-1        0/3      3             0            6s
[minasafwat@Dell-G5 lab1]$
```

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

Deployment : 1

Replicasets: 2

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl get deployments
NAME                READY    UP-TO-DATE    AVAILABLE    AGE
deployment-1        0/3      3             0            28s
[minasafwat@Dell-G5 lab1]$ kubectl get replicasets
NAME                DESIRED    CURRENT    READY    AGE
deployment-1-68884945f  3          3          0        39s
replica-set-1       3          3          0        10m
[minasafwat@Dell-G5 lab1]$
```

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

zero

```
minasafwat@Dell-G5: ~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl get pods
NAME                                READY   STATUS             RESTARTS   AGE
deployment-1-68884945f-7scmd        0/1     CrashLoopBackOff   3 (44s ago) 118s
deployment-1-68884945f-tfxlb        0/1     Completed           4 (61s ago) 118s
deployment-1-68884945f-zdjp2        0/1     Completed           4 (52s ago) 118s
q2-pod                              1/1     Running             0           28m
```

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

```
minasafwat@Dell-G5: ~/labs/k8s/lab1 — /usr/bin/vim q12.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: deployment-1
spec:
  replicas: 3
  template:
    metadata:
      name: busybox-pod
      labels:
        label: busybox-label
    spec:
      containers:
        - name: busybox
          image: nginx
  selector:
    matchLabels:
      label: busybox-label
~
~
```

```
minasafwat@Dell-G5: ~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ vi q12.yaml
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q12.yaml
deployment.apps/deployment-1 configured
```

```
minasafwat@Dell-G5: ~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-7ddcc89dfc-47c4z      1/1     Running   0           33s
deployment-1-7ddcc89dfc-nrtst      1/1     Running   0           37s
deployment-1-7ddcc89dfc-s6dd5      1/1     Running   0           40s
q2-pod                              1/1     Running   0           31m
```

```
minasafwat@Dell-G5: ~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl get deployments
NAME            READY   UP-TO-DATE   AVAILABLE   AGE
deployment-1    3/3     3            3           5m17s
[minasafwat@Dell-G5 lab1]$
```

All 3 pods are ready now



16- Run `kubectl describe deployment deployment-1` and check events What is the deployment strategy used to upgrade the deployment-1?

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl describe deployment deployment-1
Name: deployment-1
Namespace: default
CreationTimestamp: Sun, 09 Feb 2025 14:55:56 +0200
StrategyType: RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
```

Rolling update

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

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl rollout undo deployment/deployment-1
deployment.apps/deployment-1 rolled back
[minasafwat@Dell-G5 lab1]$ kubectl describe deployment deployment-1
Name: deployment-1
Namespace: default
CreationTimestamp: Sun, 09 Feb 2025 14:55:56 +0200
Labels: <none>
Annotations: deployment.kubernetes.io/revision: 3
Selector: label=busybox-label

Pod Template:
  Labels: label=busybox-label
  Containers:
    busybox:
      Image: busybox
      Port: <none>
      Host Port: <none>
      Environment: <none>
      Mounts: <none>
  Volumes: <none>
  Node-Selectors: <none>
  Tolerations: <none>
Conditions:
  Type           Status  Reason
  ----           -
  Available      True    MinimumReplicasAvailable
  Progressing    True    ReplicaSetUpdated
OldReplicaSets: deployment-1-7ddcc89dfc (3/3 replicas created)
NewReplicaSet:  deployment-1-68884945f (1/1 replicas created)
Events:
```

18- Create a deployment using nginx image with latest tag only and remember to mention tag i.e nginx:latest  
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.

```
minasafwat@Dell-G5:~/labs/k8s/lab1 — /usr/bin/vim q18.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx-app
      type: front-end
  template:
    metadata:
      labels:
        app: nginx-app
        type: front-end
    spec:
      containers:
        - name: nginx-container
          image: nginx:latest
```

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl apply -f q18.yaml
deployment.apps/nginx-deployment created
[minasafwat@Dell-G5 lab1]$ kubectl get deployment
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
deployment-1        3/3     1             3           23m
nginx-deployment    3/3     3             3           20s
[minasafwat@Dell-G5 lab1]$
```

19- How many static pods exist in this cluster?  
Currently 1

```
minasafwat@Dell-G5:~/labs/k8s/lab1
[minasafwat@Dell-G5 lab1]$ kubectl get pods | grep "minikube"
static-pod-minikube 1/1    Running    0           4m8s
[minasafwat@Dell-G5 lab1]$
```

## 20- create a static pod nginx

[illegible]

```
apiVersion: v1
kind: Pod
metadata:
  name: static-pod
spec:
  containers:
  - name: nginx-container
    image: nginx
```

```
minasafwat@Dell-G5:~/labs/k8s/lab1 — minikube ssh x minasafwat@Dell-G5:~/labs/k8s/lab1 x
$ sudo systemctl restart kubelet
$
```

```
[minasafwat@Dell-G5 lab1]$ kubectl delete pod static-pod-minikube  
pod "static-pod-minikube" deleted
```

```
[minasafwat@Dell-G5 lab1]$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
deployment-1-68884945f-dm6dv	0/1	CrashLoopBackOff	12 (30s ago)	24m
deployment-1-7ddcc89dfc-47c4z	1/1	Running	0	32m
deployment-1-7ddcc89dfc-nrtst	1/1	Running	0	32m
deployment-1-7ddcc89dfc-s6dd5	1/1	Running	0	32m
nginx-deployment-69b966d577-5txc6	1/1	Running	0	13m
nginx-deployment-69b966d577-mg7z9	1/1	Running	0	13m
nginx-deployment-69b966d577-vnd7d	1/1	Running	0	13m
q2-pod	1/1	Running	0	63m
q3-pod	1/1	Running	0	61m
replica-set-1-6tcm2	0/1	CrashLoopBackOff	16 (24s ago)	47m
replica-set-1-g2n1m	0/1	CrashLoopBackOff	16 (26s ago)	46m
replica-set-1-qhqj2	0/1	CrashLoopBackOff	16 (29s ago)	44m
static-pod-minikube	0/1	Pending	0	2s

```
[minasafwat@Dell-G5 lab1]$
```