

K8s Day 1 Lab 1

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1- Install k8s cluster (minikube)

```
Administrator: Windows PowerShell
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\WINDOWS\system32> minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured

PS C:\WINDOWS\system32>
```

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

```
Administrator: Windows PowerShell

PS C:\WINDOWS\system32> kubectl run --image=redis redis
pod/redis created
PS C:\WINDOWS\system32> kubectl get pod
NAME      READY   STATUS             RESTARTS   AGE
redis     0/1     ContainerCreating   0           10s

PS C:\WINDOWS\system32>
```

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

4- What is the nginx pod status?

```
Administrator: Windows PowerShell
PS C:\Users\Ibrahim> cd C:\Windows\System32
PS C:\Windows\System32> kubectl apply -f pod.yml
Error from server (BadRequest): error when creating "pod.yml": Pod in version "v1" cannot be handled as a Pod: json: cannot unmarshal object into Go struct field PodSpec.spec.containers of type []v1.Container
PS C:\Windows\System32> kubectl apply -f pod.yml
pod/nginx created
PS C:\Windows\System32> kubectl get pod
NAME      READY   STATUS             RESTARTS   AGE
nginx     0/1     ImagePullBackOff   0           18s
redis     1/1     Running            0           11m

PS C:\Windows\System32>
```

```
C:\WINDOWS\system32> ! pod.yml
1  apiVersion: v1
2  kind: Pod
3  metadata:
4    | name: nginx
5  spec:
6    containers:
7    - name: nginx
8      | image: nginx123
```

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

```
Administrator: Windows PowerShell
PS C:\Windows\System32> kubectl run --image=nginx nginx2
pod/nginx2 created
PS C:\Windows\System32> kubectl get pod
NAME      READY   STATUS    RESTARTS   AGE
nginx     0/1     ImagePullBackOff  0          9m
nginx2    1/1     Running   0          10s
redis     1/1     Running   0          20m
PS C:\Windows\System32> kubectl get pod -o wide
NAME      READY   STATUS    RESTARTS   AGE   IP            NODE       NOMINATED NODE   READINESS GATES
nginx     0/1     ImagePullBackOff  0      9m9s   10.244.0.13   minikube   <none>           <none>
nginx2    1/1     Running   0      19s    10.244.0.14   minikube   <none>           <none>
redis     1/1     Running   0      20m    10.244.0.11   minikube   <none>           <none>
PS C:\Windows\System32>
```

6- How many ReplicaSets exist on the system?

```
PS C:\Windows\System32> kubectl get ReplicaSet
No resources found in default namespace.
```

7- create a ReplicaSet with name= replica-set-1 image= busybox replicas= 3

```
Administrator: Windows PowerShell
PS C:\Windows\System32> code Replica.yml
PS C:\Windows\System32> kubectl apply -f Replica.yml
error: resource mapping not found for name: "replica-set-1" namespace: "" from "Replica.yml": no matches for kind "ReplicaSet" in version "v1"
ensure CRDs are installed first
PS C:\Windows\System32> kubectl apply -f Replica.yml
replicaset.apps/replica-set-1 created
PS C:\Windows\System32> kubectl get ReplicaSet
NAME          DESIRED   CURRENT   READY   AGE
replica-set-1 3         3         2       17s
PS C:\Windows\System32> kubectl get pod
NAME      READY   STATUS    RESTARTS   AGE
nginx     0/1     ImagePullBackOff  0          17m
nginx2    1/1     Running   0          29s
redis     1/1     Running   0          33s
replica-set-1-2pgs4 1/1     Running   0          33s
replica-set-1-fqgrn 1/1     Running   0          33s
replica-set-1-phetr 1/1     Running   0          33s
PS C:\Windows\System32>
```

```
C:\Windows\System32> ! Replica.yml
1  apiVersion: apps/v1
2  kind: ReplicaSet
3  metadata:
4    name: replica-set-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: ["sleep", "3600"]
19
```

8- Scale the ReplicaSet replica-set-1 to 5 PODs.

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

```
PS C:\Windows\System32> kubectl scale ReplicaSet replica-set-1 --replicas=5
replicaset.apps/replica-set-1 scaled
PS C:\Windows\System32> kubectl get pod
NAME                READY   STATUS              RESTARTS   AGE
nginx                0/1     ImagePullBackOff    0           21m
nginx2               1/1     Running              0           12m
redis                1/1     Running              0           32m
replica-set-1-2pgz4  1/1     Running              0           3m55s
replica-set-1-9lr8d  1/1     Running              0           5s
replica-set-1-fhqrn  1/1     Running              0           3m55s
replica-set-1-p4mtr  1/1     Running              0           3m55s
replica-set-1-pnwvz  0/1     ContainerCreating   0           5s
PS C:\Windows\System32> kubectl get pod
NAME                READY   STATUS              RESTARTS   AGE
nginx                0/1     ImagePullBackOff    0           21m
nginx2               1/1     Running              0           12m
redis                1/1     Running              0           32m
replica-set-1-2pgz4  1/1     Running              0           4m
replica-set-1-9lr8d  1/1     Running              0           10s
replica-set-1-fhqrn  1/1     Running              0           4m
replica-set-1-p4mtr  1/1     Running              0           4m
replica-set-1-pnwvz  1/1     Running              0           10s
PS C:\Windows\System32>
```

10- Delete any one of the 5 PODs then check How many PODs exist now? Why are there still 5 PODs, even after you deleted one?

```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> kubectl get pod -l 'app in (nginx,redis)'
NAME                READY   STATUS              RESTARTS   AGE
replica-set-1-2pgz4  1/1     Running              0           10m
replica-set-1-2v77p  1/1     Running              0           3m8s
replica-set-1-9lr8d  1/1     Running              0           6m32s
replica-set-1-fhqrn  1/1     Running              0           10m
replica-set-1-nkrd2  1/1     Running              0           4m16s
PS C:\WINDOWS\system32> kubectl get pod -l 'app in (nginx,redis)'
NAME                READY   STATUS              RESTARTS   AGE
replica-set-1-2pgz4  1/1     Terminating        0           10m
replica-set-1-2v77p  1/1     Running              0           3m35s
replica-set-1-9lr8d  1/1     Running              0           6m59s
replica-set-1-blrww  0/1     ContainerCreating   0           2s
replica-set-1-fhqrn  1/1     Running              0           10m
replica-set-1-nkrd2  1/1     Running              0           4m43s
PS C:\WINDOWS\system32> kubectl get pod -l 'app in (nginx,redis)'
NAME                READY   STATUS              RESTARTS   AGE
replica-set-1-2pgz4  1/1     Terminating        0           10m
replica-set-1-2v77p  1/1     Running              0           3m44s
replica-set-1-9lr8d  1/1     Running              0           7m8s
replica-set-1-blrww  1/1     Running              0           11s
replica-set-1-fhqrn  1/1     Running              0           10m
replica-set-1-nkrd2  1/1     Running              0           4m52s
Administrator: Windows PowerShell
PS C:\Windows\System32> kubectl delete pod replica-set-1-2pgz4
"replica-set-1-2pgz4" deleted
```

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

```
Administrator: Windows PowerShell

PS C:\Windows\System32> kubectl get all
NAME                                READY    STATUS              RESTARTS   AGE
pod/nginx                           0/1      ImagePullBackOff    0           29m
pod/nginx2                           1/1      Running              0           20m
pod/redis                            1/1      Running              0           40m
pod/replica-set-1-2v77p              1/1      Running              0           5m3s
pod/replica-set-1-9lr8d              1/1      Running              0           8m27s
pod/replica-set-1-blrrm              1/1      Running              0           90s
pod/replica-set-1-fhqrn              1/1      Running              0           12m
pod/replica-set-1-nkrd2              1/1      Running              0           6m11s

NAME                                TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
service/kubernetes                  ClusterIP      10.96.0.1     <none>         443/TCP    21h

NAME                                DESIRED    CURRENT    READY    AGE
replicaset.apps/replica-set-1       5          5          5        12m
PS C:\Windows\System32>
```

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

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

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

```
Administrator: Windows PowerShell

PS C:\Windows\System32> code Deployment.yml
PS C:\Windows\System32> kubectl apply -f Deployment.yml
deployment.apps/deployment-1 created
PS C:\Windows\System32> kubectl get Deployment
NAME          READY    UP-TO-DATE    AVAILABLE    AGE
deployment-1  3/3      3             3            9s
PS C:\Windows\System32> kubectl get all
NAME                                READY    STATUS              RESTARTS   AGE
pod/deployment-1-5c684d4858-nq92    1/1      Running           0           82s
pod/deployment-1-5c684d4858-qg5kg    1/1      Running           0           82s
pod/deployment-1-5c684d4858-xd8vn    1/1      Running           0           82s
pod/nginx                           0/1      ImagePullBackOff    0           34m
pod/nginx2                           1/1      Running           0           25m
pod/redis                            1/1      Running           0           46m
pod/replica-set-1-2v77p              1/1      Running           0           18m
pod/replica-set-1-9lr8d              1/1      Running           0           6m31s
pod/replica-set-1-blrrm              1/1      Running           0           17m
pod/replica-set-1-fhqrn              1/1      Running           0           11m

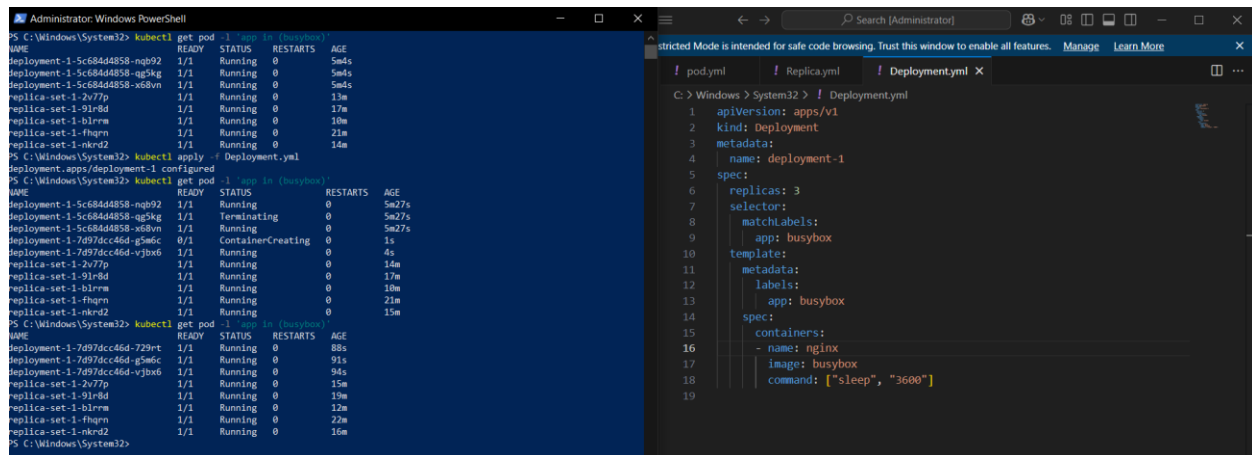
NAME                                TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
service/kubernetes                  ClusterIP      10.96.0.1     <none>         443/TCP    21h

NAME                                READY    UP-TO-DATE    AVAILABLE    AGE
deployment.apps/deployment-1       3/3      3             3            82s

NAME                                DESIRED    CURRENT    READY    AGE
replicaset.apps/deployment-1-5c684d4858  3          3          3        82s
replicaset.apps/replica-set-1       5          5          5        17m
PS C:\Windows\System32> kubectl get pod -l app=busybox
NAME                                READY    STATUS              RESTARTS   AGE
deployment-1-5c684d4858-nq92        1/1      Running           0           2m1s
deployment-1-5c684d4858-qg5kg        1/1      Running           0           2m1s
deployment-1-5c684d4858-xd8vn        1/1      Running           0           2m1s
replica-set-1-2v77p                  1/1      Running           0           14m
replica-set-1-9lr8d                  1/1      Running           0           14m
replica-set-1-blrrm                  1/1      Running           0           7m10s
replica-set-1-fhqrn                  1/1      Running           0           17m
replica-set-1-nkrd2                  1/1      Running           0           11m
```

```
C:\Windows\System32> ! Deployment.yml
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: ["sleep", "3600"]
19
```

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



The screenshot shows two windows. The left window is an Administrator Windows PowerShell terminal running a series of kubectl commands to update deployment-1. The right window is a code editor showing the deployment-1.yaml file with the image updated to nginx.

PowerShell Terminal Output:

```
PS C:\Windows\System32> kubectl get pod -l 'app=kn (busybox)'
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-5c684d4858-qsp92      1/1     Running   0           5s4s
deployment-1-5c684d4858-qg5kg      1/1     Running   0           5s4s
deployment-1-5c684d4858-xc8vn      1/1     Running   0           5s4s
replica-set-1-2v77p                1/1     Running   0           13m
replica-set-1-91r8d                1/1     Running   0           17m
replica-set-1-blrrw                1/1     Running   0           10m
replica-set-1-fhqgn                1/1     Running   0           21m
replica-set-1-nkrd2                1/1     Running   0           14m

PS C:\Windows\System32> kubectl apply -f Deployment.yml
deployment.apps/deployment-1 configured

PS C:\Windows\System32> kubectl get pod -l 'app=kn (busybox)'
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-5c684d4858-qsp92      1/1     Running   0           5s27s
deployment-1-5c684d4858-qg5kg      1/1     Terminating   0           5s27s
deployment-1-5c684d4858-xc8vn      1/1     Running   0           5s27s
deployment-1-7d97dccc46d-g5m6c    0/1     ContainerCreating   0           1s
deployment-1-7d97dccc46d-vjbx6    1/1     Running   0           4s
replica-set-1-2v77p                1/1     Running   0           14m
replica-set-1-91r8d                1/1     Running   0           17m
replica-set-1-blrrw                1/1     Running   0           10m
replica-set-1-fhqgn                1/1     Running   0           21m
replica-set-1-nkrd2                1/1     Running   0           15m

PS C:\Windows\System32> kubectl get pod -l 'app=kn (busybox)'
NAME                                READY   STATUS    RESTARTS   AGE
deployment-1-7d97dccc46d-729et     1/1     Running   0           88s
deployment-1-7d97dccc46d-g5m6c     1/1     Running   0           91s
deployment-1-7d97dccc46d-vjbx6     1/1     Running   0           94s
replica-set-1-2v77p                1/1     Running   0           15m
replica-set-1-91r8d                1/1     Running   0           19m
replica-set-1-blrrw                1/1     Running   0           12m
replica-set-1-fhqgn                1/1     Running   0           22m
replica-set-1-nkrd2                1/1     Running   0           16m

PS C:\Windows\System32>
```

Deployment.yaml File Content:

```
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: nginx
17        image: busybox
18        command: ["sleep", "3600"]
19
```

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

```
Administrator: Windows PowerShell
PS C:\Windows\System32> kubectl describe deployment deployment-1
Name: deployment-1
Namespace: default
CreationTimestamp: Sun, 02 Mar 2025 00:35:02 +0200
Labels: <none>
Annotations: deployment.kubernetes.io/revision: 2
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:
    nginx:
      Image: busybox
      Port: <none>
      Host Port: <none>
      Command:
        sleep
        3600
      Environment: <none>
      Mounts: <none>
      Volumes: <none>
      Node-Selectors: <none>
      Tolerations: <none>
Conditions:
  Type           Status  Reason
  ----           -
  Available      True    MinimumReplicasAvailable
  Progressing    True    NewReplicaSetAvailable
OldReplicaSets: deployment-1-5c684d4858 (0/0 replicas created)
NewReplicaSet: deployment-1-7d97dcc46d (3/3 replicas created)
Events:
  Type           Reason             Age           From             Message
  ----           -
  Normal         ScalingReplicaSet   8m7s         deployment-controller Scaled up replica set deployment-1-5c684d4858 from 0 to 3
  Normal         ScalingReplicaSet   2m44s        deployment-controller Scaled up replica set deployment-1-7d97dcc46d from 0 to 1
  Normal         ScalingReplicaSet   2m41s        deployment-controller Scaled down replica set deployment-1-5c684d4858 from 3 to 2
  Normal         ScalingReplicaSet   2m41s        deployment-controller Scaled up replica set deployment-1-7d97dcc46d from 1 to 2
  Normal         ScalingReplicaSet   2m38s        deployment-controller Scaled down replica set deployment-1-5c684d4858 from 2 to 1
  Normal         ScalingReplicaSet   2m38s        deployment-controller Scaled up replica set deployment-1-7d97dcc46d from 2 to 3
  Normal         ScalingReplicaSet   2m35s        deployment-controller Scaled down replica set deployment-1-5c684d4858 from 1 to 0
PS C:\Windows\System32>
```

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

```
Administrator: Windows PowerShell
PS C:\Windows\System32> kubectl rollout history deployment/deployment-1
deployment.apps/deployment-1
REVISION  CHANGE-CAUSE
1          <none>
2          <none>

PS C:\Windows\System32> kubectl rollout undo deployment/deployment-1
deployment.apps/deployment-1 rolled back
PS C:\Windows\System32> kubectl describe deployment deployment-1
Name:          deployment-1
Namespace:     default
CreationTimestamp: Sun, 02 Mar 2025 00:35:02 +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:
        sleep
```

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

```
Administrator: Windows PowerShell
PS C:\Windows\System32> code Deployment2.yml
PS C:\Windows\System32> kubectl apply -f Deployment2.yml
deployment.apps/nginx-deployment created
PS C:\Windows\System32> kubectl get deployment
NAME          READY  UP-TO-DATE  AVAILABLE  AGE
deployment-1  3/3    3           3          18m
nginx-deployment  3/3    3           3          18s
PS C:\Windows\System32> kubectl get pod -l 'app in (nginx-app)'
NAME          READY  STATUS    RESTARTS  AGE
nginx-deployment-69b966d577-d2z57  1/1    Running   0          38s
nginx-deployment-69b966d577-g8cmk  1/1    Running   0          38s
nginx-deployment-69b966d577-g8bx2  1/1    Running   0          38s
PS C:\Windows\System32> kubectl get pod -l 'app in (nginx-app)' -type In (Front-end)'
NAME          READY  STATUS    RESTARTS  AGE
nginx-deployment-69b966d577-d2z57  1/1    Running   0          56s
nginx-deployment-69b966d577-g8cmk  1/1    Running   0          56s
nginx-deployment-69b966d577-g8bx2  1/1    Running   0          56s
PS C:\Windows\System32>
```

```
C:\Windows\System32> Deployment2.yml
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
```