Deployment Extra

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Deployment

- 3 Pods running already using label "run:nginx"
- 4 replicas desired with deployment
  - Using same labels "run: nginx" --> for deployment, existing pods

Output:
- Deployment is not touch existing pods
- Creating 4 pods + 1 RS
- Labeled "pod-template-hash"

```
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME           READY    STATUS     RESTARTS   AGE    LABELS
nginx          1/1      Running    0          81m    app=nginx,locatioin=in,tier=frontend
nginx-prod     1/1      Running    0          93m    app=nginx,environment=production
nginx-qa       1/1      Running    0          93m    app=nginx,environment=qa
[root@k8s-master day3]# kubectl  get rs
No resources found in default namespace.
[root@k8s-master day3]# kubectl  get deployments.apps
No resources found in default namespace.
[root@k8s-master day3]# cat deployment.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  creationTimestamp: null
  labels:
    run: nginx
  name: nginx-deploy
spec:
  replicas: 4
  selector:
    matchLabels:
      run: nginx
  strategy: {}
  template:
    metadata:
      creationTimestamp: null
      labels:
        run: nginx
    spec:
      containers:
      - image: nginx
        name: nginx
        resources: {}
status: {}
[root@k8s-master day3]# kubectl  apply -f deployment.yaml
deployment.apps/nginx-deploy created
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME                           READY    STATUS             RESTARTS   AGE    LABELS
nginx                          1/1      Running            0          83m    app=nginx,locatioin=in,tier=frontend
nginx-deploy-598b589c46-55rvb  0/1      ContainerCreating  0          4s     pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-7j4rc  0/1      ContainerCreating  0          4s     pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-jh7n8  0/1      ContainerCreating  0          4s     pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-mbjzm  0/1      ContainerCreating  0          4s     pod-template-hash=598b589c46,run=nginx
nginx-prod                     1/1      Running            0          95m    app=nginx,environment=production
nginx-qa                       1/1      Running            0          95m    app=nginx,environment=qa
[root@k8s-master day3]#
```

```
[root@k8s-master day3]# kubectl  apply -f deployment.yaml
deployment.apps/nginx-deploy created
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME                           READY    STATUS             RESTARTS   AGE    LABELS
nginx                          1/1      Running            0          83m    app=nginx,locatioin=in,tier=frontend
nginx-deploy-598b589c46-55rvb  0/1      ContainerCreating  0          4s     pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-7j4rc  0/1      ContainerCreating  0          4s     pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-jh7n8  0/1      ContainerCreating  0          4s     pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-mbjzm  0/1      ContainerCreating  0          4s     pod-template-hash=598b589c46,run=nginx
nginx-prod                     1/1      Running            0          95m    app=nginx,environment=production
nginx-qa                       1/1      Running            0          95m    app=nginx,environment=qa
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME                           READY    STATUS     RESTARTS   AGE      LABELS
nginx                          1/1      Running    0          86m      app=nginx,locatioin=in,tier=frontend
nginx-deploy-598b589c46-55rvb  1/1      Running    0          2m51s    pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-7j4rc  1/1      Running    0          2m51s    pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-jh7n8  1/1      Running    0          2m51s    pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-mbjzm  1/1      Running    0          2m51s    pod-template-hash=598b589c46,run=nginx
nginx-prod                     1/1      Running    0          98m      app=nginx,environment=production
nginx-qa                       1/1      Running    0          98m      app=nginx,environment=qa
[root@k8s-master day3]#
```

Replicaset

► Creating new replicaset using the same label we have used for existing replica (created by deployment in above step) "run: nginx"

```
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME                               READY   STATUS    RESTARTS   AGE    LABELS
nginx                              1/1     Running   0          87m    app=nginx,locatioin=in,tier=frontend
nginx-deploy-598b589c46-55rvb      1/1     Running   0          4m24s  pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-7j4rc      1/1     Running   0          4m24s  pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-jh7n8      1/1     Running   0          4m24s  pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-mbjzm      1/1     Running   0          4m24s  pod-template-hash=598b589c46,run=nginx
nginx-prod                         1/1     Running   0          100m   app=nginx,environment=production
nginx-qa                           1/1     Running   0          100m   app=nginx,environment=qa
[root@k8s-master day3]# kubectl get deployments.apps --show-labels
NAME            READY   UP-TO-DATE   AVAILABLE   AGE     LABELS
nginx-deploy    4/4     4            4           4m36s   run=nginx
[root@k8s-master day3]# kubectl get rs --show-labels
NAME                     DESIRED   CURRENT   READY   AGE      LABELS
nginx-deploy-598b589c46  4         4         4       4m45s    pod-template-hash=598b589c46,run=nginx
[root@k8s-master day3]# cat replicaset.yaml
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  labels:
    run: nginx
  name: nginx-replicaset
spec:
  replicas: 4
  selector:
    matchLabels:
      run: nginx
  template:
    metadata:
      labels:
        run: nginx
    spec:
      containers:
      - image: nginx
        name: nginx
[root@k8s-master day3]# 
```

```
[root@k8s-master day3]# kubectl  create -f replicaset.yaml
replicaset.apps/nginx-replicaset created
[root@k8s-master day3]# kubectl  get replicasets.apps -w
NAME                     DESIRED   CURRENT   READY   AGE
nginx-deploy-598b589c46  4         4         4       10m
nginx-replicaset         0         0         0       8s
^C[root@k8s-master day3]#
[root@k8s-master day3]# kubectl get deployments.apps --show-labels
NAME            READY   UP-TO-DATE   AVAILABLE   AGE     LABELS
nginx-deploy    4/4     4            4           12m     run=nginx
[root@k8s-master day3]# kubectl  get replicasets.apps --show-labels
NAME                     DESIRED   CURRENT   READY   AGE     LABELS
nginx-deploy-598b589c46  4         4         4       12m     pod-template-hash=598b589c46,run=nginx
nginx-replicaset         0         0         0       2m11s   run=nginx
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME                               READY   STATUS    RESTARTS   AGE    LABELS
nginx                              1/1     Running   0          96m    app=nginx,locatioin=in,tier=frontend
nginx-deploy-598b589c46-55rvb      1/1     Running   0          12m    pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-7j4rc      1/1     Running   0          12m    pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-jh7n8      1/1     Running   0          12m    pod-template-hash=598b589c46,run=nginx
nginx-deploy-598b589c46-mbjzm      1/1     Running   0          12m    pod-template-hash=598b589c46,run=nginx
nginx-prod                         1/1     Running   0          108m   app=nginx,environment=production
nginx-qa                           1/1     Running   0          108m   app=nginx,environment=qa
[root@k8s-master day3]# 
```

Output:
► Replicaset tried to create 4 (replicas) pods but couldn't
  ○ Replicaset we created using same labels is also controlled by deployment - because of labels (run: nginx)

```
[root@k8s-master day3]# kubectl  describe rs nginx-replicaset
Name:           nginx-replicaset
Namespace:      default
Selector:       run=nginx
Labels:         run=nginx
Annotations:    deployment.kubernetes.io/desired-replicas: 4
                deployment.kubernetes.io/max-replicas: 5
Controlled By:  Deployment/nginx-deploy
Replicas:       0 current / 0 desired
Pods Status:    0 Running / 0 Waiting / 0 Succeeded / 0 Failed
Pod Template:
  Labels:  run=nginx
  Containers:
   nginx:
    Image:        nginx
    Port:         <none>
    Host Port:    <none>
    Environment:  <none>
    Mounts:       <none>
  Volumes:        <none>
Events:
  Type     Reason            Age     From                   Message
  ----     ------            ----    ----                   -------
  Normal   SuccessfulCreate  5m20s   replicaset-controller  Created pod: nginx-replicaset-czwsv
  Normal   SuccessfulCreate  5m20s   replicaset-controller  Created pod: nginx-replicaset-5zh5n
  Normal   SuccessfulCreate  5m20s   replicaset-controller  Created pod: nginx-replicaset-5nqzk
  Normal   SuccessfulCreate  5m20s   replicaset-controller  Created pod: nginx-replicaset-bd6dz
  Normal   SuccessfulDelete  5m20s   replicaset-controller  Deleted pod: nginx-replicaset-bd6dz
  Normal   SuccessfulDelete  5m20s   replicaset-controller  Deleted pod: nginx-replicaset-czwsv
  Normal   SuccessfulDelete  5m20s   replicaset-controller  Deleted pod: nginx-replicaset-5nqzk
  Normal   SuccessfulDelete  5m20s   replicaset-controller  Deleted pod: nginx-replicaset-5zh5n
[root@k8s-master day3]# 
```

► **DELETING DEPLOYMENT'S CREATED REPLICASET**

- Replicaset which we created using same lable (run: nginx) is now only RS under deployment NOW
  - So deployment created // scaled up (new) pods under "nginx -replicaset" deployment, as per the specifications mentioned in replicaset definition

```
[root@k8s-master day3]# kubectl get deployments.apps --show-labels
NAME            READY   UP-TO-DATE   AVAILABLE   AGE    LABELS
nginx-deploy    4/4     4            4           18m    run=nginx
[root@k8s-master day3]# kubectl  get replicasets.apps --show-labels
NAME                     DESIRED   CURRENT   READY   AGE    LABELS
nginx-deploy-598b589c46  4         4         4       18m    pod-template-hash=598b589c46,run=nginx
nginx-replicaset         0         0         0       8m19s  run=nginx
[root@k8s-master day3]# ### try to delete system generated replica (created by deployment)
[root@k8s-master day3]# kubectl delete rs nginx-deploy-598b589c46
replicaset.apps "nginx-deploy-598b589c46" deleted
[root@k8s-master day3]# kubectl get deployments.apps --show-labels
NAME            READY   UP-TO-DATE   AVAILABLE   AGE    LABELS
nginx-deploy    4/4     4            4           23m    run=nginx
[root@k8s-master day3]# kubectl  get replicasets.apps --show-labels
NAME                 DESIRED   CURRENT   READY   AGE    LABELS
nginx-replicaset     4         4         4       13m    run=nginx
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME                     READY   STATUS    RESTARTS   AGE     LABELS
nginx                    1/1     Running   0          106m    app=nginx,locatioin=in,tier=frontend
nginx-prod               1/1     Running   0          119m    app=nginx,environment=production
nginx-qa                 1/1     Running   0          119m    app=nginx,environment=qa
nginx-replicaset-8mgp7   1/1     Running   0          3m18s   run=nginx
nginx-replicaset-mwcrf   1/1     Running   0          3m18s   run=nginx
nginx-replicaset-t7xn5   1/1     Running   0          3m18s   run=nginx
nginx-replicaset-x9qhg   1/1     Running   0          3m18s   run=nginx
[root@k8s-master day3]#
```

```
[root@k8s-master day3]# kubectl  describe  deployments.apps nginx-deploy
Name:                   nginx-deploy
Namespace:              default
CreationTimestamp:      Wed, 06 Jan 2021 09:26:22 -0500
Labels:                 run=nginx
Annotations:            deployment.kubernetes.io/revision: 1
Selector:               run=nginx
Replicas:               4 desired | 4 updated | 4 total | 4 available | 0 unavailable
StrategyType:           RollingUpdate
MinReadySeconds:        0
RollingUpdateStrategy:  25% max unavailable, 25% max surge
Pod Template:
  Labels:  run=nginx
  Containers:
   nginx:
    Image:        nginx
    Port:         <none>
    Host Port:    <none>
    Environment:  <none>
    Mounts:       <none>
  Volumes:        <none>
Conditions:
  Type         Status  Reason
  ----         ------  ------
  Progressing  True    NewReplicaSetAvailable
  Available    True    MinimumReplicasAvailable
OldReplicaSets:  <none>
NewReplicaSet:   nginx-replicaset (4/4 replicas created)
Events:
  Type    Reason             Age     From                    Message
  ----    ------             ----    ----                    -------
  Normal  ScalingReplicaSet  28m     deployment-controller   Scaled up replica set nginx-deploy-598b589c46 to 4
  Normal  ScalingReplicaSet  17m     deployment-controller   Scaled down replica set nginx-replicaset to 0
  Normal  ScalingReplicaSet  7m49s   deployment-controller   Scaled up replica set nginx-replicaset to 4
[root@k8s-master day3]#
```

Conclusion:

> The **pod-template-hash** label is added by the Deployment controller to every ReplicaSet that a Deployment creates or adopts. This label ensures that child ReplicaSets of a Deployment do not overlap. Dec 8, 2020
>
> kubernetes.io › workloads › controllers › deployment
> Deployments | Kubernetes

Rolling Strategy

```
[root@k8s-master day3]# kubectl get deployments.apps
NAME              READY   UP-TO-DATE   AVAILABLE   AGE
nginx-mydeploy    4/4     4            4           5m7s
[root@k8s-master day3]# kubectl  get rs
NAME                        DESIRED   CURRENT   READY   AGE
nginx-mydeploy-75577696bd   4         4         4       5m9s
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME                              READY   STATUS    RESTARTS   AGE     LABELS
nginx                             1/1     Running   0          150m    app=nginx,locatioin=in,tier=frontend
nginx-mydeploy-75577696bd-2fwsk   1/1     Running   0          5m16s   pod-template-hash=75577696bd,run=mynginx
nginx-mydeploy-75577696bd-4c7sf   1/1     Running   0          5m16s   pod-template-hash=75577696bd,run=mynginx
nginx-mydeploy-75577696bd-jbx2z   1/1     Running   0          5m16s   pod-template-hash=75577696bd,run=mynginx
nginx-mydeploy-75577696bd-tc5nq   1/1     Running   0          5m16s   pod-template-hash=75577696bd,run=mynginx
nginx-prod                        1/1     Running   0          163m    app=nginx,environment=production
nginx-qa                          1/1     Running   0          163m    app=nginx,environment=qa
```

```
[root@k8s-master day3]# kubectl  describe deployments.apps nginx-mydeploy
Name:                   nginx-mydeploy
Namespace:              default
CreationTimestamp:      Wed, 06 Jan 2021 10:28:42 -0500
Labels:                 run=mynginx
Annotations:            deployment.kubernetes.io/revision: 1
Selector:               run=mynginx
Replicas:               4 desired | 4 updated | 4 total | 4 available | 0 unavailable
StrategyType:           RollingUpdate
MinReadySeconds:        0
RollingUpdateStrategy:  25% max unavailable, 25% max surge
Pod Template:
  Labels:  run=mynginx
  Containers:
   nginx:
    Image:         nginx
    Port:          <none>
    Host Port:     <none>
    Environment:   <none>
    Mounts:        <none>
  Volumes:         <none>
Conditions:
  Type           Status  Reason
  ----           ------  ------
  Available      True    MinimumReplicasAvailable
  Progressing    True    NewReplicaSetAvailable
OldReplicaSets:  <none>
NewReplicaSet:   nginx-mydeploy-75577696bd (4/4 replicas created)
Events:
  Type    Reason            Age   From                  Message
  ----    ------            ----  ----                  -------
  Normal  ScalingReplicaSet  6m9s  deployment-controller  Scaled up replica set nginx-mydeploy-75577696bd to 4
[root@k8s-master day3]#
```

- **Updated code/image deployment**

```
[root@k8s-master day3]# kubectl  get deployments.apps
NAME            READY   UP-TO-DATE   AVAILABLE   AGE
nginx-mydeploy  4/4     4            4           10m
[root@k8s-master day3]# kubectl set image deployment/nginx-mydeploy nginx=nginx:1.16.1 --record
deployment.apps/nginx-mydeploy image updated
[root@k8s-master day3]# kubectl  rollout status deployment/nginx-mydeploy
Waiting for deployment "nginx-mydeploy" rollout to finish: 2 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 2 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 2 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 2 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 2 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 3 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 3 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 3 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 3 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 3 out of 4 new replicas have been updated...
Waiting for deployment "nginx-mydeploy" rollout to finish: 1 old replicas are pending termination...
Waiting for deployment "nginx-mydeploy" rollout to finish: 1 old replicas are pending termination...
Waiting for deployment "nginx-mydeploy" rollout to finish: 1 old replicas are pending termination...
Waiting for deployment "nginx-mydeploy" rollout to finish: 3 of 4 updated replicas are available...
deployment "nginx-mydeploy" successfully rolled out
[root@k8s-master day3]#
```

- Deployment created new pods with new image/code

```
[root@k8s-master day3]# kubectl  get pods --show-labels
NAME                            READY   STATUS    RESTARTS   AGE    LABELS
nginx                           1/1     Running   0          158m   app=nginx,locatioin=in,tier=frontend
nginx-mydeploy-6b4bc7c9df-2flgw 1/1     Running   0          98s    pod-template-hash=6b4bc7c9df,run=mynginx
nginx-mydeploy-6b4bc7c9df-bgq9q 1/1     Running   0          104s   pod-template-hash=6b4bc7c9df,run=mynginx
nginx-mydeploy-6b4bc7c9df-npl42 1/1     Running   0          2m10s  pod-template-hash=6b4bc7c9df,run=mynginx
nginx-mydeploy-6b4bc7c9df-r8pt4 1/1     Running   0          2m10s  pod-template-hash=6b4bc7c9df,run=mynginx
nginx-prod                      1/1     Running   0          170m   app=nginx,environment=production
nginx-qa                        1/1     Running   0          170m   app=nginx,environment=qa
[root@k8s-master day3]#

[root@k8s-master day3]# kubectl  describe  pod nginx-mydeploy-6b4bc7c9df-2flgw
Name:         nginx-mydeploy-6b4bc7c9df-2flgw
Namespace:    default
Priority:     0
Node:         worker3/192.168.1.64
Start Time:   Wed, 06 Jan 2021 10:37:00 -0500
Labels:       pod-template-hash=6b4bc7c9df
              run=mynginx
Annotations:  <none>
Status:       Running
IP:           192.168.3.89
IPs:
  IP:           192.168.3.89
Controlled By:  ReplicaSet/nginx-mydeploy-6b4bc7c9df
Containers:
  nginx:
    Container ID:   docker://7706855fb2a0d301d39df1ed56cc61f4b497eb5fc39d1b60e6e5d96acaf32477
    Image:          nginx:1.16.1
    Image ID:       docker-pullable://nginx@sha256:d20aa6d1cae56fd17cd458f4807e0de462caf2336f0b70b5eeb69fcaaf30dd9c
    Port:           <none>
```

```
[root@k8s-master day3]# kubectl  get deployments.apps
NAME              READY   UP-TO-DATE   AVAILABLE   AGE
nginx-mydeploy    4/4     4            4           21m
[root@k8s-master day3]# kubectl edit deployments.apps
deployment.apps/nginx-mydeploy edited
[root@k8s-master day3]# kubectl  get pods -w
NAME                              READY   STATUS    RESTARTS   AGE
nginx                             1/1     Running   0          168m
nginx-mydeploy-6b4bc7c9df-2flgw   1/1     Running   0          12m
nginx-mydeploy-6b4bc7c9df-bgq9q   1/1     Running   0          12m
nginx-mydeploy-6b4bc7c9df-npl42   1/1     Running   0          12m
nginx-mydeploy-6b4bc7c9df-r8pt4   1/1     Running   0          12m
nginx-prod                        1/1     Running   0          3h1m
nginx-qa                          1/1     Running   0          3h1m
```

```
apiVersion: apps/v1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "2"
    kubernetes.io/change-cause: kubectl set image deployment/nginx-mydeploy nginx=nginx:1.16.1
      --record=true
  creationTimestamp: "2021-01-06T15:28:42Z"
  generation: 2
  labels:
    run: mynginx
  name: nginx-mydeploy
  namespace: default
  resourceVersion: "71862"
  uid: a3aacd2b-6137-4eea-b57d-c8642bd429bb
spec:
  progressDeadlineSeconds: 600
  replicas: 4
  revisionHistoryLimit: 10
  selector:
    matchLabels:
      run: mynginx
  strategy:
#   rollingUpdate:
#     maxSurge: 25%
#     maxUnavailable: 25%
    #type: RollingUpdate
    type: Recreate
  template:
    metadata:
      creationTimestamp: null
      labels:
        run: mynginx
```

```
[root@k8s-master day3]# kubectl describe deployments.apps nginx-mydeploy
Name:                   nginx-mydeploy
Namespace:              default
CreationTimestamp:      Wed, 06 Jan 2021 10:28:42 -0500
Labels:                 run=mynginx
Annotations:            deployment.kubernetes.io/revision: 2
                        kubernetes.io/change-cause: kubectl set image deployment/nginx-mydeploy nginx=nginx:1.16.1 --record=true
Selector:               run=mynginx
Replicas:               4 desired | 4 updated | 4 total | 4 available | 0 unavailable
StrategyType:           Recreate
MinReadySeconds:        0
Pod Template:
  Labels:  run=mynginx
  Containers:
   nginx:
    Image:        nginx:1.16.1
    Port:         <none>
    Host Port:    <none>
```