1.1 Deployment 实验

1.1.1 运行第一个 Deployment

步骤 1　输入命令创建一个 Deployment

```
[root@k8s-master /]# kubectl create deployment mydep  --image=nginx
```

步骤 2　查看 Deployment

```
[root@k8s-master /]# kubectl get deployment
```

或者

```
[root@k8s-master /]# kubectl get deploy
```

```
NAME    READY   UP-TO-DATE   AVAILABLE   AGE
mydep   1/1     1            1           65s
```

1.1.2 使用 kubectl 命令行工具

步骤 1　使用 kubectl get 命令。

get all 可以查看所有对象。

```
[root@k8s-master /]# kubectl get all
```

查看指定 namespace 的对象：

```
[root@k8s-master /]# kubectl get all --namespace=kube-system
```

或者

```
[root@k8s-master /]# kubectl get all -n kube-system
```

以交互模式观察对象的变化：

```
[root@k8s-master /]# kubectl get deployment --watch
```

或者

```
[root@k8s-master /]# kubectl get deployment -w
```

按 ctrl+c 退出交互模式

查看更为完整的对象信息：

```
[root@k8s-master /]# kubectl get deployment -o wide
```

步骤 2　使用 kubectl help 命令

使用如下命令查看 kubectl 中可用的[COMMAND]

```
[root@k8s-master /]# kubectl --help
```

使用如下命令查看 kubectl 中 get 命令的详细说明，使用样例：

```
[root@k8s-master /]# kubectl get --help
```

步骤 3　使用 kubectl describe 命令查看资源对象的详细信息

```
[root@k8s-master /]# kubectl describe deployment mydep
```

回显示例

```
Name:                   mydep
Namespace:              default
CreationTimestamp:      Fri, 28 Jun 2019 14:17:51 +0800
Labels:                 app=mydep
Annotations:            deployment.kubernetes.io/revision: 1
Selector:               app=mydep
Replicas:               1 desired | 1 updated | 1 total | 1 available | 0
unavailable
StrategyType:           RollingUpdate
MinReadySeconds:        0
RollingUpdateStrategy:  25% max unavailable, 25% max surge
Pod Template:
  Labels:  app=mydep
  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:   mydep-65bbdb4c9f (1/1 replicas created)
Events:
  Type    Reason             Age   From                   Message
  ----    ------             ----  ----                   -------
  Normal  ScalingReplicaSet  34m   deployment-controller  Scaled up replica
set mydep-65bbdb4c9f to 1
```

1.1.3 创建 Deployment

步骤 1 在 master 节点创建/labfile/deployfile 目录，用于保存配置文件。后续创建 deployment 的 yaml 文件保存在此处。

```
[root@k8s-master /]# cd /
[root@k8s-master /]# mkdir labfile
[root@k8s-master /]# cd labfile/
[root@k8s-master labfile]# mkdir deployfile
[root@k8s-master labfile]# cd deployfile/
```

步骤 2 创建 deployment 文件

```
[root@k8s-master deployfile]# vim nginx-deployment.yaml
```

文件内容如下

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.7.9
        ports:
        - containerPort: 80
```

步骤 3 部署该 nginx-deployment

```
[root@k8s-master deployfile]# kubectl apply -f nginx-deployment.yaml
```

步骤 4 查看创建结果

```
[root@k8s-master deployfile]# kubectl describe deploymentc 的
[root@k8s-master deployfile]# kubectl get deployment
```

步骤 5 查看 replicaset

```
[root@k8s-master deployfile]# kubectl get replicaset
NAME                          DESIRED   CURRENT   READY   AGE
nginx-deployment-6dd86d77d    3         3         3       33m
```

步骤 6　查看 Pod（等待约 2min，才会显示 Running 状态）

```
[root@k8s-master deployfile]# kubectl get pod
NAME                                READY   STATUS    RESTARTS   AGE
nginx-deployment-6dd86d77d-cl2wh    1/1     Running   0          34m
nginx-deployment-6dd86d77d-llnb8    1/1     Running   0          34m
nginx-deployment-6dd86d77d-sjmmd    1/1     Running   0          34m
```

1.1.4 弹性伸缩 Deployment

步骤 1　编辑之前创建的 nginx-deployment.yaml 文件，将副本数量“replicas”改为 5。

```
[root@k8s-master deployfile]# vim nginx-deployment.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 5
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.7.9
        ports:
        - containerPort: 80
```

步骤 2　应用变更后的文件 yaml 文件。

```
[root@k8s-master deployfile]# kubectl apply -f nginx-deployment.yaml
```

步骤 3　查看 pod 状态。

```
[root@k8s-master deployfile]# kubectl get pod
```

确认 Pod 数量是否正确。

1.1.5 滚动升级 deployment

步骤 1 复制 nginx-deployment.yaml 文件为两个新版本。

```
[root@k8s-master deployfile]# cp nginx-deployment.yaml nginx-deployment-v2.yaml
[root@k8s-master deployfile]# cp nginx-deployment.yaml nginx-deployment-v3.yaml
```

步骤 2 修改 v2 和 v3 的 yaml 文件中镜像版本为 1.8.1 和 1.9.1

```
[root@k8s-master deployfile]# vim nginx-deployment-v2.yaml
```

```
……
spec:
     containers:
     - name: nginx
       image: nginx:1.8.1
……
[root@k8s-master deployfile]# vim nginx-deployment-v3.yaml
……
spec:
     containers:
     - name: nginx
       image: nginx:1.9.1
……
```

步骤 3 进行滚动更新

```
[root@k8s-master deployfile]# kubectl apply -f nginx-deployment-v2.yaml --
record
```

使用 get 命令查看更新状态（等待 10min 左右，能看到如图状态）

```
[root@k8s-master deployfile]# kubectl get deployment -o wide
```

可以看到镜像版本已变为 1.8.1

NAME	READY	UP-TO-DATE	AVAILABLE	AGE	CONTAINERS	IMAGES	SELECTOR
nginx-deployment	5/5	5	5	94m	nginx	nginx:1.8.1	app=nginx

查看 replicaset，可以发现出现了一个新的 replicaset，里面有 5 个 Pod，而原有的 replicaset 中没有 pod 存在。

```
[root@k8s-master deployfile]# kubectl get replicaset
```

NAME	DESIRED	CURRENT	READY	AGE
nginx-deployment-59988f74c7	0	0	0	17m
nginx-deployment-784b7cc96d	5	5	5	5m53s

查看 deployment 更新事件：

```
[root@k8s-master deployfile]# kubectl describe deployment
```

```
Events:
  Type    Reason             Age                  From                   Message
  ----    ------             ----                 ----                   -------
  Normal  ScalingReplicaSet  20m (x2 over 67m)    deployment-controller  Scaled up replica set nginx-deployment-6dd86d77d to 5
  Normal  ScalingReplicaSet  20m                  deployment-controller  Scaled up replica set nginx-deployment-59988f74c7 to 2
  Normal  ScalingReplicaSet  20m                  deployment-controller  Scaled down replica set nginx-deployment-6dd86d77d to 4
  Normal  ScalingReplicaSet  20m                  deployment-controller  Scaled up replica set nginx-deployment-59988f74c7 to 3
  Normal  ScalingReplicaSet  17m (x2 over 63m)    deployment-controller  Scaled down replica set nginx-deployment-6dd86d77d to 3
  Normal  ScalingReplicaSet  17m                  deployment-controller  Scaled up replica set nginx-deployment-59988f74c7 to 4
  Normal  ScalingReplicaSet  17m                  deployment-controller  Scaled down replica set nginx-deployment-6dd86d77d to 2
  Normal  ScalingReplicaSet  17m                  deployment-controller  Scaled up replica set nginx-deployment-59988f74c7 to 5
  Normal  ScalingReplicaSet  17m                  deployment-controller  Scaled down replica set nginx-deployment-6dd86d77d to 1
  Normal  ScalingReplicaSet  8m44s (x10 over 17m)  deployment-controller  (combined from similar events): Scaled down replica set
```

更新到 v3 版本

```
[root@k8s-master deployfile]# kubectl apply -f nginx-deployment-v3.yaml --
record
```

步骤 4 查看 deployment 的更新记录

```
[root@k8s-master deployfile]# kubectl rollout history deployment nginx-
deployment
```

```
deployment.extensions/nginx-deployment
REVISION  CHANGE-CAUSE
1         <none>
2         kubectl apply --filename=nginx-deployment-v2.yaml --record=true
3         kubectl apply --filename=nginx-deployment-v3.yaml --record=true
```

步骤 5 查看历史版本 2 的详细信息

```
[root@k8s-master deployfile]# kubectl rollout history deployment nginx-
deployment --revision=2
```

```
deployment.extensions/nginx-deployment with revision #2
Pod Template:
  Labels:       app=nginx
        pod-template-hash=59988f74c7
  Annotations:  kubernetes.io/change-cause: kubectl apply --filename=nginx-
deployment-v2.yaml --record=true
  Containers:
   nginx:
    Image:      nginx:1.8.1
    Port:       80/TCP
    Host Port:  0/TCP
    Environment:        <none>
    Mounts:     <none>
  Volumes:      <none>
```

步骤 6 回滚到历史版本 2

```
[root@k8s-master deployfile]# kubectl rollout undo deployment nginx-deployment
--to-revision=2
```

查看当前 deployment 版本信息

```
[root@k8s-master deployfile]# kubectl get deployment -o wide
NAME               READY   UP-TO-DATE   AVAILABLE   AGE    CONTAINERS   IMAGES         SELECTOR
nginx-deployment   5/5     5            5           128m   nginx        nginx:1.8.1    app=nginx
```

步骤 7　删除 deployment

```
[root@k8s-master podfile]# kubectl delete deployment nginx-deployment
```