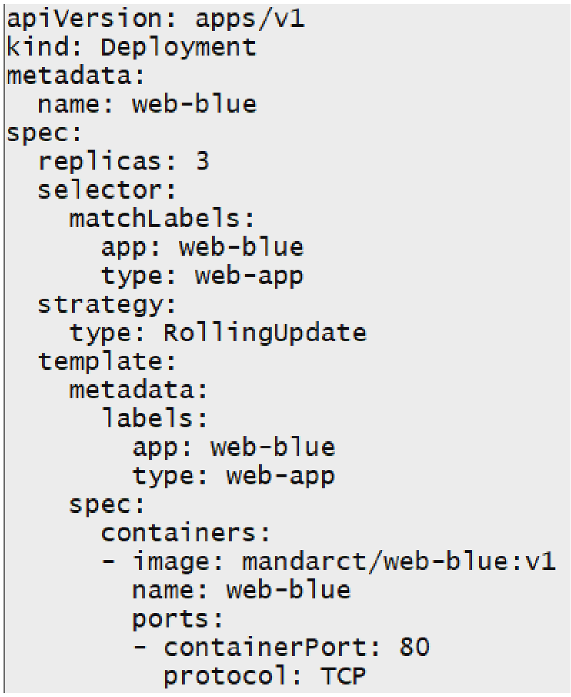
Canary Deployment on Kubernetes

Create a deployment using below yaml to deploy pods for our web-blue app

```
vi web-blue.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: web-blue
spec:
  replicas: 3
  selector:
    matchLabels:
      app: web-blue
      type: web-app
  strategy:
    type: RollingUpdate
  template:
    metadata:
      labels:
        app: web-blue
        type: web-app
    spec:
      containers:
      - image: mandarct/web-blue:v1
        name: web-blue
        ports:
        - containerPort: 80
          protocol: TCP
```



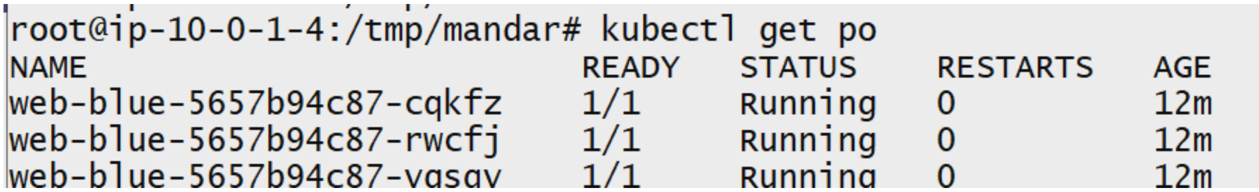
```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: web-blue
spec:
  replicas: 3
  selector:
    matchLabels:
      app: web-blue
      type: web-app
  strategy:
    type: RollingUpdate
  template:
    metadata:
      labels:
        app: web-blue
        type: web-app
    spec:
      containers:
      - image: mandarct/web-blue:v1
        name: web-blue
        ports:
        - containerPort: 80
          protocol: TCP
```

Deploy the above deployment to the Kubernetes cluster in the default namespace

```
kubectl apply -f web-blue.yaml
```

Verify that pods are running

```
kubectl get po

NAME                         READY   STATUS    RESTARTS   AGE
web-blue-5657b94c87-cqkfz    1/1     Running   0          12m
web-blue-5657b94c87-rwcfj    1/1     Running   0          12m
web-blue-5657b94c87-vgsqv    1/1     Running   0          12m
```



```
root@ip-10-0-1-4:/tmp/mandar# kubectl get po
NAME                         READY   STATUS    RESTARTS   AGE
web-blue-5657b94c87-cqkfz    1/1     Running   0          12m
web-blue-5657b94c87-rwcfj    1/1     Running   0          12m
web-blue-5657b94c87-vgsqv    1/1     Running   0          12m
```

Create a service of type Load-balancer to expose above deployment using below yaml

vi svc-web-lb.yaml

```
apiVersion: v1
kind: Service
metadata:
  name: web-app-svc-lb
spec:
  ports:
  - port: 80
    protocol: TCP
    targetPort: 80
  selector:
    type: web-app
  type: LoadBalancer
  ports:
   - port: 80
     targetPort: 80
```

Deploy this Load-Balancer service to the default namespace

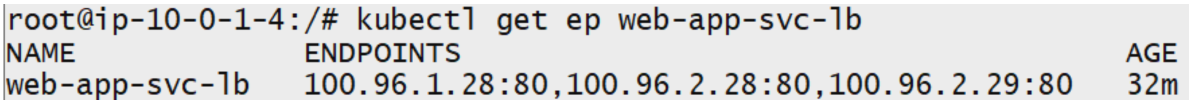
```
kubectl apply -f svc-web-lb.yaml
```

Verify the service is created of type load-balancer

```
kubectl get svc web-app-svc-lb
NAME             TYPE           CLUSTER-IP       EXTERNAL-IP
PORT(S)        AGE
web-app-svc-lb   LoadBalancer   100.67.144.247   a72cd7c5e674044e4b09e34ae1848acd-
702623717.ap-south-1.elb.amazonaws.com   80:30229/TCP   18m
```

Verify the end-point object is created pointing to the IP address for web-blue pods

```
kubectl get ep web-app-svc-lb
NAME             ENDPOINTS                                      AGE
web-app-svc-lb   100.96.1.28:80,100.96.2.28:80,100.96.2.29:80   32m
```

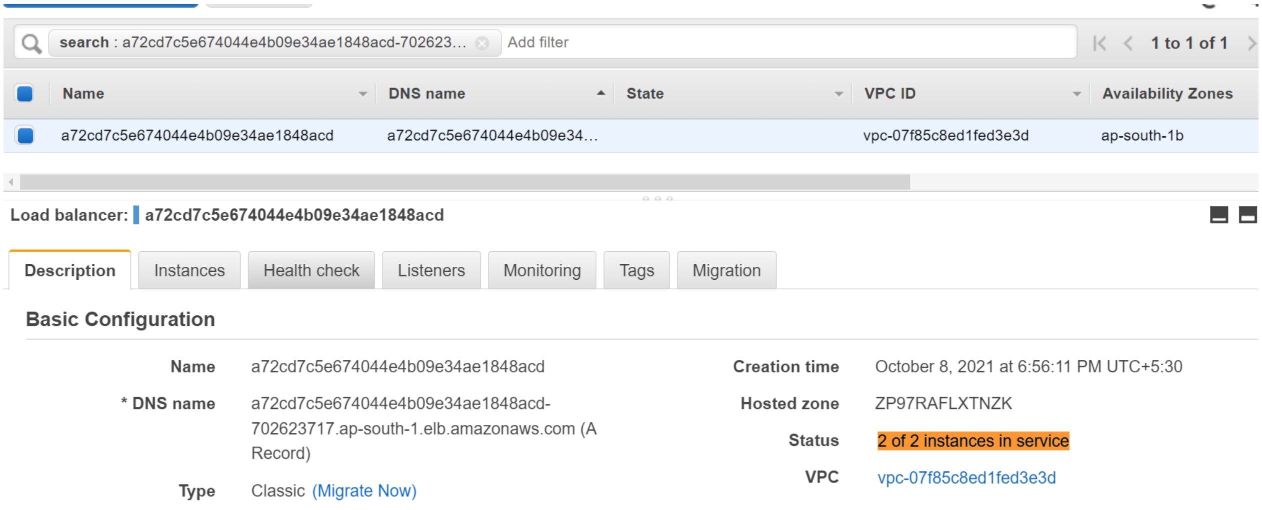


```
root@ip-10-0-1-4:/# kubectl get ep web-app-svc-lb
NAME             ENDPOINTS                                      AGE
web-app-svc-lb   100.96.1.28:80,100.96.2.28:80,100.96.2.29:80   32m
```

Search for a72cd7c5e674044e4b09e34ae1848acd-702623717.ap-south-1.elb.amazonaws.com in

`AWS -> EC2 Dashboard -> Load balancers`

Verify that a new ELB has been created in AWS. Wait for 2 minutes for the ELB instances to be in-service.



Name	DNS name	State	VPC ID	Availability Zones
a72cd7c5e674044e4b09e34ae1848acd	a72cd7c5e674044e4b09e34…		vpc-07f85c8ed1fed3e3d	ap-south-1b

Load balancer: a72cd7c5e674044e4b09e34ae1848acd

Basic Configuration

Name: a72cd7c5e674044e4b09e34ae1848acd

* DNS name: a72cd7c5e674044e4b09e34ae1848acd-702623717.ap-south-1.elb.amazonaws.com (A Record)

Type: Classic (Migrate Now)

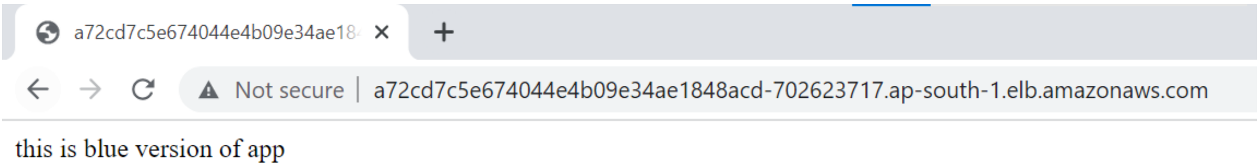
Creation time: October 8, 2021 at 6:56:11 PM UTC+5:30

Hosted zone: ZP97RAFLXTNZK

Status: 2 of 2 instances in service

VPC: vpc-07f85c8ed1fed3e3d

Test the ELB DNS URL from your browser, you should get below response from the web-blue app pods.



a72cd7c5e674044e4b09e34ae1848acd-702623717.ap-south-1.elb.amazonaws.com

this is blue version of app

Create another deployment using below yaml

vi web-green.yaml

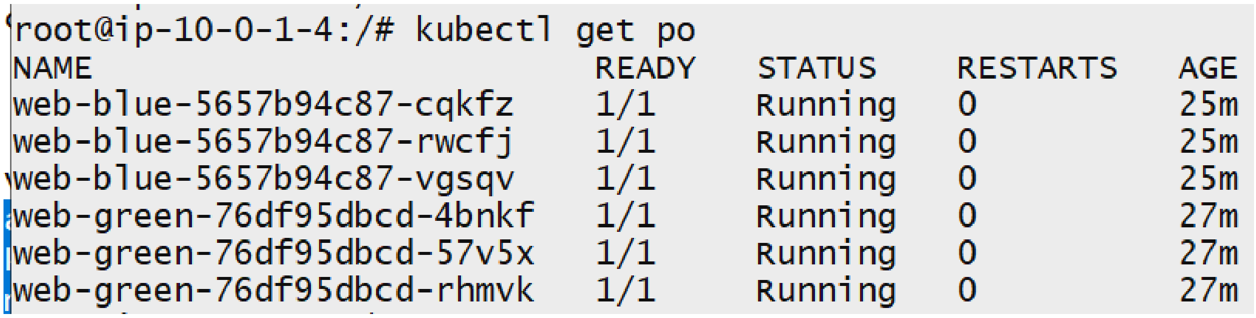
```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: web-green
spec:
  replicas: 3
  selector:
    matchLabels:
      app: web-green
  strategy:
    type: RollingUpdate
  template:
    metadata:
      labels:
        app: web-green
        type: web-app
    spec:
      containers:
      - image: mandarct/web-green:v1
        name: web-green
        ports:
        - containerPort: 80
          protocol: TCP
```

Deploy the above deployment to the Kubernetes cluster in the default namespace

kubectl apply -f web-green.yaml

Verify pods running for web-green deployment as well

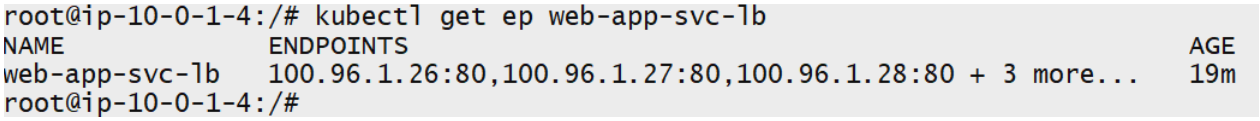
```
kubectl get po

NAME                            READY    STATUS     RESTARTS    AGE
web-blue-5657b94c87-cqkfz       1/1      Running    0           25m
web-blue-5657b94c87-rwcfj       1/1      Running    0           25m
web-blue-5657b94c87-vgsqv       1/1      Running    0           25m
web-green-76df95dbcd-4bnkf      1/1      Running    0           27m
web-green-76df95dbcd-57v5x      1/1      Running    0           27m
web-green-76df95dbcd-rhmvk      1/1      Running    0           27m
```



```
root@ip-10-0-1-4:/# kubectl get po
NAME                         READY   STATUS    RESTARTS   AGE
web-blue-5657b94c87-cqkfz    1/1     Running   0          25m
web-blue-5657b94c87-rwcfj    1/1     Running   0          25m
web-blue-5657b94c87-vgsqv    1/1     Running   0          25m
web-green-76df95dbcd-4bnkf   1/1     Running   0          27m
web-green-76df95dbcd-57v5x   1/1     Running   0          27m
web-green-76df95dbcd-rhmvk   1/1     Running   0          27m
```

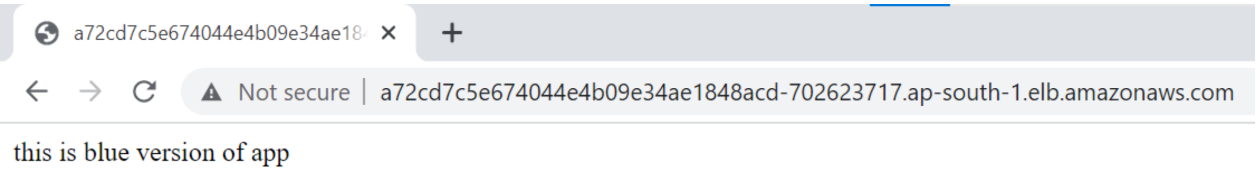
Verify that the end-points for the existing load-balancer service are updated with pods for web-green deployment

```
root@ip-10-0-1-4:/# kubectl get ep web-app-svc-lb
NAME               ENDPOINTS                                               AGE
web-app-svc-lb     100.96.1.26:80,100.96.1.27:80,100.96.1.28:80 + 3 more...   19m
```

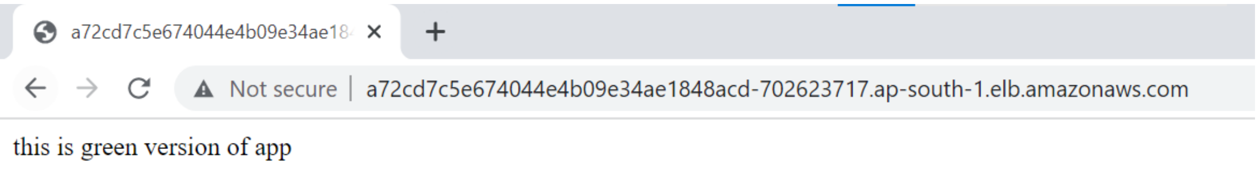


```
root@ip-10-0-1-4:/# kubectl get ep web-app-svc-lb
NAME             ENDPOINTS                                               AGE
web-app-svc-lb   100.96.1.26:80,100.96.1.27:80,100.96.1.28:80 + 3 more...   19m
root@ip-10-0-1-4:/#
```

Hit the load balancer (ELB) URL from web-browser, multiple times. You should be below 2 outputs, as the traffic is routed between the 2 deployments (web-blue & web-green)

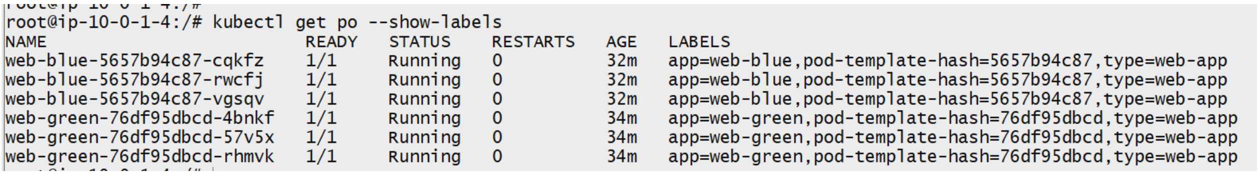

a72cd7c5e674044e4b09e34ae18
Not secure
a72cd7c5e674044e4b09e34ae1848acd-702623717.ap-south-1.elb.amazonaws.com

this is blue version of app


a72cd7c5e674044e4b09e34ae18
Not secure
a72cd7c5e674044e4b09e34ae1848acd-702623717.ap-south-1.elb.amazonaws.com

this is green version of app

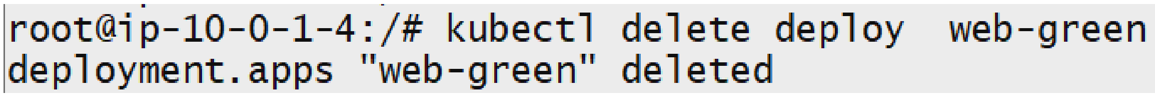
Once we have deployed both blue and green versions of our deployments, we notice that pods are created with below labels. Our Load balancer service is created with matching labels for 'type=web-app', so the traffic is distributed (load balanced) across both the versions of our deployments



```
root@ip-10-0-1-4:/# kubectl get po --show-labels
NAME                          READY   STATUS    RESTARTS   AGE   LABELS
web-blue-5657b94c87-cqkfz     1/1     Running   0          32m   app=web-blue,pod-template-hash=5657b94c87,type=web-app
web-blue-5657b94c87-rwcfj     1/1     Running   0          32m   app=web-blue,pod-template-hash=5657b94c87,type=web-app
web-blue-5657b94c87-vgsqv     1/1     Running   0          32m   app=web-blue,pod-template-hash=5657b94c87,type=web-app
web-green-76df95dbcd-4bnkf    1/1     Running   0          34m   app=web-green,pod-template-hash=76df95dbcd,type=web-app
web-green-76df95dbcd-57v5x    1/1     Running   0          34m   app=web-green,pod-template-hash=76df95dbcd,type=web-app
web-green-76df95dbcd-rhmvk    1/1     Running   0          34m   app=web-green,pod-template-hash=76df95dbcd,type=web-app
```

If you delete the web-green deployment, load-balancer will start sending traffic only to the blue pods

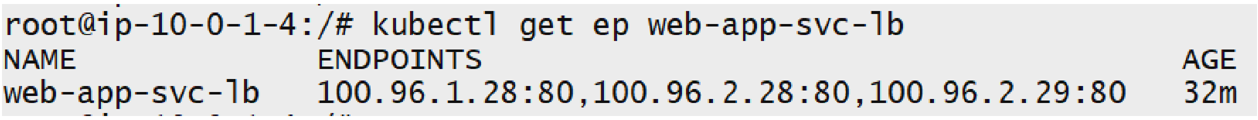
```
kubectl delete deploy  web-green
deployment.apps "web-green" deleted
```



```
root@ip-10-0-1-4:/# kubectl delete deploy  web-green
deployment.apps "web-green" deleted
```

The end point object for load balancer service will be back pointing only to the IP address for web-blue pods

```
kubectl get ep web-app-svc-lb
NAME             ENDPOINTS                                      AGE
web-app-svc-lb   100.96.1.28:80,100.96.2.28:80,100.96.2.29:80   32m
```

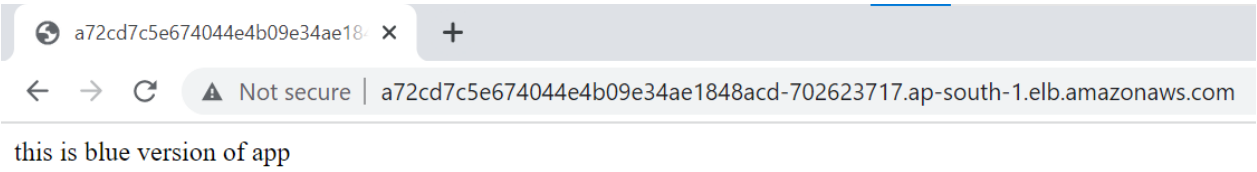


```
root@ip-10-0-1-4:/# kubectl get ep web-app-svc-lb
NAME             ENDPOINTS                                      AGE
web-app-svc-lb   100.96.1.28:80,100.96.2.28:80,100.96.2.29:80   32m
```

Same can be verified by describing the service

```
kubectl describe svc web-app-svc-lb
Name:                     web-app-svc-lb
Namespace:                default
Labels:                   <none>
Annotations:              kubectl.kubernetes.io/last-applied-configuration:

{"apiVersion":"v1","kind":"Service","metadata":{"annotations":{},"name":"web-app-svc-
lb","namespace":"default"},"spec":{"ports":[{"port":8...
Selector:                 type=web-app
Type:                     LoadBalancer
IP:                       100.67.144.247
LoadBalancer Ingress:     a72cd7c5e674044e4b09e34ae1848acd-702623717.ap-south-
1.elb.amazonaws.com
Port:                     <unset>  80/TCP
TargetPort:               80/TCP
NodePort:                 <unset>  30229/TCP
Endpoints:                100.96.1.28:80,100.96.2.28:80,100.96.2.29:80
Session Affinity:         None
External Traffic Policy:  Cluster
Events:
  Type    Reason                Age   From                Message
  ----    ------                ----  ----                -------
  Normal  EnsuringLoadBalancer  38m   service-controller  Ensuring load balancer
  Normal  EnsuredLoadBalancer   38m   service-controller  Ensured load balancer
```

Try hitting the ELB URL from web-browser multiple times, you should only see the response from web-app-blue.



a72cd7c5e674044e4b09e34ae1848acd-702623717.ap-south-1.elb.amazonaws.com

this is blue version of app