KUBERNETES ASSIGNMENT-5

Name: Vikram
Assignment: Kubernetes – Deployment, ClusterIP Service & Ingress Routing

Problem Statement

Using the existing Kubernetes cluster and previous setup:

1. Deploy an NGINX deployment of 3 replicas
2. Create an NGINX service of type ClusterIP
3. Create an Ingress service (NGINX → NGINX)
4. Verify application access from browser

TASK 1: Use Previous Deployment

The Kubernetes cluster, network plugin, and ingress controller were already deployed from previous assignments.

This assignment continues from that environment.

TASK 2: Deploy NGINX with 3 Replicas

Command:

```
nano nginx-deploy.yaml
```

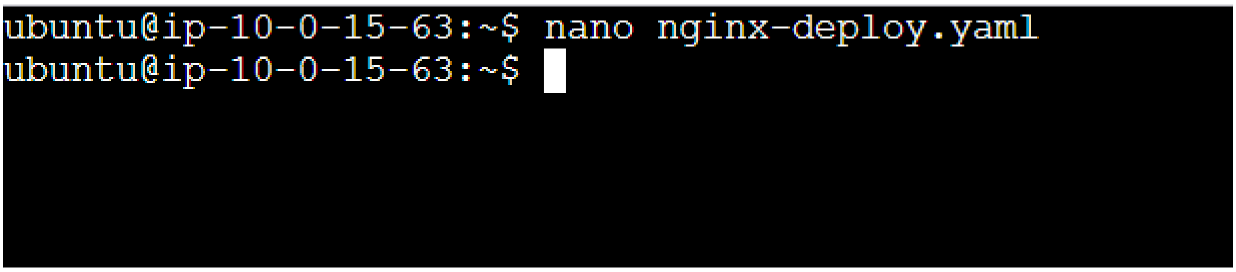
paste this:

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: final-nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: final-nginx
  template:
    metadata:
      labels:
```

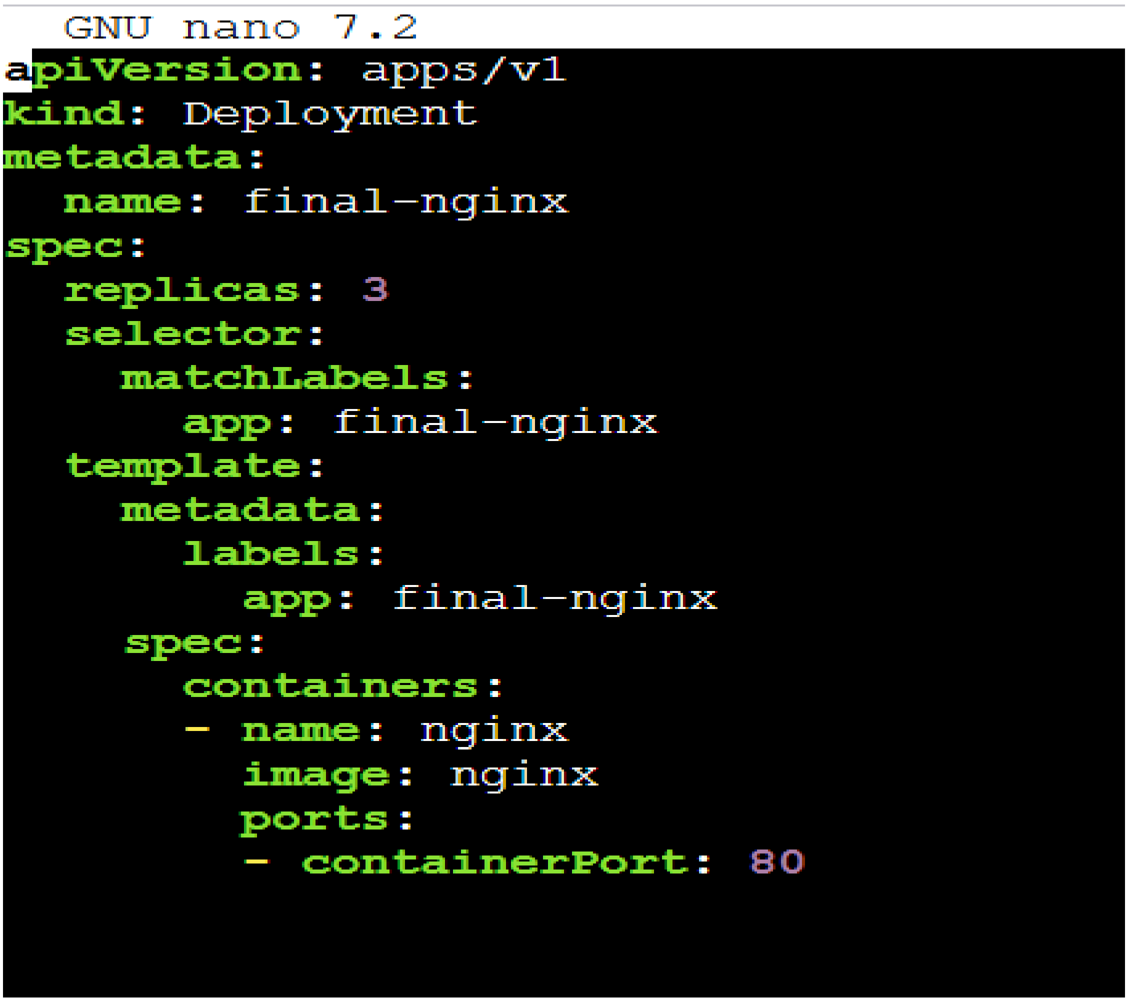
```
      app: final-nginx
  spec:
    containers:
    - name: nginx
      image: nginx
      ports:
      - containerPort: 80
```

Save and exit

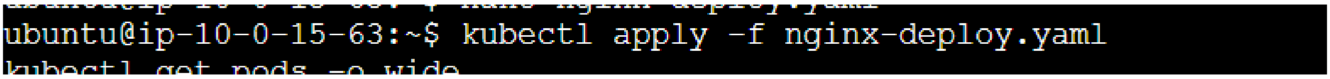
```
kubectl apply -f nginx-deploy.yaml
kubectl get pods -o wide
```



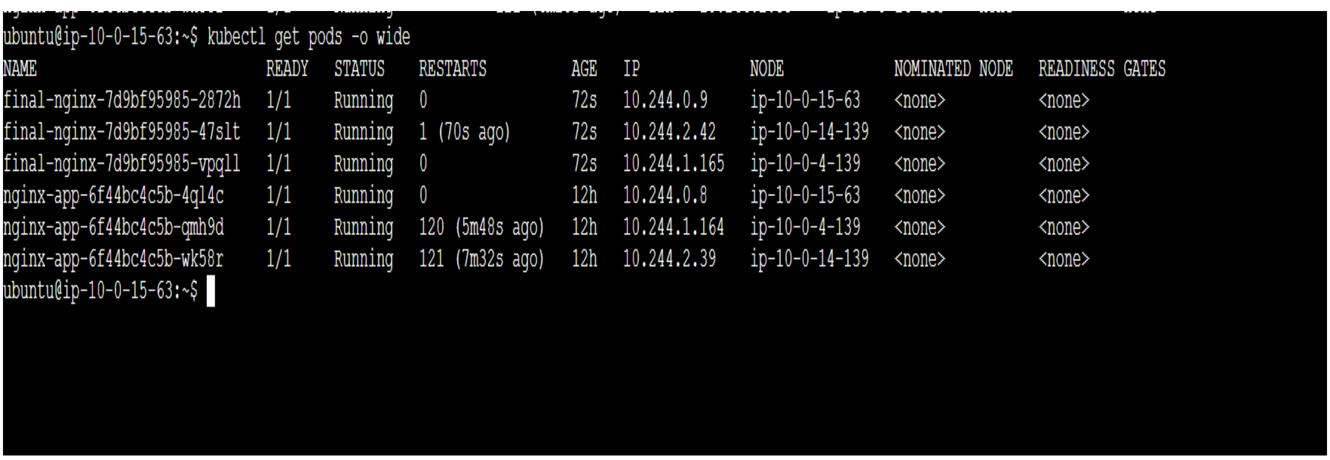
```
ubuntu@ip-10-0-15-63:~$ nano nginx-deploy.yaml
ubuntu@ip-10-0-15-63:~$
```



```
  GNU nano 7.2
apiVersion: apps/v1
kind: Deployment
metadata:
  name: final-nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: final-nginx
  template:
    metadata:
      labels:
        app: final-nginx
    spec:
      containers:
      - name: nginx
        image: nginx
        ports:
        - containerPort: 80
```



```
ubuntu@ip-10-0-15-63:~$ nano nginx-deploy.yaml
ubuntu@ip-10-0-15-63:~$ kubectl apply -f nginx-deploy.yaml
kubectl get pods -o wide
```



```
ubuntu@ip-10-0-15-63:~$ kubectl get pods -o wide
NAME                            READY   STATUS    RESTARTS         AGE   IP             NODE            NOMINATED NODE   READINESS GATES
final-nginx-7d9bf95985-2872h    1/1     Running   0                72s   10.244.0.9     ip-10-0-15-63   <none>           <none>
final-nginx-7d9bf95985-47slt    1/1     Running   1 (70s ago)      72s   10.244.2.42    ip-10-0-14-139  <none>           <none>
final-nginx-7d9bf95985-vpqll    1/1     Running   0                72s   10.244.1.165   ip-10-0-4-139   <none>           <none>
nginx-app-6f44bc4c5b-4ql4c      1/1     Running   0                12h   10.244.0.8     ip-10-0-15-63   <none>           <none>
nginx-app-6f44bc4c5b-qmh9d      1/1     Running   120 (5m48s ago)  12h   10.244.1.164   ip-10-0-4-139   <none>           <none>
nginx-app-6f44bc4c5b-wk58r      1/1     Running   121 (7m32s ago)  12h   10.244.2.39    ip-10-0-14-139  <none>           <none>
ubuntu@ip-10-0-15-63:~$
```

TASK 3: Create ClusterIP Service

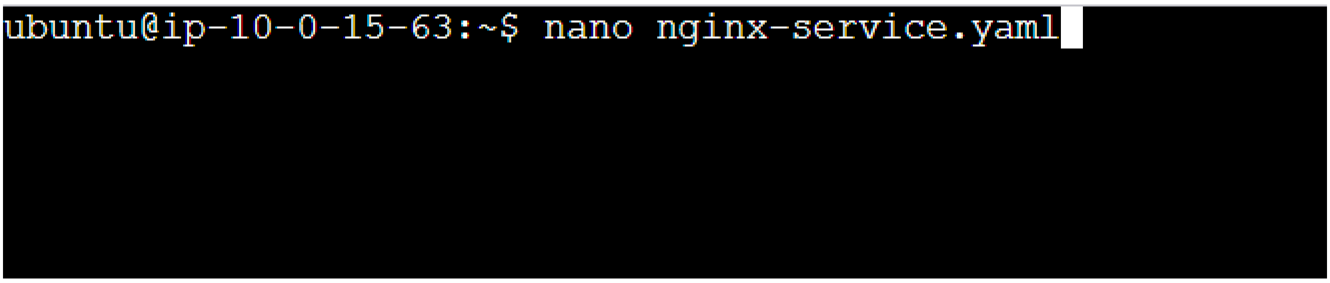
nano nginx-service.yaml

paste this:

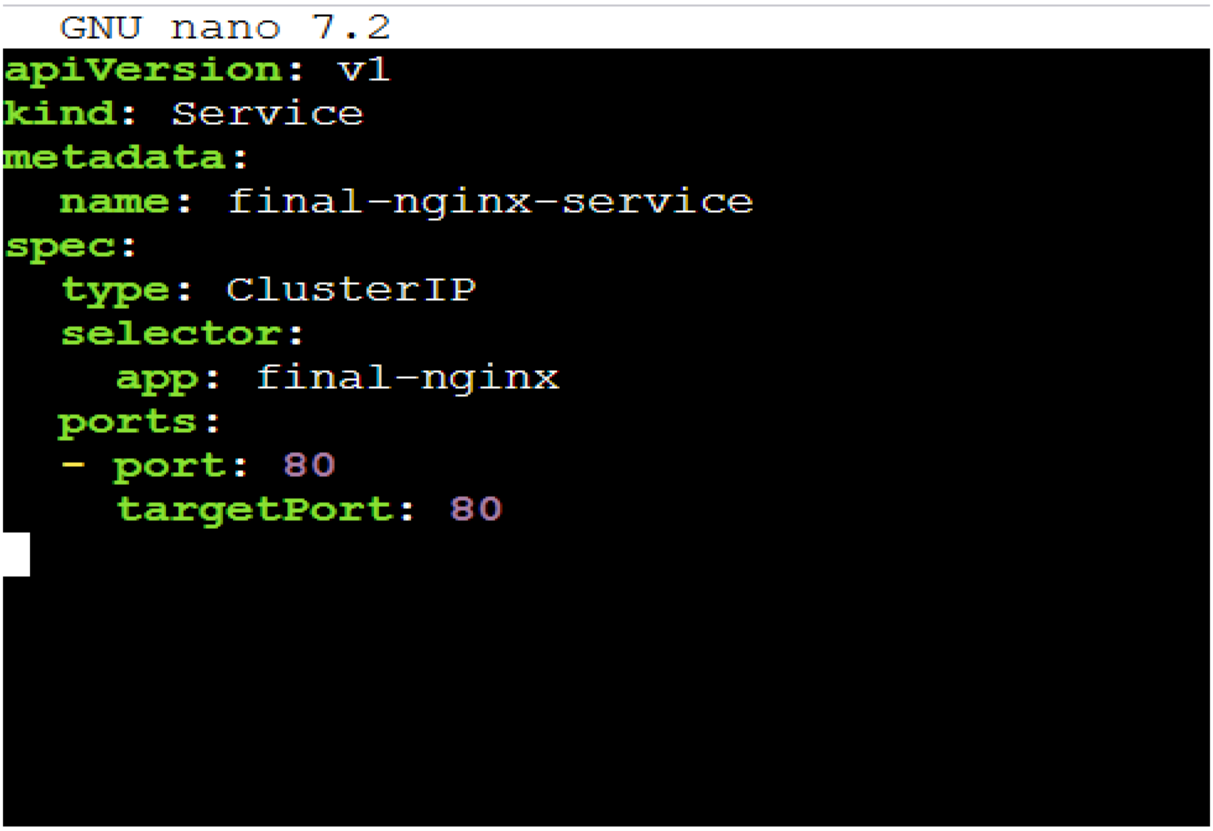
```
apiVersion: v1
kind: Service
metadata:
  name: final-nginx-service
spec:
  type: ClusterIP
  selector:
    app: final-nginx
  ports:
  - port: 80
    targetPort: 80
```

save and exit

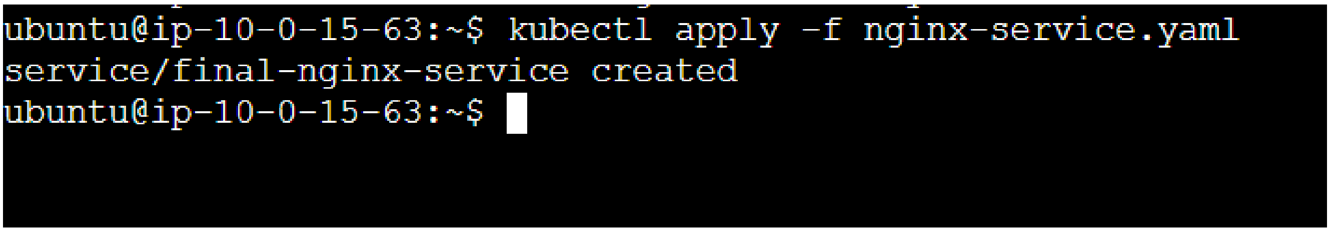
```
kubectl apply -f nginx-service.yaml
kubectl get svc
```



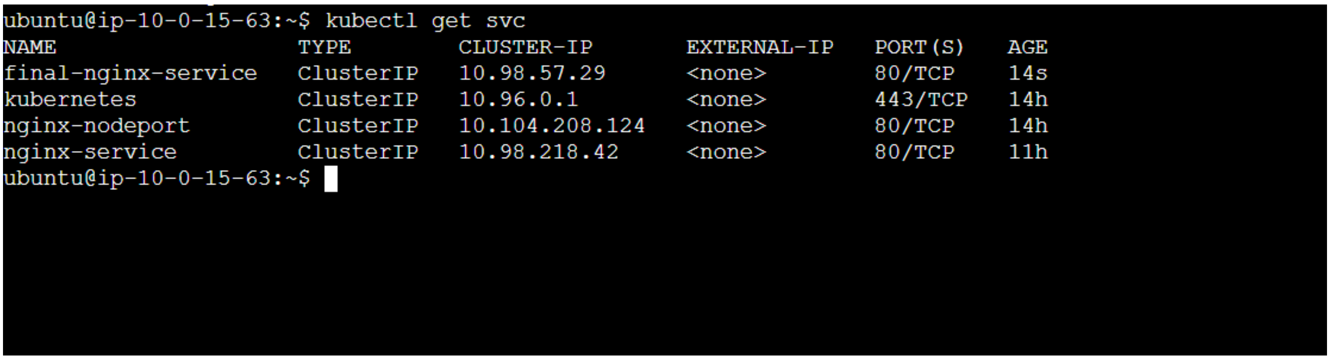
```
ubuntu@ip-10-0-15-63:~$ nano nginx-service.yaml
```



```
  GNU nano 7.2
apiVersion: v1
kind: Service
metadata:
  name: final-nginx-service
spec:
  type: ClusterIP
  selector:
    app: final-nginx
  ports:
  - port: 80
    targetPort: 80
```



```
ubuntu@ip-10-0-15-63:~$ kubectl apply -f nginx-service.yaml
service/final-nginx-service created
ubuntu@ip-10-0-15-63:~$
```



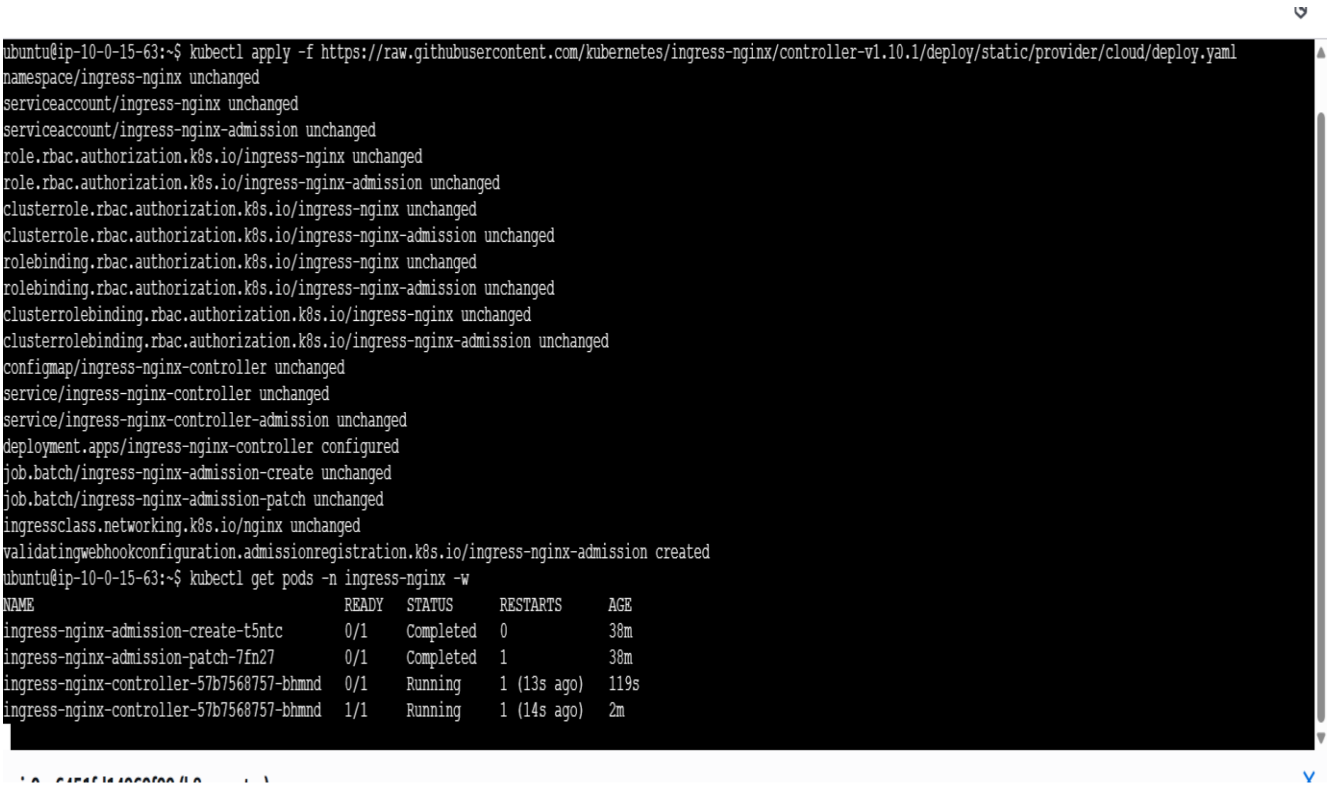
```
ubuntu@ip-10-0-15-63:~$ kubectl get svc
NAME                  TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)   AGE
final-nginx-service   ClusterIP   10.98.57.29      <none>        80/TCP    14s
kubernetes            ClusterIP   10.96.0.1        <none>        443/TCP   14h
nginx-nodeport        ClusterIP   10.104.208.124   <none>        80/TCP    14h
nginx-service         ClusterIP   10.98.218.42     <none>        80/TCP    11h
ubuntu@ip-10-0-15-63:~$
```

TASK 4: Install Ingress Controller

kubectl apply -f https://raw.githubusercontent.com/kubernetes/ingress-nginx/controller-v1.10.1/deploy/static/provider/cloud/deploy.yaml

Wait:

kubectl get pods -n ingress-nginx -w

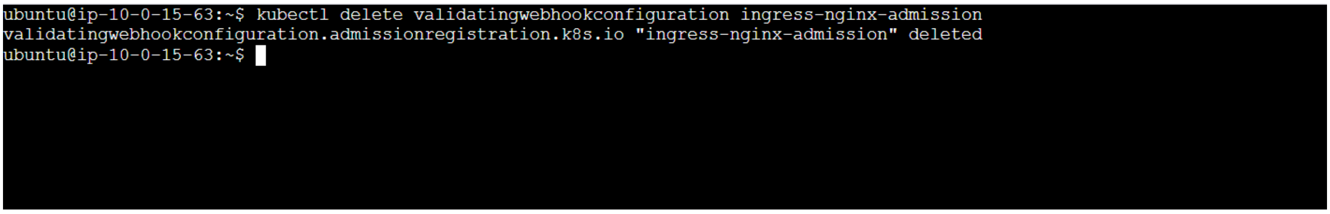


```
ubuntu@ip-10-0-15-63:~$ kubectl apply -f https://raw.githubusercontent.com/kubernetes/ingress-nginx/controller-v1.10.1/deploy/static/provider/cloud/deploy.yaml
namespace/ingress-nginx unchanged
serviceaccount/ingress-nginx unchanged
serviceaccount/ingress-nginx-admission unchanged
role.rbac.authorization.k8s.io/ingress-nginx unchanged
role.rbac.authorization.k8s.io/ingress-nginx-admission unchanged
clusterrole.rbac.authorization.k8s.io/ingress-nginx unchanged
clusterrole.rbac.authorization.k8s.io/ingress-nginx-admission unchanged
rolebinding.rbac.authorization.k8s.io/ingress-nginx unchanged
rolebinding.rbac.authorization.k8s.io/ingress-nginx-admission unchanged
clusterrolebinding.rbac.authorization.k8s.io/ingress-nginx unchanged
clusterrolebinding.rbac.authorization.k8s.io/ingress-nginx-admission unchanged
configmap/ingress-nginx-controller unchanged
service/ingress-nginx-controller unchanged
service/ingress-nginx-controller-admission unchanged
deployment.apps/ingress-nginx-controller configured
job.batch/ingress-nginx-admission-create unchanged
job.batch/ingress-nginx-admission-patch unchanged
ingressclass.networking.k8s.io/nginx unchanged
validatingwebhookconfiguration.admissionregistration.k8s.io/ingress-nginx-admission created
ubuntu@ip-10-0-15-63:~$ kubectl get pods -n ingress-nginx -w
NAME                                       READY   STATUS      RESTARTS       AGE
ingress-nginx-admission-create-t5ntc       0/1     Completed   0              38m
ingress-nginx-admission-patch-7fn27        0/1     Completed   1              38m
ingress-nginx-controller-57b7568757-bhmnd  0/1     Running     1 (13s ago)    119s
ingress-nginx-controller-57b7568757-bhmnd  1/1     Running     1 (14s ago)    2m
```

TASK 5 : Fix Webhook Issue & Apply Ingress

Disable broken webhook:

```
kubectl delete validatingwebhookconfiguration ingress-nginx-admission
```



```
ubuntu@ip-10-0-15-63:~$ kubectl delete validatingwebhookconfiguration ingress-nginx-admission
validatingwebhookconfiguration.admissionregistration.k8s.io "ingress-nginx-admission" deleted
ubuntu@ip-10-0-15-63:~$
```

Create ingress:

```
nano ingress.yaml
```

paste this:

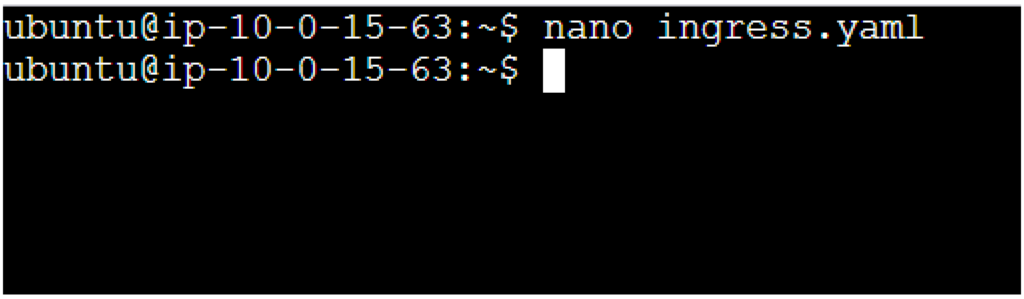
```
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: nginx-ingress
  annotations:
    nginx.ingress.kubernetes.io/rewrite-target: /
spec:
  ingressClassName: nginx
  rules:
  - http:
      paths:
      - path: /
        pathType: Prefix
        backend:
          service:
            name: final-nginx-service
            port:
              number: 80
```

save and exit

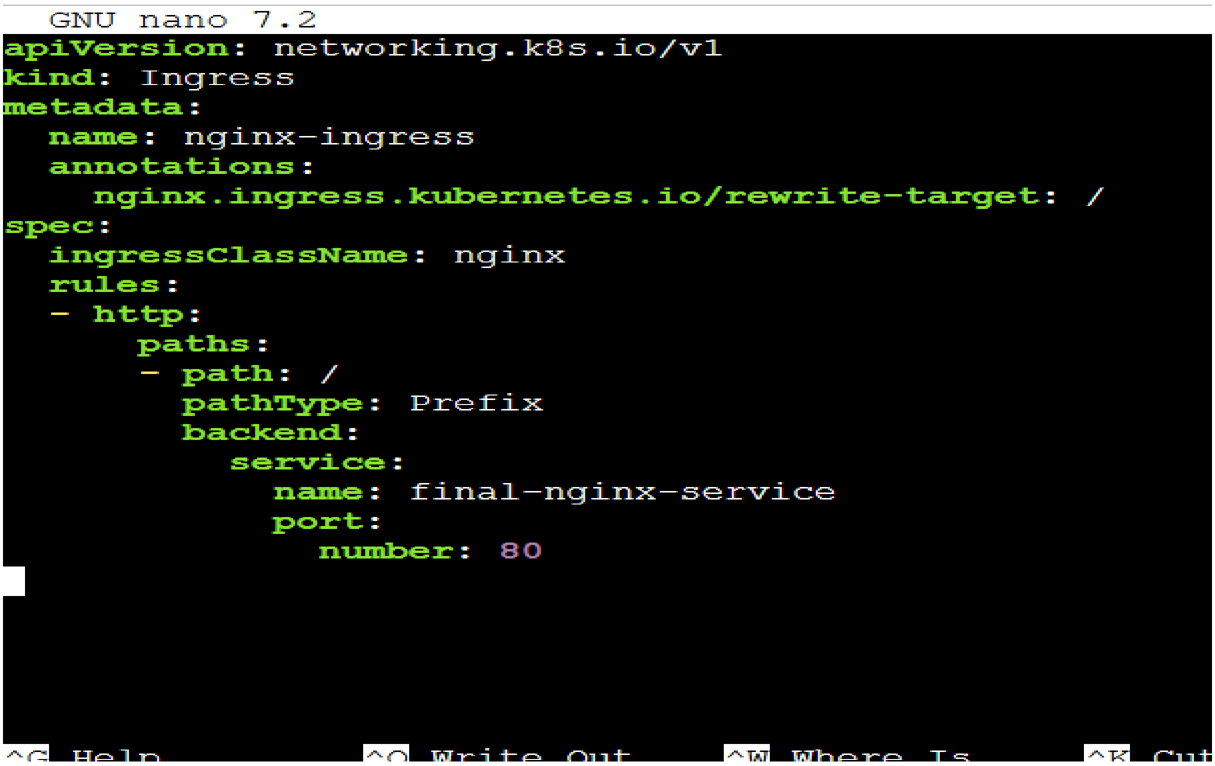
```
kubectl apply -f ingress.yaml
```

Restart ingress controller:

```
kubectl delete pod -n ingress-nginx -l app.kubernetes.io/component=controller
```

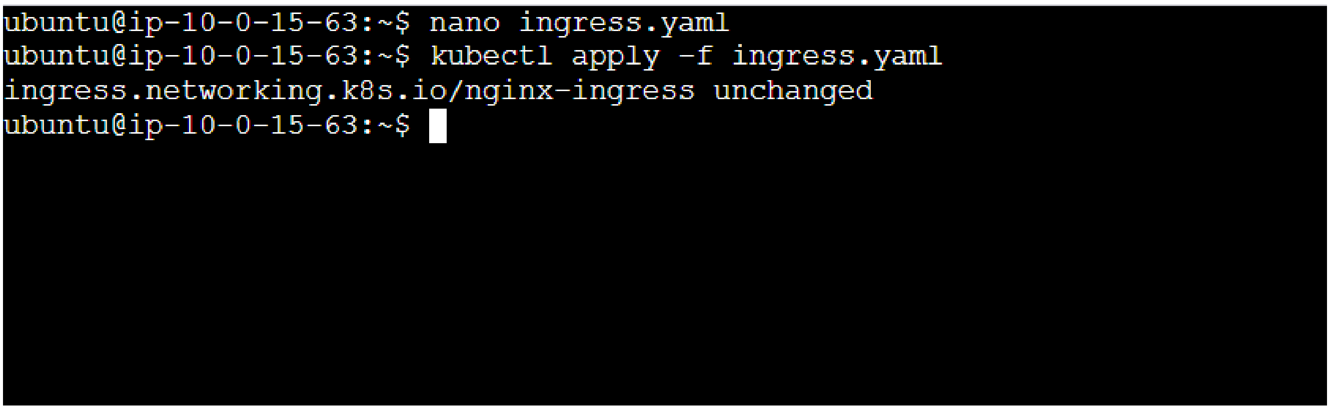


```
ubuntu@ip-10-0-15-63:~$ nano ingress.yaml
ubuntu@ip-10-0-15-63:~$
```

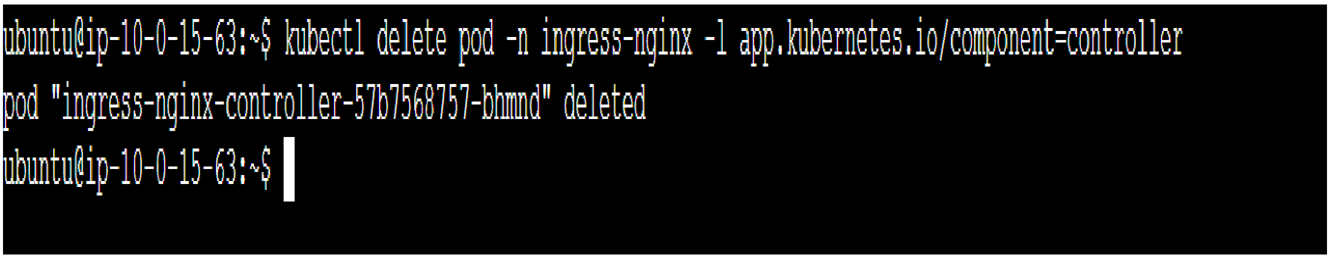


```
  GNU nano 7.2
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: nginx-ingress
  annotations:
    nginx.ingress.kubernetes.io/rewrite-target: /
spec:
  ingressClassName: nginx
  rules:
  - http:
      paths:
      - path: /
        pathType: Prefix
        backend:
          service:
            name: final-nginx-service
            port:
              number: 80

^G Help          ^O Write Out       ^W Where Is        ^K Cut
```



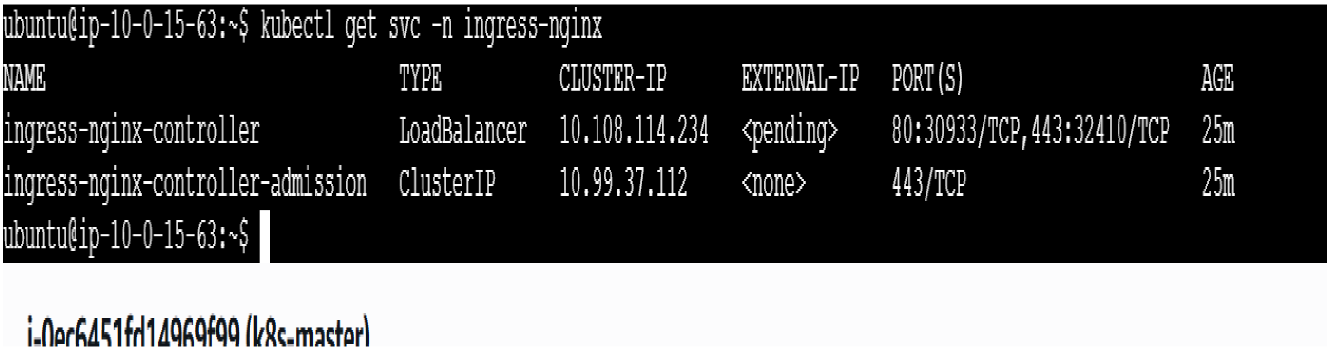
```
ubuntu@ip-10-0-15-63:~$ nano ingress.yaml
ubuntu@ip-10-0-15-63:~$ kubectl apply -f ingress.yaml
ingress.networking.k8s.io/nginx-ingress unchanged
ubuntu@ip-10-0-15-63:~$
```



```
ubuntu@ip-10-0-15-63:~$ kubectl delete pod -n ingress-nginx -l app.kubernetes.io/component=controller
pod "ingress-nginx-controller-57b7568757-bhmnd" deleted
ubuntu@ip-10-0-15-63:~$
```

TASK 6: Expose Ingress & Verify

kubectl get svc -n ingress-nginx



```
ubuntu@ip-10-0-15-63:~$ kubectl get svc -n ingress-nginx
NAME                                 TYPE           CLUSTER-IP       EXTERNAL-IP   PORT(S)                      AGE
ingress-nginx-controller             LoadBalancer   10.108.114.234   <pending>     80:30933/TCP,443:32410/TCP   25m
ingress-nginx-controller-admission   ClusterIP      10.99.37.112     <none>        443/TCP                      25m
ubuntu@ip-10-0-15-63:~$
```

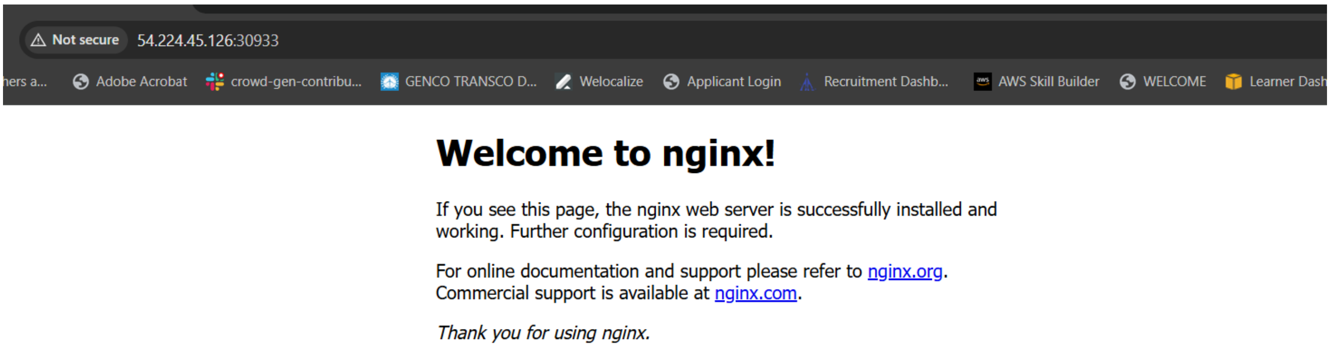
i-0ec6451fd14969f99 (k8s-master)

Open browser:

http://<WORKER_PUBLIC_IP>:<NODEPORT>

Note: Make sure to add the nodeport 30933 in security group

NGINX Welcome Page displayed



Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org. Commercial support is available at nginx.com.

Thank you for using nginx.

Conclusion

Successfully deployed Kubernetes cluster, NGINX application, ClusterIP service, and NGINX-based ingress routing with full browser access verification.