

Kubernetes Project 2 - Kubernetes multi-Tenant Project

Step 1: Check if Any Worker Node is Ready

Run the following command to check the status of worker nodes:

kubectl get nodes

```
master@master-vm:~/Desktop$ kubectl get nodes
NAME             STATUS    ROLES    AGE   VERSION
master-vm        Ready    control-plane   17d   v1.28.15
worker1-vm       Ready    <none>         17d   v1.28.15
worker2-vm       Ready    <none>         17d   v1.28.15
```

Step 2: Create Namespaces for Tenants

To isolate tenants, create separate namespaces:

kubectl create namespace tenant-a

kubectl create namespace tenant-b

Step 3: Create Folder Structure for YAML Files

Create the folder structure to organize YAML files for each tenant:

mkdir -p ~/k8s-multi-tenant/tenant-a

mkdir -p ~/k8s-multi-tenant/tenant-b

cd ~/k8s-multi-tenant

```
master@master-vm:~/Desktop$ kubectl create namespace tenant-a
namespace/tenant-a created
master@master-vm:~/Desktop$ kubectl create namespace tenant-b
namespace/tenant-b created
master@master-vm:~/Desktop$ mkdir -p ~/k8s-multi-tenant/tenant-a
master@master-vm:~/Desktop$ mkdir -p ~/k8s-multi-tenant/tenant-b
master@master-vm:~/Desktop$ cd ~/k8s-multi-tenant
master@master-vm:~/k8s-multi-tenant$ nano tenant-a/tenant-a-app.yaml
master@master-vm:~/k8s-multi-tenant$
master@master-vm:~/k8s-multi-tenant$ kubectl apply -f tenant-a/tenant-a-app.yaml
deployment.apps/tenant-a-app created
service/tenant-a-service created
master@master-vm:~/k8s-multi-tenant$ nano tenant-a/tenant-a-restrict.yaml
master@master-vm:~/k8s-multi-tenant$ kubectl apply -f tenant-a/tenant-a-restrict.yaml
networkpolicy.networking.k8s.io/tenant-a-restrict created
master@master-vm:~/k8s-multi-tenant$ nano tenant-b/tenant-b-app.yaml
master@master-vm:~/k8s-multi-tenant$ kubectl apply -f tenant-b/tenant-b-app.yaml
deployment.apps/tenant-b-app created
service/tenant-b-service created
master@master-vm:~/k8s-multi-tenant$ kubectl get pods -n tenant-b
NAME                                READY   STATUS    RESTARTS   AGE
tenant-b-app-bbb987489-dxs7h        1/1     Running   0           16s
tenant-b-app-bbb987489-s4zkf        1/1     Running   0           16s
master@master-vm:~/k8s-multi-tenant$ kubectl get svc -n tenant-b
NAME             TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
tenant-b-service ClusterIP   10.104.119.15 <none>        80/TCP     16s
master@master-vm:~/k8s-multi-tenant$ nano tenant-b/tenant-b-restrict.yaml
master@master-vm:~/k8s-multi-tenant$ kubectl apply -f tenant-b/tenant-b-restrict.yaml
networkpolicy.networking.k8s.io/tenant-b-restrict created
```

Step 4: Create Deployment and Service for Tenant A and Tenant B

Step 5: Restrict Network Access for Tenant A and Tenant B

```
master@master-vm:~/k8s-multi-tenant$ kubectl exec -it test-pod -n tenant-b -- wget --spider tenant-a-service.tenant-a
wget: bad address 'tenant-a-service.tenant-a'
command terminated with exit code 1
master@master-vm:~/k8s-multi-tenant$ kubectl get pods -A
```

NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
kube-system	calico-kube-controllers-658d97c59c-ncdhh	1/1	Running	3 (90m ago)	105m
kube-system	calico-node-4fkv6	0/1	CrashLoopBackOff	33 (83s ago)	113m
kube-system	calico-node-fzz9n	0/1	Running	27 (40s ago)	113m
kube-system	calico-node-wc74m	0/1	Running	33 (8s ago)	113m
kube-system	coredns-5dd5756b68-6447t	1/1	Running	0	104m
kube-system	coredns-5dd5756b68-pc8hx	1/1	Running	0	104m
kube-system	etcd-master-vm	1/1	Running	14 (159m ago)	17d
kube-system	kube-apiserver-master-vm	1/1	Running	14 (159m ago)	17d
kube-system	kube-controller-manager-master-vm	1/1	Running	15 (159m ago)	17d
kube-system	kube-proxy-bqvv7	1/1	Running	5 (103m ago)	17d
kube-system	kube-proxy-h6lcw	1/1	Running	14 (159m ago)	17d
kube-system	kube-proxy-mnfmr	1/1	Running	5 (100m ago)	17d
kube-system	kube-scheduler-master-vm	1/1	Running	15 (159m ago)	17d
tenant-a	tenant-a-app-57856ccbd-c2s8q	1/1	Running	0	4m15s
tenant-a	tenant-a-app-57856ccbd-tpv7r	1/1	Running	0	4m15s
tenant-b	tenant-b-app-bbb987489-dxs7h	1/1	Running	0	2m40s
tenant-b	tenant-b-app-bbb987489-s4zkf	1/1	Running	0	2m40s
tenant-b	test-pod	1/1	Running	0	32s

Step 6: Verify Network Policy

Step 7: Test Tenant Isolation

```
master@master-vm:~/k8s-multi-tenant$ kubectl get svc -A
```

NAMESPACE	NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
default	kubernetes	ClusterIP	10.96.0.1	<none>	443/TCP	17d
kube-system	kube-dns	ClusterIP	10.96.0.10	<none>	53/UDP,53/TCP,9153/TCP	17d
tenant-a	tenant-a-service	ClusterIP	10.109.101.126	<none>	80/TCP	4m15s
tenant-b	tenant-b-service	ClusterIP	10.104.119.15	<none>	80/TCP	2m40s

```
master@master-vm:~/k8s-multi-tenant$ kubectl get networkpolicy -A
```

NAMESPACE	NAME	POD-SELECTOR	AGE
tenant-a	tenant-a-restrict	app=tenant-a-app	3m49s
tenant-b	tenant-b-restrict	app=tenant-b-app	2m

```
master@master-vm:~/k8s-multi-tenant$
```