Kubernetes Multi-Tenant Project

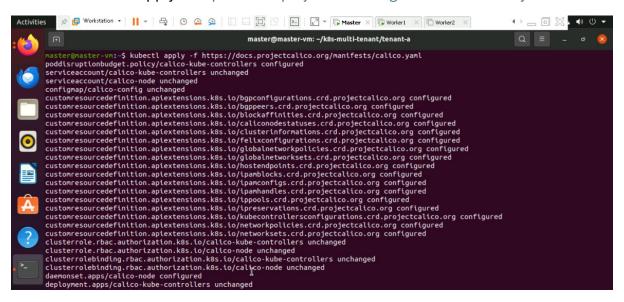
Step 1: Check if Any Worker Node is Ready

- kubectl get nodes

```
master@master-vm:-$ 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 NotReady <none> 17d v1.28.15
```

Step 2: Install Calico for Networking

- kubectl apply -f https://docs.projectcalico.org/manifests/calico.yaml



Step 3: Create Namespaces for Tenants

- kubectl create namespace tenant-a
- kubectl create namespace tenant-b

```
master@naster-vm:-$ kubectl create namespace tenant-a
namespace/tenant-a created
master@naster-vm:-$ kubectl create namespace tenant-b
namespace/tenant-b created

Activate Windows
Go to Settings to activate Windows.
```

Step 4: Create Folder Structure for YAML Files

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

```
master@master-vm:~$ mkdir -p ~/k8s-multi-tenant/tenant-a
master@master-vm:~$ mkdir -p ~/k8s-multi-tenant-b
master@master-vm:~$ cd ~/k8s-multi-tenant
master@master-vm:~/k8s-multi-tenant5 cd tenant-a
```

Step 5: Create Deployment and Service for Tenant A and apply the configuration.

- kubectl apply -f tenant-a/tenant-a-app.yaml

```
master@master-vm:-/k8s-multi-tenant/tenant-a$ nano tenant-a-app.yaml
master@master-vm:-/k8s-multi-tenant/tenant-a$ kubectl apply -f tenant-a/tenant-a-app.yaml
error: the path "tenant-a/tenant-a-app.yaml" does not exist
master@master-vm:-/k8s-multi-tenant/tenant-a$ ls -l -/k8s-multi-tenant/tenant-a/
total 4
-rw-rw-r-- 1 master master 506 Mar 15 15:10 tenant-a-app.yaml
master@master-vm:-/k8s-multi-tenant/tenant-a$ kubectl apply -f -/k8s-multi-tenant/tenant-a-app.yaml
deployment.apps/tenant-a-app.reated
service/tenant-a-service created
```

Step 6: Restrict Network Access for Tenant A and apply the network policy.

- kubectl apply -f tenant-a/tenant-a-restrict.yaml

```
service/tenant-a-service created

master@master-vm:-/k8s-multi-tenant/tenant-a$ nano tenant-a-restrict.yaml
master@master-vm:-/k8s-multi-tenant/tenant-a$ kubectl apply -f tenant-a/tenant-a-restrict.yaml
error: the path 'tenant-a/tenant-a-restrict.yaml" does not exist

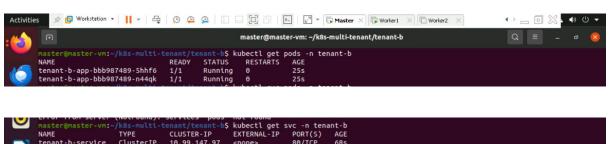
master@master-vm:-/k8s-multi-tenant/tenant-a$ kubectl apply -f ~/k8s-multi-tenant/tenant-a-restrict.yaml
networkpolicy.networking.k8s.io/tenant-a-restrict created
```

Step 7: Create Deployment and Service for Tenant B and apply the deployment.

- kubectl apply -f tenant-b/tenant-b-app.yaml

```
master@naster-vm:~/k8s-multi-tenant$ cd tenant-b
naster@naster.vm:~/k8s-multi-tenant/tenant-b$ nano tenant-b-app.yaml
naster@naster.vm:-/k8s-multi-tenant/tenant-b$ kubectl apply -f ~/k8s-multi-tenant/tenant-b-app.yaml
deployment.apps/tenant-b-app created
service/tenant-b-service created
```

Verify the Deployment



Step 8: Restrict Network Access for Tenant B and Apply the network policy.

kubectl apply -f tenant-b/tenant-b-restrict.yaml

```
master@master-vm:~/k8s-multi-tenant/tenant-b$ nano tenant-b-restrict.yaml
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl apply -f ~/k8s-multi-tenant/tenant-b-restrict.yaml
networkpolicy.networking.k8s.io/tenant-b-restrict created
```

Step 9: Verify Network Policy

- kubectl get networkpolicy -n tenant-b
- kubectl describe networkpolicy tenant-b-restrict -n tenant-b

Step 10: Test Tenant Isolation

- docker pull alpine

```
master@naster-vm:-/k8s-multi-tenant/tenant-b$ docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
f18232174bc9: Pull complete
Digest: sha256:a8560b36e8b8210634f77d9f7f9efd7ffa463e380b75e2e74aff4511df3ef88c
Status: Downloaded newer image for alpine:latest
docker.io/library/alpine:latest
```

- kubectl run test-pod --image=alpine -n tenant-b --restart=Never -- sleep 3600
- kubectl exec -it test-pod -n tenant-b -- wget --spider tenant-a-service.tenant-

