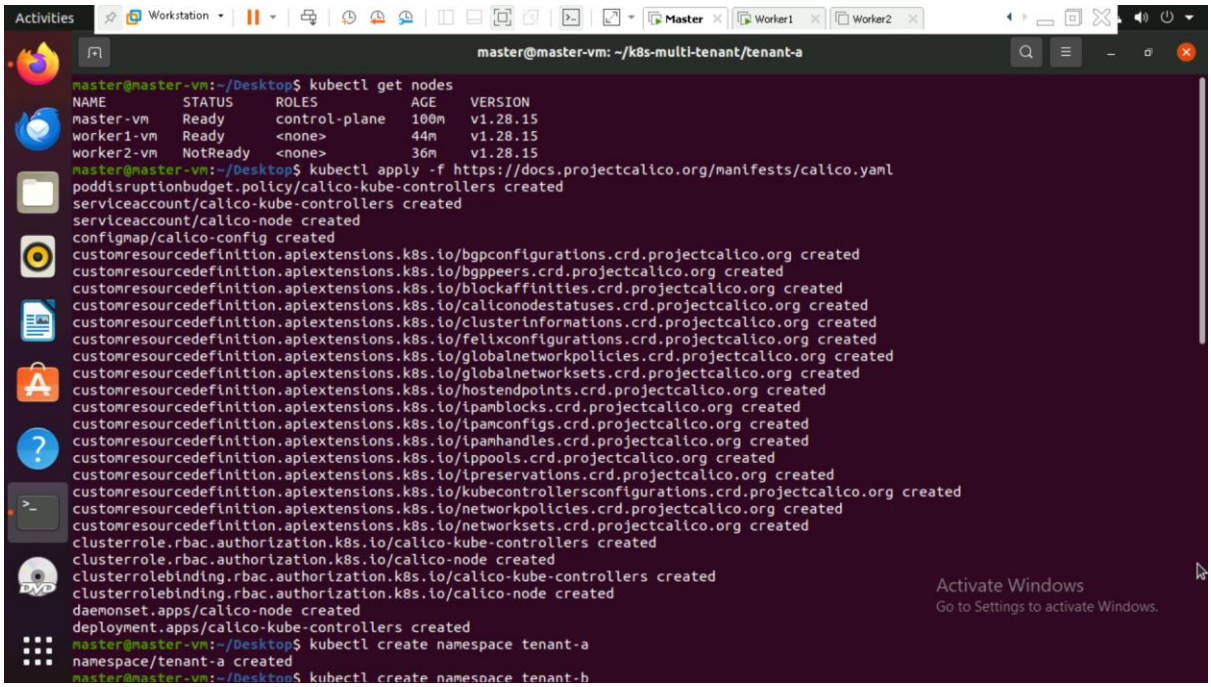
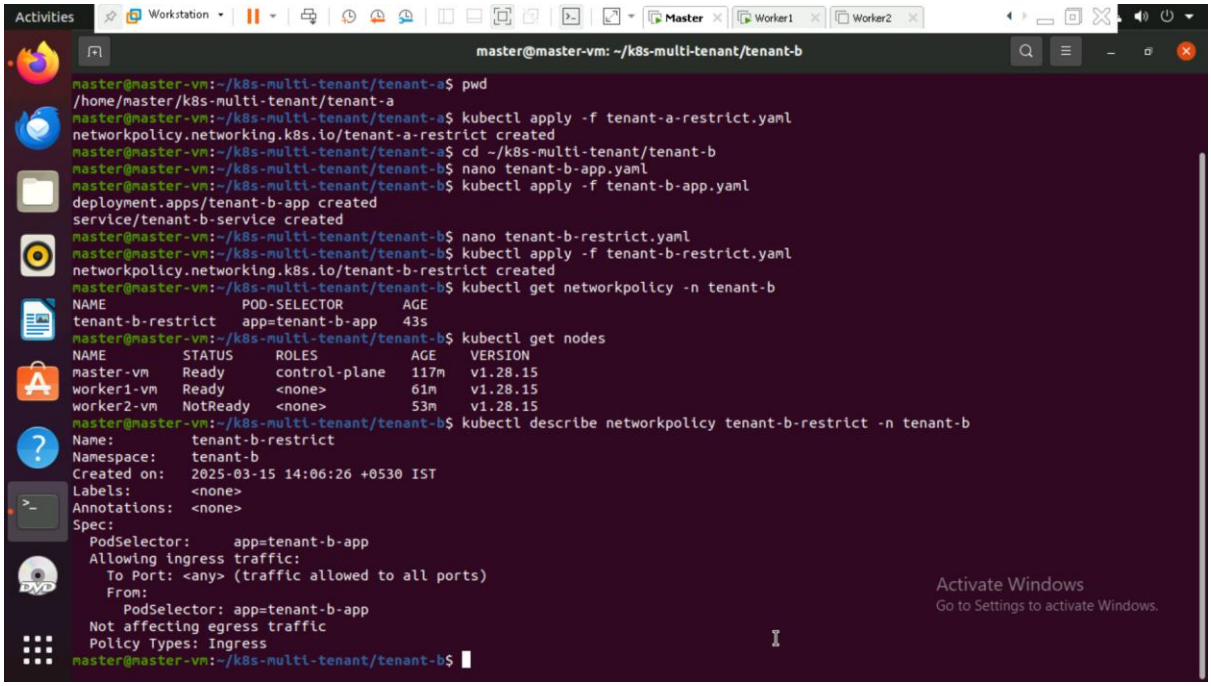
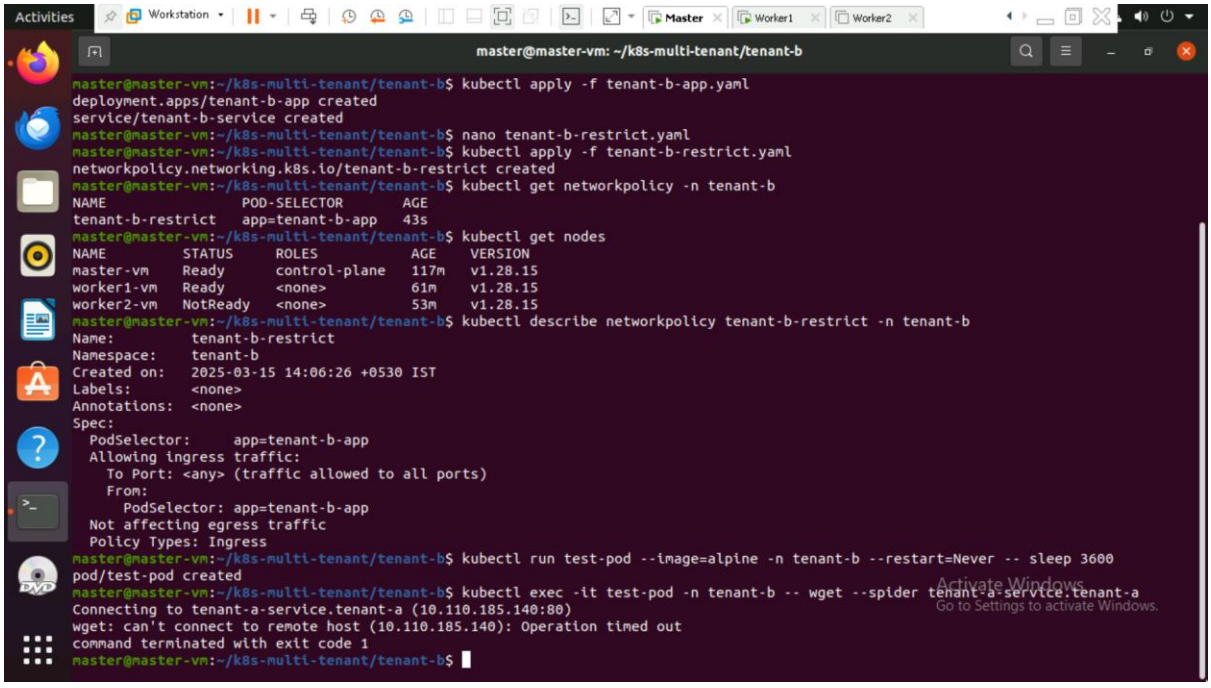
Multi-Tenant Kubernetes Security




```
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$ cd ~/k8s-multi-tenant/tenant-a
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-app.yaml
deployment.apps/tenant-a-app created
service/tenant-a-service created
```

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


Activities
Workstation
Master
Worker1
Worker2
master@master-vm: ~/k8s-multi-tenant/tenant-b
master@master-vm:~/k8s-multi-tenant/tenant-a$ pwd
/home/master/k8s-multi-tenant/tenant-a
master@master-vm:~/k8s-multi-tenant/tenant-a$ kubectl apply -f tenant-a-restrict.yaml
networkpolicy.networking.k8s.io/tenant-a-restrict created
master@master-vm:~/k8s-multi-tenant/tenant-a$ cd ~/k8s-multi-tenant/tenant-b
master@master-vm:~/k8s-multi-tenant/tenant-b$ nano tenant-b-app.yaml
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl apply -f tenant-b-app.yaml
deployment.apps/tenant-b-app created
service/tenant-b-service created
master@master-vm:~/k8s-multi-tenant/tenant-b$ nano tenant-b-restrict.yaml
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl apply -f tenant-b-restrict.yaml
networkpolicy.networking.k8s.io/tenant-b-restrict created
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl get networkpolicy -n tenant-b
NAME   POD-SELECTOR   AGE
tenant-b-restrict   app=tenant-b-app   43s
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl get nodes
NAME   STATUS   ROLES   AGE   VERSION
master-vm   Ready   control-plane   117m   v1.28.15
worker1-vm   Ready   <none>   61m   v1.28.15
worker2-vm   NotReady   <none>   53m   v1.28.15
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl describe networkpolicy tenant-b-restrict -n tenant-b
Name: tenant-b-restrict
Namespace: tenant-b
Created on: 2025-03-15 14:06:26 +0530 IST
Labels: <none>
Annotations: <none>
Spec:
  PodSelector: app=tenant-b-app
  Allowing ingress traffic:
    To Port: <any> (traffic allowed to all ports)
    From:
      PodSelector: app=tenant-b-app
  Not affecting egress traffic
  Policy Types: Ingress
master@master-vm:~/k8s-multi-tenant/tenant-b$
Activate Windows
Go to Settings to activate Windows.


Activities
Workstation
Master
Worker1
Worker2
master@master-vm: ~/k8s-multi-tenant/tenant-b
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl apply -f tenant-b-app.yaml
deployment.apps/tenant-b-app created
service/tenant-b-service created
master@master-vm:~/k8s-multi-tenant/tenant-b$ nano tenant-b-restrict.yaml
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl apply -f tenant-b-restrict.yaml
networkpolicy.networking.k8s.io/tenant-b-restrict created
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl get networkpolicy -n tenant-b
NAME   POD-SELECTOR   AGE
tenant-b-restrict   app=tenant-b-app   43s
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl get nodes
NAME   STATUS   ROLES   AGE   VERSION
master-vm   Ready   control-plane   117m   v1.28.15
worker1-vm   Ready   <none>   61m   v1.28.15
worker2-vm   NotReady   <none>   53m   v1.28.15
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl describe networkpolicy tenant-b-restrict -n tenant-b
Name: tenant-b-restrict
Namespace: tenant-b
Created on: 2025-03-15 14:06:26 +0530 IST
Labels: <none>
Annotations: <none>
Spec:
  PodSelector: app=tenant-b-app
  Allowing ingress traffic:
    To Port: <any> (traffic allowed to all ports)
    From:
      PodSelector: app=tenant-b-app
  Not affecting egress traffic
  Policy Types: Ingress
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl run test-pod --image=alpine -n tenant-b --restart=Never -- sleep 3600
pod/test-pod created
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl exec -it test-pod -n tenant-b -- wget --spider tenant-a-service.tenant-a
Connecting to tenant-a-service.tenant-a (10.110.185.140:80)
wget: can't connect to remote host (10.110.185.140): Operation timed out
command terminated with exit code 1
master@master-vm:~/k8s-multi-tenant/tenant-b$
Activate Windows
Go to Settings to activate Windows.