Kubernetes Project 2 - Kubernetes multi-Tenant Project

Step 1: Check if Any Worker Node is Ready

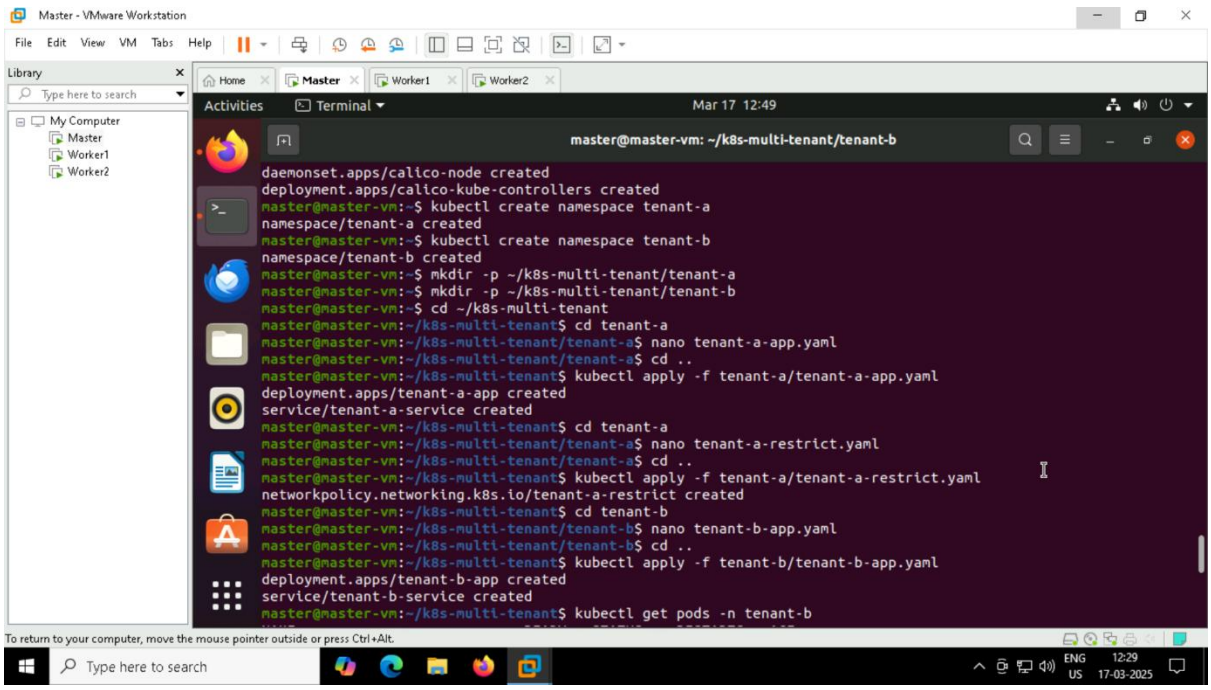
Run the following command to check the status of worker nodes

Step 2: Create Namespaces for Tenants

To isolate tenants, create separate namespaces:

kubectl create namespace tenant-a

kubectl create namespace tenant-b



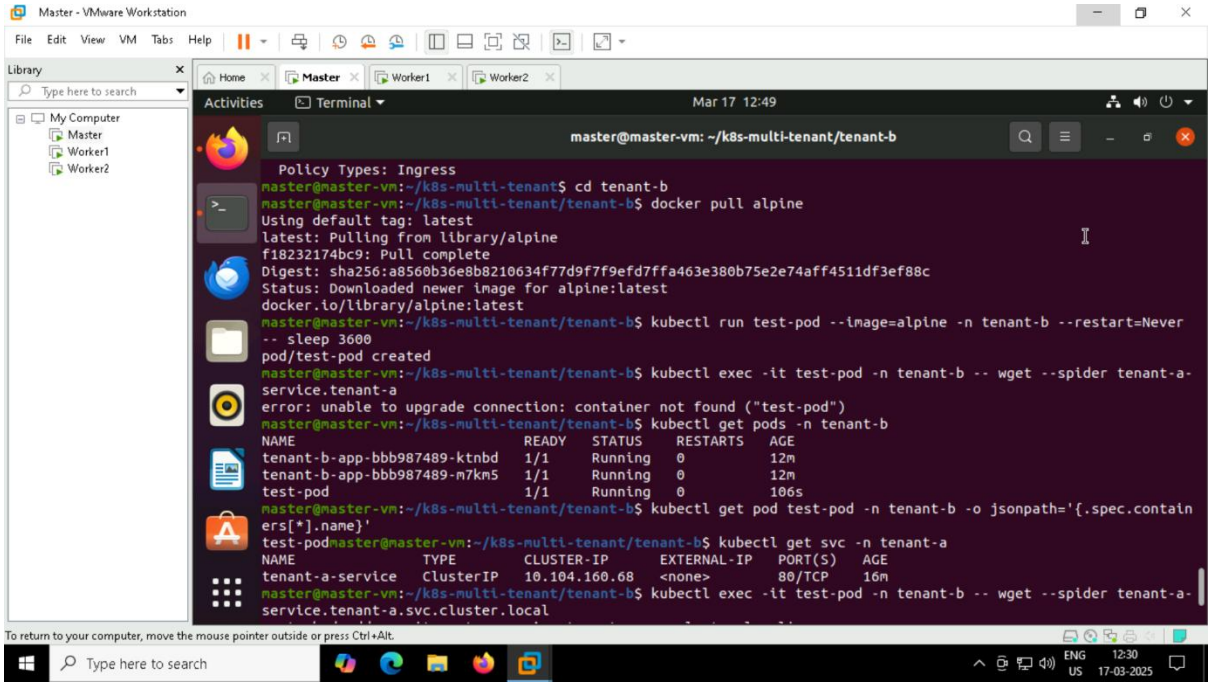
Step 3: Create Folder Structure for YAML Files

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 - VMware Workstation
File Edit View VM Tabs Help
Library
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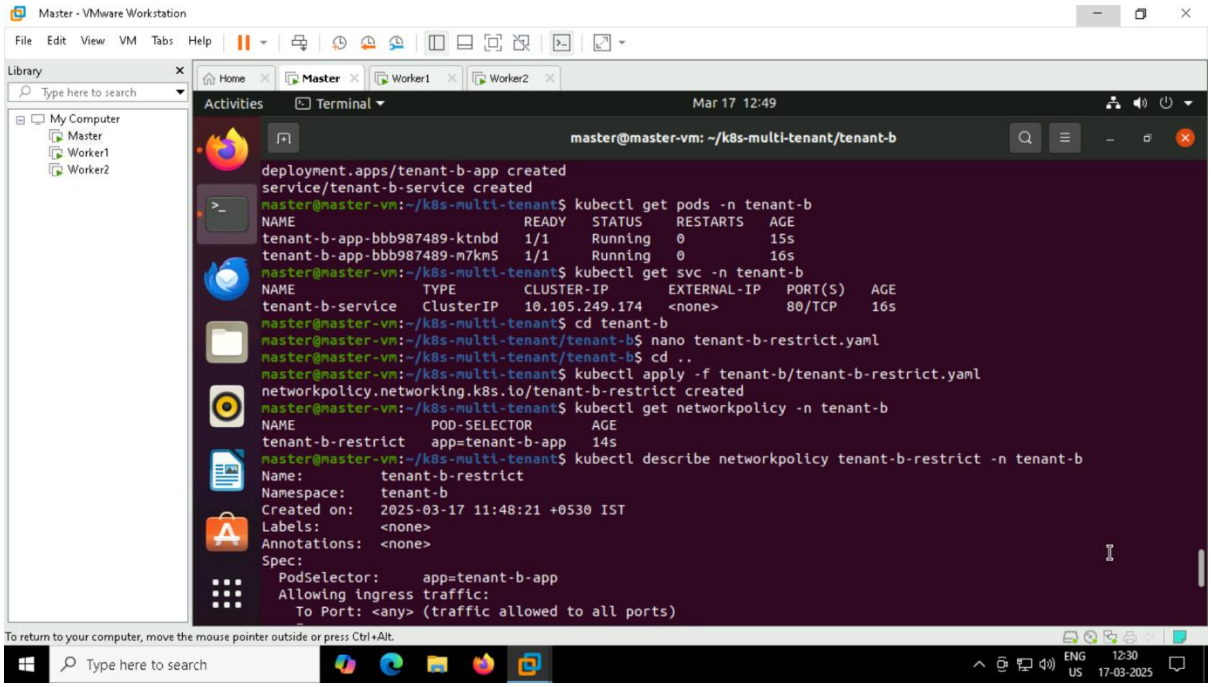
Worker2
Home
Master
Worker1
Worker2
Activities
Terminal
Mar 17 12:49
master@master-vm: ~/k8s-multi-tenant/tenant-b
Policy Types: Ingress
master@master-vm:~/k8s-multi-tenant$ cd tenant-b
master@master-vm:~/k8s-multi-tenant/tenant-b$ docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
f18232174bc9: Pull complete
Digest: sha256:a8560b36e8b8210634f77d9f7f9efd7ffa463e380b75e2e74aff4511df3ef88c
Status: Downloaded newer image for alpine:latest
docker.io/library/alpine:latest
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
error: unable to upgrade connection: container not found ("test-pod")
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl get pods -n tenant-b
NAME READY STATUS RESTARTS AGE
tenant-b-app-bbb987489-ktnbd 1/1 Running 0 12m
tenant-b-app-bbb987489-m7km5 1/1 Running 0 12m
test-pod 1/1 Running 0 106s
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl get pod test-pod -n tenant-b -o jsonpath='{.spec.containers[*].name}'
test-podmaster@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl get svc -n tenant-a
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
tenant-a-service ClusterIP 10.104.160.68 <none> 80/TCP 16m
master@master-vm:~/k8s-multi-tenant/tenant-b$ kubectl exec -it test-pod -n tenant-b -- wget --spider tenant-a-service.tenant-a.svc.cluster.local
To return to your computer, move the mouse pointer outside or press Ctrl+Alt.
Type here to search
ENG US
12:30 17-03-2025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Worker1
Worker2
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master@master-vm: ~/k8s-multi-tenant/tenant-b
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-ktnbd 1/1 Running 0 15s
tenant-b-app-bbb987489-m7km5 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 10.105.249.174 <none> 80/TCP 16s
master@master-vm:~/k8s-multi-tenant$ cd tenant-b
master@master-vm:~/k8s-multi-tenant/tenant-b$ nano tenant-b-restrict.yaml
master@master-vm:~/k8s-multi-tenant/tenant-b$ cd ..
master@master-vm:~/k8s-multi-tenant$ kubectl apply -f tenant-b/tenant-b-restrict.yaml
networkpolicy.networking.k8s.io/tenant-b-restrict created
master@master-vm:~/k8s-multi-tenant$ kubectl get networkpolicy -n tenant-b
NAME POD-SELECTOR AGE
tenant-b-restrict app=tenant-b-app 14s
master@master-vm:~/k8s-multi-tenant$ kubectl describe networkpolicy tenant-b-restrict -n tenant-b
Name: tenant-b-restrict
Namespace: tenant-b
Created on: 2025-03-17 11:48:21 +0530 IST
Labels: <none>
Annotations: <none>
Spec:
PodSelector: app=tenant-b-app
Allowing ingress traffic:
To Port: <any> (traffic allowed to all ports)
To return to your computer, move the mouse pointer outside or press Ctrl+Alt.
Type here to search
ENG US
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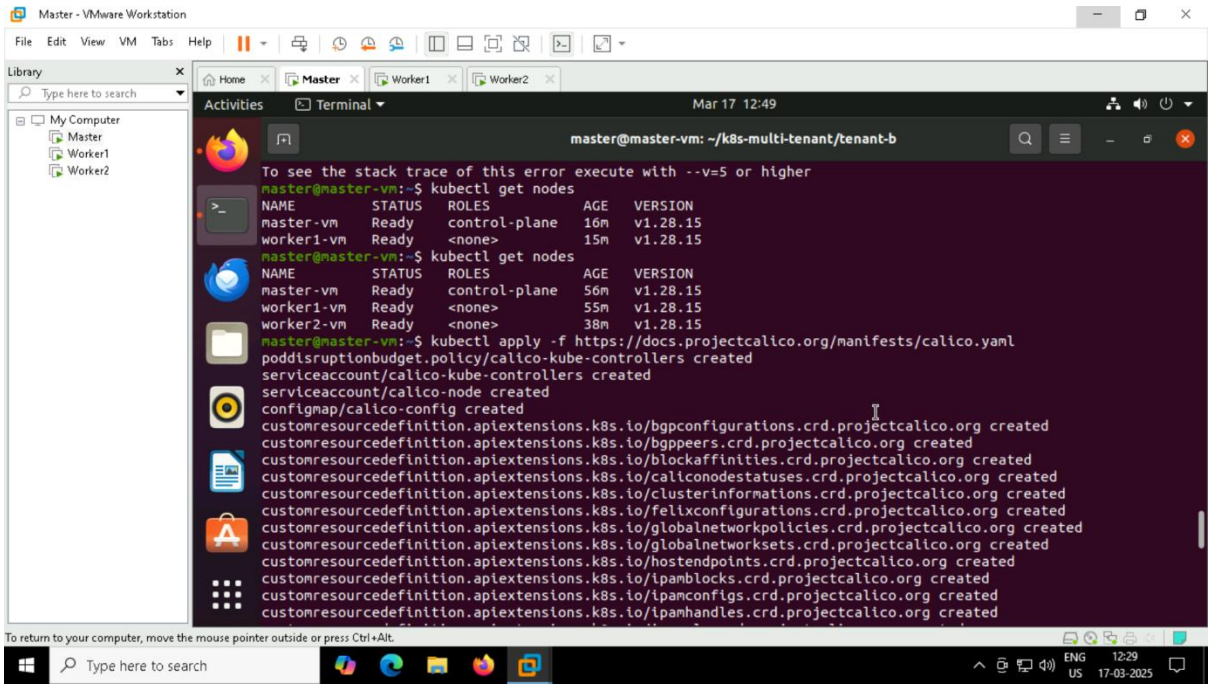
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Worker1
Worker2
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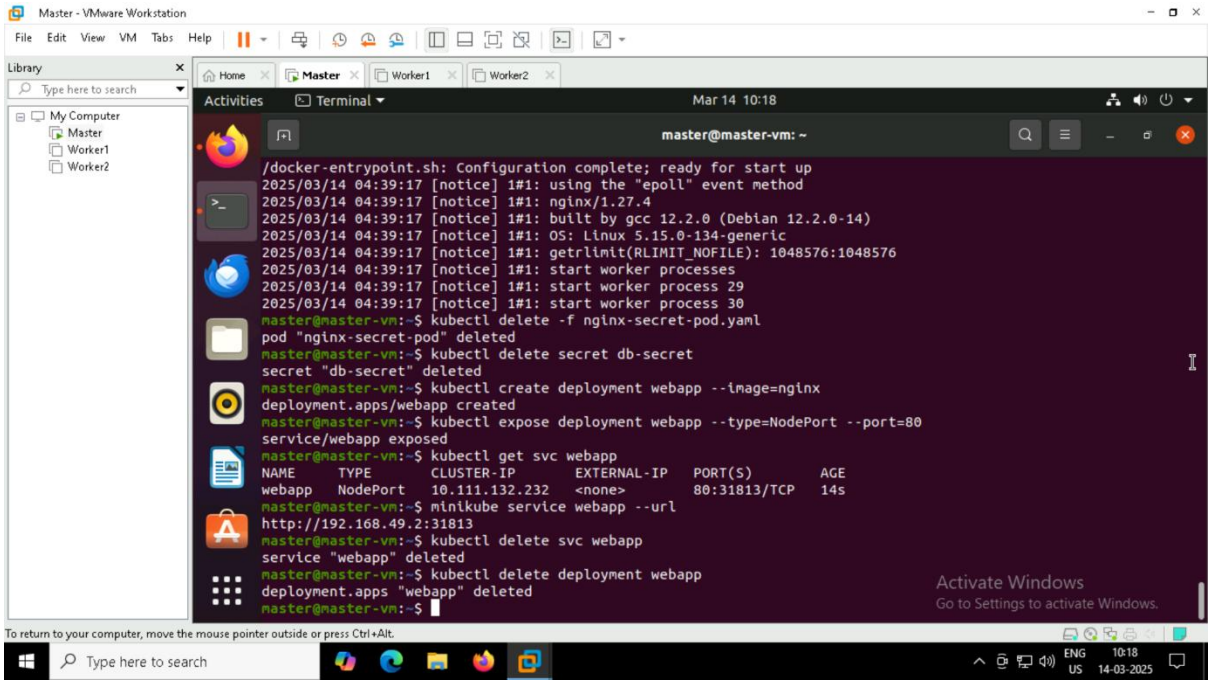
Terminal
Mar 17 12:49
master@master-vm: ~/k8s-multi-tenant/tenant-b
To see the stack trace of this error execute with --v=5 or higher
master@master-vm:~$ kubectl get nodes
NAME STATUS ROLES AGE VERSION
master-vm Ready control-plane 16m v1.28.15
worker1-vm Ready <none> 15m v1.28.15
master@master-vm:~$ kubectl get nodes
NAME STATUS ROLES AGE VERSION
master-vm Ready control-plane 56m v1.28.15
worker1-vm Ready <none> 55m v1.28.15
worker2-vm Ready <none> 38m v1.28.15
master@master-vm:~$ kubectl apply -f https://docs.projectcalico.org/manifests/calico.yaml
poddisruptionbudget.policy/calico-kube-controllers created
serviceaccount/calico-kube-controllers created
serviceaccount/calico-node created
configmap/calico-config created
customresourcedefinition.apiextensions.k8s.io/bgpconfigurations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/bgppeers.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/blockaffinities.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/caliconodestatuses.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/clusterinformations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/felixconfigurations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/globalnetworkpolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/globalnetworksets.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/hostendpoints.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ipamblocks.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ipamconfigs.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ipamhandles.crd.projectcalico.org created
To return to your computer, move the mouse pointer outside or press Ctrl+Alt.
Type here to search
ENG US
12:29
17-03-2025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master@master-vm: ~
/docker-entrypoint.sh: Configuration complete; ready for start up
2025/03/14 04:39:17 [notice] 1#1: using the "epoll" event method
2025/03/14 04:39:17 [notice] 1#1: nginx/1.27.4
2025/03/14 04:39:17 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2025/03/14 04:39:17 [notice] 1#1: OS: Linux 5.15.0-134-generic
2025/03/14 04:39:17 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2025/03/14 04:39:17 [notice] 1#1: start worker processes
2025/03/14 04:39:17 [notice] 1#1: start worker process 29
2025/03/14 04:39:17 [notice] 1#1: start worker process 30
master@master-vm:~$ kubectl delete -f nginx-secret-pod.yaml
pod "nginx-secret-pod" deleted
master@master-vm:~$ kubectl delete secret db-secret
secret "db-secret" deleted
master@master-vm:~$ kubectl create deployment webapp --image=nginx
deployment.apps/webapp created
master@master-vm:~$ kubectl expose deployment webapp --type=NodePort --port=80
service/webapp exposed
master@master-vm:~$ kubectl get svc webapp
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
webapp NodePort 10.111.132.232 <none> 80:31813/TCP 14s
master@master-vm:~$ minikube service webapp --url
http://192.168.49.2:31813
master@master-vm:~$ kubectl delete svc webapp
service "webapp" deleted
master@master-vm:~$ kubectl delete deployment webapp
deployment.apps "webapp" deleted
master@master-vm:~$
Activate Windows
Go to Settings to activate Windows.
To return to your computer, move the mouse pointer outside or press Ctrl+Alt.
Type here to search
ENG US
10:18
14-03-2025