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289226

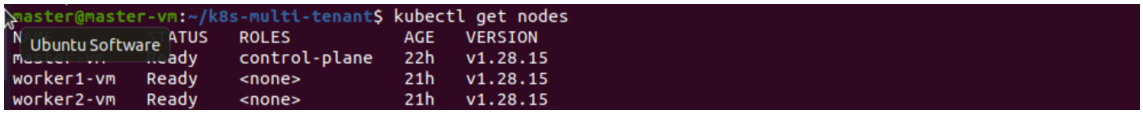
KUBERNETES PROJECT - 2

Multi-Tenant Project

Step 1: Check if Any Worker Node is Ready

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

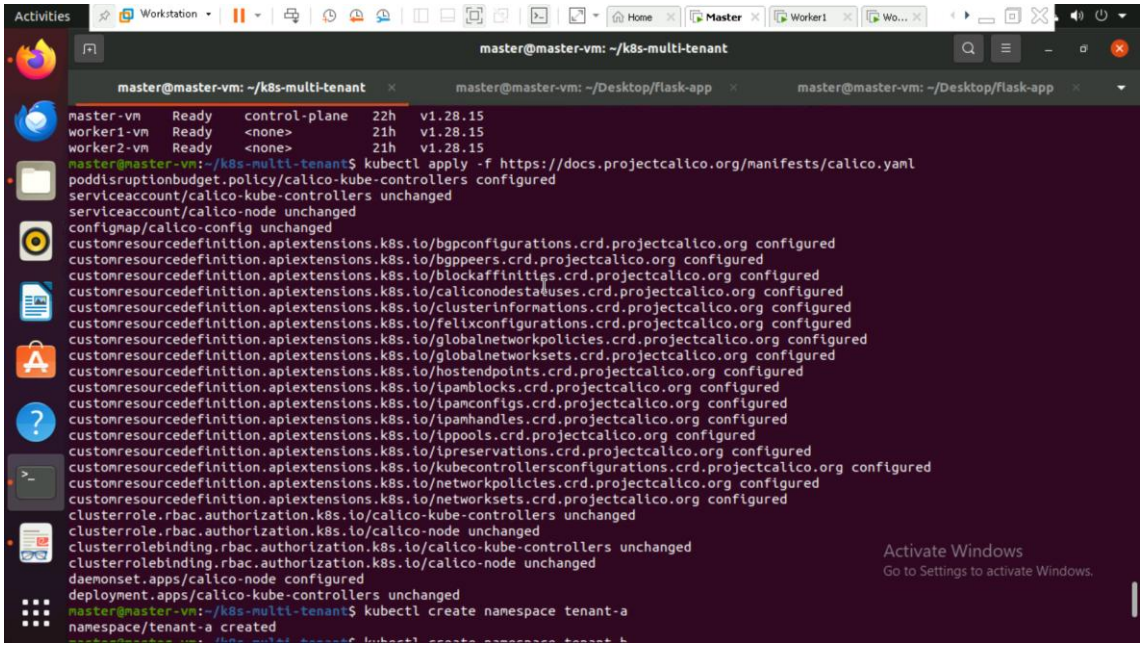
kubectl get nodes



Step 2: Install Calico for Networking

Apply the Calico manifest to enable networking:

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

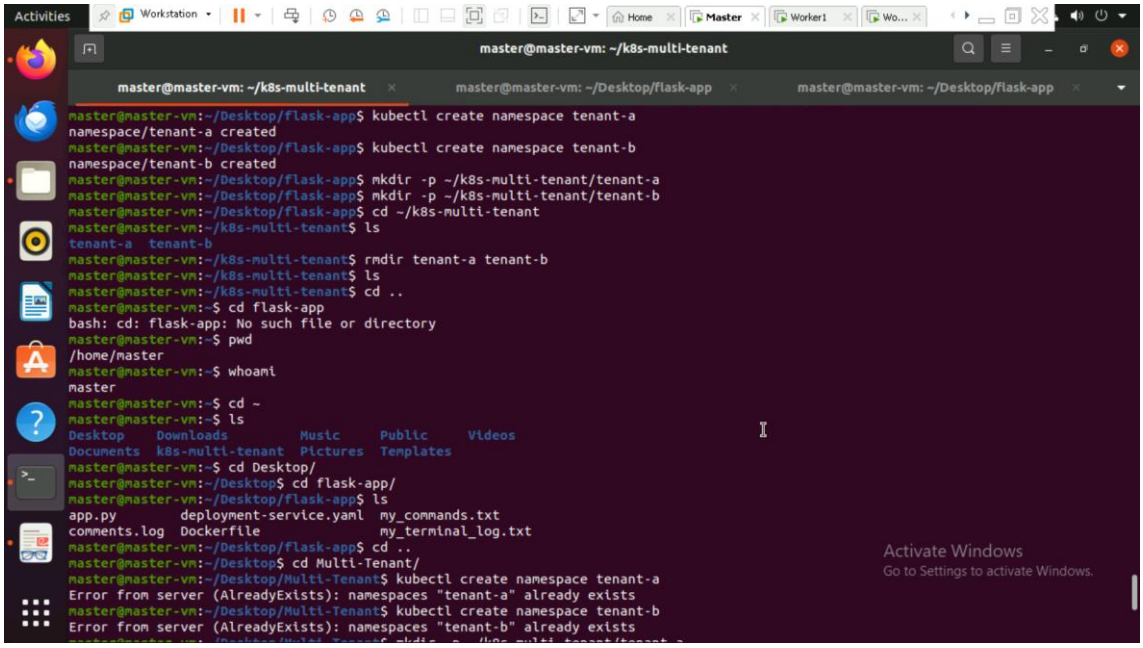


Step 3: Create Namespaces for Tenants

To isolate tenants, create separate namespaces:

kubectl create namespace tenant-a kubectl

create namespace tenant-b



Step 4: 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

Step 5: Create Deployment and Service for Tenant A

Create tenant-a-app.yaml in the tenant-a/ directory with the following contents:

apiVersion: apps/v1 kind:

Deployment metadata:

name: tenant-a-app

namespace: tenant-a spec:

replicas: 2 selector:

matchLabels: app:

tenant-a-app template:

metadata: labels:

app: tenant-a-app spec:

containers: - name:

tenant-a-app image:

nginx

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apiVersion: v1 kind:

Service metadata:

name: tenant-a-service

namespace: tenant-a

spec: selector:

app: tenant-a-app

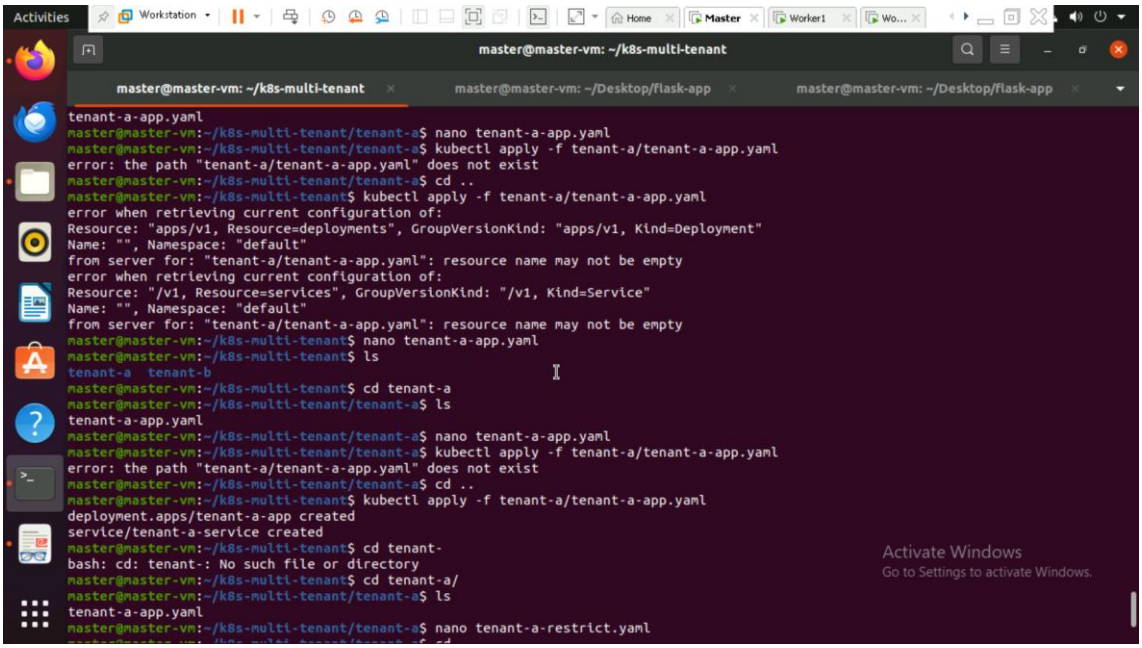
ports: - protocol:

TCP port: 80

targetPort: 80

Apply the configuration:

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



Step 6: Restrict Network Access for Tenant A

Create tenant-a-restrict.yaml in the tenant-a/ directory with the following contents:

apiVersion: networking.k8s.io/v1 kind: NetworkPolicy metadata:

name: tenant-a-restrict

namespace: tenant-a

spec: podSelector:

matchLabels:

app: tenant-a-app

policyTypes: - Ingress

ingress:

- from: -

podSelector:

matchLabels:

app: tenant-a-app Apply

the network policy:

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

Step 7: Create Deployment and Service for Tenant B

Create tenant-b-app.yaml in the tenant-b/ directory with the following contents:

apiVersion: apps/v1 kind:

Deployment metadata:

name: tenant-b-app

namespace: tenant-b spec:

replicas: 2 selector:

matchLabels: app:

tenant-b-app template:

metadata: labels:

app: tenant-b-app spec:

containers: - name:

tenant-b-app image:

nginx

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apiVersion: v1 kind:

Service metadata:

name: tenant-b-service

namespace: tenant-b

spec: selector:

app: tenant-b-app

ports: - protocol:

TCP port: 80

targetPort: 80

Apply the deployment:

kubectl apply -f tenant-b/tenant-b-app.yaml Verify the deployment:

kubectl get pods -n tenant-b kubectl get svc -n tenant-b

Step 8: Restrict Network Access for Tenant B

Create tenant-b-restrict.yaml in the tenant-b/ directory with the following contents:

apiVersion: networking.k8s.io/v1

kind: NetworkPolicy metadata:

name: tenant-b-restrict

namespace: tenant-b

spec: podSelector:

matchLabels:

app: tenant-b-app

policyTypes: - Ingress

ingress:

- from: -

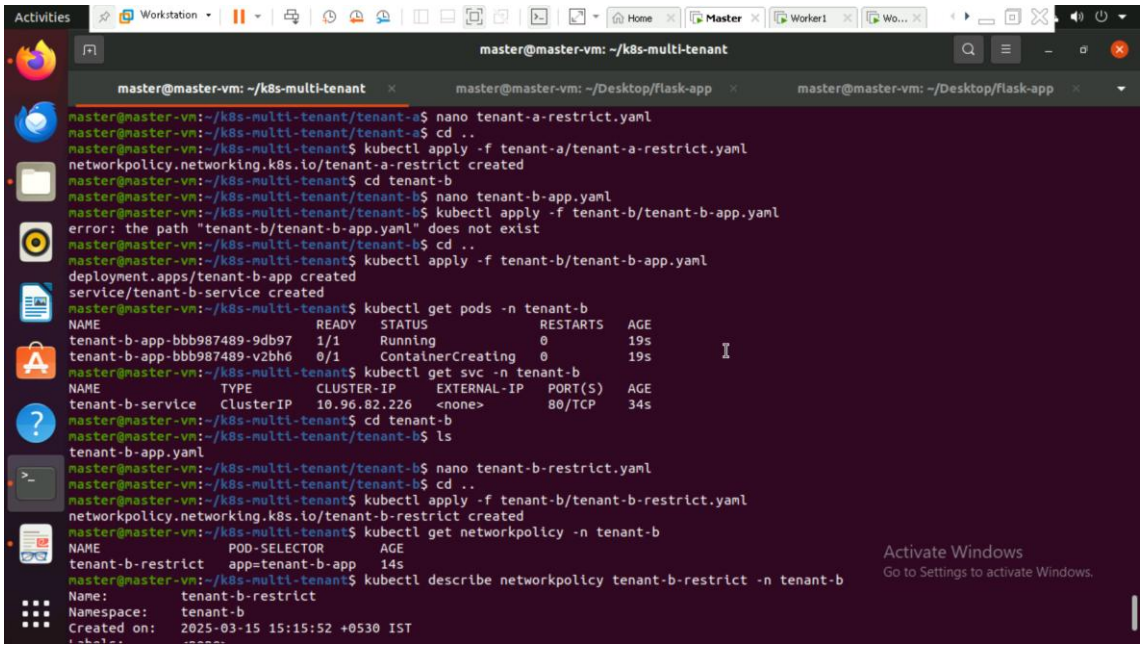
podSelector:

matchLabels:

app: tenant-b-app Apply

the network policy:

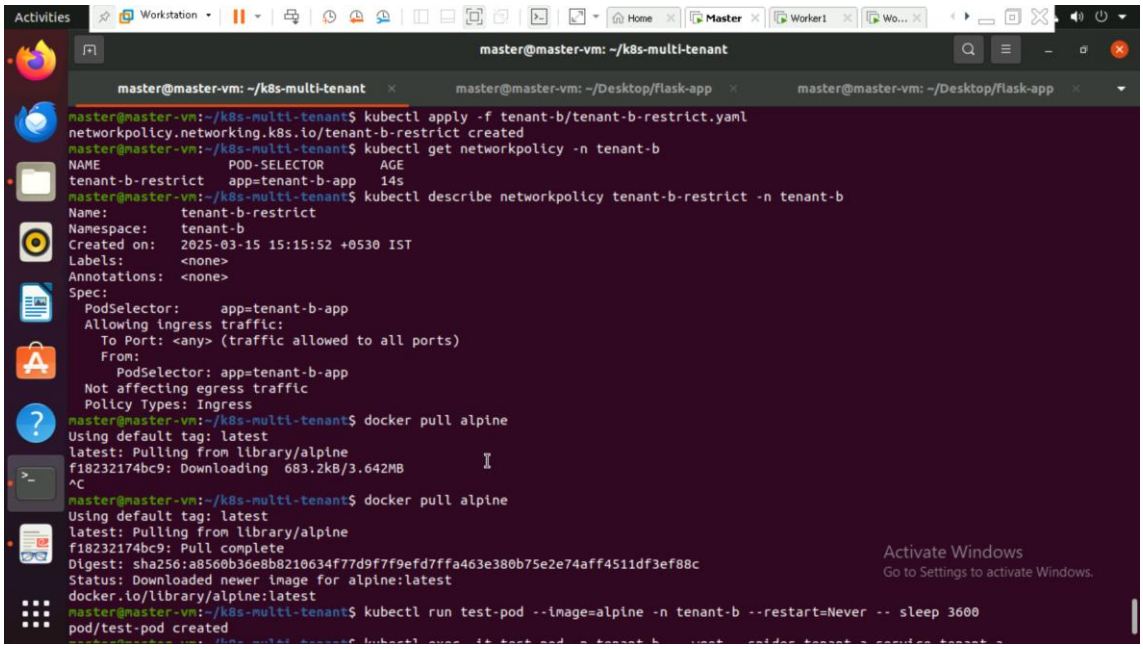
kubectl apply -f tenant-b/tenant-b-restrict.yaml



Step 9: Verify Network Policy

To verify the network policy for Tenant B, run the following commands:

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



Step 10: Final Folder Structure

The final folder structure should look like this:

k8s-multi-tenant/

|— tenant-a/

| ├— tenant-a-app.yaml

| ├— tenant-a-restrict.yaml

|— tenant-b/

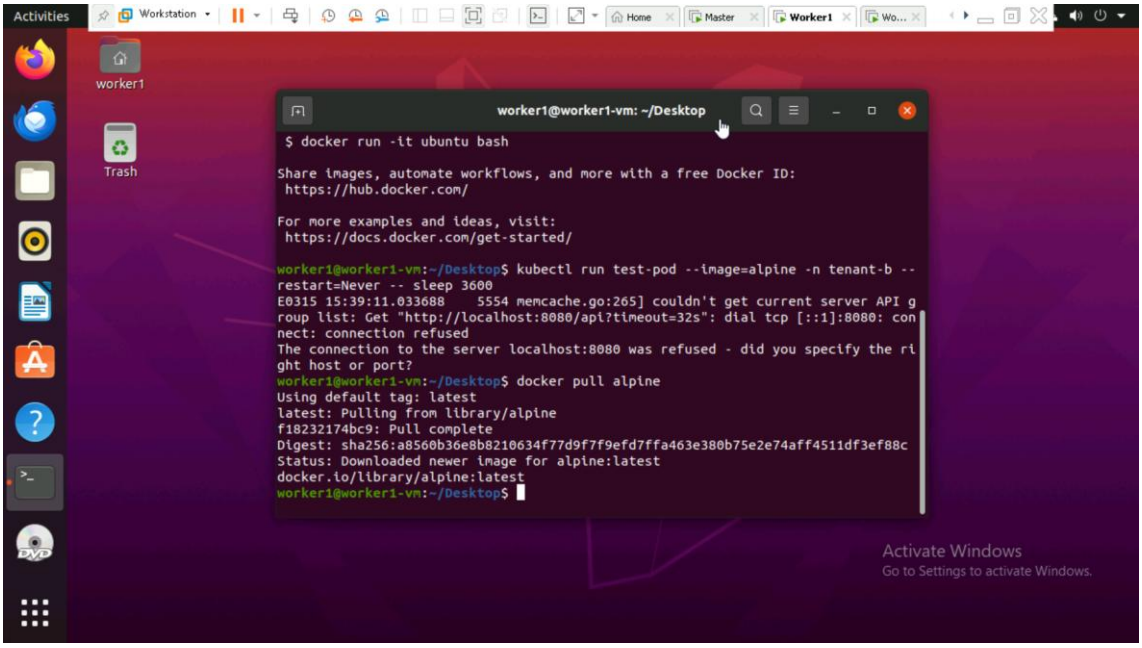
| ├— tenant-b-app.yaml

| ├— tenant-b-restrict.yaml

Step 11: Test Tenant Isolation

Create a test pod in tenant-b and check access to tenant-a: In

worker docker run docker pull alpine



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-a