

## Lesson 03 Demo 06

### Implementing RBAC Using Namespaces

**Objective:** To demonstrate the setup and verification of role-based access control (RBAC) in Kubernetes using namespaces for secure and efficient user management

**Tools required:** kubeadm, kubectl, kubelet, and containerd

**Prerequisites:** A Kubernetes cluster should already be set up (refer to the steps provided in Lesson 02, Demo 01 for guidance).

Steps to be followed:

1. Create a namespace in master node
2. Generate an RSA private key and certificate requests
3. Create a role
4. Create a rolebinding service
5. Set up credentials for the user
6. Verify the roles

#### Step 1: Create a namespace in master node

1.1 Use the following command to create a namespace:

**kubectl create namespace role**

```
labsuser@master:~$ kubectl create namespace role
namespace/role created
labsuser@master:~$
```

1.2 Create and navigate to the **role** directory with these commands:

**mkdir role**

**cd role**

```
labsuser@master:~$ kubectl create namespace role
namespace/role created
labsuser@master:~$ mkdir role
labsuser@master:~$ cd role
labsuser@master:~/role$
```

## Step 2: Generate an RSA private key and certificate requests

2.1 Generate an RSA private key using the following commands:

```
sudo openssl genrsa -out user3.key 2048
sudo openssl req -new -key user3.key -out user3.csr
```

```
labsuser@master:~/role$ sudo openssl genrsa -out user3.key 2048
labsuser@master:~/role$ sudo openssl req -new -key user3.key -out user3.csr
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:In
State or Province Name (full name) [Some-State]:MH
Locality Name (eg, city) []:au
Organization Name (eg, company) [Internet Widgits Pty Ltd]:role
Organizational Unit Name (eg, section) []:role
Common Name (e.g. server FQDN or YOUR name) []:user3
Email Address []:role@gmail.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:
An optional company name []:
labsuser@master:~/role$
```

2.2 Link an identity to the private key using a digital signature with the following command:

```
sudo openssl x509 -req -in user3.csr -CA /etc/kubernetes/pki/ca.crt -CAkey
/etc/kubernetes/pki/ca.key -CAcreateserial -out user3.crt -days 500
```

```
Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:
An optional company name []:
labsuser@master:~/role$ sudo openssl x509 -req -in user3.csr -CA /etc/kubernetes/pki/ca.crt -CAkey /etc/kubernetes/pki/ca.key -CAcreateserial -out user3.crt -days 500
Certificate request self-signature ok
subject=C = In, ST = MH, L = au, O = role, OU = role, CN = user3, emailAddress = role@gmail.com
labsuser@master:~/role$
```

## Step 3: Create a role

3.1 Add the following code to the **role.yaml** file:

```
vi role.yaml
```

```
kind: Role
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  namespace: role
  name: user3-role
rules:
- apiGroups: ["", "extensions", "apps"]
  resources: ["deployments", "pods", "services"]
  verbs: ["get", "list", "watch", "create", "update", "patch", "delete"]
```

```
kind: Role
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  namespace: role
  name: user3-role
rules:
- apiGroups: ["", "extensions", "apps"]
  resources: ["deployments", "pods", "services"]
  verbs: ["get", "list", "watch", "create", "update", "patch", "delete"]

~
~
```

3.2 Create a role with the following commands:

```
kubectl create -f role.yaml
```

```
kubectl get roles -n role
```

```
labsuser@master:~$ vi role.yaml
labsuser@master:~$ kubectl create -f role.yaml
role.rbac.authorization.k8s.io/user3-role created
labsuser@master:~$ kubectl get roles -n role
NAME          CREATED AT
user3-role    2023-10-09T09:25:16Z
labsuser@master:~$
```

## Step 4: Create a rolebinding service

4.1 To create a rolebinding service, add the following code to the **rolebinding.yaml** file:

```
vi rolebinding.yaml
```

```
kind: RoleBinding
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  name: role-test
  namespace: role
subjects:
- kind: User
  name: user3
  apiGroup: ""
roleRef:
  kind: Role
  name: user3-role
  apiGroup: ""
```

```
kind: RoleBinding
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  name: role-test
  namespace: role
subjects:
- kind: User
  name: user3
  apiGroup: ""
roleRef:
  kind: Role
  name: user3-role
  apiGroup: ""
```

4.2 Create a rolebinding with the following commands:

```
kubectl create -f rolebinding.yaml
```

```
kubectl get rolebinding -n role
```

```
labsuser@master:~$ vi rolebinding.yaml
labsuser@master:~$ kubectl create -f rolebinding.yaml
rolebinding.rbac.authorization.k8s.io/role-test created
labsuser@master:~$ kubectl get rolebinding -n role
NAME          ROLE              AGE
role-test     Role/user3-role   6s
labsuser@master:~$
```

## Step 5: Setup credentials for the user

5.1 Assign credentials to user3 using the following command:

```
kubectrl config set-credentials user3 --client-certificate=/home/labsuser/role/user3.crt  
--client-key=/home/labsuser/role/user3.key
```

```
labsuser@master:~$ kubectrl config set-credentials user3 --client-certificate=/home/labsuser/role/user3.crt --client-key=/home/labsuser/role/user3.key  
User "user3" set.  
labsuser@master:~$
```

5.2 Set the context for user3 using the following command:

```
kubectrl config set-context user3-context --cluster=kubernetes --namespace=role --  
user=user3
```

```
labsuser@master:~$ kubectrl config set-credentials user3 --client-certificate=/home/labsuser/role/user3.crt --client-key=/home/labsuser/role/user3.key  
User "user3" set.  
labsuser@master:~$ kubectrl config set-context user3-context --cluster=kubernetes --namespace=role --user=user3  
Context "user3-context" created.  
labsuser@master:~$
```

5.3 Display current contexts using the following command:

```
kubectrl config get-contexts
```

```
labsuser@master:~$ kubectrl config set-credentials user3 --client-certificate=/home/labsuser/role/user3.crt --client-key=/home/labsuser/role/user3.key  
User "user3" set.  
labsuser@master:~$ kubectrl config set-context user3-context --cluster=kubernetes --namespace=role --user=user3  
Context "user3-context" created.  
labsuser@master:~$ kubectrl config get-contexts  
CURRENT  NAME             CLUSTER  AUTHINFO  NAMESPACE  
*         kubernetes-admin@kubernetes  kubernetes  kubernetes-admin  role  
user3-context  user3-context  kubernetes  user3        role  
labsuser@master:~$
```





```
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: LS0tLS1CRUdJTTI0RDVJUSUzJQ8FURS0tLS0tCk1JSURCVENDQmUyZ0F3SUJBZ0lJWFBXL05wTiszTEl3RFFZSkctVmk1odmNOQVFfTEJRQXdGVEVUTUJFR0ExVUUKQXhNS2EzVnI
    1aWEP1WJhsBgN6WgDzB5TXpFd01Ea3d0ekU1TXpKYUz3MHpNekV3TURZd056TBNEkphT3UJVeApFekFSQmdOVKcJBTVRDbXQxdWlWenJtVjBaWE13Z2dFaU1BMEduD3FHU011M0RRRUJBUVNBQTRJQkR3QXdnZ0VLckFv
    SUJBUURyYWRuYmPZGpxU2s2Ym1lQzc4dmhBSmZQWUdschwPY2FQ52ZkZVaU21LVH0YXNUd11NNHBFwJIKcDhuY9NNTPdp0wK0xaaA2amRDQzhUcUV4M0JkSFhmTFF0Z1Vjd2k2c2RmNmQk08xRL3ZsQ0njVVG0UF
    dPdpNlbXExMzF0dWU2l0tBR0FkL0dMMVJwSkQ4TT1T3JMN1Ud2FwCucxb01CSUxKNC9MVFewUWVZyVklTW9pcUphc1NQb0BkZHZZk9DdkVrOTD0amVsdEFpa1V0b3ViZnMwTDJSGVGDdXhoUH15RX15SwttemNHOFdH
    aEpNUJ3scU8KQczck1JMMWHYKRMR2RsbDE3RWRURjHbVbK1UW1hZwtqTmhXen1KNUFkd0FLM1R5Nz3cemNfC1V0VzZodUJ2c2Q5SWUJnTFB0SErDaE0wQmhcEgzN1Z5c28xZGxwQWQmdkQkFBR2pXVEJYUe0R0ExVWREdD
    VCL3RRUF3SUNwREFQcKjNt1Z1Uk1CQWY4RUJQUURBUJgVtUwR0ExVWREZ1FXQK3SVK02enhSMU9sbV1uUdPtM1S1BvNVpNTR6QVYKmdOVKhSRUVEakFNZ2dwcmlR5SmxjbTVsZEdlek1BMEduD3FHU011M0RRRUJBU
    d1V0TRJQkR3QXdnZ0VLckFvYWRuYmPZGpxU2s2Ym1lQzc4dmhBSmZQWUdschwPY2FQ52ZkZVaU21LVH0YXNUd11NNHBFwJIKcDhuY9NNTPdp0wK0xaaA2amRDQzhUcUV4M0JkSFhmTFF0Z1Vjd2k2c2RmNmQk08xRL3ZsQ0njVVG0UF
    8zTmhYnN1MmdqGLEb1Baa0Fydc9EcFgKYpVUDR3ahQAVE90UmSHN13mVFA3bXJzY05tE22FRUFYJzUzUBSXLjMGNLm05pd19HQzNsefFENDR4xjcwQpJUVUUDdFQ195Qnh4QW13emFXZF1D0MhNMzgyM23xVtMn
    eE51ZAVJNEh2N1BUK1ZFcF8gSHZuL0M2Q1Q4ZmFHC19PU1BpdEplZytEbnp5SHoyc3JjcnRRM1p1eH4wJdRUBET0xEtmK3mK1vLz3jQVJvbmLud1HnQUE25GZuNm0K3cDNhdZwUWjYz3i0tLS0tRUSIEENFU1RJRK
    1DQVRFLS0tLS0K
    server: https://172.31.3.59:6443
    name: kubernetes
contexts:
- context:
    cluster: kubernetes
    user: kubernetes-admin
    name: kubernetes-admin@kubernetes
- context:
    cluster: kubernetes
    namespace: role
    user: user3
    name: user3-context
current-context: kubernetes-admin@kubernetes
kind: Config
preferences: {}
"myconf" 28L, 5862B
```

1,1 Top

```
- name: kubernetes-admin
  user:
    client-certificate-data: LS0tLS1CRUdJTTI0RDVJUSUzJQ8FURS0tLS0tCk1JSURCVENDQmUyZ0F3SUJBZ0lJWFBXL05wTiszTEl3RFFZSkctVmk1odmNOQVFfTEJRQXdGVEVUTUJFR0E
    xVUUKQXhNS2EzVnIaWEP1WJhsBgN6WgDzB5TXpFd01Ea3d0ekU1TXpKYUz3MHpNekV3TURZd056TBNEkphT3UJVeApFekFSQmdOVKcJBTVRDbXQxdWlWenJtVjBaWE13Z2dFaU1BMEduD3FHU011M0RRRUJBUVNBQTRJQkR3QXdnZ0VLckFv
    RREv4Qn3K0p5Y201bGRHvnpM0ZrCmJXhVNSU1CSWpBTKna3Foa21HDXcwKfRRRUZBQU9DQVE4QU1JSUJ0Z0t0QVFFQXVCTE1sdz2VmrIL01J53UKOTdbbjniQW5aZJLYngxSkcsySFUwFp
    3UzUyQmtkbnYyUHRMGNscG1IaXk3WEV1Wm1KNE2dXRrR253cHNLDApLQXdNRVc0S0ZVYUR6ZVc1YVAzV3U1WFMbmVpTXp4SnJ6VxPbnJsdHBREREN5ZDNYV1A1NkVeEbvJv1RUUDbZCj1uWVh
    1bUJ2aW44Z2NGNEtqde43WHT2g3eE5sMy94VvC2ZDAwcVRSR1BBL2xoSEQwT15RTHhc1U3NpYcmQMhVamKJvYwJ1L0DRUbm03a3pSaHh6eXR1chHhRM20Uz24dndPWTBfbF1DdhNOTi8wNEV
    PenRYZjdLYmRkVTVIqgo2SWRSQ0NUT3QySFp6bHFVK3Q1MmJ1MxVWVkoV2trQjVRdzZw50FiVmRyTG93cXhZZ2VtFY2dmpkRw092TuxnCj1UUDJkUJLEQVFBQm8xWkdHREFPQmdOVKhROEjBZjh
    FQkFQ09JhQXdf11EVL1WbE3Bd3dZ11J53dZQkRVRUgKQXdd0RBRMURWUjBUQVF1L0tBSXk4BREFMQmdOVKhTtUWIREFXZ0JUCmRtdm1Z5s1L3BFaHlmlaW8yUUA0cUNGVQpHVEFQmdrcihhUlc
    5dzBCQVFzRkFBT0NBUBVQpK5ZwYzdkV5b25NSXh3Q29pWctTYi90S0Jusmt1VU91e1E53jRfBgHudmozMU56VVB6ekVnNzMTGM2NjVNM05IOVd5ZMxTGtGN0uUT1p3L0VjQVRWdzYyVzhVdFh
    HaFU3eUQUTB5OGNjUDZ1cHJhVjBSKytkS1dKYzN0TVc2b11VZkpocEFnTjNIR2hKbnhNQmYnNDNQTFNRY2VBhZGZkZyZ2MupNDJmQTAzT2pwV1hwcGMemZ1UH2X4WwzbjBNVEFTUX1RcnBsdMw
    FRkFBT2NoN0d0aEhneEkrR2V4dm5zSU1OCit5QmSueUM3e1PgCw9sZF1oU3pwRZ1Q529KQ212RkphcTVwZ3F4LzI2QjJmdHhZUEd3VGfHOGY5ZTUyU31sR0IKTgZxL22qc1hpYjZ6bitpChphdW
    XUJdWU5GOWd1ZUF2e1p5Z04zd2pYek1heGk1Vhc9PQotLS0tLSUVR0RCBDRVJUSUzJQ8FURS0tLS0tCg==
    client-key-data: LS0tLS1CRUdJTTI0RDVJUSUzJQ8FURS0tLS0tCk1JSURCVENDQmUyZ0F3SUJBZ0lJWFBXL05wTiszTEl3RFFZSkctVmk1odmNOQVFfTEJRQXdGVEVUTUJFR0E
    xVUUKQXhNS2EzVnIaWEP1WJhsBgN6WgDzB5TXpFd01Ea3d0ekU1TXpKYUz3MHpNekV3TURZd056TBNEkphT3UJVeApFekFSQmdOVKcJBTVRDbXQxdWlWenJtVjBaWE13Z2dFaU1BMEduD3FHU011M0RRRUJBUVNBQTRJQkR3QXdnZ0VLckFv
    RREv4Qn3K0p5Y201bGRHvnpM0ZrCmJXhVNSU1CSWpBTKna3Foa21HDXcwKfRRRUZBQU9DQVE4QU1JSUJ0Z0t0QVFFQXVCTE1sdz2VmrIL01J53UKOTdbbjniQW5aZJLYngxSkcsySFUwFp
    3UzUyQmtkbnYyUHRMGNscG1IaXk3WEV1Wm1KNE2dXRrR253cHNLDApLQXdNRVc0S0ZVYUR6ZVc1YVAzV3U1WFMbmVpTXp4SnJ6VxPbnJsdHBREREN5ZDNYV1A1NkVeEbvJv1RUUDbZCj1uWVh
    1bUJ2aW44Z2NGNEtqde43WHT2g3eE5sMy94VvC2ZDAwcVRSR1BBL2xoSEQwT15RTHhc1U3NpYcmQMhVamKJvYwJ1L0DRUbm03a3pSaHh6eXR1chHhRM20Uz24dndPWTBfbF1DdhNOTi8wNEV
    PenRYZjdLYmRkVTVIqgo2SWRSQ0NUT3QySFp6bHFVK3Q1MmJ1MxVWVkoV2trQjVRdzZw50FiVmRyTG93cXhZZ2VtFY2dmpkRw092TuxnCj1UUDJkUJLEQVFBQm8xWkdHREFPQmdOVKhROEjBZjh
    FQkFQ09JhQXdf11EVL1WbE3Bd3dZ11J53dZQkRVRUgKQXdd0RBRMURWUjBUQVF1L0tBSXk4BREFMQmdOVKhTtUWIREFXZ0JUCmRtdm1Z5s1L3BFaHlmlaW8yUUA0cUNGVQpHVEFQmdrcihhUlc
    5dzBCQVFzRkFBT0NBUBVQpK5ZwYzdkV5b25NSXh3Q29pWctTYi90S0Jusmt1VU91e1E53jRfBgHudmozMU56VVB6ekVnNzMTGM2NjVNM05IOVd5ZMxTGtGN0uUT1p3L0VjQVRWdzYyVzhVdFh
    HaFU3eUQUTB5OGNjUDZ1cHJhVjBSKytkS1dKYzN0TVc2b11VZkpocEFnTjNIR2hKbnhNQmYnNDNQTFNRY2VBhZGZkZyZ2MupNDJmQTAzT2pwV1hwcGMemZ1UH2X4WwzbjBNVEFTUX1RcnBsdMw
    FRkFBT2NoN0d0aEhneEkrR2V4dm5zSU1OCit5QmSueUM3e1PgCw9sZF1oU3pwRZ1Q529KQ212RkphcTVwZ3F4LzI2QjJmdHhZUEd3VGfHOGY5ZTUyU31sR0IKTgZxL22qc1hpYjZ6bitpChphdW
    XUJdWU5GOWd1ZUF2e1p5Z04zd2pYek1heGk1Vhc9PQotLS0tLSUVR0RCBDRVJUSUzJQ8FURS0tLS0tCg==
    client-key-data: LS0tLS1CRUdJTTI0RDVJUSUzJQ8FURS0tLS0tCk1JSURCVENDQmUyZ0F3SUJBZ0lJWFBXL05wTiszTEl3RFFZSkctVmk1odmNOQVFfTEJRQXdGVEVUTUJFR0E
    xVUUKQXhNS2EzVnIaWEP1WJhsBgN6WgDzB5TXpFd01Ea3d0ekU1TXpKYUz3MHpNekV3TURZd056TBNEkphT3UJVeApFekFSQmdOVKcJBTVRDbXQxdWlWenJtVjBaWE13Z2dFaU1BMEduD3FHU011M0RRRUJBUVNBQTRJQkR3QXdnZ0VLckFv
    RREv4Qn3K0p5Y201bGRHvnpM0ZrCmJXhVNSU1CSWpBTKna3Foa21HDXcwKfRRRUZBQU9DQVE4QU1JSUJ0Z0t0QVFFQXVCTE1sdz2VmrIL01J53UKOTdbbjniQW5aZJLYngxSkcsySFUwFp
    3UzUyQmtkbnYyUHRMGNscG1IaXk3WEV1Wm1KNE2dXRrR253cHNLDApLQXdNRVc0S0ZVYUR6ZVc1YVAzV3U1WFMbmVpTXp4SnJ6VxPbnJsdHBREREN5ZDNYV1A1NkVeEbvJv1RUUDbZCj1uWVh
    1bUJ2aW44Z2NGNEtqde43WHT2g3eE5sMy94VvC2ZDAwcVRSR1BBL2xoSEQwT15RTHhc1U3NpYcmQMhVamKJvYwJ1L0DRUbm03a3pSaHh6eXR1chHhRM20Uz24dndPWTBfbF1DdhNOTi8wNEV
    PenRYZjdLYmRkVTVIqgo2SWRSQ0NUT3QySFp6bHFVK3Q1MmJ1MxVWVkoV2trQjVRdzZw50FiVmRyTG93cXhZZ2VtFY2dmpkRw092TuxnCj1UUDJkUJLEQVFBQm8xWkdHREFPQmdOVKhROEjBZjh
    FQkFQ09JhQXdf11EVL1WbE3Bd3dZ11J53dZQkRVRUgKQXdd0RBRMURWUjBUQVF1L0tBSXk4BREFMQmdOVKhTtUWIREFXZ0JUCmRtdm1Z5s1L3BFaHlmlaW8yUUA0cUNGVQpHVEFQmdrcihhUlc
    5dzBCQVFzRkFBT0NBUBVQpK5ZwYzdkV5b25NSXh3Q29pWctTYi90S0Jusmt1VU91e1E53jRfBgHudmozMU56VVB6ekVnNzMTGM2NjVNM05IOVd5ZMxTGtGN0uUT1p3L0VjQVRWdzYyVzhVdFh
    HaFU3eUQUTB5OGNjUDZ1cHJhVjBSKytkS1dKYzN0TVc2b11VZkpocEFnTjNIR2hKbnhNQmYnNDNQTFNRY2VBhZGZkZyZ2MupNDJmQTAzT2pwV1hwcGMemZ1UH2X4WwzbjBNVEFTUX1RcnBsdMw
    FRkFBT2NoN0d0aEhneEkrR2V4dm5zSU1OCit5QmSueUM3e1PgCw9sZF1oU3pwRZ1Q529KQ212RkphcTVwZ3F4LzI2QjJmdHhZUEd3VGfHOGY5ZTUyU31sR0IKTgZxL22qc1hpYjZ6bitpChphdW
    XUJdWU5GOWd1ZUF2e1p5Z04zd2pYek1heGk1Vhc9PQotLS0tLSUVR0RCBDRVJUSUzJQ8FURS0tLS0tCg==
```

```

labsuser@worker-node-1:~$ vi myconf
labsuser@worker-node-1:~$ cat myconf
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: LS0tLS1CRUdJTIwYDRVc3U0ZjQ0FUR5b0tLS0tCk1JSURCVENDQWUyZDZlSUJBT01RmhwIDNwRvazR3RFFZSktwLmNmMQWFVFEtJQXQdGVVUUTUJFRGEeVUUKQXhNS2EzVmlaaw
B5TPeF081EwXhNek0zTURaYUz3MhpNekv3TURNE16UX1NRFphTUJVeApFekFSQmdOVGk1BTRVBRbDQxYmV1bWk0TjVJbWw1M3Z2dFAlBMEDU3FHU01jMRRRRUJBUUwBQTRJQkr3QXQndZ0VLckFvSUyBUURFUEM2UmzrVWntabTg
U3hIdG83S0pNwHcubmlrINDU1NHNH0aVE0eWNUm3MgMgKjdnEDJ6T0dKHzdJem54TErXa3BalnkSNR2s3bWbQ01MgGk1Undxzd1FdVR4NUJhT204R25V2zGtMwV2ZENrZgpTYzNqZm1FODUuT05zG9Fdz3p1Ng4vbC9IX0FCW
tyYYvZ2Z1TDrrB0k3hJhlnYvXdu4CmtDc0pGU0Z1VklG1MvREnYRmYDxbX0TStISUdHdkIRSUH1QW0ZUySSWNSVdEe1F3SW1Ca2duamFyN2ZZUGIKRUFZm1UY3jYVc3G0EVJedFUEvR6VEFSK2WQZdmkUzK4hIFQ3d
YQVYkQ0d1TndrcKsApK3WdJVF1tZHFdB3G3X0XqKdGcGxgM5z2bU3QW1NQKfBR2pXVEJTYUE0R0EXWREdVCL3dRRUF3SUMNREFQCKnT1ZLUk1CQW4RUJ3URBUluyYUtiwR0EXWREZ1FXQkUjVtnzRmJ3QURJQF0Q
RqQYKQ0d0KSHR5UeakFN2d2wcmRXSxjbTVtSzFdeWek1BMEduD3FHU01jMRRRRUJd1VBQTRJQkRQVW1M01QxaTcrUQpbczVdG4GmCnVBVctqTE3THdVMVf3MFmPUEXU1T1AcEN6cE1nHpyZ2pmS3dYmWbU3ByLmR6dFpi
V1pY2Z1Bdd3dXhRSTVPXZVYz1Z1N2kzbTfGsdZB7T1HJhLmTJdFVZ5J2Z5aWfG6nJLaVtXz2gx4QkdRyN01j4GvG9FUTHHmYkd1UGlyQW1Q3UwH1h0ZmRkQW2eT2kzcm1S4wGbnFRKJdzCFRRY1d0R2xvZvN2U0ppS
NWRF681zRtq1QvG9aWb1Y0zUuRnaGyXQckyNmLueaF0vG0w4SldmFZKUj8bVnvcCmt5QmlpZTVtQzYLSbE1rNFmWTQ1RwtpdZTbC805mCUJhN3NFaFk4w9kVzQY09L1HJUL1mMTNPLm55bVEK0TZtQz0v0bR3V
U1RJRk1DQvRF50tL59K
server: https://172.31.9.176:6443
name: kubernetess
contexts:
- context:
    cluster: kubernetess
    user: kubernetess-admin

```

5.8 Navigate to the `/role` directory and list its contents`cd role``ls -a`

```

- name: user3
  user:
    client-certificate: /home/labsuser/role/user3.crt
    client-key: /home/labsuser/role/user3.key
labsuser@master:~$ cd role
labsuser@master:~/role$ ls -a
. .. role.yaml rolebinding.yaml user3.crt user3.csr user3.key
labsuser@master:~/role$

```

5.9 View the `user3.crt` file on the master node and copy the code`cat user3.crt`

```

labsuser@master:~/role$ ls -a
. .. role.yaml rolebinding.yaml user3.crt user3.csr user3.key
labsuser@master:~/role$ cat user3.crt
-----BEGIN CERTIFICATE-----
MIIDEDCCAfgCFAN6Ihq8da3fSwcd6FS2cu1edHwrMA0GCSqGSIb3DQEBCwUAMBUx
EzARBgNVBAMTCmt1YmVybmV0ZXNwHhcNMjMDEwMDc0NTUyWWhcNMjUwMjIxMDc0
NTUyWjB0MQswCQYDVQGEwJJTjEELMAkGA1UECAwCTUgxZzAjbGVBACMAmF1MQ0w
CwYDVQQQLDARYb2x1MQ0wCwYDVQQQLDARYb2x1MQ0wDAYDVQQDDAV1c2VyMzEdMBsG
CSqGSIb3DQEJARYOc9sZUBnbWVpbC5jb20wggEiMA0GCSqGSIb3DQEBAQUAA4IB
DwAwggEKAoIBAQC+CysJMaa67v+Qx/K/8pscd3uCG9uSYJKzc95gw24f7LIaV1s
e1i6ZdyLtrjpUGUWfVcz0pqyR0nc4UQjwx70nPjDwxQTb0DSuMb4WoYiC+YJDHw
OsQWkgcVOAnW3YmmZI1JrUkKpEmL6lNmNzCjQXq574MQGJOwawJowxPIV0SZii9
AsTy7d6T/rrjZWLE/dsrVcEQr0mV/1a133i567DZatQI98+hL+xx523P464MJfNA6
9V0x7rmdWYYNblWoDKKAwF6KPOnZvVvCTCnJzb6jnIT/5GjybpqhNSiAoIn16oJWw
/h2ntK3a1fhIq2sMJWUZahowinthsg6U1f3v1AgMBAAEwDQYJKoZIhvcNAQELBQAD
ggEBAASqE5HQLm1jSxTDJp7raBGrwryRq3urDm2I/sN9ZYdICcJqIulr5wF64Ic7
B4SKCENC7XCICsPBGJxsMqDf4RAvgw1DIp7zDXan7vy2T3V9zyIGHznMEZKTQ1hO
YtV5CKZ64m0vLSYmwbkKPwtKX9c8Z1E2/Z9QXWnzEwcFgOhNdMPIzvw4BNegAhG+
x0f1Z12zd1s3duhwKbdV+Z3rAQxhd0AhrJh7njfzF198agVJ5McETDqWEGCPjoV
p4JDpz/UYE50JhJWoh2s8vjAsMHZM0DjhADxc3WyoGE/X/D1d2tNpaEffPbo8t6
9IA+Cpe8BpR2rv0xrZgh+VPAkQ=
-----END CERTIFICATE-----
labsuser@master:~/role$

```

5.10 On the **worker-node-1**, paste the copied code in the **/role** directory

**mkdir role**

**cd role**

**vi user3.crt**

**cat user3.crt**

```
labsuser@worker-node-1:~$ mkdir role
```

```
labsuser@worker-node-1:~$ cd role
labsuser@worker-node-1:~/role$ vi user3.crt
labsuser@worker-node-1:~/role$ cat user3.crt
```

```
-----BEGIN CERTIFICATE-----
MIIDEDCAfGCFB33h0jrkBm6ZabYuEpjFC1pkrQwMA0GCSqGSIb3DQEBCwUAMBUx
EzARBgNVBAMTCmt1YmVybmV0ZXNwHhcNMjMxMDA5MDc1MTMzWhcNMjUwMjIwMDc1
MTMzWjB0MQswCQYDVQQGEwJJb2JELMAkGA1UECAwCTUgxGzAJBgNVBACMAmF1MQ0w
CwYDVQQKDARyb2x1MQ0wCwYDVQQQLDARyb2x1MQ4wDAYDVQQDDAV1c2VyMzEdMBsG
CSqGSIb3DQEJARYOcm9sZUBnbWVpY2x1b20wgGEiMA0GCSqGSIb3DQEBAQUAA4IB
DwAwggEKAoIBAQC72oaDdx8wRSjC45cpekGQt4s9oL4fnICpsqM76978mQOGboKV
zqasrTyPQLzIYX9PH2R4+1iMv/gE2uUjBGqm5pTbpwcV8E6nzSa6t0z4hZ4+5h9a
0gJ/S/2ssFKaCcFb24hhf7R9MtJ8hEUfzPLFCGejBVBV71+s9z9zIRJBkQxGrGrm
e2AV0mVbPssAEwX0mboA/iMSu+zxQ1Tp2dMKCc4mcoPe/J8n/1+3UJo+7zIjaSxd
qFaAdx5dxa7qHP7z+/Vkf064ipQqsivBpfvOKzalVzuHFS1uy/Qihld0HjzqJjx
/Phvc1TIEIEHgNav3iliCOD+u/jmkzZDcTm1AgMBAAEwDQYJKoZIhvcNAQELBQAD
ggEBAI5R2k1XI/91TluTcwHLxI9uOLCXP3Jy3x/0jAT8W5ww4R7BKd9+/9GL7o7
vCZC/q2ocJ6+Vbqhs32GaNkf+is8E559MCLXSRqGmG+gZaHOFH7VIpt41A3C180T
WEPLC1bqPeutzRqXkGFJPoemRjeS67oPFybvYy3W5X75Y6hWS7PWBQHvS0p8pj67
1S0PHb/g/KbBLTWcgLUuoRWbq5yrH+44A1pItxxH3t+VaD5W+UHLL3rozK6mXzCB
hSXBxhRzKkiz5QfzaTUh5m0eH6RrUyYKHrMo91y7z3B+Yo+T5Sx78Hufgr5SM0A
ujMSiY3ayBNSysPZ1GycNLbrM18=
-----END CERTIFICATE-----
labsuser@worker-node-1:~/role$
```

5.11 Navigate to the master node use the following command to access the key:

**sudo cat user3.key**

```

labsuser@master:~/role$ ^C
labsuser@master:~/role$ cat user3.key
cat: user3.key: Permission denied
labsuser@master:~/role$ sudo cat user3.key
-----BEGIN PRIVATE KEY-----
MIIEVQIBADANBgkqhkiG9w0BAQEFAASCBAwggSjAgEAAoIBAQCtL1v9t06YYcLo
MzjH2WlQrNKpCg+1Alnb08cph33e8MF5NPED1pWp1cwn86FohLRdNFyTic80Wyt
hCRl4K8mCn1cPTDTJx4WRS2or7J7m4+rFMZudtoeXDZqANySXwsPmx6DzUZW32dp
3CUzUNno0cW0ZE22KdYsK1RFEWIZUuyCJJ0BjP4u11Fi/v9w9JvybYjWpmacamWY
bcqHgINALnV7zlvW4DE/FRDtRtKG1A6aVqYI8xx0mWgtLXt6rEGTammQ6GMzdnJX
0mhcyWm8Ib4WUHCe2Y4oCMc90TP4+gpRgRGjrnjxCPSXGKJXX3myf/S8Z0gEaLYX
M+3bzcbraAgMBAAECggEAMbShkHwBwi8DD2PZFu5x2xsqJIBf/W4aR42dqa4ZxdG+
yAz9s/Y9GCOI2+VhkqvTjqC37sNF0bHhmZttCuce9qgGcfumCygcqRGJrEvoyFr/
i3aG0s0y+RDdvYV1VCWvYPYRjoIG9BIq03bNaggiieVQ6+iwNzcZqn9Svns2Wwi
lpqAyEMLSzoGHYmW90xYyMlGF3X0TgtJH3RB0bk6R+D4smGhhiXF2WdkKrIphPdK
p1HzDJ1WT3JkTEpLK6biRqHsuhG1ZV1OC8b4TVVzvXC9Z3R4V0aCHjLneZsyU/
LraJ936Ljuwt69M7Nu47ov22gSvAYxG31F8yYJypYQKBgQDEWjnmrWxUbxfkpqN
ukPTQp/tAdH4bKA81lybIQsCt58eeUiGE6/RIkZ+PPndJCJCtCCW4JVahGZcjdKNx
x/15+fgafC2Pxq93SD70u/hb2isXqN+iNwpaQLQxp2FauLJsoDz2X2aVrzmpbStx
MsiFJ+2t2TFNnH4YjfmWw95H1wKBgQDAZpIjH8ej56HoGtI0fV7GP0/kR/R+Tauf
r47AsWM8QWdsxmR0j26xMtWdavHEZvADhtQqasElwBkpppTcRUYEUEwZahoNFGCz
h36tQhY1Y7hBI4qhBXQtKZQRUK7NvRjgaAL7xake+Imwg10wDHUX14pcRw6WxQ
0wY9u0THDQKBgQCWh504oUw43RUwpNde1HYHJV0rFmBzGgyPi00LjhAc+ECHH9eQ
GYC0zVB8S0sCQGrPjILsYjzApcPwKZUaRAVfM9bU0JARMjggTvuP1TJ4ONEGqx2o
8jxPwN3lyaje6y4UM5W6k5dgt69p3ifw0wvC8R1eberB9o7xuiKIXbul7wKBgC0W
XFy6z9ALMhfWYR5H2vPdx+HZMuR+UyOCopNpfnXaZeBJxavbVPdVkfWpgCqkbM6G
YqkmB0k3Ef5+uRe9bCELCCEhiVShy7LK9ZyTDpK2hz5tTzyyDxRxt++X0Dxieff
sp/ZUZcOKPsoMnIPn03Fh49yoEjFNUm/lysVEHpAoGAYFwKVYc33Iw79i41y/YC
yttvuIVE6T8VJKP0h8bQMzicYtf42pMgv6CE/v/BzLh5+ugIVBjXzhuyPAtdnoS
j3m5G5A2KbWPyCNP1RjNA0U7uQwfg+R0shvw+6fwZ/EQ+1SCFTIetfwETzBSrBmB
wVAAl49dKdFUBcQen6Qt1nk=
-----END PRIVATE KEY-----
labsuser@master:~/role$

```

5.12 Copy and paste the key into **worker-node-1** by using the following commands:

```
vi users3.key
```

```
cat user3.key
```

```
labsuser@worker-node-1:~/role$ vi user3.key
labsuser@worker-node-1:~/role$ cat user3.key
-----BEGIN PRIVATE KEY-----
MIIEvgIBADANBgkqhkiG9w0BAQEFAASCBAgEAAoIBAQCQ+CysJMaa67v+
Qx/K/8pscd3uCG9uSYJKzc95gw24f7LIaVlse1i6ZDyLtrjpUGUwFVcz0pqqyROn
c4UQjwx70nPjDwxQTb0DsUmb4WoYiC+YJDHw0sQWkgcV0AnW3YmmZITlJrUkkpEm
L6lNmNzCjQXq574MQGJOwawJowxPlV0SZii9AsTy7d6T/rrjZWLE/dsrVcEQr0mV
/la133i567DZatQI98+hL+x523P464MJfNA69V0x7rmdwYYNbW0DKKAwF6KP0nZv
VsCTCnJzb6jnIT/5GjybpbqNSiAoIn16oJWw/h2ntK3alfhIq2sMJWUZhownths
g6U1f3v1AgMBAAECggEAMnNj3I653V1PodeLX3KwaBgig35Vy2xinxTL8P5GTqCG
QA/FsqakhM1wcrBWGJBfda98lwjkbADmoFt3Arkbc0aTnlEsEeyQxGEzwWeDiaK
5bgm9vMEndQ5Cc3kQrX7ewA/sLaNump/IBpzIZGitkQsvIjkz0+yxrTGnsUy+hi7
R4yMq0Yx38luKy7lTcw//PfrUQhqnO3wCHW3qVQ3uzAGNCiMXyAab6N02WcnVhM
aBXeVxPr7dd+z9wc4uimzrMuky7mjRYB4sIDyfYi++370s1ISlhwIuGzLryhqqlj
B+uxZtlVURew8HPKdDru36KaAK00n43VHb/9Yy0EGwKBgQC5KW+mjDH0S5meel0V
KBnjr4tyTY0N78BisvI/xxHkf4v7CjqKw17ajYYpMd/Mwke7UK1K6wWlIEPI320E
59Cz5dbkcYoJeh7h38lfqV3nkcEHLmRmEz2UAe+JsLnbfyYXLYIOGFCVMisQkrv8
5vo1j0P7vfmaru76itmV7xGBlwKBgQDIbLU5GAoV9XEWG0PQs7UQYElwb44Riev2
5nEMFxoie6uahDrJWhXda7xzoMIlG00U0hcn0zPRxXU2k30e61oCElIveBTFQZKM
PZInkQIC2kNhRJ7Nbonj5p740CqgxcDf4pglTGZkHYz70P5SakqlwewEXPawLC4f
SmdEeKBiUwKBgQCnebgYDyQ7z4lyE0FQGoZYL3ZUe5Hq9pivbSw51Af2AfuNo/HR
guavjWR0rDy9ylIQIWesPKjlcyp8bLlqA/b8UH4vABcXfVKjgLNfA9MA2g+avDZp
MSv4TEvp4V5I+tdsDuChmRKB7++NvPq1xAE6IoweDfXPGDzldmNZvv05nwKBgGjK
BpSLFPrWEAHVkyYT7p5Z0Qwnxsc0rMGxSXlgurE8p0NpZrJm/vdGdMifS+HKNEo+
bQzNR1JtQhL+mXQI6E4c9f1zgqh+1/eqwTeGgN6s7n100vJ80GrusD5mXyMfQO/M
sG8Pupit0oA+E/lSyRx41sSRNgh1kMebRtJtnp8xAoGBAJqo9kzgo7ATC1YBiPpy
KaiqIMzFEQ89Rw/+0E9k2H08em9dYZ+5DSUbnVcURc3z/ww5uZEqxLA43x+8fFyu
G3ZMXK7osiH6tCff9MApS+2AXoiRiQ0YEpmGSLzluZJPntMv180GlsY8LCAeyzha
w4fy0Gkc1Z2popPYm93ZK+61
-----END PRIVATE KEY-----
labsuser@worker-node-1:~/role$
```

## Step 6: Verify the roles

### 6.1 Navigate to the home directory

```
cd ..
```

```
labsuser@worker-node-1:~$ cd ..
```

### 6.2 Validate role permissions by listing pods, initiating a test deployment, and checking deployment and pod statuses with the following commands:

```
kubectl get pods --kubeconfig=myconf
```

```
kubectl create deployment test --image=docker.io/httpd -n role --kubeconfig=myconf
```

```
kubectl get pods --kubeconfig=myconf
```

```
kubectl get deployment --kubeconfig=myconf
```

```
labsuser@worker-node-1:~$ kubectl get pods --kubeconfig=myconf
```

NAME	READY	STATUS	RESTARTS	AGE
admin-56d684dff9-7tzkl	0/1	ImagePullBackOff	0	160m
frontend-4ff81	1/1	Running	1 (18m ago)	45m
frontend-jvd98	1/1	Running	1 (18m ago)	45m
mydep-548c7db5df-mxk4t	0/1	CreateContainerError	0	59m
mydep-6f74bcd49-jjw2g	0/1	CreateContainerError	0	60m
nginx	0/1	Pending	0	72m
security-context-1	1/1	Running	1 (18m ago)	41m

```
labsuser@worker-node-1:~$ kubectl create deployment test --image=docker.io/httpd -n role --kubeconfig=myconf
deployment.apps/test created
labsuser@worker-node-1:~$ kubectl get pods --kubeconfig=myconf
```

NAME	READY	STATUS	RESTARTS	AGE
admin-56d684dff9-7tzkl	0/1	ImagePullBackOff	0	161m
frontend-4ff81	1/1	Running	1 (19m ago)	46m
frontend-jvd98	1/1	Running	1 (19m ago)	46m
mydep-548c7db5df-mxk4t	0/1	CreateContainerError	0	60m
mydep-6f74bcd49-jjw2g	0/1	CreateContainerError	0	60m
nginx	0/1	Pending	0	73m
security-context-1	1/1	Running	1 (19m ago)	42m

```
labsuser@worker-node-1:~$ kubectl get deployment --kubeconfig=myconf
```

NAME	READY	UP-TO-DATE	AVAILABLE	Age
admin	0/1	1	0	161m
mydep	0/1	1	0	61m

```
labsuser@worker-node-1:~$
```



6.3 Run the following commands to verify and create the ConfigMap **my-config** in the **role** namespace using the **myconf** kubeconfig:

```
kubectl create configmap my-config --from-literal=key1=config1 --kubeconfig=myconf
```

```
kubectl get configmaps --kubeconfig=myconf
```

```
kubectl get configmap my-config --kubeconfig=myconf -o yaml
```

```
labsuser@worker-node-1:~$ kubectl get deployment --kubeconfig=myconf
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
myhttpd       0/1     1            0           3h21m
redis-cache   1/3     3            1           3d4h
web-server    1/3     3            1           3d3h
labsuser@worker-node-1:~$ kubectl create configmap my-config --from-literal=key1=config1 --kubeconfig=myconf
configmap/my-config created
labsuser@worker-node-1:~$
```

```
labsuser@worker-node-1:~$ kubectl get configmaps --kubeconfig=myconf
NAME                  DATA   AGE
deployment-configmap  2       3h39m
kube-root-ca.crt      1       4d2h
my-config             1       17m
labsuser@worker-node-1:~$ kubectl get configmap my-config --kubeconfig=myconf -o yaml
apiVersion: v1
data:
  key1: config1
kind: ConfigMap
metadata:
  creationTimestamp: "2023-11-03T11:50:05Z"
  name: my-config
  namespace: default
  resourceVersion: "157363"
  uid: 62db8bbc-c41e-4445-9cb5-78ce259b2cbc
labsuser@worker-node-1:~$
```

By following these steps, you have successfully configured and verified RBAC in Kubernetes using namespaces.