CKS Q&As

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QUESTION 1

You can switch the cluster/configuration context using the following command:

[desk@cli] $ kubectl config use-context prod-account

Context:

A Role bound to a Pod\\'s ServiceAccount grants overly permissive permissions. Complete the following tasks to reduce the set of permissions.

Task:

Given an existing Pod named web-pod running in the namespace database.

1.

Edit the existing Role bound to the Pod\\'s ServiceAccount test-sa to only allow performing get operations, only on resources of type Pods.

2.

Create a new Role named test-role-2 in the namespace database, which only allows performing update operations, only on resources of type statuefulsets.

3.

Create a new RoleBinding named test-role-2-bind binding the newly created Role to the Pod\\'s ServiceAccount. Note: Don\\'t delete the existing RoleBinding.

A. See the explanation below

B. PlaceHolder

Correct Answer: A

```
candidate@cli:~$ kubectl config use-context KSCH00201
Switched to context "KSCH00201".
candidate@cli:~$ kubectl get pods -n security
NAME      READY   STATUS    RESTARTS   AGE
web-pod   1/1     Running   0          6h9m
candidate@cli:~$ kubectl get deployments.apps -n security
No resources found in security namespace.
candidate@cli:~$ kubectl describe rolebindings.rbac.authorization.k8s.io -n security
Name:         dev-role
Labels:       <none>
Annotations:  <none>
Role:
  Kind:  Role
  Name:  dev-role
Subjects:
  Kind            Name      Namespace
  ----            ----      ---------
  ServiceAccount  sa-dev-1
candidate@cli:~$ kubectl describe role dev-role -n security
Name:         dev-role
Labels:       <none>
Annotations:  <none>
PolicyRule:
  Resources  Non-Resource URLs  Resource Names  Verbs
  ---------  -----------------  --------------  -----
  *          []                 []              [*]
candidate@cli:~$ kubectl edit role/dev-role -n security
```

```
  uid: b4c9ddd6-2729-43bd-8fbd-b2d227f4c4cd
rules:
- apiGroups:
  - ""
  resources:
  - services
  verbs:
  - watch
```

```
candidate@cli:~$ kubectl describe role dev-role -n security
Name:         dev-role
Labels:       <none>
Annotations:  <none>
PolicyRule:
  Resources  Non-Resource URLs  Resource Names  Verbs
  ---------  -----------------  --------------  -----
  *          []                 []              [*]
candidate@cli:~$ kubectl edit role/dev-role -n security
role.rbac.authorization.k8s.io/dev-role edited
candidate@cli:~$ kubectl describe role dev-role -n security
Name:         dev-role
Labels:       <none>
Annotations:  <none>
PolicyRule:
  Resources  Non-Resource URLs  Resource Names  Verbs
  ---------  -----------------  --------------  -----
  services   []                 []              [watch]
candidate@cli:~$ kubectl get pods -n security
NAME      READY   STATUS    RESTARTS   AGE
web-pod   1/1     Running   0          6h12m
candidate@cli:~$ kubectl get pods/web-pod -n security -o yaml | grep serviceAccount
  serviceAccount: sa-dev-1
  serviceAccountName: sa-dev-1
    - serviceAccountToken:
candidate@cli:~$ kubectl create role role-2 --verb=update --resource=namespaces -n security
role.rbac.authorization.k8s.io/role-2 created
candidate@cli:~$ kubectl create rolebinding role-2-binding --role
--role   --role=
candidate@cli:~$ kubectl create rolebinding role-2-binding --role=role-2 --serviceaccount=se
curity:sa-dev-1 -n security
rolebinding.rbac.authorization.k8s.io/role-2-binding created
candidate@cli:~$
```

QUESTION 2

Service is running on port 389 inside the system, find the process-id of the process, and stores the names of all the open-files inside the /candidate/KH77539/files.txt, and also delete the binary.

A. See explanation below.

B. PlaceHolder

Correct Answer: A

root# netstat -ltnup

Active Internet connections (only servers)

Proto Recv-Q Send-Q Local Address Foreign Address State PID/Program name

tcp 0 0 127.0.0.1:17600 0.0.0.0:* LISTEN 1293/dropbox

tcp 0 0 127.0.0.1:17603 0.0.0.0:* LISTEN 1293/dropbox

tcp 0 0 0.0.0.0:22 0.0.0.0:* LISTEN 575/sshd

tcp 0 0 127.0.0.1:9393 0.0.0.0:* LISTEN 900/perl

tcp 0 0 :::80 :::* LISTEN 9583/docker-proxy

tcp 0 0 :::443 :::* LISTEN 9571/docker-proxy

udp 0 0 0.0.0.0:68 0.0.0.0:* 8822/dhcpcd

root# netstat -ltnup | grep \\':22\\'

tcp 0 0 0.0.0.0:22 0.0.0.0:* LISTEN 575/sshd

The ss command is the replacement of the netstat command.

Now let\\'s see how to use the ss command to see which process is listening on port 22:

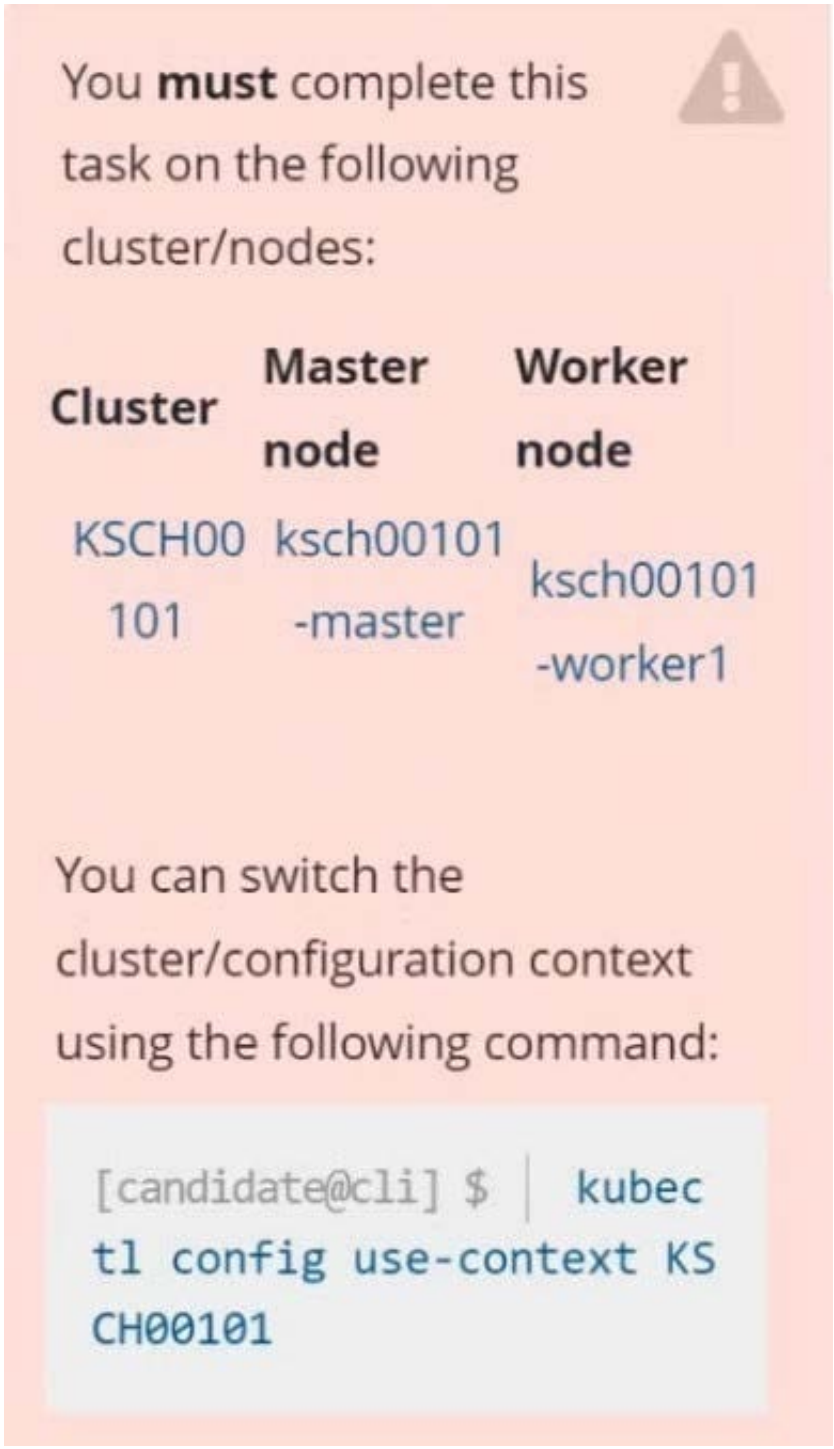
root# ss -ltnup \\'sport = :22\\'

Netid State Recv-Q Send-Q Local Address:Port Peer Address:Port

tcp LISTEN 0 128 0.0.0.0:22 0.0.0.0:* users:("sshd",pid=575,fd=3))

QUESTION 3

The kubeadm-created cluster\\'s Kubernetes API server was, for testing purposes, temporarily configured to allow unauthenticated and unauthorized access granting the anonymous user duster-admin access.



Task

Reconfigure the cluster\\'s Kubernetes API server to ensure that only authenticated and authorized REST requests are allowed.

Use authorization mode Node,RBAC and admission controller NodeRestriction.

Cleaning up, remove the ClusterRoleBinding for user system:anonymous.

A. See explanation below.

B. PlaceHolder

Correct Answer: A

```
candidate@cli:~$ kubectl config use-context KSCH00101
Switched to context "KSCH00101".
candidate@cli:~$ ssh ksch00101-master
Warning: Permanently added '10.240.86.190' (ECDSA) to the list of known hosts.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
root@ksch00101-master:~# vim /etc/kubernetes/manifests/kube-apiserver.yaml
```

```
apiVersion: v1
kind: Pod
metadata:
  annotations:
    kubeadm.kubernetes.io/kube-apiserver.advertise-address.endpoint: 10.240.86.190:6443
  creationTimestamp: null
  labels:
    component: kube-apiserver
    tier: control-plane
  name: kube-apiserver
  namespace: kube-system
spec:
  containers:
    - command:
        - kube-apiserver
        - --advertise-address=10.240.86.190
        - --allow-privileged=true
        - --authorization-mode=Node,RBAC
        - --client-ca-file=/etc/kubernetes/pki/ca.crt
        - --enable-admission-plugins=AlwaysAdmit
        - --enable-bootstrap-token-auth=true
        - --etcd-cafile=/etc/kubernetes/pki/etcd/ca.crt
        - --etcd-certfile=/etc/kubernetes/pki/apiserver-etcd-client.crt
        - --etcd-keyfile=/etc/kubernetes/pki/apiserver-etcd-client.key
"/etc/kubernetes/manifests/kube-apiserver.yaml" 128L, 4343C                1,1           Top
```

```
root@ksch00101-master:~# cat /etc/kubernetes/admin.conf
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tCk1JSUMvakNDQWVhZ0F3SUJB
Z0lCQURBTkJna3Foa21HOXcwQkFRc0ZBREFWTVJNd0VRWURWUFERXdwcmRXSmwKY201bGRHVnpNQjRYRFRJeU1ESXhO
akF3T1RVeE9Wb1hEVE15TURJeE5EQXdOVFV4T1Zvd0ZURVRNQkVHQTFVRQpBeE1LYTNWaVpYSnVaWFJsY3pDQ0FTSXdE
UVlKS29aSWh2Y05BQUVCQlFBRGdnRVBBRENDQVFvQ2dnRUJBTlgwCm9LeUYvTGNmYTIvNzNZTktkSFdZU3JUaUx0QStr
NG1qTXpRZllzM2ttNGllalpoM0tZc3Y1bUdpNOUyQ2tYc0MKUnhlLlNiZnBDMzlla2k5V3hOSHc5eTM0OEtXUVE3VXBL
UmZRdXVxd1A1WXdDZkordlJmWGNGTXQxLzRNQVhWLwpkdjZ5YWRKSitPeFFSVjZlaHFBZHR0M3FtOFdVcW84UE5JT1E0
OEc3WWhnRUg5RHU3SFdkMS8raXVkSjNOMXl6CnNISEdtYklsWENSbEcydFV0M2RScDczSnRIS1JjS2tnMGxYM3FWS1Uy
QmJRblBmK01wb0V1TXFGcmZvcWVaVWcKYlBKK3ROVmZIM1JLTkhVUnYydVJIa3ZZc2JrclhUMW8rMXFNNHZrYnFNMHlq
KzNxTUtiSyt5V3dzUTlBYUVPMApUdXR4UUdlTFp3OUE3TjZZeTFVQ0F3RUFBYU5aTUZjd0RnWURWUjBQQVFLL0JBUURB
Z0trTUE4R0ExVWRFd0VCCi93UUZNQUlCQWY4d0hBWURWUjBPQkJZRUZEcUlwLzdYbzZaNkJNVjVEK2w3bFZPcGpBOWlN
QlVHQTFVZEVRUU8KTUF5QONtdDFZbVZ5YmlWMFpYTXdEUVlKS29aSWh2Y05BQUVMQlFBRGdnRUJBSlNWNm9wNGgxYkNv
eGZLRUZ4bwoxaVlHUFlnMlhhOTN0WEZlTTY3RnA2NkdqUEc5SXBONnNHUnRnWVlyd0MyalBDeFVOb2IySWtUQlFNbDV3
cWRHCkdPS2JwVVp6Smc3YOdyS2E3RlpZWVNyVUVGRWhyd2xZWXNGME56aFBoZVcwcHJjcWtSdXNlbm55SG5YNGVOMUoK
N1NzbGZYTjJIdVFJd1VIRGl5LOJsL1ZWRmZNZnRxOGF0Z0pYSFZGTmlVcDRpNXlJTXFRNTB4ZjVqcnFlWFRmVwpVdmJq
ZjEyOThhXVTk3QkxHcDdRZE9QYWVKU051USt1VkMrdnpVZ2tVQVNjclVsc24xcThPNnBRbjV3TjNxdUVrCm5zQk9pckxS
c2k2alN3U1hLbGcvangvcitqd0dTc0xwWUxDZTIxalFraTdCSVRJT1N3ejd3c2hzbERuNzBFY0IKa0VBPQotLS0tLUVO
RCBDRVJUSUZJQ0FURS0tLS0tCg==
    server: https://10.240.86.190:6443
  name: kubernetes
contexts:
- context:
    cluster: kubernetes
    user: kubernetes-admin
  name: kubernetes-admin@kubernetes
current-context: kubernetes-admin@kubernetes
kind: Config
preferences: {}
users:
- name: kubernetes-admin
  user:
    client-certificate-data: LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tCk1JSURJVENDQWdtZ0F3SUJBZ01
ocEdQcDB4Zk9JbkYxaGJwcTh5YlBUMGxlTm5VNjBiSUpxRXVKckxJbEtXC1NVa1h1VkYzNkl0ZHc1ZUlOT2JxK1haaHd
hY2JURVZCMlVDVURsbDgzdG5teFQyVXJmY0pUQmhlTCtzTFAvcWYKdjdXR3BwQlZXNnhVZGFibGNuUklIMnpleUVJTEt
Tck5XbUQ0TzZzMU13blZOOVJzQ2RXTkV3VGNZRHdoUTd2OQpGcExxKL3hiSDdUTzkwY1RFd1Iwazl3cFVYdllkdklj5XN
MRkYwL3F2bDA3U3lxbGplOEI1SnNpQlhCUlZxbS9wCmNUUSs3SnZlbmdaZzlkOWd2aVJVdFFTcHBONkx4UnhkSzNKMGR
BK240SWxFZEtHRWh3TE00d0tMaldERG9scHgKYzB3WHkwVXBORGZ6UUxuRUFzVUJsbDRCQ3VkdW5QNVVDN2FuS3dJREF
RQUJBb0lCQURWRkZNSVRqYnNySTZTTWpQOGM0MTByN3RWZ251cXJVS202dHRnZWtXOWd1S1pvMnZyb3RsbG9qOGFRamF
0MTZnaEUwOXdZd2xMSDhId0tLCk1Mb2NrZnFCUytlOWo1ZmlFWGxYTG00cElCVDFRbGFJQlJRMDRyQ0JZbHdCN1VFbVB
lWjhuQ3lmR2JYTC9HM2wKcXBYTDVKdzJqcVh2MXdzcWsrdWNCRk0zZ0FYZk5YZkk1RExnV0VyNXRZRlF4VXo5UFFHODl
pcDY1OTBkYnB1SApoOMnU2NGk4UTgldk83OFV1Tlc2eUFZU1loZVdha093RDFwZzNPdkhxV3FhbnV1MnlrOWxaUUR0WW5
2MytBeU5DCnloNlRaRHluZ0l2dEptbDFTQ01TNEpSR2d4NXNwaCtKOC9XOGx0Ri9wMWZxbTA0bXZSRndxU3M2Y1JCQ2Z
PVVcKbFV1MGxLRUNnWUVBNWJzT0lVVzFBVndjTmJsc0pSVDNURkI2OVlxbDRYcnZRR0FZY3BhdktENnd5VmtEOTV1QQp
SaXVRS1NNKzY4REtBVmlpYllpaThJemExTkdqdC9JZDUwTGVoNklaRVg2enVpK0g3d1BSbVd6SE9ueWNmU2FmC1VQMEF
RL0RiM2lCNWJQTmJHYXNkaDNIb2JvR0NSSHZmTFFXY2tYbUVXM2ZudVlIRlJLZ2xlTEVDZllFQTVUdysKTEVTV1BESFF
mamNBNOhtNmdsMndGRjdCUGlsSGdaYVVRN25Eb3ZvRmMxalBMRWVCMWJ6OHJNWld1eGdmaHN0OQpMZ0xSUDBXdkJWd1J
sVTdMTmFLTlVzRmkxU2dvaWZsS01ZWkMyZmpLWTY1RFE3YUUzcTdnVis4U2pIZHpoclhCCkVQc1AvWXQ3S0QrbFBMZmh
aNXNKZWFtelY3b3gveno5Y0s0U0ZKc0NnWUJ4OVk2VzFydHBoMFcvS05JS3V4SEoKMjRxRFQxbm1ObE9FdmFhakFUaTJ
ZQkxXYnIvWERsNWRjTEs4bFcxYkNYR3JwY2s3U0xKNlhZUVlXajQ2dTNJMgpEQ2ZUWlFiRWRQTzNBbWtPR2ZqWmdPcDd
pdUVkLOJDLzNpRkprcXVlenNFdFdMTHlVcjM5T0hZeWl6QVJ4Tmo2CnZuUGlma000Rkl6d3F2MHVoN0xlb1FLQmdBT1Z
XZTRZMlRwbzJ3aEswbmVkMllsMXhVNjJoZ2JiVHcvaVdhdVcKY3ZMV3dlZUlmd0Q4MVRWL2R3a29KVEM1VEJRUXQzUkk
xRFFnVmtnMHFwcUtOOGhDNGQwM05MRzIwTWdZMk94WgpjSFZzK2J4elYwVVB6V1RUbEMyVEsyamhmOHVRcndzSktxY2N
OU0ZEczZwclhocThsV213Znd3aWlBRlhLSFJRCkE3RkxBb0dCQUx3NW8rbHFVZ3hHQlpKdy9ZelBGek5TekQreVd6Um8
lc2ZEc2x6a2FvY0pHbEx2MUNndEVIc3QKeG5HMTlIYStSM1M3cDRtei9LeDJYMFRzaTZzUzVwWlR5WEx5STF5azh2TUZ
rRldacjRmeVhXV2t3SjZlVEllYwpyWFl3TWM5VFlDUGZrSFJaTm9XRlhZV3BkeTJBOXZCbFlScHZsQVZoenU2T1VZQ2w
5b2ZpCi0tLS0tRU5EIFJTQSBQUklWQVRFIEtFWS0tLS0tCg==
root@ksch00101-master:~# vim /etc/kubernetes/manifests/kube-apiserver.yaml
```

```
root@ksch00101-master:~# vim /etc/kubernetes/manifests/kube-apiserver.yaml
root@ksch00101-master:~# systemctl daemon-reload
sroot@ksch00101-master:~# systemctl restart kubelet.service
root@ksch00101-master:~# kubectl get nodes
error: You must be logged in to the server (Unauthorized)
root@ksch00101-master:~# exit
logout
Connection to 10.240.86.190 closed.
candidate@cli:~$ kubectl get nodes
NAME               STATUS   ROLES                  AGE   VERSION
ksch00101-master   Ready    control-plane,master   93d   v1.23.3
ksch00101-worker1  Ready    <none>                 93d   v1.23.3
candidate@cli:~$ kubectl get pod -n kube-system
NAME                                       READY   STATUS    RESTARTS       AGE
coredns-64897985d-7pnhm                    1/1     Running   1 (7h2m ago)   93d
coredns-64897985d-rr7sd                    1/1     Running   1 (7h2m ago)   93d
etcd-ksch00101-master                      1/1     Running   1 (7h2m ago)   93d
kube-apiserver-ksch00101-master            0/1     Running   0              24s
kube-controller-manager-ksch00101-master   1/1     Running   3 (42s ago)    93d
kube-flannel-ds-llktn                      1/1     Running   1 (93d ago)    93d
kube-flannel-ds-q9vnl                      1/1     Running   1 (93d ago)    93d
kube-proxy-2c4ht                           1/1     Running   1 (93d ago)    93d
kube-proxy-pmmbc                           1/1     Running   1 (93d ago)    93d
kube-scheduler-ksch00101-master            1/1     Running   3 (42s ago)    93d
candidate@cli:~$ kubectl get pod -n kube-system
NAME                                       READY   STATUS    RESTARTS       AGE
coredns-64897985d-7pnhm                    1/1     Running   1 (7h2m ago)   93d
coredns-64897985d-rr7sd                    1/1     Running   1 (7h2m ago)   93d
etcd-ksch00101-master                      1/1     Running   1 (7h2m ago)   93d
kube-apiserver-ksch00101-master            0/1     Running   0              30s
kube-controller-manager-ksch00101-master   1/1     Running   3 (48s ago)    93d
kube-flannel-ds-llktn                      1/1     Running   1 (93d ago)    93d
kube-flannel-ds-q9vnl                      1/1     Running   1 (93d ago)    93d
kube-proxy-2c4ht                           1/1     Running   1 (93d ago)    93d
kube-proxy-pmmbc                           1/1     Running   1 (93d ago)    93d
kube-scheduler-ksch00101-master            1/1     Running   3 (48s ago)    93d
candidate@cli:~$ kubectl get clusterrolebindings.rbac.authorization.k8s.io | grep anon
system:anonymous                                       ClusterRole/cluster-admin
                                                 7h1m
candidate@cli:~$ kubectl delete clusterrolebindings.rbac.authorization.k8s.io/system:anonymo
us
clusterrolebinding.rbac.authorization.k8s.io "system:anonymous" deleted
```

QUESTION 4

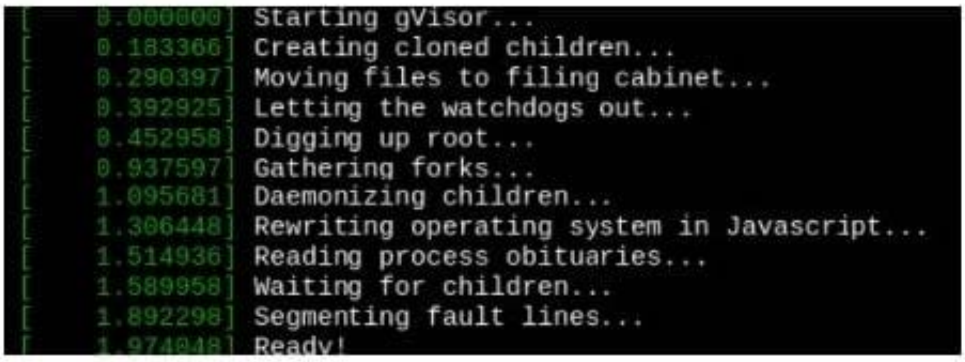
Create a RuntimeClass named untrusted using the prepared runtime handler named runsc.

Create a Pods of image alpine:3.13.2 in the Namespace default to run on the gVisor runtime class.

A. See the explanation below:

B. PlaceHolder

Correct Answer: A



QUESTION 5

You must complete this task on the following cluster/nodes: Cluster: immutable-cluster

Master node: master1

Worker node: worker1

You can switch the cluster/configuration context using the following command:

[desk@cli] $ kubectl config use-context immutable-cluster

Context: It is best practice to design containers to be stateless and immutable.

Task:

Inspect Pods running in namespace prod and delete any Pod that is either not stateless or not immutable.

Use the following strict interpretation of stateless and immutable:

1.

Pods being able to store data inside containers must be treated as not stateless.

Note: You don\\'t have to worry whether data is actually stored inside containers or not already.

2.

Pods being configured to be privileged in any way must be treated as potentially not stateless or not immutable.

A. See the explanation below

B. PlaceHolder

Correct Answer: A

Explanation/Reference:

```
candidate@cli:~$ kubectl config use-context KSRS00501
Switched to context "KSRS00501".
candidate@cli:~$ kubectl get pod -n testing
NAME       READY   STATUS    RESTARTS   AGE
app        1/1     Running   0          6h31m
frontend   1/1     Running   0          6h32m
smtp       1/1     Running   0          6h31m
candidate@cli:~$ kubectl get pod/app -n testing  -o yaml
   - lastProbeTime: null
     lastTransitionTime: "2022-05-20T08:40:35Z"
     status: "True"
     type: PodScheduled
   containerStatuses:
   - containerID: docker://11143682c400984c9faf3dff1e056d4b00a7eb1de007fe1834be0a84fa146e18
     image: nginx:latest
     imageID: docker-pullable://nginx@sha256:2d17cc4981bf1e22a87ef3b3dd20fbb72c3868738e3f3076
62eb40e2630d4320
     lastState: {}
     name: app-container
     ready: true
     restartCount: 0
     started: true
     state:
       running:
         startedAt: "2022-05-20T08:40:37Z"
   hostIP: 10.240.86.141
   phase: Running
   podIP: 10.10.1.3
   podIPs:
   - ip: 10.10.1.3
   qosClass: BestEffort
   startTime: "2022-05-20T08:40:35Z"
candidate@cli:~$ kubectl get pod/app -n testing -o yaml | grep -E 'privileged|ReadOnlyFileSy
stem'
      privileged: true
candidate@cli:~$ kubectl get pod/frontend -n testing -o yaml | grep -E 'privileged|ReadOnlyF
ileSystem'
      privileged: false
```

```
candidate@cli:~$ kubectl get pod/smtp -n testing -o yaml | grep -E 'privileged|ReadOnlyFileS
ystem'
      privileged: true
candidate@cli:~$ kubectl get pod -n testing -o yaml | grep -i ReadOnly
        readOnlyRootFilesystem: false
        readOnly: true
        readOnlyRootFilesystem: true
        readOnly: true
        readOnlyRootFilesystem: false
        readOnly: true
candidate@cli:~$ kubectl get pod/smtp -n testing -o yaml | grep -E 'privileged|readOnlyRootF
ileSystem'
      privileged: true
candidate@cli:~$ kubectl get pod/app -n testing -o yaml | grep -E 'privileged|readOnlyRootFi
leSystem'
      privileged: true
candidate@cli:~$ kubectl get pod/frontend -n testing -o yaml | grep -E 'privileged|readOnlyR
ootFileSystem'
      privileged: false
candidate@cli:~$ kubectl get pod/frontend -n testing -o yaml | grep -E 'privileged|readOnlyR
ootFilesystem'
      privileged: true
      readOnlyRootFilesystem: false
candidate@cli:~$ kubectl delete pod/app -n testing
pod "app" deleted
candidate@cli:~$ kubectl get pod/smtp -n testing -o yaml | grep -E 'privileged|readOnlyRootF
ilesystem'
      privileged: true
      readOnlyRootFilesystem: false
candidate@cli:~$ kubectl delete pod/smtp -n testing
pod "smtp" deleted
```