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QUESTION 1

Use the kubesec docker images to scan the given YAML manifest, edit and apply the advised changes, and passed with a score of 4 points.

kubesec-test.yaml

1.

apiVersion: v1

2.

kind: Pod

3.

metadata:

4.

name: kubesec-demo

5.

spec:

6.

containers:

7.

- name: kubesec-demo

8.

image: gcr.io/google-samples/node-hello:1.0

9.

securityContext: 10.readOnlyRootFilesystem: true

Hint: docker run -i kubesec/kubesec:512c5e0 scan /dev/stdin

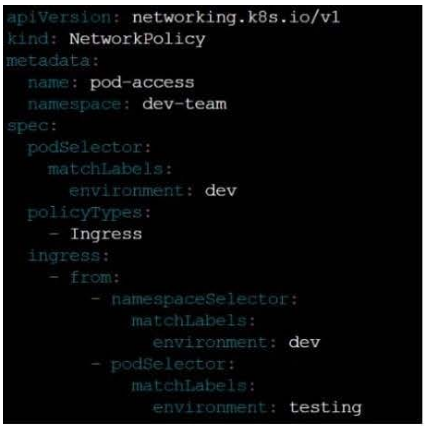
A. See explanation below.

B. PlaceHolder

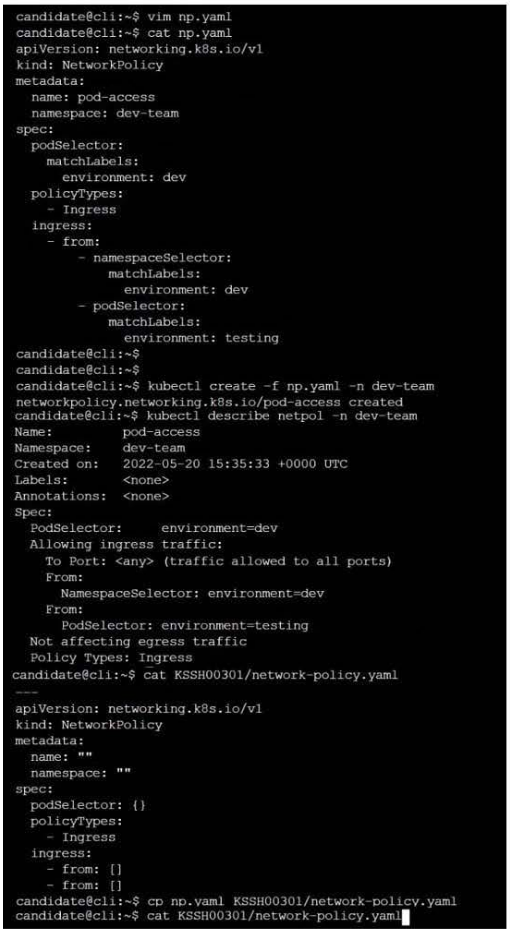
Correct Answer: A

kubesec scan k8s-deployment.yaml cat evt.type in (open,openat,creat) and evt.is_open_exec=true and container and not runc_writing_exec_fifo and not runc_writing_var_lib_docker and not user_known_container_drift_activities and evt.rawres>=0 output: > %evt.time,%user.uid,%proc.name # Add this/Refer falco documentation priority: ERROR [node01@cli] $ vim /etc/falco/falco.yaml

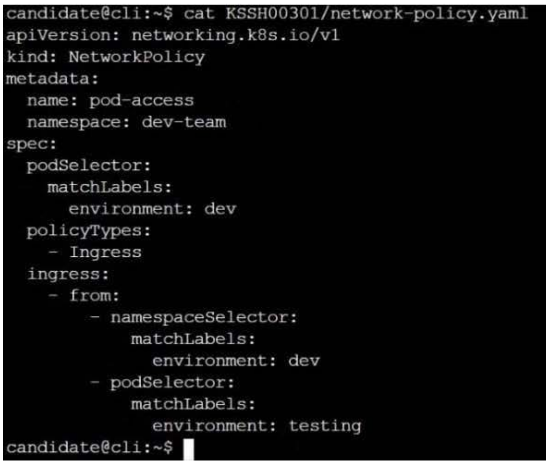
QUESTION 8



```
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: pod-access
  namespace: dev-team
spec:
  podSelector:
    matchLabels:
      environment: dev
  policyTypes:
    - Ingress
  ingress:
    - from:
        - namespaceSelector:
            matchLabels:
              environment: dev
        - podSelector:
            matchLabels:
              environment: testing
```



```
candidate@cli:~$ vim np.yaml
candidate@cli:~$ cat np.yaml
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: pod-access
  namespace: dev-team
spec:
  podSelector:
    matchLabels:
      environment: dev
  policyTypes:
    - Ingress
  ingress:
    - from:
        - namespaceSelector:
            matchLabels:
              environment: dev
        - podSelector:
            matchLabels:
              environment: testing
candidate@cli:~$
candidate@cli:~$
candidate@cli:~$ kubectl create -f np.yaml -n dev-team
networkpolicy.networking.k8s.io/pod-access created
candidate@cli:~$ kubectl describe netpol -n dev-team
Name:         pod-access
Namespace:    dev-team
Created on:   2022-05-20 15:35:33 +0000 UTC
Labels:       <none>
Annotations:  <none>
Spec:
  PodSelector:     environment=dev
  Allowing ingress traffic:
    To Port: <any> (traffic allowed to all ports)
    From:
      NamespaceSelector: environment=dev
    From:
      PodSelector: environment=testing
  Not affecting egress traffic
  Policy Types: Ingress
candidate@cli:~$ cat KSSH00301/network-policy.yaml
---
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: ""
  namespace: ""
spec:
  podSelector: {}
  policyTypes:
    - Ingress
  ingress:
    - from: []
    - from: []
candidate@cli:~$ cp np.yaml KSSH00301/network-policy.yaml
candidate@cli:~$ cat KSSH00301/network-policy.yaml
```



```
candidate@cli:~$ cat KSSH00301/network-policy.yaml
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: pod-access
  namespace: dev-team
spec:
  podSelector:
    matchLabels:
      environment: dev
  policyTypes:
    - Ingress
  ingress:
    - from:
        - namespaceSelector:
            matchLabels:
              environment: dev
        - podSelector:
            matchLabels:
              environment: testing
candidate@cli:~$
```

Enable audit logs in the cluster, To Do so, enable the log backend, and ensure that

1.

logs are stored at /var/log/kubernetes-logs.txt.

2.

Log files are retained for 12 days.

3.

at maximum, a number of 8 old audit logs files are retained.

4.

set the maximum size before getting rotated to 200MB

Edit and extend the basic policy to log:

1.

namespaces changes at RequestResponse

2.

Log the request body of secrets changes in the namespace kube-system.

3.

Log all other resources in core and extensions at the Request level.

4.

Log "pods/portforward", "services/proxy" at Metadata level.

5.

Omit the Stage RequestReceived

All other requests at the Metadata level

A. See the explanation below:

B. PlaceHolder

Correct Answer: A

Kubernetes auditing provides a security-relevant chronological set of records about a cluster. Kube-apiserver performs auditing. Each request on each stage of its execution generates an event, which is then pre-processed according to a

certain policy and written to a backend. The policy determines what\\'s recorded and the backends persist the records. You might want to configure the audit log as part of compliance with the CIS (Center for Internet Security) Kubernetes

Benchmark controls.

The audit log can be enabled by default using the following configuration in cluster.yml:

services:

kube-api:

audit_log:

enabled: true

When the audit log is enabled, you should be able to see the default values at /etc/kubernetes/audit-policy.yaml

The log backend writes audit events to a file in JSONlines format. You can configure the log audit backend using the following kube-apiserver flags:

--audit-log-path specifies the log file path that log backend uses to write audit events. Not specifying this flag disables log backend. - means standard out --audit-log-maxage defined the maximum number of days to retain old audit log files

--audit-log-maxbackup defines the maximum number of audit log files to retain

--audit-log-maxsize defines the maximum size in megabytes of the audit log file before it gets rotated

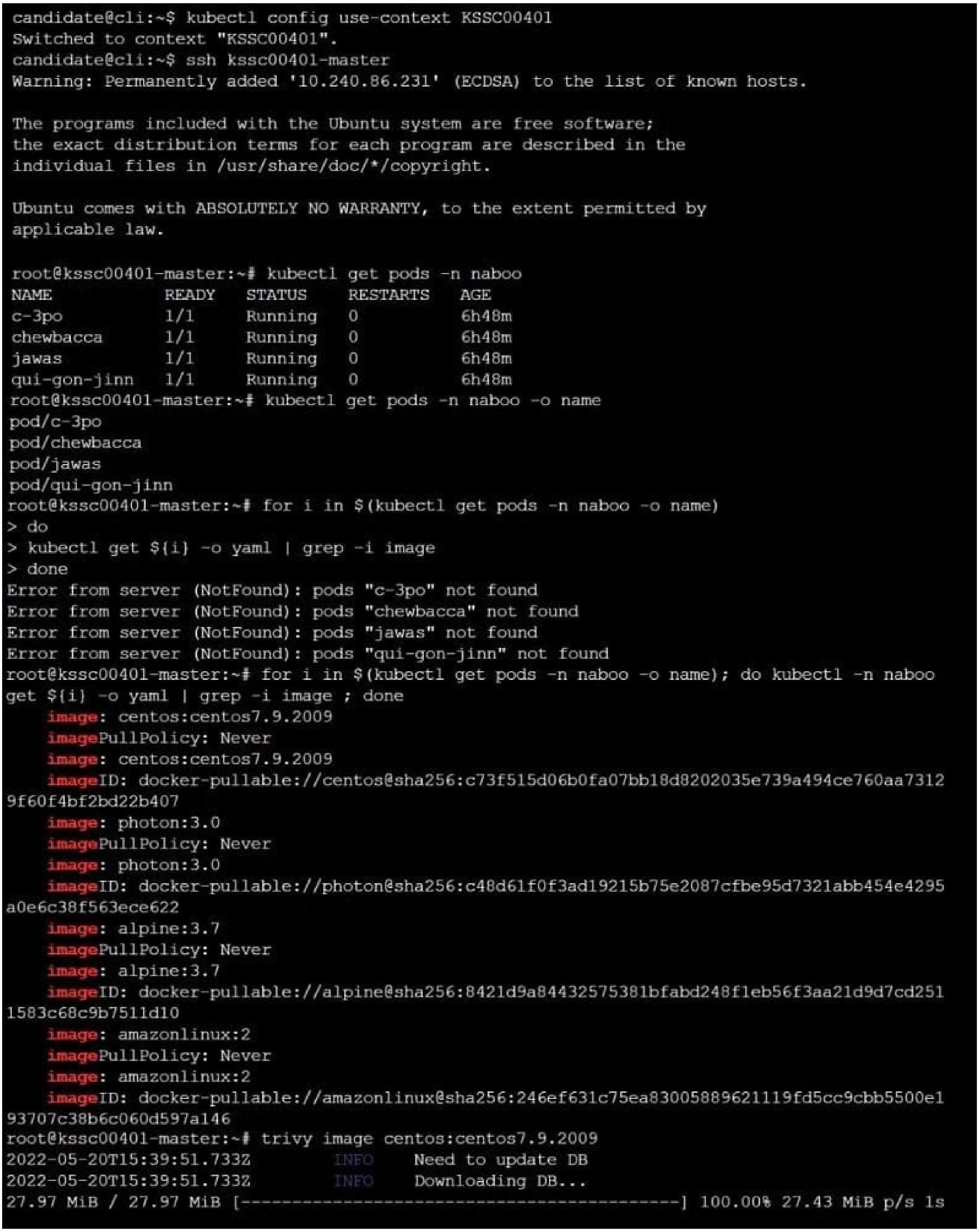
If your cluster\\'s control plane runs the kube-apiserver as a Pod, remember to mount the hostPath to the location of the policy file and log file, so that audit records are persisted.

For example:

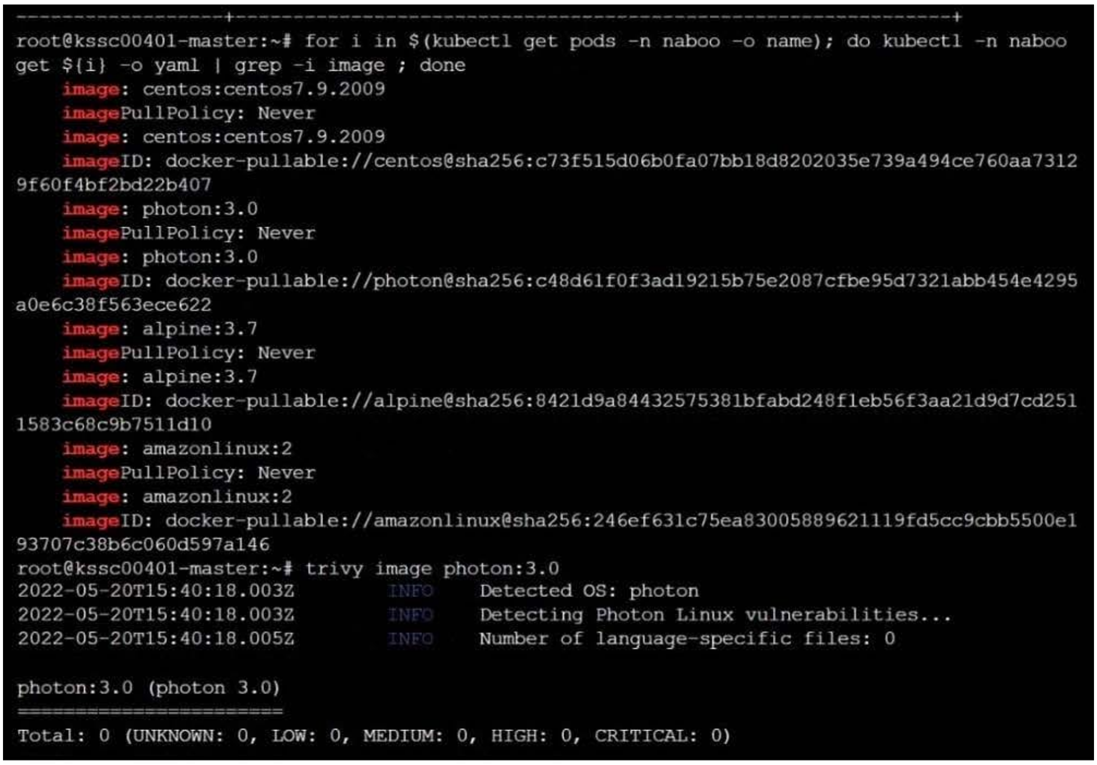
--audit-policy-file=/etc/kubernetes/audit-policy.yaml \

--audit-log-path=/var/log/audit.log

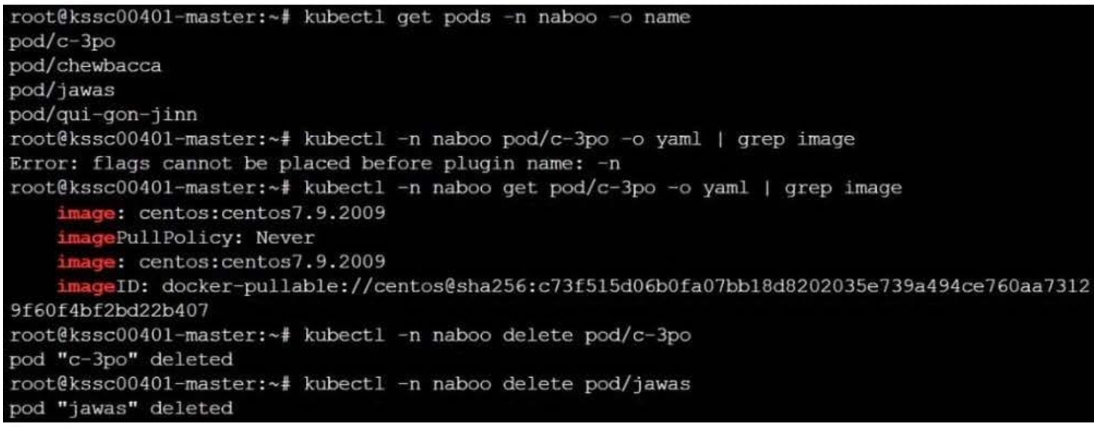
QUESTION 9



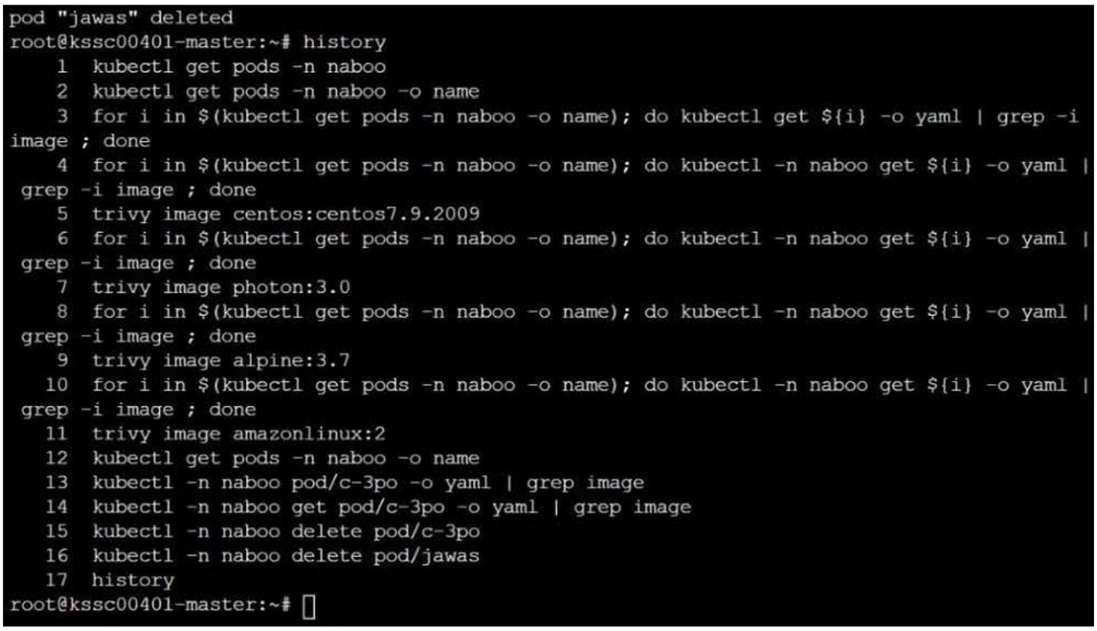
```
candidate@cli:~$ kubectl config use-context KSSC00401
Switched to context "KSSC00401".
candidate@cli:~$ ssh kssc00401-master
Warning: Permanently added '10.240.86.231' (ECDSA) to the list of known hosts.

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@kssc00401-master:~# kubectl get pods -n naboo
NAME           READY   STATUS    RESTARTS   AGE
c-3po          1/1     Running   0          6h48m
chewbacca      1/1     Running   0          6h48m
jawas          1/1     Running   0          6h48m
qui-gon-jinn   1/1     Running   0          6h48m
root@kssc00401-master:~# kubectl get pods -n naboo -o name
pod/c-3po
pod/chewbacca
pod/jawas
pod/qui-gon-jinn
root@kssc00401-master:~# for i in $(kubectl get pods -n naboo -o name)
> do
> kubectl get ${i} -o yaml | grep -i image
> done
Error from server (NotFound): pods "c-3po" not found
Error from server (NotFound): pods "chewbacca" not found
Error from server (NotFound): pods "jawas" not found
Error from server (NotFound): pods "qui-gon-jinn" not found
root@kssc00401-master:~# for i in $(kubectl get pods -n naboo -o name); do kubectl -n naboo
get ${i} -o yaml | grep -i image ; done
    image: centos:centos7.9.2009
    imagePullPolicy: Never
    image: centos:centos7.9.2009
    imageID: docker-pullable://centos@sha256:c73f515d06b0fa07bb18d8202035e739a494ce760aa7312
9f60f4bf2bd22b407
    image: photon:3.0
    imagePullPolicy: Never
    image: photon:3.0
    imageID: docker-pullable://photon@sha256:c48d61f0f3ad19215b75e2087cfbe95d7321abb454e4295
a0e6c38f563ece622
    image: alpine:3.7
    imagePullPolicy: Never
    image: alpine:3.7
    imageID: docker-pullable://alpine@sha256:8421d9a84432575381bfabd248f1eb56f3aa21d9d7cd251
1583c68c9b7511d10
    image: amazonlinux:2
    imagePullPolicy: Never
    image: amazonlinux:2
    imageID: docker-pullable://amazonlinux@sha256:246ef631c75ea83005889621119fd5cc9cbb5500e1
93707c38b6c060d597a146
root@kssc00401-master:~# trivy image centos:centos7.9.2009
2022-05-20T15:39:51.733Z        INFO    Need to update DB
2022-05-20T15:39:51.733Z        INFO    Downloading DB...
27.97 MiB / 27.97 MiB [-------------------------------------------] 100.00% 27.43 MiB p/s 1s
```



```
------------------+-----------------------------------------------------------------+
root@kssc00401-master:~# for i in $(kubectl get pods -n naboo -o name); do kubectl -n naboo
get ${i} -o yaml | grep -i image ; done
    image: centos:centos7.9.2009
    imagePullPolicy: Never
    image: centos:centos7.9.2009
    imageID: docker-pullable://centos@sha256:c73f515d06b0fa07bb18d8202035e739a494ce760aa7312
9f60f4bf2bd22b407
    image: photon:3.0
    imagePullPolicy: Never
    image: photon:3.0
    imageID: docker-pullable://photon@sha256:c48d61f0f3ad19215b75e2087cfbe95d7321abb454e4295
a0e6c38f563ece622
    image: alpine:3.7
    imagePullPolicy: Never
    image: alpine:3.7
    imageID: docker-pullable://alpine@sha256:8421d9a84432575381bfabd248f1eb56f3aa21d9d7cd251
1583c68c9b7511d10
    image: amazonlinux:2
    imagePullPolicy: Never
    image: amazonlinux:2
    imageID: docker-pullable://amazonlinux@sha256:246ef631c75ea83005889621119fd5cc9cbb5500e1
93707c38b6c060d597a146
root@kssc00401-master:~# trivy image photon:3.0
2022-05-20T15:40:18.003Z        INFO    Detected OS: photon
2022-05-20T15:40:18.003Z        INFO    Detecting Photon Linux vulnerabilities...
2022-05-20T15:40:18.005Z        INFO    Number of language-specific files: 0

photon:3.0 (photon 3.0)
=======================
Total: 0 (UNKNOWN: 0, LOW: 0, MEDIUM: 0, HIGH: 0, CRITICAL: 0)
```

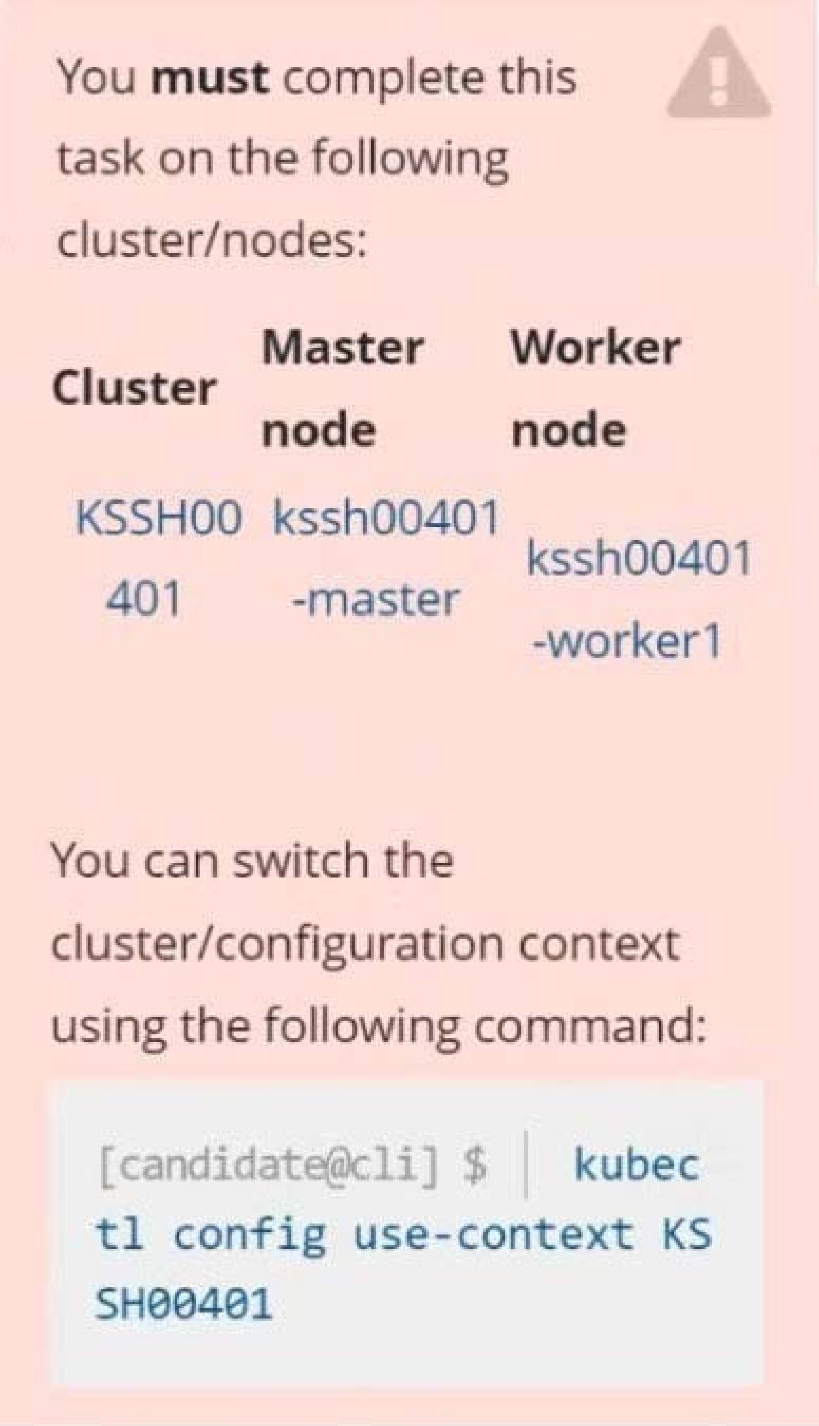


```
root@kssc00401-master:~# kubectl get pods -n naboo -o name
pod/c-3po
pod/chewbacca
pod/jawas
pod/qui-gon-jinn
root@kssc00401-master:~# kubectl -n naboo pod/c-3po -o yaml | grep image
Error: flags cannot be placed before plugin name: -n
root@kssc00401-master:~# kubectl -n naboo get pod/c-3po -o yaml | grep image
    image: centos:centos7.9.2009
    imagePullPolicy: Never
    image: centos:centos7.9.2009
    imageID: docker-pullable://centos@sha256:c73f515d06b0fa07bb18d8202035e739a494ce760aa7312
9f60f4bf2bd22b407
root@kssc00401-master:~# kubectl -n naboo delete pod/c-3po
pod "c-3po" deleted
root@kssc00401-master:~# kubectl -n naboo delete pod/jawas
pod "jawas" deleted
```



```
pod "jawas" deleted
root@kssc00401-master:~# history
    1  kubectl get pods -n naboo
    2  kubectl get pods -n naboo -o name
    3  for i in $(kubectl get pods -n naboo -o name); do kubectl get ${i} -o yaml | grep -i
image ; done
    4  for i in $(kubectl get pods -n naboo -o name); do kubectl -n naboo get ${i} -o yaml |
 grep -i image ; done
    5  trivy image centos:centos7.9.2009
    6  for i in $(kubectl get pods -n naboo -o name); do kubectl -n naboo get ${i} -o yaml |
 grep -i image ; done
    7  trivy image photon:3.0
    8  for i in $(kubectl get pods -n naboo -o name); do kubectl -n naboo get ${i} -o yaml |
 grep -i image ; done
    9  trivy image alpine:3.7
   10  for i in $(kubectl get pods -n naboo -o name); do kubectl -n naboo get ${i} -o yaml |
 grep -i image ; done
   11  trivy image amazonlinux:2
   12  kubectl get pods -n naboo -o name
   13  kubectl -n naboo pod/c-3po -o yaml | grep image
   14  kubectl -n naboo get pod/c-3po -o yaml | grep image
   15  kubectl -n naboo delete pod/c-3po
   16  kubectl -n naboo delete pod/jawas
   17  history
root@kssc00401-master:~# ▯
```

AppArmor is enabled on the cluster\\'s worker node. An AppArmor profile is prepared, but not enforced yet.

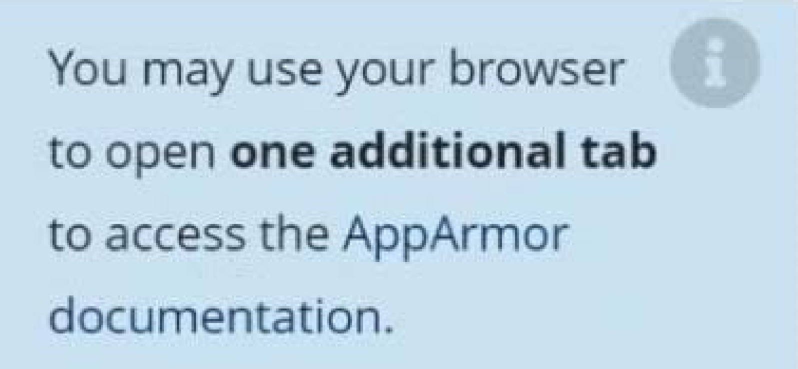


You **must** complete this task on the following cluster/nodes:

Cluster	Master node	Worker node
KSSH00401	kssh00401-master	kssh00401-worker1

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

```
[candidate@cli] $ kubectl config use-context KSSH00401
```



You may use your browser to open **one additional tab** to access the AppArmor documentation.

Task

On the cluster\\'s worker node, enforce the prepared AppArmor profile located at /etc/apparmor.d/nginx_apparmor.

Edit the prepared manifest file located at /home/candidate/KSSH00401/nginx-pod.yaml to apply the AppArmor profile.

Finally, apply the manifest file and create the Pod specified in it.

A. See the explanation below

B. PlaceHolder

Correct Answer: A

QUESTION 10

Create a PSP that will prevent the creation of privileged pods in the namespace.

Create a new PodSecurityPolicy named prevent-privileged-policy which prevents the creation of privileged pods.

Create a new ServiceAccount named psp-sa in the namespace default.

Create a new ClusterRole named prevent-role, which uses the newly created Pod Security Policy prevent-privileged-policy.

Create a new ClusterRoleBinding named prevent-role-binding, which binds the created ClusterRole prevent-role to the created SA psp-sa.

Also, Check the Configuration is working or not by trying to Create a Privileged pod, it should get failed.

A. See the below.

B. PlaceHolder

Correct Answer: A

Create a PSP that will prevent the creation of privileged pods in the namespace. $ cat clusterrole-use-privileged.yaml apiVersion: rbac.authorization.k8s.io/v1

kind: ClusterRole metadata: name: use-privileged-psp rules:

-apiGroups: [\\'policy\\']

resources: [\\'podsecuritypolicies\\']

verbs: [\\'use\\']

resourceNames:

-default-psp

apiVersion: rbac.authorization.k8s.io/v1 kind: RoleBinding metadata: name: privileged-role-bind namespace: psp-test roleRef: apiGroup: rbac.authorization.k8s.io kind: ClusterRole name: use-privileged-psp subjects:

-kind: ServiceAccount name: privileged-sa $ kubectl -n psp-test apply -f clusterrole-use-privileged.yaml

After a few moments, the privileged Pod should be created.

Create a new PodSecurityPolicy named prevent-privileged-policy which prevents the creation of privileged pods.

```
apiVersion: policy/v1beta1
kind: PodSecurityPolicy
metadata:
name: example
spec:
privileged: false # Don\\'t allow privileged pods!
# The rest fills in some required fields.
seLinux:
rule: RunAsAny
supplementalGroups:
rule: RunAsAny
runAsUser:
rule: RunAsAny
fsGroup:
rule: RunAsAny
volumes:
-\\'*\\'
```

And create it with kubectl:

```
kubectl-admin create -f example-psp.yaml
```

Now, as the unprivileged user, try to create a simple pod:

```
kubectl-user create -f-
```