

CKS^{Q&As}

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QUESTION 1
Fix all issues via configuration and restart the affected components to ensure the new setting takes effect.
Fix all of the following violations that were found against the API server:
1.
Ensure theauthorization-mode argument includes RBAC
2.
Ensure theauthorization-mode argument includes Node
3.
Ensure that theprofiling argument is set to false
Fix all of the following violations that were found against the Kubelet:
1.
Ensure theanonymous-auth argument is set to false.
2.
Ensure that theauthorization-mode argument is set to Webhook. Fix all of the following violations that were found against the ETCD:
Ensure that theauto-tls argument is not set to true Hint: Take the use of Tool Kube-Bench
A. See the below.
B. PlaceHolder
Correct Answer: A
API server:
Ensure theauthorization-mode argument includes RBAC
Turn on Role Based Access Control.Role Based Access Control (RBAC) allows fine- grained control over the operations that different entities can perform on different objects in the cluster. It is recommended to use the RBAC authorization
mode.
Fix - BuildtimeKubernetesapiVersion: v1
kind: Pod
metadata:
creationTimestamp: null

labels:



component: kube-apiserver tier: control-plane name: kube-apiserver namespace: kube-system spec: containers: -command: + - kube-apiserver + - --authorization-mode=RBAC,Node image: gcr.io/google_containers/kube-apiserveramd64:v1.6.0 livenessProbe: failureThreshold: 8 httpGet: host: 127.0.0.1 path: /healthz port: 6443 scheme: HTTPS initialDelaySeconds: 15 timeoutSeconds: 15 name: kube-apiserver-should-pass resources: requests: cpu: 250m volumeMounts: mountPath: /etc/kubernetes/ name: k8s readOnly: true mountPath: /etc/ssl/certs name: certs mountPath: /etc/pki name: pki hostNetwork: true volumes: hostPath: path: /etc/kubernetes name: k8s hostPath: path: /etc/ssl/certs name: certs hostPath: path: /etc/pki name: pki Ensure the --authorization-mode argument includes Node Remediation: Edit the API server pod specification file /etc/kubernetes/manifests/kube- apiserver.yaml on the master node and set the --authorization-mode parameter to a value that includes Node. --authorization-mode=Node,RBAC Audit: /bin/ps -ef | grep kube-apiserver | grep -v grep Expected result: \\'Node,RBAC\\' has \\'Node\\' Ensure that the --profiling argument is set to false



Remediation: Edit the API server pod specification file /etc/kubernetes/manifests/kube-apiserver.yaml on the master node and set the below parameter.

node and set the seton parameter.
profiling=false
Audit:
/bin/ps -ef grep kube-apiserver grep -v grep
Expected result:
\\'false\\' is equal to \\'false\\'
Fix all of the following violations that were found against the Kubelet:
uk.co.certification.simulator.questionpool.PList@e3e35a0
Remediation: If using a Kubelet config file, edit the file to set authentication: anonymous:
enabled to false. If using executable arguments, edit the kubelet service file /etc/systemd/system/kubelet.service.d/10-kubeadm.conf on each worker node and set the below parameter in KUBELET_SYSTEM_PODS_ARGS variable.
anonymous-auth=false
Based on your system, restart the kubelet service. For example:
systemctl daemon-reload
systemctl restart kubelet.service
Audit:
/bin/ps -fC kubelet
Audit Config:
/bin/cat /var/lib/kubelet/config.yaml
Expected result:
\\'false\\' is equal to \\'false\\'
2) Ensure that theauthorization-mode argument is set to Webhook.
Audit
docker inspect kubelet jq -e \\'.[0].Args[] match("authorization- mode=Webhook").string\\'
Returned Value:authorization-mode=Webhook
Fix all of the following violations that were found against the ETCD:
a. Ensure that theauto-tls argument is not set to true

Do not use self-signed certificates for TLS. etcd is a highly-available key value store used by Kubernetes deployments for persistent storage of all of its REST API objects. These objects are sensitive in nature and should not be available to



unauthenticated clients. You should enable the client authentication via valid certificates to secure the access to the etcd service.

Fix - BuildtimeKubernetesapiVersion: v1 kind: Pod metadata: annotations: scheduler.alpha.kubernetes.io/critical-pod: "" creationTimestamp: null labels: component: etcd tier: control-plane name: etcd namespace: kube-system spec: containers: -command: + - etcd + - --auto-tls=true image: k8s.gcr.io/etcd-amd64:3.2.18 imagePullPolicy: IfNotPresent livenessProbe: exec: command: -/bin/sh - -ec -ETCDCTL_API=3 etcdctl --endpoints=https://[192.168.22.9]:2379 -- cacert=/etc/kubernetes/pki/etcd/ca.crt --cert=/etc/kubernetes/pki/etcd/healthcheck-client.crt -- key=/etc/kubernetes/pki/etcd/healthcheck-client.key get foo failureThreshold: 8 initialDelaySeconds: 15 timeoutSeconds: 15 name: etcd-should-fail resources: {} volumeMounts: mountPath: /var/lib/etcd name: etcd-data mountPath: /etc/kubernetes/pki/etcd name: etcd-certs

hostNetwork: true



status: {}

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priorityClassName: system-cluster-critical
volumes:
-
hostPath:
path: /var/lib/etcd
type: DirectoryOrCreate
name: etcd-data
-
hostPath:
path: /etc/kubernetes/pki/etcd
type: DirectoryOrCreate
name: etcd-certs

```
ndidate@cli:~$ kubectl delete sa/p
 serviceaccount "podrunner" deleted candidate@cli:~$ kubectl config use-context KSCS00201 Switched to context "KSCS00201".
  andidate@cli:~$ ssh kscs00201-master
 Warning: Permanently added '10.240.86.194' (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
 root@kscs00201-master:~# vim /etc/kubernetes/manifests/kube-apiserver.yaml
 root@kscs00201-master:~# systemctl daemon-reload
root@kscs00201-master:~# systemctl restart kubelet.service
  coot@kscs00201-master:~# systemctl enable kubelet.service
     Drop-In: /etc/systemd/system/kubelet.service.d

Loaded: loaded (/lib/systemd/system/kubelet.service; enabled; vendor preset: enabled)

Drop-In: /etc/systemd/system/kubelet.service.d

—10-kubeadm.conf
       Active: active (running) since Fri 2022-05-20 14:19:31 UTC; 29s ago
Docs: https://kubernetes.io/docs/home/
Main PID: 134205 (kubelet)
             Tasks: 16 (limit: 76200)
Memory: 39.5M
             CGroup: /system.slice/kubelet.service

-134205 /usr/bin/kubelet --bootstrap-kubeconfig=/etc/kubernetes/bootstrap-kub
May 20 14:19:35 kscs00201-master kubelet[134205]: 10520 14:19:35.420825 134205 reconciler.
May 20 14:19:35 kscs00201-master kubelet[134205]: 10520 14:19:35.420863 134205 reconciler.
May 20 14:19:35 kscs00201-master kubelet[134205]: 10520 14:19:35.420907 134205 reconciler.
May 20 14:19:36 kscs00201-master kubelet[134205]: 10520 14:19:36.572353 134205 reconciler.
May 20 14:19:37 kscs00201-master kubelet[134205]: 10520 14:19:36.572353 134205 request.go:
May 20 14:19:37 kscs00201-master kubelet[134205]: 10520 14:19:37.185076 134205 prober_mana
May 20 14:19:37 kscs00201-master kubelet[134205]: 10520 14:19:37.185076 134205 kubelet.go:
May 20 14:19:38 kscs00201-master kubelet[134205]: 10520 14:19:37.645798 134205 kubelet.go:
May 20 14:19:40 kscs00201-master kubelet[134205]: 10520 14:19:38.184062 134205 kubelet.go:
May 20 14:19:40 kscs00201-master kubelet[134205]: 10520 14:19:40.036042 134205 prober_mana
May 20 14:19:40 kscs00201-master kubelet[134205]: 10520 14:19:40.036042 134205 prober_mana
   et.service; enabled; vendor preset: enabled)
  ce.d
   5-20 14:19:31 UTC; 29s ago
   trap-kubeconfig=/etc/kubernetes/bootstrap-kubelet.conf --kubeconfig=/etc/kubernetes/kubelet
 5]: I0520 14:19:35.420825 134205 reconciler.go:221] "operationExecutor.VerifyControllerAtt>
5]: I0520 14:19:35.420863 134205 reconciler.go:221] "operationExecutor.VerifyControllerAtt>
5]: I0520 14:19:35.420907 134205 reconciler.go:221] "operationExecutor.VerifyControllerAtt>
5]: I0520 14:19:35.420928 134205 reconciler.go:157] "Reconciler: start to sync state"
5]: I0520 14:19:36.572353 134205 request.go:665] Waited for 1.049946364s due to client-sic>
5]: I0520 14:19:37.112347 134205 prober_manager.go:255] "Failed to trigger a manual run" p>
5]: I0520 14:19:37.645798 134205 kubelet.go:1693] "Trying to delete pod" pod="kube-system/>
5]: I0520 14:19:38.184062 134205 kubelet.go:1698] "Deleted mirror pod because it is outdat>
5]: I0520 14:19:40.036042 134205 prober_manager.go:255] "Failed to trigger a manual run" p>
  let.conf --kubeconfig=/etc/kubernetes/kubelet.conf --config=/var/lib/kubelet/config.vaml
 o:221] "operationExecutor.VerifyControllerAttachedVolume started for volume \"kube-proxy\"o:221] "operationExecutor.VerifyControllerAttachedVolume started for volume \"lib-modules\"
                  "operationExecutor.VerifyControllerAttachedVolume started for volume \"flannel-cfg\"
o:221] "operationExecutor.VerifyControllerAttachedVolume started for volume \"flannel-cfg\">
o:157] "Reconciler: start to sync state"
65] Waited for 1.049946364s due to client-side throttling, not priority and fairness, reque-
er.go:255] "Failed to trigger a manual run" probe="Readiness"
711] "Failed creating a mirror pod for" err="pods \"kube-apiserver-kscs00201-master\" alrea>
693] "Trying to delete pod" pod="kube-system/kube-apiserver-kscs00201-master" podUID=bb91e1>
698] "Deleted mirror pod because it is outdated" pod="kube-system/kube-apiserver-kscs00201->
er.go:255] "Failed to trigger a manual run" probe="Readiness"
    oot@kscs00201-master:~# vim /var/lib/kubelet/config.yaml
```



```
apiVersion: kubelet.config.k8s.io/vlbeta1
authentication:
    anonymous:
    enabled: false
    webhook:
        cacheTTL: 0s
        enabled: true
    x509:
        clientCAFile: /etc/kubernetes/pki/ca.lt
authorization:
    mode: Webhook[]
    webhook:
        cacheAuthorizedTTL: 0s
        cacheUnauthorizedTTL: 0s
cgroupDriver: systemd
clusterDNS:
```

```
root@kscs00201-master:~# vim /var/lib/kubelet/config.yaml
root@kscs00201-master:~# vim /var/lib/kubelet/config.yaml
root@kscs00201-master:~# vim /etc/kubernetes/manifests/etcd.yaml
root@kscs00201-master:~# systemctl daemon-reload
root@kscs00201-master:~# systemctl restart kubelet.service
root@kscs00201-master:~# systemctl status kubelet.service
```

```
kubelet.service - kubelet: The Kubernetes Node Agent
     Loaded: loaded (/lib/systemd/system/kubelet.service; enabled; vendor preset: enabled)
    Drop-In: /etc/systemd/system/kubelet.service.d
             └10-kubeadm.conf
     Active: active (running) since Fri 2022-05-20 14:22:29 UTC; 4s ago
      Docs: https://kubernetes.io/docs/home/
   Main PID: 135849 (kubelet)
      Tasks: 17 (limit: 76200)
     Memory: 38.0M
     CGroup: /system.slice/kubelet.service
             -135849 /usr/bin/kubelet --bootstrap-kubeconfig=/etc/kubernetes/bootstrap-kub
May 20 14:22:30 kscs00201-master kubelet[135849]: I0520 14:22:30.330232 135849 reconciler.
May 20 14:22:30 kscs00201-master kubelet[135849]: 10520 14:22:30.330259 135849 reconciler.
May 20 14:22:30 kscs00201-master kubelet[135849]: I0520 14:22:30.330304 135849 reconciler
May 20 14:22:30 kscs00201-master kubelet[135849]: I0520 14:22:30.330354 135849 reconciler
May 20 14:22:30 kscs00201-master kubelet[135849]: I0520 14:22:30.330378 135849 reconciler
May 20 14:22:30 kscs00201-master kubelet[135849]: 10520 14:22:30.330397 135849 reconciler.
May 20 14:22:30 kscs00201-master kubelet[135849]: 10520 14:22:30.330415 135849 reconciler.
May 20 14:22:30 kscs00201-master kubelet[135849]: I0520 14:22:30.330433 135849 reconciler.
May 20 14:22:30 kscs00201-master kubelet[135849]: I0520 14:22:30.330452 135849 reconciler.
May 20 14:22:30 kscs00201-master kubelet[135849]: 10520 14:22:30.330463 135849 reconciler.
lines 1-22/22 (END)
May 20 14:22:30 kscs00201-master kubelet[135849]: I0520 14:22:30.330463 135849 reconciler.
root@kscs00201-master:~#
root@kscs00201-master:~#
root@kscs00201-master:~#
root@kscs00201-master:~# exit
logout
Connection to 10.240.86.194 closed.
```

candidate@cli:~\$



QUESTION 2

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

[desk@cli] \$ kubectl config use-context qa

Context:

A pod fails to run because of an incorrectly specified ServiceAccount

Task:

Create a new service account named backend-qa in an existing namespace qa, which must not have access to any secret.

Edit the frontend pod yaml to use backend-qa service account

Note: You can find the frontend pod yaml at /home/cert_masters/frontend-pod.yaml

A. See the explanation below

B. PlaceHolder

Correct Answer: A

[desk@cli] \$ k create sa backend-qa -n qasa/backend-qa created [desk@cli] \$ k get role,rolebinding -n qaNo resources found in qa namespace. [desk@cli] \$ k create role backend -n qa --resource pods,namespaces,configmaps --verb list# No access to secret [desk@cli] \$ k create rolebinding backend -n qa --role backend --serviceaccount qa:backend-qa [desk@cli] \$ vim /home/ cert_masters/frontend-pod.yaml uk.co.certification.simulator.questionpool.PList@120e0660 [desk@cli] \$ k apply -f /home/cert_masters/frontend-pod.yamlpod created [desk@cli] \$ k create sa backend-qa -n qaserviceaccount/backend-qa created [desk@cli] \$ k get role,rolebinding -n qaNo resources found in qa namespace. [desk@cli] \$ k create role backend -n qa --resource pods,namespaces,configmaps --verb listrole.rbac.authorization.k8s.io/backend created [desk@cli] \$ k create rolebinding backend -n qa --role backend --serviceaccount qa:backendqarolebinding.rbac.authorization.k8s.io/backend created [desk@cli] \$ vim /home/cert_masters/frontend-pod.yaml apiVersion: v1 kind: Pod metadata: name: frontend spec: serviceAccountName: backend-qa # Add this image: nginx name: frontend [desk@cli] \$ k apply -f /home/cert_masters/frontend-pod.yamlpod/frontend createdhttps://kubernetes.io/docs/tasks/configure-pod-container/configure-service-account/

QUESTION 3

CORRECT TEXT



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



worker1

Cluster Master Worker node node

KSRS001 ksrs00101 ksrs00101-

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

[candidate@cli] \$ kubec
tl config use-context KS
RS00101

You may use your browser to open **one additional tab** to access Falco's documentation.

Two tools are pre-installed on the cluster\\'s worker node:

1.

sysdig

2.

falco

Using the tool of your choice (including any non pre-installed tool), analyze the container\\'s behavior for at least 30 seconds, using filters that detect newly spawning and executing processes. Store an incident file at /opt/KSRS00101/alerts/

details, containing the detected incidents, one per line, in the following format:

timestamp,uid/username,proce ssName

The following example shows a properly formatted incident file:

01:40:19.601363716, root, init

01:40:20.606013716, nobody, ba

sh

01:40:21.137163716,1000,tar

Keep the tool's original timestamp-format as-is.



Make sure to store the incident file on the cluster's worker node.



A. See the explanation below:

B. PlaceHolder

Correct Answer: A

```
candidate@cli:~$ kubectl config use-context KSRS00101
Switched to context "KSRS00101".
candidate@cli:~$ ssh ksrs00101-worker1
Warning: Permanently added '10.240.86.96' (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@ksrs00101-worker1:~# falco
                    falco-driver-loader
root@ksrs00101-worker1:~# ls -1 /etc/falco/
total 200
-rw-r--r-- 1 root root 12399 Jan 31 16:06 aws cloudtrail rules.yaml
-rw-r--r-- 1 root root 11384 Jan 31 16:06 falco.yaml
-rw-r--r- 1 root root 1136 Jan 31 16:06 falco rules.local.yaml
-rw-r--r-- 1 root root 132112 Jan 31 16:06 falco rules.yaml
-rw-r--r- 1 root root 27289 Jan 31 16:06 k8s audit rules.yaml
drwxr-xr-x 2 root root 4096 Feb 16 01:07 rules.available
drwxr-xr-x 2 root root 4096 Jan 31 16:28 rules.d
root@ksrs00101-worker1:~# vim /etc/falco/falco rules.local.yaml
```

```
rule: Container Drift Detected (chmod)
desc: New executable created in a container due to chmod
  evt.type in (open, openat, create) 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
   %evt.time, %user.uid, %proc.name
priority: ERROR
```

Text

```
root@ksrs00101-worker1:~# vim /etc/falco/falco_rules.local.yaml
root@ksrs00101-worker1:~# systemctl status falco.service

• falco.service - Falco Runtime Security

Loaded: loaded (/lib/systemd/system/falco.service; disabled; vendor preset: enabled)
Active: inactive (dead)
root@ksrs00101-worker1:~# systemctl enable falco.service
Created symlink /etc/systemd/system/multi-user.target.wants/falco.service → /lib/systemd/system/falco.service.
root@ksrs00101-worker1:~# systemctl start falco.service
root@ksrs00101-worker1:~# exit
logout
Connection to 10.240.86.96 closed.
candidate@cli:~$ ssh ksrs00101-worker1
Last login: Fri May 20 15:59:48 2022 from 10.240.86.88
root@ksrs00101-worker1:~# vim /etc/falco/falco.yaml
```

```
# When using json output, whether or not to include the "tags" property
# itself in the json output. If set to true, outputs caused by rules
# with no tags will have a "tags" field set to an empty array. If set to
# false, the "tags" field will not be included in the json output at all.
json_include_tags_property: true

# Send information logs to stderr and/or syslog Note these are *not* security
# notification logs! These are just Falco lifecycle (and possibly error) logs.
log_stderr: true
log_syslog: true
log_file: /opt/KSRS00101/alerts/details

# Minimum log level to include in logs. Note: these levels are
# separate from the priority field of rules. This refers only to the
# log level of falco's internal logging. Can be one of "emergency",
# "alert", "critical", "error", "warning", "notice", "info", "debug".
log_level: info
```

Text

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```
root@ksrs00101-worker1:~# vim /etc/falco/falco.yaml
root@ksrs00101-worker1:~# grep log /etc/falco/falco.yaml
# cloudtrail log files.
# If true, the times displayed in log messages and output messages
# Send information logs to stderr and/or syslog Note these are *not* security
# notification logs! These are just Falco lifecycle (and possibly error) logs.
log_stderr: true
log syslog: true
log file: /opt/KSRS00101/alerts/details
# Minimum log level to include in logs. Note: these levels are
# log level of falco's internal logging. Can be one of "emergency",
  level: info
    - log: log a DEBUG message noting that the buffer was full
# Notice it is not possible to ignore and log/alert messages at the same time.
# The rate at which log/alert messages are emitted is governed by a
# The timeout error will be reported to the log according to the above log * settings.
syslog output:
    - logging (alternate method than syslog):
          program: logger -t falco-test
# this information will be logged, however the main Falco daemon will not be stopped.
root@ksrs00101-worker1:~# systemctl restart falco.service
root@ksrs00101-worker1:~# exit
logout
Connection to 10.240.86.96 closed.
candidate@cli:~$
```

QUESTION 4

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

1.

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

2.

Log files are retained for 5 days.

3.

at maximum, a number of 10 old audit logs files are retained. Edit and extend the basic policy to log:

1.

Cronjobs changes at RequestResponse

2.

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

3.

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



4.

Don\\'t log watch requests by the "system:kube-proxy" on endpoints or

A. See explanation below.

B. PlaceHolder

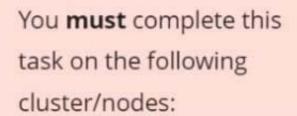
Correct Answer: A

QUESTION 5

CORRECT TEXT

Task







Cluster Master Worker node node

KSSH00 kssh00301 301 -master -worker1

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

[candidate@cli] \$ kubec
tl config use-context KS
SH00301

Create a NetworkPolicy named pod-access to restrict access to Pod users-service running in namespace dev-team. Only allow the following Pods to connect to Pod users-service:

1.

Pods in the namespace qa

2.

Pods with label environment: testing, in any namespace



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Make sure to apply the NetworkPolicy.



You can find a skeleton
manifest file at
/home/candidate/KSSH00301/n
etwork-policy.yaml

- A. See explanation below.
- B. PlaceHolder

Correct Answer: A

Explanation/Reference:

```
candidate@cli:~$ kubectl config use-context KSSH00301
Switched to context "KSSH00301".
candidate@cli:~$
candidate@cli:~$
candidate@cli:~$ kubectl get ns dev-team --show-labels
          STATUS
                    AGE
                            LABELS
                            environment=dev, kubernetes.io/metadata.name=dev-team
dev-team
           Active
                    6h39m
candidate@cli:~$ kubectl get pods -n dev-team --show-labels
                                  RESTARTS
                                                     LABELS
                READY
                        STATUS
                                             AGE
users-service
                1/1
                        Running
                                  0
                                             6h40m
                                                     environment=dev
candidate@cli:~$ ls
KSCH00301 KSMV00102
                     KSSC00301
                                 KSSH00401
                                               test-secret-pod.yaml
KSCS00101 KSMV00301
                      KSSH00301
                                 password.txt username.txt
candidate@cli:~$ vim np.yaml
```

- A. See explanation below.
- B. PlaceHolder

Correct Answer: A

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