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Achieving the CKS Certification is a valuable asset for IT professionals who are responsible for securing Kubernetes clusters. Certified Kubernetes Security Specialist (CKS) certification demonstrates that a candidate has the knowledge and skills to effectively manage the security risks associated with Kubernetes clusters, and can take proactive measures to prevent security breaches. Additionally, the certification can help professionals differentiate themselves in a competitive job market and increase their earning potential.

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Exam Linux Foundation CKS Practice & Valid CKS Test Guide

Some of our customers are white-collar workers with no time to waste, and need a Linux Foundation certification urgently to get their promotions, meanwhile the other customers might aim at improving their skills. So we try to meet different requirements by setting different versions of our CKS question and answers. The special one is online CKS engine version. As an online tool, it is convenient and easy to study, supports all Web Browsers and system including Windows, Mac, Android, iOS and so on. You can apply this version of CKS exam questions on all electric devices.

Linux Foundation Certified Kubernetes Security Specialist (CKS) Sample Questions (Q144-Q149):

NEW QUESTION # 144

Context

This cluster uses containerd as CRI runtime.

Containerd's default runtime handler is runc. Containerd has been prepared to support an additional runtime handler, runsc (gVisor).

Task

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

Update all Pods in the namespace server to run on gVisor.

You can find a skeleton

manifest file at

/home/candidate/KSMV00301/
runtime-class.yaml

Answer:

Explanation:

```
candidate@cli:~$ kubectl config use-context KSMV00301
Switched to context "KSMV00301".
candidate@cli:~$ cat /home/candidate/KSMV00301/runtime-class.yaml
---
apiVersion: node.k8s.io/v1
kind: RuntimeClass
metadata:
  name: ""
  handler: ""
candidate@cli:~$ vim /home/candidate/KSMV00301/runtime-class.yaml
```

```
apiVersion: node.k8s.io/v1
kind: RuntimeClass
metadata:
  name: "sandboxed"
handler: "runsc"
```



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:wq!

```

candidate@cli:~$ kubectl config use-context KSMV00301
Switched to context "KSMV00301".
candidate@cli:~$ cat /home/candidate/KSMV00301/runtime-class.yaml
---
apiVersion: node.k8s.io/v1
kind: RuntimeClass
metadata:
  name: ""
handler: ""
candidate@cli:~$ vim /home/candidate/KSMV00301/runtime-class.yaml
candidate@cli:~$ cat /home/candidate/KSMV00301/runtime-class.yaml
---
apiVersion: node.k8s.io/v1
kind: RuntimeClass
metadata:
  name: "sandboxed"
handler: "runsc"
candidate@cli:~$ kubectl get deployments.apps -n server
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
workload1            1/1     1             1           5h43m
workload2            1/1     1             1           5h43m
workload3            1/1     1             1           5h43m
candidate@cli:~$ kubectl get pods -n server
NAME                                READY   STATUS    RESTARTS   AGE
workload1-6869857dd7-s45rc          1/1     Running   0           5h43m
workload2-d4bd497d5-h44df           1/1     Running   0           5h43m
workload3-8587774495-chm56          1/1     Running   0           5h43m
candidate@cli:~$ kubectl -n server edit deployments.apps workload1

```



```

template:
  metadata:
    creationTimestamp: null
  labels:
    app: nginx
    name: workload1
  spec:
    runtimeClassName: sandboxed
    containers:
    - image: nginx:1.14.2
      imagePullPolicy: IfNotPresent
      name: workload1
      ports:
      - containerPort: 80
        protocol: TCP
      resources: {}
    terminationMessagePath: /dev/termination-log
    terminationMessagePolicy: File
    dnsPolicy: ClusterFirst
    restartPolicy: Always
    schedulerName: default-scheduler
    securityContext: {}
    terminationGracePeriodSeconds: 30

```

status:

```

/tmp/kubect1-edit-3385772700.yaml"

```

NAME	READY	STATUS	RESTARTS	AGE
workload1-6869857dd7-s45rc	1/1	Running	0	5h44m
workload2-d4bd497d5-h44df	1/1	Running	0	5h44m
workload3-8587774495-chm56	1/1	Running	0	5h44m

candidate@cli:~\$ kubectl -n server edit deployments.apps workload1
Edit cancelled, no changes made.

candidate@cli:~\$ kubectl get pods -n server

NAME	READY	STATUS	RESTARTS	AGE
workload1-6869857dd7-s45rc	1/1	Running	0	5h45m
workload2-d4bd497d5-h44df	1/1	Running	0	5h44m
workload3-8587774495-chm56	1/1	Running	0	5h44m

candidate@cli:~\$ kubectl -n server edit deployments.apps workload2
Edit cancelled, no changes made.

candidate@cli:~\$ kubectl create -n kube-system /home/candidate/KSMV00301/runtime-class.yaml
runtimeclass.node.k8s.io/sandboxed created

candidate@cli:~\$ kubectl get pods -n server

NAME	READY	STATUS	RESTARTS	AGE
workload1-6869857dd7-s45rc	1/1	Running	0	5h45m
workload2-d4bd497d5-h44df	1/1	Running	0	5h45m
workload3-8587774495-chm56	1/1	Running	0	5h45m

candidate@cli:~\$ kubectl -n server edit deployments.apps workload2

```
strategy:
  rollingUpdate:
    maxSurge: 25%
    maxUnavailable: 25%
  type: RollingUpdate
template:
  metadata:
    creationTimestamp: null
  labels:
    app: nginx
  name: workload2
  spec:
    runtimeClassName: sandboxed
```

NAME	READY	STATUS	RESTARTS	AGE
workload1-6869857dd7-s45rc	1/1	Running	0	5h45m
workload2-d4bd497d5-h44df	1/1	Running	0	5h45m
workload3-8587774495-chm56	1/1	Running	0	5h45m

```
candidate@cli:~$ kubectl -n server edit deployments.apps workload2
deployment.apps/workload2 edited
```

```
candidate@cli:~$ kubectl get pods -n server
```

NAME	READY	STATUS	RESTARTS	AGE
workload1-8d8649ff6-wvjtg	1/1	Running	0	15s
workload2-765bdb98c8-wd8cm	1/1	Running	0	4s
workload3-8587774495-chm56	1/1	Running	0	5h45m

```
candidate@cli:~$ kubectl -n server edit deployments.apps workload3
```

```
  app: nginx
  name: workload3
  spec:
    runtimeClassName: sandboxed
    containers:
    - image: nginx:1.14.2
      imagePullPolicy: IfNotPresent
      name: workload3
      ports:
```

```
candidate@cli:~$ kubectl -n server edit deployments.apps workload3
deployment.apps/workload3 edited
```

```
candidate@cli:~$ kubectl get pods -n server
```

NAME	READY	STATUS	RESTARTS	AGE
workload1-8d8649ff6-wvjtg	1/1	Running	0	58s
workload2-765bdb98c8-wd8cm	1/1	Running	0	47s
workload3-76c994b4d-s6286	1/1	Running	0	4s

```
candidate@cli:~$
```

NEW QUESTION # 145

You're tasked With securing a Kubernetes cluster for a sensitive application. The application utilizes a service account for accessing a database. However, due to legacy reasons, this service account has broad permissions, including 'read', 'write', and 'delete' access to all resources in the cluster. How would you mitigate this security risk while maintaining application functionality? Implement a

solution that minimizes the permissions granted to the service account and adheres to the principle of least privilege.

Answer:

Explanation:

Solution (Step by Step) :

1. Create a new Role With restricted permissions:

- Define a Role that grants only the necessary permissions for the service account to interact with the database.
- The Role should have specific permissions for 'read' , 'write' , and 'delete' operations, but limited to the database resources used by the application.

```
apiVersion: rbac.authorization.k8s.io/v1
kind: Role
metadata:
  name: database-access-role
  namespace: your-namespace
rules:
- apiGroups: ["apps"]
  resources: ["deployments"]
  verbs: ["get", "list", "watch"]
- apiGroups: ["extensions"]
  resources: ["ingresses"]
  verbs: ["get", "list", "watch"]
- apiGroups: ["apps"]
  resources: ["statefulsets"]
  verbs: ["get", "list", "watch"]
```

2. Create a RoleBinding: - Bind the newly created Role to the service account. - This will grant the service account the specific permissions defined in the Role.

```
apiVersion: rbac.authorization.k8s.io/v1
kind: RoleBinding
metadata:
  name: database-access-rolebinding
  namespace: your-namespace
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: Role
  name: database-access-role
subjects:
- kind: ServiceAccount
  name: your-service-account
  namespace: your-namespace
```

3. Update the Deployment - Update the Deployment configuration to use the new service account with restricted permissions.

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: your-deployment
spec:
  template:
    spec:
      serviceAccountName: your-service-account
```

4. Validate the Permissions: - Verify that the application still functions correctly with the restricted permissions. - Use 'kubectl auth can-i --list --as=your-service-account' to confirm the available permissions for the service account. 5. Revoke the Legacy Service Account: - Once the application is running with the new service account, revoke the old service account with broad permissions.

NEW QUESTION # 146

Context: Cluster: prod Master node: master1 Worker node: worker1

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

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

Task: Analyse and edit the given Dockerfile (based on the ubuntu:18.04 image) /home/cert_masters/Dockerfile fixing two instructions present in the file being prominent security/best-practice issues.

Analyse and edit the given manifest file /home/cert_masters/mydeployment.yaml fixing two fields present in the file being prominent security/best-practice issues.

Note: Don't add or remove configuration settings; only modify the existing configuration settings, so that two configuration settings each are no longer security/best-practice concerns. Should you need an unprivileged user for any of the tasks, use user nobody with user id 65535

Answer:

Explanation:

1. For Dockerfile: Fix the image version & user name in Dockerfile 2. For mydeployment.yaml : Fix security contexts Explanation

[desk@cli] \$ vim /home/cert_masters/Dockerfile

FROM ubuntu:latest # Remove this

FROM ubuntu:18.04 # Add this

USER root # Remove this

USER nobody # Add this

RUN apt get install -y lsof=4.72 wget=1.17.1 nginx=4.2

ENV ENVIRONMENT=testing

USER root # Remove this

USER nobody # Add this

CMD ["nginx -d"]

```
FROM ubuntu:latest # Remove this
FROM ubuntu:18.04 # Add this
USER root # Remove this
USER nobody # Add this
RUN apt get install -y lsof=4.72 wget=1.17.1 nginx=4.2
ENV ENVIRONMENT=testing
USER root # Remove this
USER nobody # Add this
CMD ["nginx -d"]
```

[desk@cli] \$ vim /home/cert_masters/mydeployment.yaml

apiVersion: apps/v1

kind: Deployment

metadata:

creationTimestamp: null

labels:

app: kafka

name: kafka

spec:

replicas: 1

selector:

matchLabels:

app: kafka

strategy: {}

template:

metadata:

creationTimestamp: null

labels:

app: kafka

spec:

containers:

- image: bitnami/kafka

name: kafka

volumeMounts:

- name: kafka-vol

mountPath: /var/lib/kafka

securityContext:

```
{'capabilities':{'add':['NET_ADMIN'],'drop':['all']},'privileged': True,'readOnlyRootFilesystem': False, 'runAsUser': 65535} #
Delete This
{'capabilities':{'add':['NET_ADMIN'],'drop':['all']},'privileged': False,'readOnlyRootFilesystem': True, 'runAsUser': 65535} #
Add This resources: {} volumes:
- name: kafka-vol
emptyDir: {}
status: {}
Pictorial View: [desk@cli] $ vim /home/cert_masters/mydeployment.yaml
```

```
apiVersion: apps/v1
kind: Deployment
metadata:
  creationTimestamp: null
  labels:
    app: kafka
  name: kafka
spec:
  replicas: 1
  selector:
    matchLabels:
      app: kafka
  strategy: {}
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: kafka
    spec:
      containers:
        - image: bitnami/kafka
          name: kafka
          volumeMounts:
            - name: kafka-vol
              mountPath: /var/lib/kafka
          securityContext:
            {'capabilities':{'add':['NET_ADMIN'],'drop':['all']},'privileged': True,'readOnlyRootFilesystem': False, 'runAsUser': 65535} # Delete This
            {'capabilities':{'add':['NET_ADMIN'],'drop':['all']},'privileged': False,'readOnlyRootFilesystem': True, 'runAsUser': 65535} # Add This
      resources: {}
      volumes:
        - name: kafka-vol
          emptyDir: {}
    status: {}
```

NEW QUESTION # 147

You are managing a Kubernetes cluster running an application that uses a private container registry. The registry is secured using basic authentication, but the credentials are stored in a secret in the cluster. You want to ensure that the application container can access the registry without storing the credentials directly within the container image.

How would you configure the application deployment to access the private registry securely without exposing the credentials?

Answer:

Explanation:

Solution (Step by Step) :

1. Create a Secret:

- Create a secret that stores the registry username and password.

- Example:

```
apiVersion: v1
kind: Secret
metadata:
  name: registry-credentials
type: kubernetes.io/basic-auth
data:
  username:
  password:
```

2. Configure the Service Account - Create a service account for the application. - Add the 'imagePullSecrets' field to the service account to reference the secret. - Example:

```
apiVersion: v1
kind: ServiceAccount
metadata:
  name: registry-app-sa
imagePullSecrets:
- name: registry-credentials
```

3. Update the Deployment: - Update the deployment YAML to use the service account. - Example:



```

apiVersion: apps/v1
kind: Deployment
metadata:
  name: registry-app
spec:
  replicas: 3
  selector:
    matchLabels:
      app: registry-app
  template:
    metadata:
      labels:
        app: registry-app
    spec:
      serviceAccountName: registry-app-sa
      containers:
      - name: registry-app
        image: your-private-registry.com/your-namespace/your-image:latest
        # ... other container settings

```

4. Apply the Changes: - Apply the secret, service account, and updated deployment using 'kubectl apply -f' commands.

NEW QUESTION # 148

You are responsible for securing the software supply chain of your company's applications deployed in a Kubernetes cluster. You are implementing a CI/CD pipeline that builds, tests, and deploys container images. Currently, your pipeline relies on pulling images directly from Docker Hub without any security checks. How would you enhance your pipeline to verify the integrity of the images pulled from Docker Hub?

Answer:

Explanation:

Solution (Step by Step):

1. Implement Image Signing:

- Step 1: Generate a signing key and certificate pair for your organization.
- Step 2: Configure your CI/CD pipeline to sign container images after they are built using the generated key and certificate.
- Step 3: Configure your Kubernetes cluster to only pull and deploy images that are signed with your organization's certificate. This step involves creating a 'PodSecurityPolicy' (PSP) or 'PodSecurityAdmission' (PSA) resource to enforce image signing.

Example Code:



```

---
apiVersion: rbac.authorization.k8s.io/v1
kind: Role
metadata:
  name: image-signer
rules:
- apiGroups: [""]
  resources: ["pods"]
  verbs: ["create", "get", "list", "watch"]
---
apiVersion: rbac.authorization.k8s.io/v1
kind: RoleBinding
metadata:
  name: image-signer-binding
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: Role
  name: image-signer
subjects:
- kind: User
  name: your-username
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: your-registry/nginx:latest
        imagePullSecrets:
        - name: image-signer-secret

```

NEW QUESTION # 149

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