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Since Kubernetes security is a specialized area, there are few other certifications that specifically address this topic. The CKS Certification fills a critical gap and is a valuable addition to the certifications available to security professionals today. Certified Kubernetes Security Specialist (CKS) certification exam requires significant preparation and training, and passing it is a testament to the candidate's hard work and dedication to their craft.

## Linux Foundation Certified Kubernetes Security Specialist (CKS) Sample Questions (Q36-Q41):

### NEW QUESTION # 36

You are using Kubesec for static analysis of Kubernetes manifests. You have a Deployment YAML file containing a container image that pulls from a public registry. The analysis reveals a potential vulnerability: the container image is outdated. How would you use Kubesec to identify this vulnerability and what steps would you take to remediate it?

**Answer:**

Explanation:

Solution (Step by Step) :

#### 1. Run Kubesec Analysis:

- Use the 'kubesec' command to analyze your Deployment YAML file:

```
bash
```

```
kubesec scan your-deployment.yaml
```

- Kubesec will provide a detailed report of potential security vulnerabilities and best practice recommendations.

#### 2. Identify Outdated Image:

- Review the Kubesec report to identify the warning related to the outdated container image. Kubesec might provide specific information like the image

name, tag, and the reason it's considered outdated (e.g., known vulnerabilities, end-of-life support).

#### 3. Check for Updates:

- Check the official repository or documentation of the container image for newer versions.
- Look for updated tags that address the identified vulnerability or have updated security patches.

#### 4. Update Deployment YAML:

- Modify your Deployment YAML file to use the newer, updated container image.

- Example (assuming the updated image is 'nginx:1.20.1'):

- 5. Re-run Kubesec Analysis: - After updating the Deployment YAML, run Kubesec analysis again. This will verify that the vulnerability is resolved and that the new container image is properly configured.

### NEW QUESTION # 37

#### SIMULATION

Documentation

ServiceAccount, Deployment,

Projected Volumes

You must connect to the correct host . Failure to do so may result in a zero score.

```
[candidate@base] $ ssh cks000033
```

Context

A security audit has identified a Deployment improperly handling service account tokens, which could lead to security vulnerabilities.

Task

First, modify the existing ServiceAccount stats-monitor-sa in the namespace monitoring to turn off automounting of API credentials. Next, modify the existing Deployment stats-monitor in the namespace monitoring to inject a ServiceAccount token mounted at /var/run/secrets/kubernetes.io/serviceaccount/token.

Use a Projected Volume named token to inject the ServiceAccount token and ensure that it is mounted read-only.

The Deployment's manifest file can be found at /home/candidate/stats-monitor/deployment.yaml.

#### Answer:

Explanation:

See the Explanation below for complete solution

Explanation:

1) Connect to correct host

```
ssh cks000033
```

```
sudo -i
```

```
export KUBECONFIG=/etc/kubernetes/admin.conf
```

2) Patch the ServiceAccount to disable automounting

Task: turn off automounting of API credentials for stats-monitor-sa in monitoring.

```
kubectl -n monitoring patch sa stats-monitor-sa -p '{"automountServiceAccountToken": false}' Verify:
```

```
kubectl -n monitoring get sa stats-monitor-sa -o yaml | grep -i automount
```

3) Edit the Deployment manifest file

Task says to modify the manifest at:

```
/home/candidate/stats-monitor/deployment.yaml
```

```
vi /home/candidate/stats-monitor/deployment.yaml
```

4) In the Deployment, ensure it uses the ServiceAccount AND inject token via Projected Volume

4.1 Make sure Deployment uses the SA

Under:

```
spec: -> template: -> spec:
```

```
ensure:
```

```
serviceAccountName: stats-monitor-sa
```

(If it already exists, leave it; don't add extra changes beyond requirements.)

#### 4.2 Add a projected volume named token

Under:

spec: -> template: -> spec: -> volumes:

add (or modify existing volume if present) so it is exactly:

- name: token

projected:

sources:

- serviceAccountToken:

path: token

This creates the file token inside the mounted directory, so the final path becomes:

/var/run/secrets/kubernetes.io/serviceaccount/token

#### 4.3 Mount the projected volume read-only at the required location

Under the target container:

spec: -> template: -> spec: -> containers: -> (your container) -> volumeMounts:

Add:

- name: token

mountPath: /var/run/secrets/kubernetes.io/serviceaccount

readOnly: true

□ This satisfies:

Projected volume name: token

Mount path: /var/run/secrets/kubernetes.io/serviceaccount/token (file inside mount) Mounted read-only

#### 4.4 Important: Don't break default token mount behavior

Because you disabled SA automounting at the ServiceAccount level, you must explicitly mount the projected token (done above).

That's the whole point of this task.

Save and exit:

:wq

#### 5) Apply the updated Deployment

kubectl -n monitoring apply -f /home/candidate/stats-monitor/deployment.yaml Wait rollout:

kubectl -n monitoring rollout status deployment/stats-monitor

#### 6) Verify the token file exists in the running Pod

Get a pod name:

POD=\$(kubectl -n monitoring get pods -l app=stats-monitor -o jsonpath='{.items[0].metadata.name}') echo \$POD Check the token file path exists:

kubectl -n monitoring exec -it \$POD -- ls -l /var/run/secrets/kubernetes.io/serviceaccount/token Optional: confirm it's mounted read-only (usually shown by mount options):

kubectl -n monitoring exec -it \$POD -- mount | grep /var/run/secrets/kubernetes.io/serviceaccount

□ What the examiner checks

SA stats-monitor-sa has:

automountServiceAccountToken: false

Deployment stats-monitor mounts a projected volume named token

Token file is at:

/var/run/secrets/kubernetes.io/serviceaccount/token

Mount is readOnly: true

If label selector doesn't match (-l app=stats-monitor)

Use:

kubectl -n monitoring get pods

Then set:

POD=<paste-pod-name>

### NEW QUESTION # 38

You can switch the cluster/configuration context using the following command: [desk@cli] \$ kubectl config use-context dev A default-deny NetworkPolicy avoid to accidentally expose a Pod in a namespace that doesn't have any other NetworkPolicy defined.

Task: Create a new default-deny NetworkPolicy named deny-network in the namespace test for all traffic of type Ingress + Egress

The new NetworkPolicy must deny all Ingress + Egress traffic in the namespace test.

Apply the newly created default-deny NetworkPolicy to all Pods running in namespace test.

You can find a skeleton manifests file at /home/cert\_masters/network-policy.yaml

**Answer:**

Explanation:

```

master1 $ k get pods -n test --show-labels
NAME READY STATUS RESTARTS AGE LABELS
test-pod 1/1 Running 0 34s role=test,run=test-pod
testing 1/1 Running 0 17d run=testing
$ vim netpol.yaml
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: deny-network
  namespace: test
spec:
  podSelector: {}
  policyTypes:
  - Ingress
  - Egress
master1 $ k apply -f netpol.yaml
Explanation
controlplane $ k get pods -n test --show-labels
NAME READY STATUS RESTARTS AGE LABELS
test-pod 1/1 Running 0 34s role=test,run=test-pod
testing 1/1 Running 0 17d run=testing
master1 $ vim netpoll.yaml
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: deny-network
  namespace: test
spec:
  podSelector: {}
  policyTypes:
  - Ingress
  - Egress
master1 $ k apply -f netpoll.yaml Reference: https://kubernetes.io/docs/concepts/services-networking/network-policies/
Explanation controlplane $ k get pods -n test --show-labels NAME READY STATUS RESTARTS AGE LABELS test-pod 1/1
Running 0 34s role=test,run=test-pod testing 1/1 Running 0 17d run=testing master1 $ vim netpoll.yaml apiVersion:
networking.k8s.io/v1 kind: NetworkPolicy metadata:
  name: deny-network
  namespace: test
spec:
  podSelector: {}
  policyTypes:
  - Ingress
  - Egress
master1 $ k apply -f netpoll.yaml Reference: https://kubernetes.io/docs/concepts/services-networking/network-policies/

```

### NEW QUESTION # 39

You have a Kubernetes cluster with a Deployment running a web application. The application relies on a third-party library that was recently discovered to have a critical security vulnerability. You need to patch the vulnerability by updating the container image with the latest version of the library. However, you are not allowed to rebuild the entire image due to strict image size constraints.

#### Answer:

Explanation:

Solution (Step by Step) :

1. Identify the Vulnerable Library:

- Determine the specific third-party library that has the vulnerability.

2. Patch the Library in a Sidecar Container:

- Create a new container image that only contains the patched version of the vulnerable library.
- Add a sidecar container to your Deployment YAML that runs the patched library container.

- Ensure that the sidecar container is configured to run alongside the main application container.
- 3. Update the Deployment - Apply the updated Deployment YAML to your Kubernetes cluster. - The sidecar container will be deployed alongside the main application container, effectively patching the vulnerability without rebuilding the entire application image.

### NEW QUESTION # 40

You are tasked with ensuring the security of a Kubernetes cluster running a sensitive application. Describe now you would implement a "least privilege" principle for both users and service accounts in this cluster.

#### Answer:

Explanation:

Solution (Step by Step) :

#### 1. User Roles and Permissions:

- Define specific roles with minimal permissions for different user groups based on their responsibilities.
- For example, developers might have access to deploy applications, while operations team members might have access to manage resources.

- use RBAC (Role-Based Access Control) in Kubernetes to define roles and assign them to users.

#### 2. Service Account Permissions:

- Create separate service accounts for each application or service in the cluster.
- Grant the service accounts only the necessary permissions to perform their specific tasks.
- Avoid using default service accounts with broad permissions.
- Employ the "principle of least privilege" by defining minimal permissions for service accounts.

#### 3. Pod Security Policies (PSPs):

- Implement PSPs to enforce security constraints on pods, restricting resources that they can access.
- Define PSPs to allow only specific container images, disable privileged containers, limit resource requests, and enforce other security controls.
- Consider using Pod Security Admission (PSA) as a replacement for PSPs in Kubernetes 1.25+.

#### 4. Network Policies:

- Implement network policies to control network communication between pods and services.
- Define rules that allow only necessary traffic between pods, restricting any unnecessary or unauthorized connections.

#### 5. Secret Management

- Utilize Kubernetes Secrets to store sensitive information like passwords and API keys.
- Limit access to secrets based on the principle of least privilege.
- Avoid storing sensitive information directly in deployment YAML files.

### NEW QUESTION # 41

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