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```
[ 0.000000] Starting gvisor...
[ 0.183366] Creating cloned children...
[ 0.290397] Moving files to filing cabinet...
[ 0.392925] Letting the watchdogs out...
[ 0.452958] Digging up root...
[ 0.937597] Gathering forks...
[ 1.095681] Daemonizing children...
[ 1.306448] Rewriting operating system in Javascript...
[ 1.514936] Reading process obituaries...
[ 1.589958] Waiting for children...
[ 1.892298] Segmenting fault lines...
[ 1.974048] Ready!
```

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The CKS certification exam is a rigorous and challenging test of the candidate's knowledge and skills in securing Kubernetes platforms. CKS exam consists of 17 questions, which are a combination of multiple-choice and hands-on tasks. The hands-on tasks require the candidate to demonstrate their ability to perform specific security-related tasks in a Kubernetes cluster. CKS Exam is conducted online and is proctored to ensure the integrity of the certification process.

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The CKS certification exam is an industry-recognized certification that validates the knowledge and skills of IT professionals in securing Kubernetes clusters and applications. It is an essential certification for IT professionals who work with Kubernetes in production environments and want to enhance their knowledge and skills in Kubernetes security. The CKS Certification Exam is rigorous and comprehensive, covering various aspects of Kubernetes security, and its vendor-neutral nature makes it widely recognized and valued in the industry.

Linux Foundation Certified Kubernetes Security Specialist (CKS) Sample Questions (Q10-Q15):

NEW QUESTION # 10

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.

Answer:

Explanation:

```
root# netstat -ltnp
```

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/dhcpd
```

...

```
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))
```

NEW QUESTION # 11

You have a Kubernetes cluster running a web application. You want to enforce secure communication between the web server pods and the database pods in a separate namespace. How would you implement this using TLS certificates and Secrets?

Answer:

Explanation:

Solution (Step by Step):

1. Generate TLS Certificates: Generate a certificate authority (CA) certificate and server/client certificates.
 - You can use tools like OpenSSL or Let's Encrypt to generate these certificates-
2. Create Secrets: Create Kubernetes Secrets to store the certificates.
 - Secret for CA Certificate: Create a Secret with the CA certificate and private key.
 - Secret for Server Certificate: Create a Secret With the server certificate and private key.
 - Secret for Client Certificate: Create a Secret with the client certificate and private key (optional, if you want to enforce client authentication).
3. Mount Certificates: Mount the Secrets containing the certificates into the pods.
 - Web Server Pods: Mount the CA certificate and server certificate Secret
 - Database Pods: Mount the CA certificate and client certificate Secret (optional, if you want to enforce client authentication).
4. Configure TLS: Configure your web server and database applications to use the mounted certificates for TLS communication.
 - Web Server: Configure it to use the server certificate and private key for HTTPS communication.
 - Database: Configure it to accept TLS connections and use the client certificate (if client authentication is enabled).

Example using OpenSSL for generating certificates and Kubernetes Secrets:

Generating Certificates:

```
bash
```

```
# Generate a CA certificate and key
```

```
openssl req -x509 -newkey rsa:2048 -keyout ca.key -out ca.crt \
```

```
-days 365 -nodes -subj "/C=US/ST=CA/L=Los Angeles/O=Example Inc./CN=Example CA"
```

```
# Generate a server certificate and key
```

```
openssl req -newkey rsa:2048 -keyout server.key -out server.csr \
```

```
-subj Angeles/O=Example Inc./CN=example.com"
```

```
openssl x509 -req -in server.csr -CA cmcrt -CAkey cakey -CAcreateserial \
```

```
-out server.cn -days 365 -sha256 -extensions v3_req
```

```
# Generate a client certificate and key (optional)
```

```
openssl req -newkey rsa:2048 -keyout client.key -out client_csr \
```

```
-subj Angeles/O=Example Inc./CN=client.example.com"
```

```
openssl x509 -req -in client.csr -CA ca.crt -CAkey cakey -CAcreateserial
```

```
-out client.crt -days 365 -sha256 -extensions v3_req
```

Creating Secrets:

Mounting Secrets in Pods: - Web Server Pod: Mount the 'ca-cen' and 'server-cert' Secrets. - Database Pod: Mount the 'ca-cert' and 'client-cert' Secrets (if client authentication is enabled). Important Notes: - This implementation assumes you have the necessary knowledge about TLS certificates and secrets management in Kubernetes. - You need to configure your web server and database applications to use the certificates and enforce TLS communication - Ensure the security of your certificates and private keys, as they are critical for secure communication.

NEW QUESTION # 12

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

```
kubesecc-test.yaml
```

```
apiVersion: v1
```

```
kind: Pod
```

```

metadata:
name: kubesecc-demo
spec:
containers:
- name: kubesecc-demo
image: gcr.io/google-samples/node-hello:1.0
securityContext:
readOnlyRootFilesystem: true
Hint: docker run -i kubesecc/kubesecc:512c5e0 scan /dev/stdin < kubesecc-test.yaml

```

Answer:

Explanation:

```
kubesecc scan k8s-deployment.yaml
```

```
cat <<EOF > kubesecc-test.yaml
```

```
apiVersion: v1
```

```
kind: Pod
```

```
metadata:
```

```
name: kubesecc-demo
```

```
spec:
```

```
containers:
```

```
- name: kubesecc-demo
```

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

```
securityContext:
```

```
readOnlyRootFilesystem: true
```

```
EOF
```

```
kubesecc scan kubesecc-test.yaml
```

```
docker run -i kubesecc/kubesecc:512c5e0 scan /dev/stdin < kubesecc-test.yaml kubesecc http 8080 &
```

```
[1] 12345
```

```
{'severity':'info','timestamp':'2019-05-12T11:58:34.662+0100','caller':'server/server.go:69','message':'Starting HTTP server on port 8080'} curl -sSX POST --data-binary @test/asset/score-0-cap-sys-admin.yml http://localhost:8080/scan
```

```
[
```

```
{
```

```
"object": "Pod/security-context-demo.default",
```

```
"valid": true,
```

```
"message": "Failed with a score of -30 points",
```

```
"score": -30,
```

```
"scoring": {
```

```
"critical": [
```

```
{
```

```
"selector": "containers[] .securityContext .capabilities .add == SYS_ADMIN",
```

```
"reason": "CAP_SYS_ADMIN is the most privileged capability and should always be avoided"
```

```
},
```

```
{
```

```
"selector": "containers[] .securityContext .runAsNonRoot == true",
```

```
"reason": "Force the running image to run as a non-root user to ensure least privilege"
```

```
},
```

```
// ...
```

NEW QUESTION # 13

You are tasked with securing the container image supply chain for your organization. You are using a container registry that supports signing and verification of container images. You need to create a policy that ensures only signed images from a specific trusted source are deployed to your Kubernetes cluster.

Answer:

Explanation:

Solution (Step by Step) :

1. Configure the Container Registry:

- Enable Image Signing: Enable image signing functionality in your container registry (e.g., Docker Hub, Google Container Registry,

etc.).

- Create a Signing Key: Generate a signing key and store it securely. This key will be used to sign images from the trusted source.

2 Create a Kubernetes Admission Controller:

- Use an Admission Controller like "Container Image Signature Validation Admission Webhook" to enforce image signature verification during deployment. This Admission Controller ensures that only signed images are allowed to be deployed to your cluster.

3. Configure the Admission Controller:

- Create a Service Account: Create a Service Account with the necessary permissions to access your container registry and verify image signatures.

- Create a Deployment for the Admission Controller: Deploy the Admission Controller with a pod using the Service Account created earlier.

- Configure the Admission Controller: Configure the Admission Controller to use your signing key to verify signatures.

4. Deploy Signed Images:

- Sign Images: Use the signing key to sign images from the trusted source before pushing them to the container registry.

- Deploy Signed Images: Deploy the signed images to your Kubernetes cluster. The Admission Controller will verify their signatures before allowing the deployment.

Example:

This example uses the 'image-signature-validator' container image available on Quay.io. The 'config.yaml' file in the ConfigMap defines the signing key and trusted image sources. Remember to replace these values with your actual information.

NEW QUESTION # 14

You are tasked with securing a Kubernetes cluster that runs a critical application using 'gcr.io/google-samples/hello-app:v1' image. You need to ensure that all deployed containers for this application adhere to strict security policies and prevent any unauthorized modifications.

How would you implement a solution that utilizes KubeLinter to enforce these security policies and prevent unauthorized modifications to the deployed containers?

Provide a step-by-step solution outlining the specific KubeLinter configurations, rules, and integration methods for achieving this security objective.

Answer:

Explanation:

Solution (Step by Step) :

1. Install KubeLinter:

- Install KubeLinter using 'pip install kube-linter'

2. Configure KubeLinter:

- Create a '.kube-linter.yaml' configuration file in the root directory of your project. This configuration file defines the security policies and rules you want to enforce.

3. Integrate KubeLinter with your CI/CD pipeline: - Use a tool like GitLab CI, Jenkins, or CircleCI to integrate KubeLinter into your CI/CD pipeline. This ensures that KubeLinter runs automatically whenever a new version of your application is built and deployed.

4. Run KubeLinter: - Run the KubeLinter command: 'kube-linter --config=.kube-linter.yaml --verbose'

5. Interpret and resolve KubeLinter results: - Review the results of the KubeLinter scan and address any reported violations. This involves modifying the

'deployment.yaml' file and container configuration to adhere to the defined security policies. - 'container-image-whitelist' rule: This rule enforces whitelisting of container images to ensure only authorized images are deployed. It verifies that all deployed containers use the specified 'gcr.io/google-samples/hello-app:v1' image. 'pod-security-policy' rule: This rule enforces strict Pod Security Policies for all Pods. It ensures containers have appropriate security contexts, including 'fsGroup' and 'runAsUser' settings, to prevent unauthorized access and privilege escalation. - 'privilege-escalation' rule: This rule prevents containers from running with elevated privileges, reducing the risk of potential attacks. - 'host-network' rule: This rule ensures that containers don't access the host network, restricting potential network-based attacks. - 'host-ports' rule: This rule prevents containers from exposing ports on the host network, further limiting the attack surface. By implementing these KubeLinter rules and integrating them into your CI/CD pipeline, you can enforce strong security policies, prevent unauthorized container image modifications, and enhance the security of your Kubernetes cluster.

NEW QUESTION # 15

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- [illegible]

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