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The CKS certification exam is designed for professionals who are already certified in the Kubernetes Administration (CKA) exam or have equivalent knowledge and experience. The CKS exam covers a broad range of topics related to Kubernetes security, including cluster hardening, network policies, authentication, authorization, and encryption. CKS Exam also tests the candidate's ability to identify and mitigate common security threats and vulnerabilities in Kubernetes clusters.

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Linux Foundation Certified Kubernetes Security Specialist (CKS) Sample Questions (Q78-Q83):

NEW QUESTION # 78

You are tasked with securing a Kubernetes cluster that is running on AWS- One of the security best practices you want to implement is to limit the number of IP addresses that can access the Kubernetes API server. You need to configure the 'kube-apiserver' to only allow access from specific IP addresses, using the '--insecure-bind-address' flag to restrict access. How would you configure 'kube-apiserver' to achieve this using an '--insecure-bind-address' flag, but allow access from only specific IP addresses?

Answer:

Explanation:

Solution (Step by Step) :

1. Identify Allowed IP Addresses: Determine the specific IP addresses that should be allowed to access the Kubernetes API server. For example, you might allow access from your local machine's IP address (e.g., 192.168.1.100), and the IP addresses of any bastion hosts that are used for remote management.
2. Modify the 'kube-apiserver' Configuration:
 - Locate the 'kube-apiserver' configuration file (typically found at "/etc/kubernetes/manifests/kube-apiserver.yaml or similar).
 - In the 'kube-apiserver' configuration file, find the '--insecure-bind-address' flag.
 - Set the '--insecure-bind-address' flag to '0.0.0.0' to allow access from all IP addresses.

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: kube-apiserver
spec:
  replicas: 1
  selector:
    matchLabels:
      app: kube-apiserver
  template:
    metadata:
      labels:
        app: kube-apiserver
    spec:
      containers:
        - name: kube-apiserver
          image: k8s.gcr.io/kube-apiserver:v1.24.3
          command:
            - kube-apiserver
            - --insecure-bind-address=0.0.0.0
            - --authorization-mode=RBAC
            - --client-ca-file=/etc/kubernetes/pki/ca.crt
            - --tls-cert-file=/etc/kubernetes/pki/apiserver.crt
            - --tls-private-key-file=/etc/kubernetes/pki/apiserver.key
          # Additional parameters for kube-apiserver
          # Define the security context for the container
          securityContext:
            # Set the privileged flag to false
            privileged: false
            # Set the runAsNonRoot flag to true
            runAsNonRoot: true
            # Set the allowPrivilegeEscalation flag to false
            allowPrivilegeEscalation: false
            # Set the runAsUser to 1000
            runAsUser: 1000
```



3. Restart 'kube-apiserver': Apply the updated configuration file. Depending on how the Kubernetes cluster is deployed, you may need to restart the 'kube-apiserver' pod or container. 4. Verify the Configuration: - After restarting 'kube-apiservers', test that you can access the API server from the allowed IP addresses. - Test from any disallowed IP addresses to confirm access is blocked.

NEW QUESTION # 79

You are running a web application in a Kubernetes cluster- You want to restrict access to the web application's API endpoints to specific IP addresses. Explain how to implement this using Ingress and NetworkPolicy.

Answer:

Explanation:

Solution (Step by Step) :

1. Create an Ingress Resource:

- Create an 'Ingress' resource that defines the rules for routing traffic to the web application.
- This example allows access to the API endpoints '/api/v1' and '/api/v2S' from the IP addresses '10.0.0.10' and '192.168.1.1'
- It also allows access to the 'r' endpoint from any IP address.

```
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: web-app-ingress
  namespace: web-app-namespace
spec:
  rules:
  - host: web-app.example.com
    http:
      paths:
      - path: /api/v1
        pathType: Prefix
        backend:
          service:
            name: web-app-service
            port:
              number: 80
      - path: /api/v2
        pathType: Prefix
        backend:
          service:
            name: web-app-service
            port:
              number: 80
      - path: /
        pathType: Prefix
        backend:
          service:
            name: web-app-service
            port:
              number: 80
```

2. Create a NetworkPolicy: - Create a 'NetworkPolicy' resource that enforces the IP address restrictions. - This example allows traffic from the IP addresses '10.0.0.10' and '192.168.1.1' to the web application's service. - You can create a more specific policy for each API endpoint if needed.

```

apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: web-app-network-policy
  namespace: web-app-namespace
spec:
  podSelector:
    matchLabels:
      app: web-app
  ingress:
    - from:
      - ipBlock:
          cidr: 10.0.0.10/32
      - ipBlock:
          cidr: 192.168.1.1/32

```

3. Apply the Resources: - Apply the 'Ingress' and 'NetworkPolicy' resources using 'kubectl apply' - For example: 'kubectl apply -f web-app-ingress.yaml' and 'kubectl apply -f web-app-network-policy.yaml' 4. Verify the Configuration: - Access the web application's API endpoints from the allowed IP addresses. - Verify that the requests are successful. - Attempt to access the API endpoints from other IP addresses. - Verify that these attempts are blocked.

NEW QUESTION # 80

You have a Kubernetes cluster with a Deployment named 'my-app' that exposes a service on port 80. You want to enforce a policy that allows only traffic from pods With a specific label to access this service.

Answer:

Explanation:

Solution (Step by Step) :

1. Create a NetworkPolicy:

- Define a NetworkPolicy resource with a 'podSelector' that matches the 'my-app' Deployment.
- Create an 'ingress' rule that allows traffic only from pods with the specific label.
- Use the 'from' field to specify the label selector.
- Ensure that the port 80 is included in the 'ports' field.

```

apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: my-app-label-policy
spec:
  podSelector:
    matchLabels:
      app: my-app
  ingress:
    - from:
      - podSelector:
          matchLabels:
            allowed: true
  ports:
    - protocol: TCP
      port: 80

```

2. Apply the NetworkPolicy: - Apply the YAML file using 'kubectl apply -f my-app-label-policy.yaml' 3. Verify the NetworkPolicy: - Use 'kubectl get networkpolicies' to list the available network policies. - Use 'kubectl describe networkpolicy my-app-label-policy' to view the details of the applied policy. 4. Test the NetworkPolicy: - Deploy a pod with the label 'allowed: true' and attempt to access the service on port 80. Verify that the connection is successful. - Deploy a pod without the label 'allowed: true' and attempt to access the service on port 80. Verify that the connection is denied.

NEW QUESTION # 81

SIMULATION

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.

- A. Send us your feedback on it.

Answer: A

NEW QUESTION # 82

You have a Kubernetes cluster running a highly sensitive application. You need to ensure that the application's data is encrypted at rest and in transit. What security measures would you implement to achieve this?

Answer:

Explanation:

Solution (Step by Step):

Data Encryption at Rest:

1. Volume Encryption:

- Kubernetes Persistent Volumes (PVs): Use volume encryption on the underlying storage system (e.g., EBS, GCE PD) to encrypt data at rest. This ensures that the data stored in the PV is encrypted even if the underlying volume is stolen or accessed without authorization.
- Container Storage Interface (CSI): If using CSI drivers, utilize their volume encryption capabilities (if supported) to encrypt data on the storage volume.

2. Secret Encryption

- Kubernetes Secrets: Encrypt sensitive data stored in Secrets using tools like HashiCorp Vault, AWS KMS, or Google Cloud KMS. This prevents unauthorized access to sensitive information like API keys, passwords, and certificates.

Data Encryption in Transit:

1. TLS/SSL:

- Network Communication: Encrypt all network communication using TLS/SSL between pods, services, and external applications. This prevents eavesdropping and data interception.
- Service Mesh: Utilize a service mesh like Istio or Linkerd that automatically enforces TLS/SSL for inter-pod communication. This simplifies the configuration and management of TLS.

2. Network Policy:

- Restrict Network Access: Implement NetworkPolicy to restrict inbound and outbound traffic to the pods running the sensitive application. This minimizes the attack surface and prevents unauthorized access to the application's network interfaces.

Additional Security Measures:

1. Pod Security Policies (PSP): Use PSPs to restrict the capabilities of pods running the sensitive application. This limits the potential for unauthorized access to the host system or other resources.

2. Security Context: Use the 'securityContext' field for pods to control their security settings. For example, you can set the 'runAsUser' and

'runAsGroups' to ensure that the pod runs as a non-root user.

Example Configuration:

```
# Encrypt data at rest on a Persistent Volume
apiVersion: v1
kind: PersistentVolume
metadata:
  name: my-encrypted-pv
spec:
  capacity:
    storage: 10Gi
  accessModes:
    - ReadWriteOnce
  hostPath:
    path: /data/my-encrypted-volume
  persistentVolumeReclaimPolicy: Retain
  storageClassName: encrypted-storage # Use a storage class that encrypts volumes
```

```
# Encrypt Secrets using HashiCorp Vault
apiVersion: v1
kind: Secret
metadata:
  name: my-secret
namespace:
type: Opaque
data:
  mypassword:
```

Important Notes: - Choose the appropriate encryption solutions based on your cluster environment and security requirements. - Ensure the key management strategy is secure and compliant with your organization's policies. - Regularly audit and review security

