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Dumps Q&A Linux Foundation - CKAD

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```
student@node-1:~$ kubectl get serviceaccount -n production
NAME          SECRETS  AGE
default       1        6h46m
restricted     1        6h46m
student@node-1:~$ kubectl get deployment -n production
NAME          READY  UP-TO-DATE  AVAILABLE  AGE
app-a         3/3    3            3          6h46m
student@node-1:~$ kubectl set serviceaccount deployment app-a restricted -n production
deployment.apps/app-a serviceaccount updated
student@node-1:~$
```

Question #5:

Set configuration context:

```
[student@node-1] $ | kubectl config
use-context dk8s
```

Set Configuration Context:

```
[student@node-1] $ | kubectl
Config use-context k8s
Context
```

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The CKAD Exam is aimed at developers who are already familiar with Kubernetes and have experience working with it. CKAD exam consists of a series of performance-based tasks that are designed to test the candidate's ability to use Kubernetes to deploy, manage, and scale containerized applications. The tasks are designed to simulate real-world scenarios that developers may encounter when working with Kubernetes. CKAD Exam is conducted online, and candidates have two hours to complete it. Upon successful completion of the exam, the candidate is awarded the CKAD certification, which is recognized by the industry as a standard for Kubernetes application development.

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Linux Foundation CKAD (Linux Foundation Certified Kubernetes Application Developer) Certification Exam is a popular certification program designed for developers who wish to validate their skills in developing and deploying applications on Kubernetes clusters. Kubernetes is a powerful and widely-used open-source platform for container orchestration, and it is increasingly being adopted by organizations to manage their containerized applications. The CKAD Certification Exam is one of the most sought-after certifications in the industry, and it is recognized by leading companies around the world.

Linux Foundation Certified Kubernetes Application Developer Exam Sample Questions (Q98-Q103):

NEW QUESTION # 98

You are working on a Kubernetes cluster where you have a Deployment named 'web-app' running an application. The application has a sensitive configuration file named 'config.json' that is mounted as a volume to each pod. You need to ensure that this configuration file is not accessible by any user or process running within the pod, except for the application itself. Describe how you would implement this security best practice, using specific Kubernetes configurations, to protect the sensitivity of the 'config.json' file.

Answer:

Explanation:

See the solution below with Step by Step Explanation.

Explanation:

Solution (Step by Step) :

1. Create a Secret for the Configuration File:

- Create a Kubernetes Secret to store the 'config.json' file securely. This will ensure that the configuration data is encrypted and stored in a way that is not accessible directly by users or processes within the pod.

- Use the following command to create the Secret:

```
bash
```

```
kubectl create secret generic config-secret --from-file=config.json=config.json
```

2. Mount the Secret as a Volume:

- In your Deployment YAML, mount the 'config-secret' as a volume to the pod. This will make the secret's content available to the pod.

- Define the volume mount in the 'spec.template.spec.containers' section of your Deployment YAML:

```

apiVersion: apps/v1
kind: Deployment
metadata:
  name: web-app
spec:
  replicas: 3
  selector:
    matchLabels:
      app: web-app
  template:
    metadata:
      labels:
        app: web-app
    spec:
      containers:
        - name: web-app
          image: example/web-app:latest
          volumeMounts:
            - name: config-volume
              mountPath: /etc/config
      volumes:
        - name: config-volume
          secret:
            secretName: config-secret

```

3. Restrict Access using Security Context: - Define a 'securityContexts' for the container in your Deployment YAML. This will restrict the container's capabilities and permissions. - Add a 'securitycontext' section to the section of your Deployment YAML:

```

securityContext:
  # Set the container's user to a non-root user (e.g., 1000)
  runAsUser: 1000
  # Set the container's group to a non-root group (e.g., 1000)
  runAsGroup: 1000
  # Set the container's permissions to a restricted set (e.g., read-only for /etc/config)
  readOnlyRootFilesystem: true

```

4. Limit the Container's Capabilities: - Configure the 'capabilities' section within the 'securityContexts' to restrict the container's access to specific system capabilities. This is essential for limiting the containers ability to access sensitive information or perform privileged operations. - Add a 'capabilities' section to the 'spec-template-spec-containers-securitycontext' section of your Deployment YAML:

```

securityContext:
  # ... (other security context settings)
  capabilities:
    drop:
      - ALL
    add:
      - NET_BIND_SERVICE

```

5. Apply the Deployment: - Once the Deployment configuration is updated, apply it to the cluster using the following command: `bash kubectl apply -f deployment.yaml` By implementing these steps, you ensure that the 'config.json' file is secured using a Kubernetes Secret, mounted as a volume, and access is restricted using security context and capabilities settings. This effectively protects the sensitive configuration from unauthorized access within the pod.

NEW QUESTION # 99

Context



Context

A user has reported an application is unteachable due to a failing livenessProbe .

Task

Perform the following tasks:

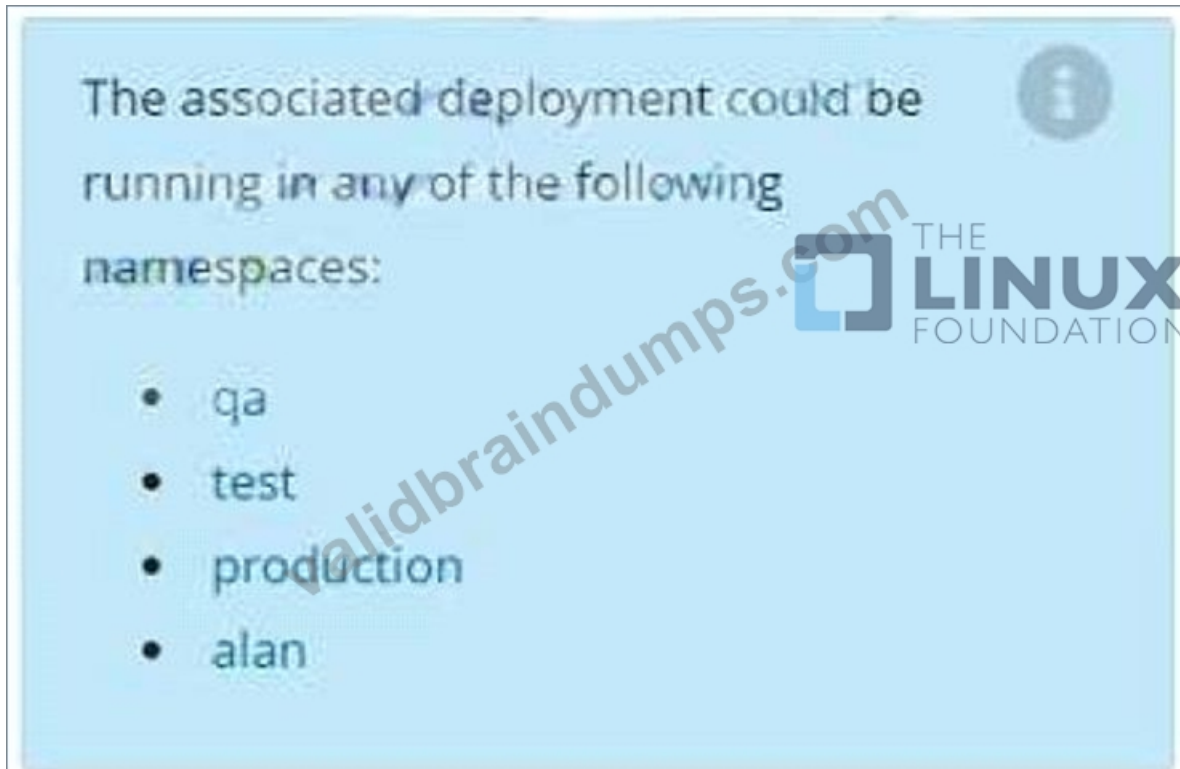
* Find the broken pod and store its name and namespace to /opt/KDOB00401/broken.txt in the format:



The output file has already been created

* Store the associated error events to a file /opt/KDOB00401/error.txt, The output file has already been created. You will need to use the -o wide output specifier with your command

* Fix the issue.



Answer:

Explanation:

Solution:

Create the Pod:

kubectl create -f <http://k8s.io/docs/tasks/configure-pod-container/exec-liveness.yaml> Within 30 seconds, view the Pod events:

kubectl describe pod liveness-exec

The output indicates that no liveness probes have failed yet:

FirstSeen LastSeen Count From SubobjectPath Type Reason Message

```
-----
24s 24s 1 {default-scheduler } Normal Scheduled Successfully assigned liveness-exec to worker0
23s 23s 1 {kubelet worker0} spec.containers{liveness} Normal Pulling pulling image "gcr.io/google_containers/busybox"
23s 23s 1 {kubelet worker0} spec.containers{liveness} Normal Pulled Successfully pulled image
"gcr.io/google_containers/busybox"
23s 23s 1 {kubelet worker0} spec.containers{liveness} Normal Created Created container with docker id 86849c15382e;
Security:[seccomp=unconfined]
23s 23s 1 {kubelet worker0} spec.containers{liveness} Normal Started Started container with docker id 86849c15382e After 35
seconds, view the Pod events again:
kubectl describe pod liveness-exec
At the bottom of the output, there are messages indicating that the liveness probes have failed, and the containers have been killed
and recreated.
FirstSeen LastSeen Count From SubobjectPath Type Reason Message
```

```

-----
37s 37s 1 {default-scheduler} Normal Scheduled Successfully assigned liveness-exec to worker0
36s 36s 1 {kubelet worker0} spec.containers{liveness} Normal Pulling pulling image "gcr.io/google_containers/busybox"
36s 36s 1 {kubelet worker0} spec.containers{liveness} Normal Pulled Successfully pulled image
"gcr.io/google_containers/busybox"
36s 36s 1 {kubelet worker0} spec.containers{liveness} Normal Created Created container with docker id 86849c15382e;
Security:[seccomp=unconfined]
36s 36s 1 {kubelet worker0} spec.containers{liveness} Normal Started Started container with docker id 86849c15382e
2s 2s 1 {kubelet worker0} spec.containers{liveness} Warning Unhealthy Liveness probe failed: cat: can't open '/tmp/healthy': No
such file or directory Wait another 30 seconds, and verify that the Container has been restarted:
kubectl get pod liveness-exec
The output shows that RESTARTS has been incremented:
NAME READY STATUS RESTARTS AGE
liveness-exec 1/1 Running 1 m

```

NEW QUESTION # 100

Refer to Exhibit.



Given a container that writes a log file in format A and a container that converts log files from format A to format B, create a deployment that runs both containers such that the log files from the first container are converted by the second container, emitting logs in format B.

Task:

- * Create a deployment named deployment-xyz in the default namespace, that:
- * Includes a primary `lfcncf/busybox:1` container, named `logger-dev`
- * includes a sidecar `lfcncf/fluentd:v0.12` container, named `adapter-zen`
- * Mounts a shared volume `/tmp/log` on both containers, which does not persist when the pod is deleted
- * Instructs the `logger-dev` container to run the command

```

while true; do
  echo "i luv cncf" > /tmp/log/input.log;
  sleep 10;
done

```

which should output logs to `/tmp/log/input.log` in plain text format, with example values:

```

i luv cncf
i luv cncf
i luv cncf

```

* The `adapter-zen` sidecar container should read `/tmp/log/input.log` and output the data to `/tmp/log/output.*` in Fluentd JSON format. Note that no knowledge of Fluentd is required to complete this task: all you will need to achieve this is to create the ConfigMap from the spec file provided at `/opt/KDMC00102/fluentd-configmap.yaml`, and mount that ConfigMap to `/fluentd/etc` in the `adapter-zen` sidecar container

Answer:

Explanation:

Solution:

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```
student@node-1:~$ kubectl create deployment deployment-xyz --image=lfcncf/busybox:1 --dry-run=client -o yaml > deployment_xyz.yml
student@node-1:~$ vim deployment_xyz.yml
```

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```
apiVersion: apps/v1
kind: Deployment
metadata:
  creationTimestamp: null
  labels:
    app: deployment-xyz
    name: deployment-xyz
spec:
  replicas: 1
  selector:
    matchLabels:
      app: deployment-xyz
  strategy: {}
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: deployment-xyz
    spec:
      containers:
      - image: lfcncf/busybox:1
        name: busybox
        resources: {}
status: {}
~
~
"deployment_xyz.yml" 3L, 434C
```

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```
kind: Deployment
metadata:
  labels:
    app: deployment-xyz
    name: deployment-xyz
spec:
  replicas: 1
  selector:
    matchLabels:
      app: deployment-xyz
  template:
    metadata:
      labels:
        app: deployment-xyz
    spec:
      volumes:
      - name: myvoll
        emptyDir: {}
      containers:
      - image: lfcncf/busybox:1
        name: logger-dev
        volumeMounts:
        - name: myvoll
          mountPath: /tmp/log
      - image: lfcncf/fluentd:v0.12
        name: adapter
3 lines yanked
```

27,22

Bot


```
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replicas: 1
selector:
  matchLabels:
    app: deployment-xyz
template:
  metadata:
    labels:
      app: deployment-xyz
  spec:
    volumes:
      - name: myvol1
        emptyDir: {}
    containers:
      - image: lfccncf/busybox:1
        name: logger-dev
        command: ["/bin/sh", "-c", "while :; do echo 'i luv cncf' >> /tmp/log/input.log; sleep 10; done"]
      - image: lfccncf/fluentd:v0.12
        name: adapter-zen
        command: ["/bin/sh", "-c", "tail -f /tmp/log/input.log >> /tmp/log/output.log"]
    volumeMounts:
      - name: myvol1
        mountPath: /tmp/log
      - name: myvol1
        mountPath: /tmp/log
      - image: lfccncf/fluentd:v0.12
        name: adapter-zen
        command: ["/bin/sh", "-c", "tail -f /tmp/log/input.log >> /tmp/log/output.log"]
        volumeMounts:
          - name: myvol1
            mountPath: /tmp/log
```

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```
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metadata:
  labels:
    app: deployment-xyz
spec:
  volumes:
    - name: myvol1
      emptyDir: {}
    - name: myvol2
      configMap:
        name: logconf
  containers:
    - image: lfccncf/busybox:1
      name: logger-dev
      command: ["/bin/sh", "-c", "while :; do echo 'i luv cncf' >> /tmp/log/input.log; sleep 10; done"]
    - image: lfccncf/fluentd:v0.12
      name: adapter-zen
      command: ["/bin/sh", "-c", "tail -f /tmp/log/input.log >> /tmp/log/output.log"]
  volumeMounts:
    - name: myvol1
      mountPath: /tmp/log
    - name: myvol2
      mountPath: /fluentd/etc
```

37,33 Bot

```
student@node-1:~$ kubectl create -f deployment_xyz.yml
deployment.apps/deployment-xyz created
student@node-1:~$ kubectl get deployment
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
deployment-xyz 0/1     1            0           9s
student@node-1:~$ kubectl get deployment
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
deployment-xyz 0/1     1            0           9s
student@node-1:~$ kubectl get deployment
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
deployment-xyz 1/1     1            1           12s
student@node-1:~$
```

NEW QUESTION # 101

You have a Deployment named 'my-app-deployment' running three replicas of an application container. You need to implement a rolling update strategy where only one pod is updated at a time. Additionally, you need to ensure that the update process is triggered automatically whenever a new image is pushed to your private Docker registry.

Answer:

Explanation:

See the solution below with Step by Step Explanation.

Explanation:

Solution (Step by Step) :

1. Update the Deployment YAML:

- Update the 'replicas' to 2.
- Define 'maxUnavailable: 1' and 'maxSurge: 0' in the 'strategy-rollingUpdate' section to control the rolling update process.
- Configure a 'strategy.type' to 'RollingUpdate' to trigger a rolling update when the deployment is updated.
- Add a 'spec.template.spec.imagePullPolicy: Always' to ensure that the new image is pulled even if it exists in the pod's local cache.
- Add a 'spec.template.spec.imagePullSecrets' section to provide access to your private Docker registry. Replace 'registry-secret' with the actual name of your secret.

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-app-deployment
spec:
  replicas: 2
  selector:
    matchLabels:
      app: my-app
  template:
    metadata:
      labels:
        app: my-app
    spec:
      containers:
        - name: my-app
          image: your-private-registry.com/your-namespace/my-app:latest
          imagePullPolicy: Always
          imagePullSecrets:
            - name: registry-secret
      strategy:
        type: RollingUpdate
        rollingUpdate:
          maxUnavailable: 1
          maxSurge: 0
```

2. Create the Deployment - Apply the updated YAML file using 'kubectl apply -f my-app-deployment.yaml' 3. Verify the Deployment: - Check the status of the deployment using 'kubectl get deployments my-app-deployment' to confirm the rollout and updated replica count. 4. Trigger the Automatic Update: - Push a new image to your private Docker registry with a tag like 'your-private-registry.com/your-namespace/my-app:latest'. 5. Monitor the Deployment: - Use 'kubectl get pods -l app=my-apps' to monitor the pod updates during the rolling update process. You will observe that one pod is terminated at a time, while one new pod with the updated image is created. 6. Check for Successful Update: - Once the deployment is complete, use 'kubectl describe deployment my-app-deployment' to see that the 'updatedReplicas' field matches the 'replicas' field, indicating a successful update.]

NEW QUESTION # 102

You have a Deployment named 'my-app-deployment' running a Flask application. You want to add a liveness probe that checks if the Flask application is responding on port '5000' and a readiness probe that checks if the application is ready to receive requests. Implement these probes using Kustomize.

Answer:

Explanation:

See the solution below with Step by Step Explanation.

Explanation:

Solution (Step by Step) :

1. Create a base Deployment configuration:


```

apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-app-deployment
spec:
  replicas: 2
  selector:
    matchLabels:
      app: my-app
  template:
    metadata:
      labels:
        app: my-app
    spec:
      containers:
        - name: my-app
          image: my-app:latest
          ports:
            - containerPort: 5000

```

2. Create a 'kustomization.yaml' file:

```

resources:
- deployment.yaml
patchesStrategicMerge:
- patches/liveness-probe.yaml
- patches/readiness-probe.yaml

```

3. Create 'patches/liveness-probe.yaml':

```

spec:
  template:
    spec:
      containers:
        - name: my-app
          livenessProbe:
            tcpSocket:
              port: 5000
            initialDelaySeconds: 15
            periodSeconds: 20
            failureThreshold: 3

```

4. Create 'patches/readiness-probe.yaml':

```

spec:
  template:
    spec:
      containers:
        - name: my-app
          readinessProbe:
            tcpSocket:
              port: 5000
            initialDelaySeconds: 5
            periodSeconds: 10
            failureThreshold: 2

```

5. Apply the Kustomize configuration: `bash kustomize . | kubectl apply -t -` - Liveness probe: This probe checks if the application is still alive and running. It uses a TCP socket to connect to port '5000' and waits for 15 seconds before making the first check. It checks every 20 seconds, and if it fails 3 times in a row, the pod is restarted. - Readiness probe: This probe checks if the application is ready to receive requests. It also uses a TCP socket to connect to port '5000'. It checks every 10 seconds and waits for 5 seconds before the first check. If it fails 2 times in a row, the pod is marked as unhealthy and excluded from receiving traffic. Note: Make sure your Flask application is actually listening on port '5000' and responding to requests. ,

NEW QUESTION # 103

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