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Dumps Q&A Linux Foundation - CKAD

Question #7

Set configuration context:

```
[student@node-1] $ kubectl config use-context k8s
```

Context
As a Kubernetes application developer you will often find yourself needing to update a running application.

Task
Please complete the following:

- Update the app deployment in the kdpd00202 namespace with a maxSurge of 5% and a maxUnavailable of 2%
- Perform a rolling update of the web1 deployment, changing the Ifccncf/ngmx image version to 1.13
- Roll back the app deployment to the previous version

See the solution below.

Explanation

Solution:

```
student@node-1:~$ kubectl edit deployment app -n kdpd00202
```

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be available with all kinds of electronic devices.

The CKAD Exam is designed to test the proficiency of developers in Kubernetes application development and deployment using command-line tools. CKAD exam consists of 19 questions that require candidates to perform tasks in a live Kubernetes cluster environment. CKAD exam is time-bound, and candidates are given two hours to complete it. Linux Foundation Certified Kubernetes Application Developer Exam certification program is vendor-neutral, which means that it is not tied to any specific cloud provider, and it is recognized globally.

The CKAD certification is ideal for professionals who want to demonstrate their expertise in Kubernetes application development. Linux Foundation Certified Kubernetes Application Developer Exam certification is recognized by top companies in the IT industry and provides a competitive advantage for job seekers. Linux Foundation Certified Kubernetes Application Developer Exam certification also offers career advancement opportunities for professionals who want to specialize in Kubernetes application development. Linux Foundation Certified Kubernetes Application Developer Exam certification is valid for two years, and candidates can renew it by passing a renewal exam or by earning Continuing Education Units (CEUs) by participating in relevant training and events.

Linux Foundation Certified Kubernetes Application Developer Exam Sample Questions (Q31-Q36):

NEW QUESTION # 31

You have a Deployment running a web application that is scaling dynamically based on traffic. However, the application occasionally experiences Slow response times during peak traffic periods. You suspect that the pods are being scheduled on nodes that are already under pressure. To improve the performance, you want to implement node affinity, ensuring that pods are scheduled on nodes with specific labels that indicate high resources and low utilization.

Answer:

Explanation:

See the solution below with Step by Step Explanation.

Explanation:

Solution (Step by Step) :

1. Define Node Labels:

- Identify nodes with high resources and low utilization.
- Label these nodes with a specific label like 'high-resource':

bash

```
kubectl label nodes node-name high-resource=true
```

2. Configure Node Affinity in Deployment

- Update the Deployment YAML to include node affinity rules.
- `preferredDuringSchedulingIgnoredDuringExecution`: This affinity rule indicates a preference for scheduling pods on nodes with specific labels. It doesn't prevent scheduling on other nodes if preferred nodes are unavailable.

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-web-app
spec:
  replicas: 3
  selector:
    matchLabels:
      app: my-web-app
  template:
    metadata:
      labels:
        app: my-web-app
    spec:
      containers:
        - name: my-web-app
          image: my-web-app-image:latest
      affinity:
        nodeAffinity:
          preferredDuringSchedulingIgnoredDuringExecution:
            - weight: 100
              preference:
                matchExpressions:
                  - key: high-resource
                    operator: In
                    values:
                      - "true"
```

3. Apply the Deployment Configuration: - Apply the updated Deployment configuration to your Kubernetes cluster: `bash kubectl apply -f my-web-app-deployment.yaml` 4. Monitor Pod Scheduling: - Use `'kubectl get pods -l app=my-web-app'` to monitor the pod scheduling. - Verify that the pods are being scheduled on nodes with the 'high-resource' label.

NEW QUESTION # 32

You have a Deployment named 'api-deployment' that runs an API server. The API server handles sensitive data and must have strong security measures. You want to ensure that all pods within the Deployment are running with a specific security context that limits their capabilities. Describe the steps to configure a SecurityContext in the Deployment to enforce these security restrictions.

Answer:

Explanation:

See the solution below with Step by Step Explanation.

Explanation:

Solution (Step by Step) :

1. Define the SecurityContext:

- Add a 'securityContext' section to the container definition Within the Deployment's template.
- Define the desired security restrictions Within the 'securityContext section
- 'runAsUser': Specifies the user ID under which the container should run.
- 'runAsGroup': Defines the group ID for the container.
- 'fsGroup': Sets the supplemental group ID for the container, giving access to specific files and directories.
- 'readOnlyRootFilesystem': Specifies whether the container should have read-only access to the root filesystem.
- 'capabilities': Configures the allowed capabilities for the container, limiting its privileges.

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: api-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: api-server
  template:
    metadata:
      labels:
        app: api-server
    spec:
      containers:
      - name: api-server
        image: example/api-server:latest
        securityContext:
          runAsUser: 1000
          runAsGroup: 1000
          readOnlyRootFilesystem: true
          capabilities:
            drop: ["ALL"]
```



2. Apply the Deployment: - Use 'kubectl apply -f api-deployment.yaml' to update the Deployment with the security context configuration. 3. Verify the Security Context: - Examine the pod details using 'kubectl describe pod -l app=api-server' to confirm that the SecurityContext is applied to the containers. 4. Test Security Measures: - Run tests to ensure the security context is effectively limiting the capabilities of the API server pods.

NEW QUESTION # 33

You have a multi-container Pod that runs a web server (Nginx) and a database (MySQL) container. The database container requires data to be initialized before the web server container can start. How would you configure the Pod to ensure the database container is initialized before the web server container starts?

Answer:

Explanation:

See the solution below with Step by Step Explanation.

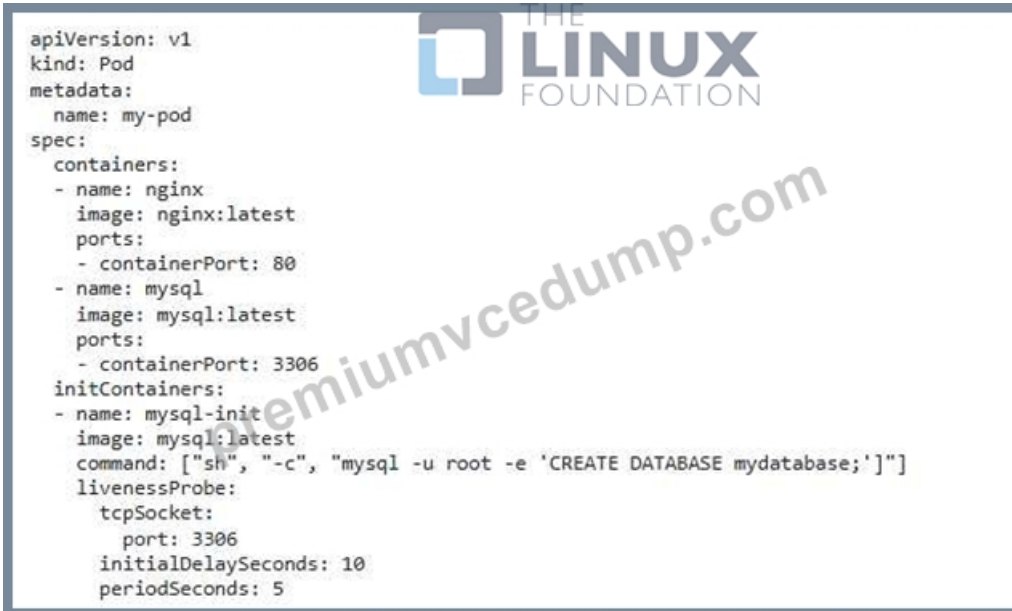
Explanation:

Solution (Step by Step) :

1. Use initContainers:

- Define one or more 'initContainers' within the Pod's 'spec.template.spec' section.
- The 'initContainers' will run before any other container in the Pod.

- In this case, you would create an 'initcontainer' for the MySQL database.
2. Configure the initContainer:
 - The 'initcontainer' should have the following attributes:
 - Name: A unique name for the container.
 - Image: The Docker image containing the necessary tools to initialize the database.
 - Command: The command to execute for database initialization.
 - LivenessProbe: Optional, but recommended to check if the database initialization process is successful.
 3. Sequence the containers:
 - Ensure the 'initContainers' are listed before the main containers in the Pod's 'spec-template-spec-containers' section.
 4. Example YAML:



```

apiVersion: v1
kind: Pod
metadata:
  name: my-pod
spec:
  containers:
  - name: nginx
    image: nginx:latest
    ports:
    - containerPort: 80
  - name: mysql
    image: mysql:latest
    ports:
    - containerPort: 3306
  initContainers:
  - name: mysql-init
    image: mysql:latest
    command: ["sh", "-c", "mysql -u root -e 'CREATE DATABASE mydatabase;']
    livenessProbe:
      tcpSocket:
        port: 3306
      initialDelaySeconds: 10
      periodSeconds: 5
  
```

- The 'mysql-init' 'initcontainer' will run before the 'nginx' and 'mysql' containers-
- The 'command' in the 'initContainer' Will create a database named within the MySQL container.
- The 'livenessprobe' will ensure that the database is reachable on port 3306 after the initialization process completes. Note: This solution assumes that the 'mysql' image already includes the necessary database initialization tools. You might need to use a custom image with these tools if the default image doesn't provide them,

NEW QUESTION # 34

You are tasked With deploying a new web application on Kubernetes. The application is designed to be highly available and requires persistent storage for user data. The application needs to be able to handle incoming requests even during rolling updates. How would you design the deployment using StatefulSets, ensuring that the application remains available and data is preserved even when updating the deployment?

Answer:

Explanation:

See the solution below with Step by Step Explanation.

Explanation:

Solution (Step by Step) :

1). Create a PersistentVolumeClaim

- Define a PersistentVolumeClaim (PVC) to request the necessary storage space for the application's data. This ensures persistent storage is provisioned for each pod.

```

apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: webapp-pvc
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 1Gi

```



2. Define a StatefulSet: - Create a StatefulSet that defines the deployment configuration. Ensure that the following configurations are included: - 'serviceName': Define a service name for the StatefulSet. - 'replicas': Define the number of replicas (pods) required for the application. - 'volumeClaimTemplates': Include the previously defined PVC to ensure each pod is assigned persistent storage. - 'template-spec-containers. volumeMounts': Mount the volume from the PVC at the desired location within the container. - 'podManagementPolicy': Parallels: Configure the podManagementPolicy to allow parallel pod updates during rolling updates, maintaining application availability.

```

apiVersion: apps/v1
kind: StatefulSet
metadata:
  name: webapp-statefulset
spec:
  serviceName: webapp-service
  replicas: 3
  selector:
    matchLabels:
      app: webapp
  template:
    metadata:
      labels:
        app: webapp
    spec:
      containers:
        - name: webapp
          image: example/webapp:latest
          ports:
            - containerPort: 8080
          volumeMounts:
            - name: webapp-data
              mountPath: /data
          volumes:
            - name: webapp-data
              persistentVolumeClaim:
                claimName: webapp-pvc
      updateStrategy:
        type: RollingUpdate
        rollingUpdate:
          partition: 0
      podManagementPolicy: Parallel

```

3. Create the Service. - Create a service that exposes the application to the outside world Use the 'ClusterIP' service type for internal access within the Kubernetes cluster.

```

apiVersion: v1
kind: Service
metadata:
  name: webapp-service
spec:
  selector:
    app: webapp
  ports:
    - port: 80
      targetPort: 8080
  type: ClusterIP

```

4. Apply the Configuration: - Apply the StatefulSet, PVC, and service configurations using 'kubectl apply -f' to deploy the application on Kubernetes. 5. Verify the Deployment: - Use 'kubectl get statefulsets webapp-statefulset' and 'kubectl get pods -l app=webapp' to verify that the StatefulSet has been deployed successfully and the pods are running with the correct configurations. 6. Test Rolling Updates: - Push a new image to the 'example/webapp:latest' Docker Hub repository. The StatefulSet will automatically initiate a rolling update. Monitor the pods using 'kubectl get pods -l app=webapp' to observe the update process. You should see that pods are updated one at a time, ensuring that the application remains available throughout the update. Important Notes: - StatefulSets are ideal for applications that require persistent storage, unique identifiers, and ordered deployments, making them suitable for highly available web applications. - The 'podManagementPolicy: Parallel' setting ensures that the application remains available even when pods are updated. - Always define a 'partition' in the 'rollingUpdate' strategy to ensure that all pods are

part of the update. - Consider using liveness probes and readiness probes Within your application containers for health checks to ensure the application is healthy during the rolling update process. - For external access, you can use a LoadBalancer service type in the service definition.,

NEW QUESTION # 35

You have a Deployment running a web application built With a Node.js container. The application currently uses an older version of the Node.js runtime, and you need to upgrade to a newer version Describe the steps involved in modifying the container image to include the new Node.js runtime without rebuilding the entire application.

Answer:

Explanation:

See the solution below with Step by Step Explanation.

Explanation:

Solution (Step by Step) :

1. Create a Dockerfile:

- Create a new 'Dockerfile' With the following content

```
FROM node:16-alpine # Use the desired Node.js version
COPY --from=existing-image:latest /app /app
WORKDIR /app
CMD ["npm", "start"]
```

- Replace With the name of the existing Docker image used by your Deployment. - This Dockerfile uses a multi-stage build approach. It starts with a new Node.js base image and copies the application code from the existing image. This allows you to update the runtime without rebuilding the entire application. 2. Build the New Image: - Build the image using the Dockerfile: `docker build -t updated-image:latest` 3. Update the Deployment - Modify your Deployment YAML file to use the newly built image:

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-node-app
spec:
  replicas: 3
  selector:
    matchLabels:
      app: my-node-app
  template:
    metadata:
      labels:
        app: my-node-app
    spec:
      containers:
        - name: my-node-app
          image: updated-image:latest # Use the new image name
          ports:
            - containerPort: 8080
          restartPolicy: Always
```

4. Apply the Changes: - Apply the updated Deployment using `kubectl apply -f deployment.yaml`. This will trigger a rolling update to the pods using the new image. 5. Verify the Update: - Check the logs of the pods using `kubectl logs -f`. You should see the application running with the updated Node.js version. 6. Test the Application: - Access your application and ensure it functions correctly with the new Node.js runtime.

NEW QUESTION # 36

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